

Sustainable Energy Action Plan



Executive Summary

September 2010



Introduction

This Sustainable Energy Action Plan (SEAP) report has been developed by Manchester: Knowledge Capital and Arup¹ to provide evidence to inform and help shape energy priorities in Greater Manchester (GM). GM covers the areas of ten Local Authorities (LAs), who together comprise the Association of Greater Manchester Authorities (AGMA). The process involved in developing a SEAP is designed to be iterative, with revised SEAP reports developed over time. This is the first SEAP for GM, providing a vital contribution towards a sustainable energy system for GM.

Action on energy is required to deliver the following three elements of the GM Strategy vision:

- **Greener City Region (Reducing CO₂ emissions by 30-40%):** 98% of our CO₂ emissions come from the burning of fossil fuels to meet our energy needs. Therefore, action to meet CO₂ reduction targets is action on energy.
- **Sustainable Economic Growth:** Energy is required for almost any business activity and businesses require a secure, affordable supply of energy to remain competitive;
- **Prosperity is enjoyed by the many and not the few:** There is a need to minimise fuel poverty and ensure that GM residents have an affordable source of energy to deliver equitable prosperity.

Interventions that work to achieve a reduction in CO₂ emissions will have a significant impact on the other two goals. In the long-term the price of energy generated by burning fossil fuels is likely to increase as a result of peak oil², peak gas and national and international measures to discourage CO₂ intensive energy (e.g. Carbon Reduction Commitment Energy Efficiency Scheme). Short term priority actions have been identified that can assist in improving competitiveness in GM and alleviate fuel poverty.

This SEAP focuses particularly on achieving CO₂ emission reductions. However, the implications of actions on economic growth have been taken into account in the development and prioritisation of actions. Ideally, the focus should be on those actions that produce 'win-win' situations, delivering CO₂ emission reductions and equitable economic growth. Securing funding and finance for actions will be one of the first priorities, particularly in the context of potentially changing national Government funding initiatives. Ensuring that GM captures funding and finance available from international, national and local sources will assist in delivery of actions and capturing benefits for GM.

Due to the timescales involved in producing this SEAP, no projections have been made for an increase in emissions due to population growth and/or economic growth³. This should be explored in the next SEAP iteration.

The methodology used to develop this SEAP has been informed by experience from elsewhere in Europe and with referral to the SEAP Guidelines produced by the Joint Research Centre⁴. This Executive Summary is structured around four key questions:

- 1) **Where are we now?** Where do GM's CO₂ emissions come from?
- 2) **Where do we want to be?** How much do we need to reduce CO₂ emissions by?
- 3) **How could we get there?** What are the actions GM could undertake to reduce CO₂ emissions?
- 4) **What should GM do now?** What should GM's priority actions be?

¹ The report has also been developed with the kind advice and input from a large number of stakeholders..

