

9. Bringing it all together

In this section we set out the high level conclusions and recommendations of this study, brought together under the following six themes:

- The long view: Inspiration and lessons from the past in seeking to respond to the challenges that lie ahead;
- A model for zero carbon growth: Developing a new model to complement the City Region's aims to build a low carbon economy;
- The role of spatial planning at different levels: How energy planning could work at different spatial levels across the City Region;
- An energy planning framework for areas of change: How energy planning could work to meet targets and co-ordinate investment in areas of change;
- Creating a viable way forward: New mechanisms to reduce the upfront cost of meeting higher targets and offset them with third party investment;
- Capacity building for change: Addressing the need to build the knowledge and skills base in order to support the scale and pace of change required.

A vision for a City Region energy spatial plan is then outlined as a way forward in the final section 10.

9.1 The long view

If we look back at the growth and development of the City Region and its economy over the last two centuries we can find both inspiration and lessons in seeking to respond to the challenges that lie ahead.

In the 19th Century the City Region led the way in developing the country's first gas and electricity networks. With the 21st Century challenge of growing the City Region's economy, new low carbon infrastructure will be required, on a scale that will need to match the ambitions and achievements of those early gas and electricity pioneers.

The enterprising approach taken by these early pioneers – in both the public and private sector – sustained the industrial revolution and supported the growth of the sub-regions towns and cities. Exponential growth in demand for energy required new forms of public and private enterprise to co-ordinate infrastructure investment, drawing on leading engineering expertise from other pioneering cities.

Strategic recommendations

- Both public and private investment vehicles should be considered, drawing on inspiration from the early gas and electricity pioneers;
 - Growth in demand for energy should be planned for, so that infrastructure can be provided in the most efficient way rather than incrementally;
 - Draw upon experience and knowledge from pioneering EU cities in the field of low and zero carbon infrastructure.
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9.2 A model for zero carbon growth?

With City Region status and commitment to the 'accelerated growth' scenario a new model is required that complements high level aims to build a low carbon economy by seeking to decouple growth, CO₂ emissions and fossil fuel prices.

Whilst City Region status seeks to build on Manchester's competitive advantages as a location for investment, this could have the effect of further increasing CO₂ emissions at a time when there is increasing pressure to demonstrate that CO₂ emissions are on a downward trajectory. Furthermore, future competitiveness may also be dependant on being able to reduce exposure to rising energy and carbon prices.

The North West RSS and the Growth Point programme promote a concentration of development around sub-regional centres, regeneration areas and strategic sites. With the economic downturn likely to delay further major investment until at least 2011/12 the imperative to ensure that future growth does not

contribute to a further rise in the City Region's CO₂ emissions, and that the investment required to mitigate these emissions is achievable within commercial constraints, will be even greater.

What is therefore needed is a model for low, or even zero, carbon growth. The mini-Stern highlighted the need to use 'smart' planning to support investment in energy infrastructure to support this aim, and to reduce exposure to the future price of fossil fuels and carbon. In order to translate this message into action on the ground the City Region will need to put in place an energy planning framework that can respond accordingly.

The PPS1 supplement on Planning and Climate Change defines the role of planning in seeking to support this objective. However, our analysis suggests that the City Region will need to go further by seeking to overcome specific future constraints on growth:

- Without planned infrastructure investment, beyond 2013, domestic developments will be constrained in meeting regulatory targets within the 'site edged red' of development;
- Commercial developments will face similar constraints beyond 2016 and 2019 as new regulatory targets are brought in which work towards zero carbon;
- Achievement of CO₂ reduction from the existing building stock will also face constraints, which in turn may constrain districts ability to respond to National Indicators 185 and 186.

To illustrate the scale of the challenge the City Region will be expected to deliver, based on current regulatory milestones, at least 58,604 units that achieve Code for Sustainable Homes level 6 (zero carbon for all energy use) between 2013 and 2021.

Our analysis has shown that the opportunities exist to overcome the constraints, but that they are not always readily achievable on a site-by-site or elemental cost basis. Instead a co-ordinated approach to infrastructure investment is required, designed to anticipate and plan for the City Region's response to future targets and milestones. This approach would enable greater CO₂ reductions to be realised earlier, and at lower cost.