² Peak oil is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline

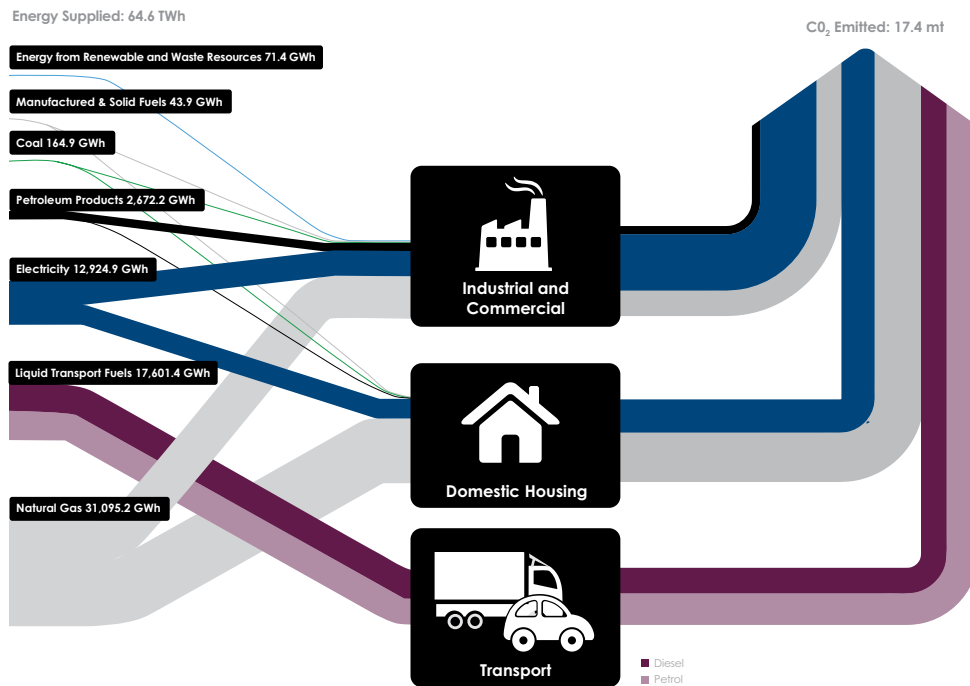
³ Although at a global scale there is a correlation between economic growth and CO₂ emissions, it is difficult to prove that economic growth in GM would cause a corresponding increase in CO₂ emissions post 2010 and the team were not able to locate robust evidence to base an assumption on in the timescales of this SEAP report.

⁴ The Joint Research Centre comprises the Institute for Energy (IE) and Institute for Environment and Sustainability (IES) of the European Commission. The SEAP Guidelines have been elaborated by the JRC, in collaboration with the Energy and Transport Directorate General (DG TREN) of the European Commission, the Covenant of Mayors' Office, and with the support and input of many experts from municipalities, regional authorities, other agencies or private companies.

Section 1

Where we are now: Where do GM's CO₂ emissions come from?

The diagram in Figure 1 shows the fuels supplied to the transport, domestic, commercial/ services and industrial sectors. Data from 2005 is used here because that is the 'baseline' year⁵ used in the SEAP. Figure 1 shows that in 2005, 36% of GM's CO₂ emissions were generated through the consumption of electricity, 33% through the consumption of gas and 25% through use of petrol and diesel road transport fuel. Figure 2 shows GM's CO₂ emissions by sector.



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

Figure 1: GM's Energy Supply and CO₂ Emissions in 2005

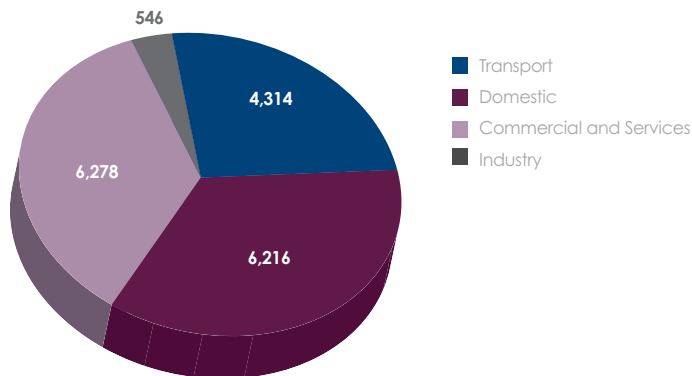


Figure 2: GM's CO₂ Emissions by Sector

⁵ The 'baseline year' is the year against which we measure progress towards targets, for example, the GM Strategy seeks to achieve a 30-40% reduction in emissions compared to the baseline year of 2005, so we need to understand emissions in 2005 to measure progress towards this target. Data from subsequent years is also described in the SEAP report.

Section 2

Where do we want to be: How much do we need to reduce CO₂ emissions by?

The UK Climate Change Act requires that the UK reduces its 'greenhouse gas emissions' by 80%, compared to a baseline year of 1990, by 2050, with interim budgets aiming for a 34% reduction by 2020. In line with sub-regional and local approaches, the SEAP focuses on CO₂ and uses a baseline year of 2005. The SEAP also assumes that national and international measures suggested by Committee on Climate Change achieve no increase (or decrease) in aviation and shipping emissions by 2050, and a 70% reduction is achieved in non-CO₂ greenhouse gases.

When all these factors are taken into account, the SEAP suggests that, as a minimum, the CO₂ reduction targets for GM⁶ should be:

- 34% by 2020; and
- 88% by 2050.

Similar targets have already been set at the sub-regional and local level. However, these targets use different baseline years, target years and assumptions in calculations. The lack of a common approach means that it is difficult to assess whether local targets will meet the sub-regional target suggested above and can be a barrier to understanding GM's emissions and sharing information. Significant progress has been made towards a consistent approach through studies such as the Decentralised Energy Study⁸ and this should be commended and continued as we move towards a low carbon GM.

⁶ Compared to a 2005 baseline.

⁷ Namely: In the GM Strategy; as part of National Indicator 186 (7 Local Authorities); as part of a Core Strategy (Bolton); and as part of a Climate Change Action Plan (Manchester).

⁸ Urbed, Aecom and Quantum Strategy and Technology, 2009, 'Decentralised and Zero Carbon Energy Planning'.

Section 3

How could we get there: What are the actions GM could undertake to reduce CO₂ emissions?

Once we had established the current situation in GM (where we are) and the targets for CO₂ emission reductions (where we want to be), analysis was carried out to identify the interventions that could be undertaken to ensure we meet our targets. Research was carried out using a combination of a literature review, stakeholder engagement and internal analysis to identify what GM could do to reduce CO₂ emissions, and the level of CO₂ reductions that could be achieved. The following steps were completed to carry out this assessment:

- 1) Develop a list of interventions that reduce CO₂ emissions;
- 2) Assess what actions outside GM's control will achieve (e.g. efforts nationally to reduce the carbon emissions from electricity generation); and
- 3) Assess what GM could achieve in addition to reductions identified in stage 2.

List of Interventions

A list of interventions was developed on an iterative basis throughout the process of developing this SEAP with feedback incorporated from a large number of stakeholders.

Actions outside GM's control

When examining actions outside GM's control, the action that will have the largest impact of GM's CO₂ emissions is the decarbonisation of the national grid. Decarbonisation of the grid through development of less CO₂ intensive fossil fuel power stations (e.g. using carbon capture and storage or combined cycle gas turbines), large scale renewable energy (e.g. offshore wind farms) and nuclear power stations will significantly reduce the CO₂ emissions generated from use of electricity. Whilst GM has some influence over the large scale generation of electricity in its own area, the majority of these actions will take place outside GM.

Therefore, this is dealt with as a 'national' action, although actions that could support large-scale renewable and low carbon energy generation in GM

have been considered in the SEAP.

Two scenarios were explored to assess the emission reductions from grid decarbonisation:

- **The DEFRA Market Transformation Programme scenario (MTP):** Which assumes that 16% of our electricity will be from renewable sources by 2020; and
- **Low Carbon Transition Plan scenario (LCTP):** This assumes that 40% of our electricity will be 'low carbon' by 2020.

Figure 3 shows what these two scenarios would mean for CO₂ emissions in GM. Projections were developed to 2050 based on the assumption that the rate of decline in emissions from electricity continues between 2020 and 2050.

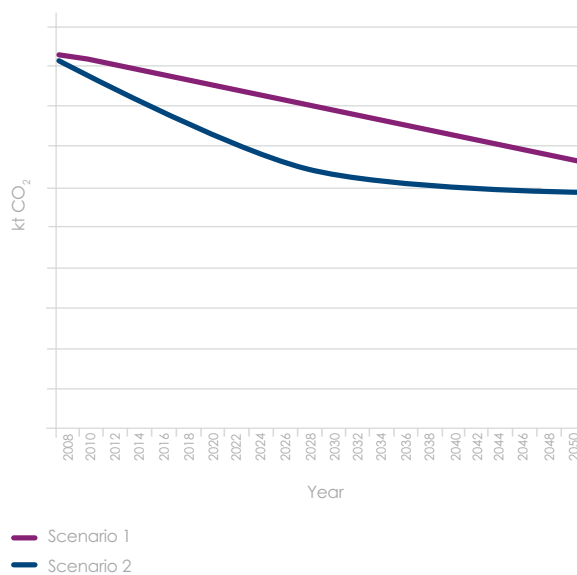


Figure 3: Influence of decarbonisation of the grid on CO₂ emissions in GM

Other national actions are considered in the SEAP and information on how these actions have been considered is provided in the main report.