Strategic recommendations

- The City Region requires an energy planning framework to ensure that growth, carbon emissions and fossil fuel prices are decoupled;
 - Infrastructure planning is required to overcome specific future constraints in seeking to meet minimum regulatory carbon reduction targets;
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9.3 The role of spatial planning at different levels

In order to make progress planning will be required at different spatial levels across the City Region, reflecting the range of opportunities for new energy infrastructure, and the roles and responsibilities of different stakeholders.

This study has highlighted the need for co-ordinated spatial energy planning at regional, sub-regional and district scales. It is proposed that this is co-ordinated by an overall spatial energy plan for the City Region – harnessing the potential of new and existing governance structures and aligning activities with appropriate partners to support infrastructure investment. An overall vision for the proposed energy spatial plan is described in section 10.

9.3.1 Regional scale: North West RSS

Strategic renewable energy projects with a regional significance should be taken forward at this scale. This is because the regions major on and offshore wind resources, amongst other opportunities, will be required to supply the major economic centres, including Manchester City Region.

The North West RSS looks to sub-regional strategies to guide the deployment of low and zero carbon energy supply technologies as they relate to these centres and their surrounding resources. It also highlights the need for a strategic approach to the use of the region's remaining natural gas resources. It is likely that sub-regional targets set out in the RSS will require revision following publication of the UK's new Renewable Energy Strategy.

9.3.2 City Regional scale: Cross boundary energy planning

Strategic renewable energy projects and low carbon power generation projects that require working across district boundaries should be taken forward by jointly developed policies at this scale. This is because the sub-regions major economic centres have the greatest energy demand, but face distinct constraints in seeking to deliver higher CO₂ reductions.

'Allowable' solutions will be required to mitigate carbon emissions from the major urban centres. Heat off-take from Carrington Power Station represents the most significant opportunity and would require joint planning by three districts. Wind energy represents the next most significant opportunity. Bringing forward new wind capacity would require the identification of sites across the City Region (see below). Other activities at this level could include co-ordination of biofuel supply chains.

9.3.3 District scale: Core Strategies and Character areas

The high level approach promoted by the spatial plan will need to be incorporated into Core Strategies in order to provide an interim statutory basis. The spatial plan could initially have the status of a statement

of intent supported by each district, and reflected in their Core Strategies, before then being translated into a City Region energy DPD that would be jointly adopted.

The Core Strategy would incorporate strategic opportunities identified in the City Region plan, as well as highlighting the distinct opportunities and resources to be found in each district. The specifics of infrastructure investment in each district would be guided by the preparation of energy proposals plans for distinct 'character areas' of change across each District, which should also be identified in the Core Strategy. The methodology for preparing energy proposals plans is discussed in Section 9.4.

Strategic recommendations

- A spatial energy plan should be developed for the City Region, working at a number of different levels, and identifying strategic projects to be taken forward;
 - The high level objectives of the plan, including strategic projects and identification of character areas, should be incorporated into Core Strategies;
 - The City Region spatial energy plan should form the basis for an adoptable DPD supported by an SPD to ensure consistent energy plan preparation;
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9.4 An energy planning framework for areas of change

With the Government having set the scene for low and zero carbon energy planning, a consistent spatial approach is now required in order to deliver carbon reduction targets and co-ordinate investment in areas of change.

This study has combined a 'top down' scoping of opportunities and constraints across the City Region with 'bottom up' case studies of development in order to explore the potential for spatial energy planning at a number of different scales. An overview of the 'top down' opportunities for low or zero carbon energy infrastructures was presented in Table 6.3.

More importantly this combined approach has also allowed a range of planning and enabling mechanisms to be identified, including development of a broad methodology for preparing energy proposals plans, and the setting of associated targets and planning requirements. Below we describe how the key elements of how this could work in practice.

9.4.1 Energy proposals plans

Energy proposal plans are proposed as the overarching approach to low/zero carbon infrastructure planning. The case studies have demonstrated the potential of this approach to create a clear spatial planning framework. This framework can be used to co-ordinate investment and regulate the cost of low/zero carbon infrastructure.

Proposals plans would consist of area or site-specific proposals for low and zero carbon infrastructure, drawing upon the evidence base for area or site specific opportunities. These opportunities could relate to the scale, form and mix of uses associated with the development, and more importantly, the availability of distinct local energy resources, including renewable energy and waste heat.