Actions within GM's control

Analysis was then carried out looking at the impact GM actions could have on CO₂ emission reductions. The potential CO₂ savings for each group of actions have been shown in Figure 4 and Figure 5. As grid decarbonisation will have a large impact on emissions, Figure 4 and Figure 5 show what GM would need to do under the two decarbonisation scenarios. This was the first attempt in GM to place all actions on one baseline to enable consideration of whether actions will be sufficient to meet targets and which actions could have the largest impact on CO₂ emissions.

The scale of the task to achieve these 'potential' savings should not be underestimated. Although theoretically possible to achieve, these actions would require significant, early action from GM to deliver. To illustrate the scale of the task, the table below provides some examples of what would need to be achieved to deliver the theoretical potential savings.

Sector	Component Action (% reduction in GM Emissions by 2020)	What would be needed to deliver this reduction by 2020
Supply: Macro	District heat networks (assuming use of biomass): 2%	Manchester Town Hall Cluster to deliver 14MW of capacity (7 electrical and 7 thermal). Delivery of half of the remaining Manchester City Centre heat network, 3 district heat networks in sub-regional centres and 8 in local centres.
Supply: Micro	Photovoltaics and solar thermal technologies on residential buildings: 1.5%	Assumes that 20% of houses in GM are suitable for these technologies and 50% of those suitable are installed by 2020 (i.e. 10% of houses in GM to have photovoltaics or solar thermal panels installed).
Demand: Residential	Loft insulation in residential buildings: 0.5%	Assumes 8% of homes have no loft insulation and 80% of these are provided with loft insulation by 2020.
Demand: Commercial/ Services	Energy efficient lighting	Assumes that 1.8% of electricity needs in commercial/ service sector buildings can be saved using energy efficient lighting and that 50% of these reductions are achieved.
Demand: Electric cars	Driver efficiency	Assumes 5% of the GM population drive electric cars by 2020.

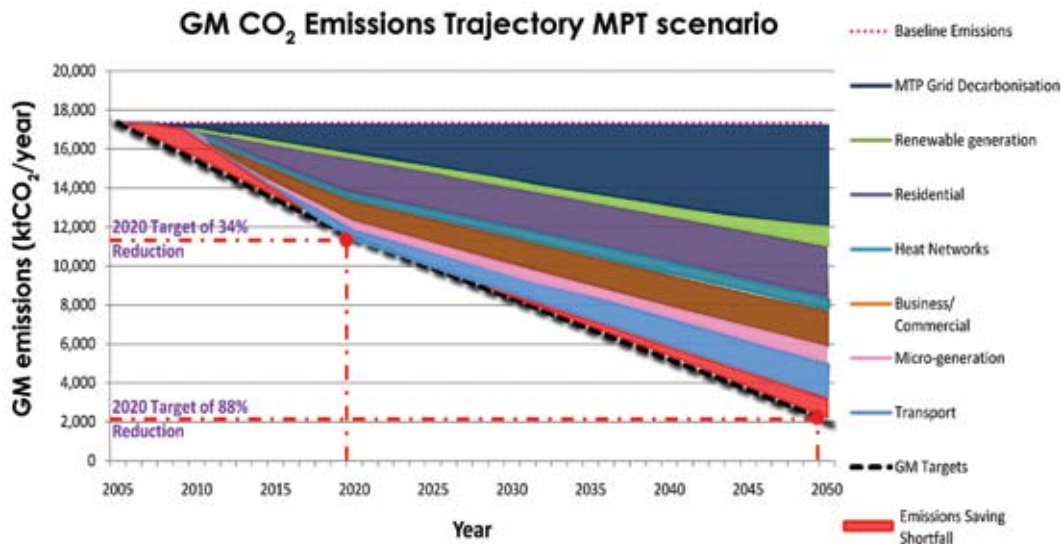


Figure 4: Actions within GM's control and grid decarbonisation under MPT scenario

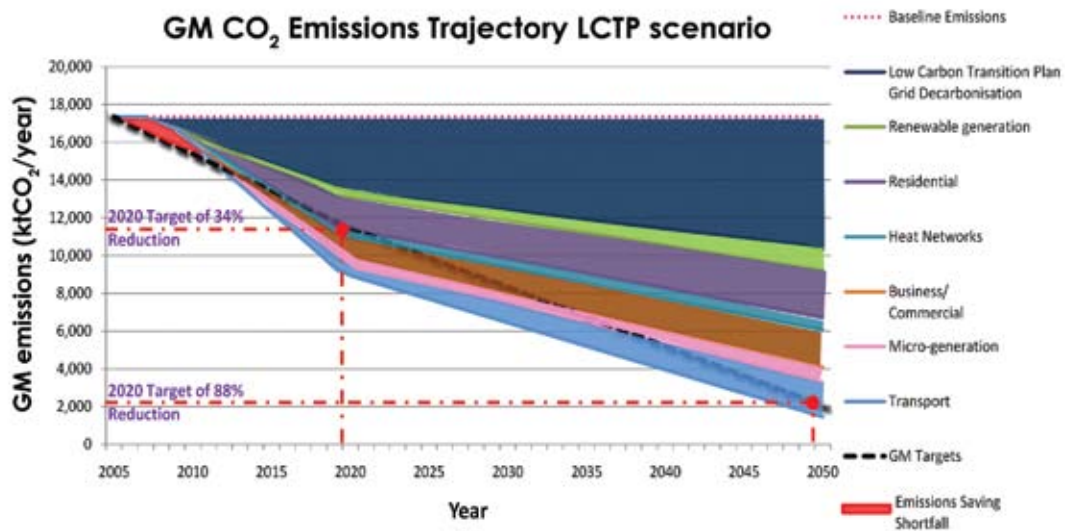


Figure 5: Actions within GM's control and grid decarbonisation under LCTP scenario

Section 4

What should GM do now: What should GM's priority actions be?

The final step was to consider what steps GM should take to implement the actions above. This analysis was also completed in three iterative stages:

- 1) Research what is being done already on each action;
- 2) Develop a set of actions that GM could do to work towards delivering interventions; and
- 3) Develop a list of priority actions taking into account:
 - What GM is able to influence;
 - GM's existing actions and political structures;
 - The actions that will achieve the largest CO₂ savings; and
 - The actions that will be easiest to implement (including a high level consideration of factors such as costs and funding).

What is being done already and what further actions do we need to develop?

This SEAP works to bring together research on what is currently happening to reduce CO₂ emissions in GM. This can aid understanding between stakeholders about what other organisations are doing to facilitate partnership working and information sharing. It is recognised that this is a very fast moving area and the SEAP does not claim to provide a comprehensive record of every stakeholder's actions.

Information of current actions was used alongside all baseline research and stakeholder engagement to develop a set of actions that could work towards delivery of CO₂ emission reductions. The actions explored include:

Primary Action

Actions that will directly reduce CO₂ emissions (e.g. development of a district heat network); and

Enabling Action

Enabling Actions: Actions that are required to support primary actions, but do not in themselves reduce CO₂ emissions (e.g. development of smart grids)

A full list of recommended actions is provided in Appendix A of the main report.

What are the short-term, priority actions for GM?

A set of priority, short-term actions is presented here with suggested actors for delivery. The priority actions have been selected through consideration of a number of factors, including:

- Actions that would deliver the largest CO₂ savings;
- Actions that are considered most viable (i.e. through an understanding of funding and finance available, technologies that could function in GM etc.); and
- Actions that would deliver local economic benefits for GM.