Following the generic methodology outlined in Box 2, energy proposal plans would be drawn up at different scales, reflecting distinct 'character areas' of change – AAP's, RSS focus areas for development, area frameworks, regeneration areas or masterplans. In order to take forward this approach each district would need to schedule the preparation of energy plans for all major areas of change and strategic development sites.

Box 2

Energy proposals plan methodology

This study has developed a basic methodology which could be utilised by districts for preparing energy proposals plans, the aim of which would be to achieve greater CO₂ reductions at lower unit cost:

- Development profile: Bring together assumptions relating to phasing, floor areas, units and mix of uses associated with new development;
- Carbon budget projections: Utilise the development profile data to produce a simplified projection of the developments energy demand profile and CO₂ emissions;
- Existing infrastructure: Assessment of the opportunities and constraints created by existing energy networks in the local area, including gas, electricity and district heating, and the potential for innovative solutions;
- Identify resources and assets: Identification and assessment of the scale and potential of local and district low and zero carbon energy resources and assets;
- Identify heat loads: Mapping of public and private buildings with sufficient proximity and heated floor area – ‘least cost’ opportunities;

The evidence base created by bringing together these layers of information can then be used to develop an overall strategy, which can in turn be used to set carbon reduction targets and establish associated requirements.

9.4.2 Supporting planning mechanisms

The evidence base provided by the 12 case studies suggests that each proposals plan will need to be supported by a suite of planning mechanisms, provision for which would need to be incorporated into Core Strategy policies:

- Carbon budget statements: Developers would be required to submit a projected carbon budget as evidence of how they will meet planning and regulatory requirements;
- Carbon reduction targets: Targets would be set that require reductions in regulated and unregulated carbon emissions projected in a developments carbon budget. The targets would be selected by using the proposed target setting framework (see section 7.3);
- Network connection requirements: Planning policy provision to require developers to connect buildings (and power generation), or to future proof their connection, to existing or planned district heating networks, with associated connection charges (an infrastructure contribution) required under the provision of Section 106 or CIL;
- Allowable solution contributions: Provision, potentially using planning obligations, to collect infrastructure contributions from developers in order to underwrite investment in a number of off-site ‘allowable’ solutions, to include wind power, district heating and micro-generation investments;

In addition a number of broader mechanisms are likely to be required in relation to the siting of specific forms of energy generation:

- Power station conditions: Conditions should be placed on all small power stations consented by the ten districts that they are designed and located in such a way that any waste heat can be cost effectively utilised;
- Infrastructure allocations and safeguards: Provision to allocate and/or safeguard existing low carbon infrastructure - such as district heating networks - and sites - such as for energy centres, biomass transport and pipeline routes - in order to support planning objectives. Local Development Orders could be used to streamline and permit the development of larger district heating networks;
- Air quality standards: Agreement of acceptable levels of NO_x and particulate emissions from CHP and biomass plant located within urban areas based upon a consideration of cumulative emissions;
- Greenbelt site allocations: Wind turbines may need to be located within the greenbelt, informed by consistent policies and criteria taking into account landscape character and cumulative impacts;

9.4.3 Target setting framework

A flexible target framework is proposed as a firm basis for planning policies requiring investment in low or zero carbon infrastructures. The framework incorporates minimum and maximum targets. The maximum target would be adjusted for a district, area or site based on the costs of appropriate solutions.

Three broad categories of target are proposed, selected by answering a simple set of questions – see Box 1 in Section 7 with reference to targets in Tables 7.5 and 7.6. These targets future proof the potential to set area and site-specific targets supported by further local evidence, including costings. It is proposed that the targets apply to all domestic applications – in-line with the Code for Sustainable Homes – and non-domestic buildings with a floor space greater than 1,000 m² – reflecting RSS policy EM18 and EU Directive 2002/91/EC.