The focus on actions associated with domestic retrofitting and small and medium scale technologies were considered to have particular potential for the creation of employment in GM. Maximising economic benefits of actions for GM should be a priority when developing strategies to implement actions.

The actors are highlighted as suggestions only and it would be a first job of a co-ordinating body to identify the most appropriate actors, and obtain their buy-in to progress the actions. These are recommended as the first actions that GM should pursue. However, to deliver the scale of reductions required to meet GM's targets, it is likely that all actions set out in Appendix A would need to be pursued, and potentially supplemented by additional actions. However, the table overleaf provides a starting point to support the accelerated development of a sustainable energy system for GM.

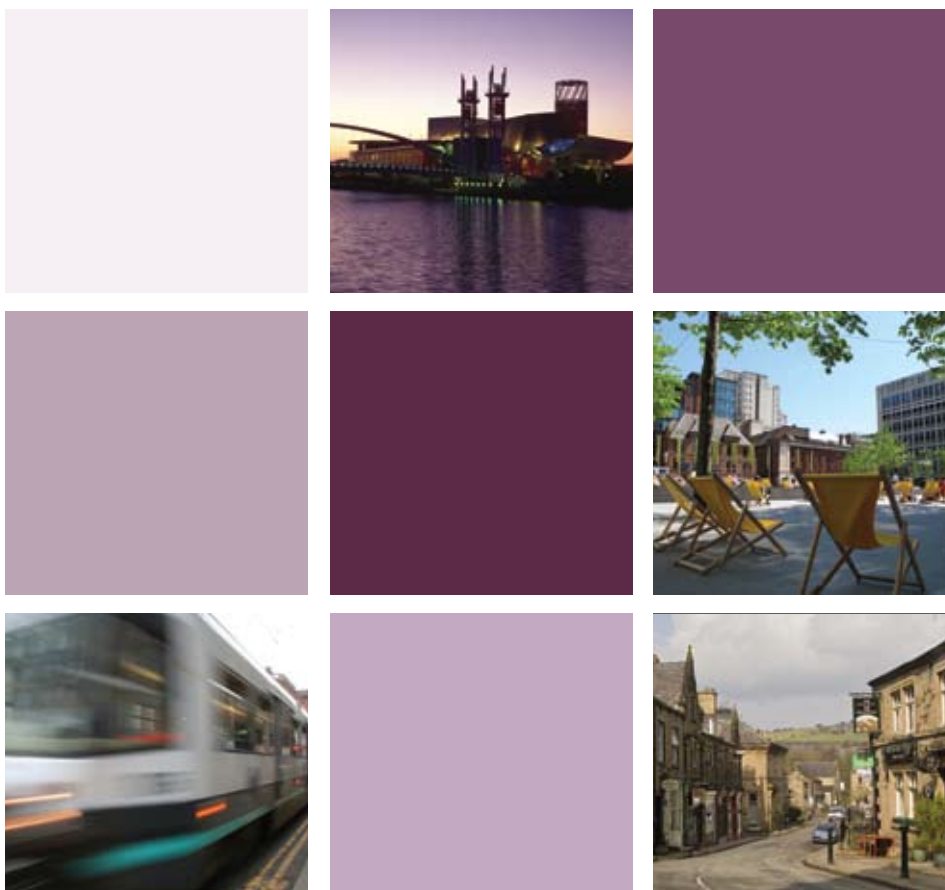
Figure 6: Priority, short-term actions for accelerated development of a Sustainable Energy System for GM¹⁰