The proposed targets use 10% as set out in RSS policy EM18 as a minimum over and above the Building Regulations. They have been designed to reflect the higher emissions from some forms of development and the strategic opportunities for lower cost emissions reductions. The overarching justifications for this approach are as follows:

Strategic justifications

- Unconstrained economic growth across the City Region creates the risk of further increases in carbon emissions;
- Where opportunities to plan for low/zero carbon infrastructure exist greater carbon emissions reductions can be achieved at a lower cost;

- In order to position itself as a low carbon economy the City Region will need to support this aspiration by:
 - Reducing its exposure to rising fossil fuel and carbon prices;
 - Creating certainty for investors in low/zero carbon infrastructure;

Technical justifications

- The RSS target does not necessarily reflect the minimum deployment of technology required for all building types to meet upcoming regulatory requirements and develop the market for low/zero carbon technologies;
- Targets should therefore be framed in terms of CO₂ reduction, so that the contribution of technologies towards meeting regulatory milestones can be clearly understood,
- Unregulated emissions should be targeted in order to manage overall carbon emissions from development;
- Unregulated emissions should be subject to interim reductions ahead of the zero carbon milestones;

This study has demonstrated that unregulated carbon emissions account for a significant proportion of emissions from new development. These emissions will not be regulated until 2016 and 2019, at which point there will be a zero carbon requirements. The higher 'maximum' targets within the target framework are, for the most part, linked to off-site contributions. This means that any associated carbon reductions would need to be assigned to the unregulated emissions from buildings or developments.

Strategic recommendations

- Energy proposal plans should form the overarching approach to low/zero carbon infrastructure planning, informed by the provisions required to secure investment;
 - Proposals plans, together with their supporting evidence base, should form the basis for the assignment of targets and requirements for carbon reduction;
 - Provision for a number of planning mechanisms is required to support this approach, including: carbon budget statements, carbon reduction targets, district heating network connection requirements and allowable solution contributions;
 - Targets for carbon reduction should go further than the 10% RSS target, and should specifically address both 'regulated' and 'unregulated' carbon emissions;
 - The districts should adopt a flexible target framework, providing scope to set higher targets based on the availability of cost effective solutions.
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9.5 Creating a viable way forward

Whilst the technologies attract the most attention, the scale of the investment required to implement them is likely to present the most significant challenge in seeking to realise the benefits for the City Region.

This study has highlighted a requirement for significant investment in new infrastructure in order to meet carbon reduction targets. Some of this cost will need to be absorbed by the developers and landowners, but in order to meet higher levels of carbon reduction new mechanisms will be needed to offset the costs. This study has identified four potential mechanisms to support investment:

- Economies of scale through the use of offsite ‘allowable solutions’, linked to developer contributions;
- Public sector commitment in order to underwrite investment by providing anchor energy loads for projects;
- Gearing of third party investment by ‘energy services companies’ and specialist investors in order to reduce the upfront capital costs for developers;
- Innovative approaches to electricity network connections in order manage costs and share the benefits.

Together these four mechanisms create the potential to manage the cost of carbon reduction to the benefit of the City Region. The overall message is that each energy proposal plan is likely to require a corresponding business plan to co-ordinate infrastructure investment.

9.5.1 Funding ‘allowable’ solutions

A novel tariff system, linked to the price of carbon mitigation, could be used to direct developer contributions towards different forms of ‘allowable’ infrastructure – including wind farms, district heating networks and micro-generation installations. Each energy proposals plan will need an associated business plan in order to calculate contributions. Banded contributions could be used to fund projects, drawing upon:

- Existing provisions under Section 106 to require upfront contributions to district heating connections and offsite micro-generation projects;
- Future provisions under the CIL (or other mechanism) to require contributions to sub-regional allowable infrastructure and, to a lesser extent, innovative technology pilots.

The latter could also create a funding stream to pilot future technologies highlighted as being important to the City Region.

9.5.2 Public sector commitment to provide certainty

Each district will need to take a pro-active role in securitising and underwriting project finance in order to provide certainty. Public sector covenant strength can play a significant role in underwriting investment, as well providing access to a greater proportion of debt finance and lower cost finance.

Public sector investment in buildings should be aligned with energy planning objectives, with a focus in energy proposals plans on their potential role as anchor loads for projects – including Council offices, Decent Homes programmes, leisure and education sites, and other public services. For example, certainty can be provided by signing up to medium term energy supply contracts.

9.5.3 Third party investment in energy services

In order to simplify the process of attracting third party investment in infrastructure such as CHP and district heating, an arrangement will be needed that can be rolled out on a consistent basis across the City Region. This study proposes the establishment of a framework for investment in energy services by Energy Service Companies (ESCO) and specialist investors. The overall benefits would be to:

- Provide access to third party finance for infrastructure;
- Enable tariffs and contributions to be calculated;
- Ensure that developers can fulfil planning requirements;
- Provide a generic approach to the licensing of opportunities.