Enabling Action	Primary Action	Suggested Lead Organisation	Steps to Facilitate Action	Progress to Date
Develop political and administrative structures to aid delivery of SEAP actions.	Develop an assessment approach to examine how actions can be implemented in a way that maximises the economic benefits of actions for GM.	Co-ordinating body	<ul style="list-style-type: none"> Identify/develop a task and finish group to assist in gaining funding for GM SEAP actions. Identify an actor for each action in the GM SEAP and obtain buy-in. Publish annual SEAP monitoring information. Develop a communication strategy for SEAP information. Explore development of a single funding pot for delivery of SEAP actions and/or more control over future resources for GM with national government. Carry out a mapping exercise of existing expertise in public and private organisations. Develop an assessment approach examining how each action can be carried out in a way that maximises economic growth. 	<p>Establishment of GM Energy Group and the AGMA Commissions.</p> <p>The Joule Centre has completed work mapping energy expertise in GM Universities.</p> <p>Existing research on maximising the opportunities for a low carbon economy in GM (e.g. Mini-Stern for Manchester).</p>
Investigate ways to support renewable and low carbon energy developments that currently have difficulty obtaining planning permission.	Investigate how renewable energy developments can be supported in planning.	Co-ordinating body to identify actors	<ul style="list-style-type: none"> Investigate how renewable energy developments can be supported in planning. Discuss how to speed up application process with national government. Education for communities on pros and cons of technologies. 	<p>Significant body of work completed as part of the DES and LA's evidence base studies.</p> <p>Many LAs have completed projects around community education and engagement.</p>
Develop support mechanisms to enable actors to obtain funding for SEAP actions.	Develop support mechanisms to enable actors to obtain funding for SEAP actions.	LAs (supported by AGMA)	<ul style="list-style-type: none"> Identify/develop a task and finish group to assist in gaining funding for GM SEAP actions. Engage with national government to gain more control over funding for GM. Collate information about existing and future funding streams. Support organisations on funding applications. Utilise existing research to determine whether planning can secure funding for energy actions. 	<p>Existing expertise in gaining funding for GM spread across organisations (e.g. Manchester: Knowledge Capital).</p> <p>DES and LA studies on role planning can have in securing funding for energy projects. M:KC report on ESCos.</p>
Support research and development of Smart Grids in GM.	Support research and development of Smart Grids in GM.	Co-ordinating body	<ul style="list-style-type: none"> Bring together existing and emerging research on Smart Grids in GM. Establish a working group of actors to develop a coherent approach to Smart Grid development and deployment for GM. Support development of a Smart Grid pilot in GM and work programme for implementation. Engage with Electricity North West on benefits and potential locations for Smart Grids. 	<p>Existing research on smart grids in GM.</p> <p>ENW considering bidding for funding for a smart grid pilot in GM.</p>
Support the development of district heat networks in GM where they are viable and would reduce GM's CO ₂ emissions.	Support the development of district heat networks in GM where they are viable and would reduce GM's CO ₂ emissions.	Co-ordinating body to identify delivery actors LAs (with support from Co-ordinating body)	<ul style="list-style-type: none"> Develop a consistent, detailed GM heat map. Define what constitutes an 'opportunity' for a heat network in each LA area. Encourage information sharing on heat networks throughout GM (particularly the Manchester Corridor). Identify potential heat customers for Carrington Power Station and identify additional sources of heat that can meet the heat demand. Utilising information on potential heat suppliers (existing or developed through the GM heat map). 	<p>High level heat mapping has been completed across GM as part of the DES, with more detailed heat mapping completed in some areas through LA studies and project-specific feasibility work (e.g. Manchester Town Hall Cluster).</p>

¹⁰ The actions in the list below are presented in the order they appear in Appendix A and the main SEAP report, and are not in priority order. Primary actions are highlighted in blue, enabling actions in purple.

Priority Action	Suggested Lead Organisation	Steps to Facilitate Action	Progress to Date
Support development of Energy from Waste (EFW) plants to generate electricity and heat in commercial, service and industrial sectors	Co-ordinating body to identify delivery actors	<ul style="list-style-type: none"> Identify priority EFW projects in GM. Engage with waste professionals to agree a strategy to bring forward priority projects. Ensure when EFW plants are specified, they need to consider opportunities for heat networks. 	Research has been completed on EFW plant potential in GM.
Promote funding and finance benefits of micro-generation.	LCEA (and other actors dealing with businesses and residents in GM)	<ul style="list-style-type: none"> Promotion of Feed-in-Tariffs (FITs) and the Renewable Heat Incentive (RHI). Provision of clear information about the financial costs and benefits of micro-generation schemes. Consider conducting research on the impact of micro-generation on house re-sale prices. 	Some LAs are considering / have developed micro-generation areas and are publicising RHI and FITs in these areas.
Encourage development of local supply chains for micro-generation technologies.	Envirolink/Enworks	<ul style="list-style-type: none"> Partnership between Envirolink Northwest and Enworks to promote lists of businesses. Consider development of a resource to help people locate a supplier and installer of micro-generation technologies. 	Envirolink and Enworks are carrying out various actions to support local businesses that could supply and install micro-generation technologies.
Develop and implement area based micro-generation schemes in three areas of GM.	LAs and/or LCEA	<ul style="list-style-type: none"> Identify gaps in current supply chains and determine a way to address issues. Identify three areas that might be suitable for micro-generation technologies. Review the types of technologies that could be used in that area and ensure there are suppliers who could meet the demand. Develop a communication strategy to promote micro-generation in identified areas. Develop partnership mechanisms for delivering the scheme. 	Existing work through the DES and subsequent LA studies.
Engage and build partnerships with transport stakeholders in GM	Co-ordinating body to identify delivery actor	<ul style="list-style-type: none"> Engaging and building partnerships with transport stakeholders in GM to develop a CO₂ reduction strategy for transport. 	AGMA Transport Commission and partnership building through organisations such as the GM Energy Group.
Encourage and support use of electric, hybrid and ultra-low emission vehicles.	Co-ordinating body to identify delivery actor	<ul style="list-style-type: none"> Submission of a successful Plugged-in Places bid. Learn from experience in other areas to understand the most effective ways to implement charging infrastructure. Encourage integration of charging points into key locations around GM. Consider GM planning requirements for charging points in new developments. Engage with ENW to discuss the relationship between the existing grid and a potential future changes to electricity demand. 	Previous Plugged-in-Places bid. GM actions to purchase and integrate hybrid bus services.
Comprehensive roll-out of programme to retrofit domestic buildings with technical solutions that will reduce heat and electricity demand.	LCEA	<ul style="list-style-type: none"> Development of a business plan as part of the LCEA programme. Establishment of a funding and financing model for delivery of LCEA programme. Development of supply chains for materials to implement LCEA programme. Delivery of the support packages for property owners. Programme to promote the package across GM. Set whole house standards as part of consents for building modifications. Incorporate measures to evaluate the success of LCEA interventions in reducing CO₂ emissions in GM. Consider whether residents can also be targeted with information about sustainable transport choices alongside residential actions. 	Consideration of planning requirements for charging points in GM and LA studies. LCEA programme is being developed at the moment and should lead on taking forward these actions.

Priority Action	Suggested Lead Organisation	Steps to Facilitate Action	Progress to Date
<p>Education and information sharing on retrofitting commercial and service buildings with measures to reduce CO₂ emissions.</p>	<p>Co-ordinating body</p>	<ul style="list-style-type: none"> Identify best practice commercial retrofitting projects in and around GM. Organise education workshops on commercial and public sector retrofitting. Map expertise and networks in GM. Supporting Envirolink's groups and providing them with contacts for further information or advice. 	<p>Some business and service sector organisations have been completing retrofits in GM.</p> <p>Joule Centre and Salford University have completed research on existing expertise in GM.</p>
<p>Actions on funding and finance to include supporting commercial and public sector retrofitting projects.</p>	<p>Co-ordinating body</p>	<ul style="list-style-type: none"> Addressed through the general funding actions, but with an emphasis on addressing particular concerns of this sector. Develop a database of information on funding for the commercial sector (e.g. CO₂ savings per £ for triple glazing) to support interventions. 	<p>Envirolink has set up small groups on specific issues such as LED lighting and smart meters.</p> <p>Organisations have obtained funding for a large number of small schemes.</p>
<p>Identify industry partners who may be able to provide heat for district heat networks.</p>	<p>Co-ordinating body to identify delivery actor</p>	<ul style="list-style-type: none"> Build on existing data on potential heat suppliers developer through the DES and subsequent work on heat networks in GM. 	



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