Having a framework in place would address two key issues, reflecting the practical implications of attracting and co-ordinating investment:

- Procurement: ESCo type arrangements are likely to be needed to invest in the new infrastructure required. There are two potential routes that could be taken, neither of which are mutually exclusive:
 - Preferred partners: ESCo partners could be sought from the private sector. A number of trusted partners could be identified and given preferred supplier status;
 - City Region ESCo: The limitations of current ESCo business models suggests there could be benefit in establishing a City Region ESCo, directly involving the districts and, potentially, other public and private stakeholders;
- Licensing: The lack of a clear regulatory framework for monopoly supplies such as district heating suggests that an off-the-shelf ‘market access and licensing’ arrangement may be warranted in order to give districts and developers some control over how new networks are run. These might include:
 - Time limiting private sector partners ability to provide a monopoly supply in order to promote competition.

- Specifying accountability structures for energy consumers, as demonstrated in the Danish district heating sector;

A framework agreement could be negotiated with each district that would set out the basis for providing engineering and business planning services, the procurement of which could be co-ordinated at City Region level.

9.5.4 Innovative approaches to network connections

This study has identified that the financial and technical constraints to the connection of low and zero carbon electricity generation to existing network exist. The extent of these constraints varies across the City Region, and in some cases is highly dependant on local conditions of the network.

Discussions with Electricity North West suggest that there is significant potential, if they are engaged early on in the strategic planning process, to accommodate new capacity and connections using innovative technical solutions, and based on an acceptable apportionment of cost.

This is particularly the case where decentralised or micro-generation has the potential to bring mutual benefits to both developers and the network operator – for example, through integrating substations and new generators, or by implementing demand-side management. This approach could only work if there was a co-ordinated approach to the design and management of new and existing networks.

Strategic recommendations

- Developer contributions to offsite ‘allowable solutions’ should be used to invest in strategic infrastructure projects;
 - A fund, or series of funds, should be setup by the City Region to pool and harness developer contributions;
 - Public sector commitment should be used to underwrite investment by providing anchor energy loads for projects;
 - A framework for providing energy services should be established by the City Region in order to ensure districts have access to delivery mechanisms;
 - A co-operation agreement should be drawn up with the electricity network operator in order to manage costs and share the benefits.
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9.6 Capacity building for change

Change will ultimately need to be driven by the people at the heart of the planning process, the knowledge and skills of whom will need to be commensurate with the scale and pace of change required.

With recognition of the increasing national importance of action on climate change there has been stronger political commitment and new resourcing across the City Region. However, the knowledge and skills to carry out energy planning within the ten districts – and specifically within Planning, Regeneration and Building Control teams - is not currently sufficient and will require specific attention going forward.

9.6.1 Organisational capacity

Delivery of investment will ultimately be the task of planners, regeneration and building control teams working alongside private sector developers and public sector procurement. Clear strategic leadership will be required to ensure that their activities are all aligned. However, at a more fundamental level their working knowledge of energy planning will need to be improved.

In order to make interim progress on the ground it is recommended that a series of live 'pilot' projects be used to develop an understanding of the energy planning process. This will require training for planning officers and regeneration teams – with a focus on carbon budgeting, proposals plan preparation and business planning.

Networking of the ten districts could support strategic policy development. This could be taken forward in the short term by AGMA working with projects such as PEPSEEC and in the medium to long term enabled by structures such as the proposed Climate Change Agency. Networking of the ten districts would also support interim process by enabling the sharing of emerging experience and best practice.

9.6.2 Consistency of approach

The lack of a consistent approach to assessing and benchmarking carbon emissions reductions from new developments will require addressing. This will be important in order to create a level playing field for developers across the City Region, but also in ensuring consistency in seeking to monitor progress.

Given that, more often than not, carbon budget statements are likely to be prepared by developers' consultants there is likely to be the need for independent quality checking of carbon budgets for planning applications across Greater Manchester, potentially on a sampled basis – as is currently the case for the Code for Sustainable Homes.

Strategic recommendations

- A series of live 'pilot' projects should be used to engage planning, regeneration and building control representatives in the energy planning process;
 - The use of specific planning mechanisms such as the target framework, policy requirements and Local Development Orders should be further refined and piloted;
 - A generic training programme should be devised to be rolled out across the districts – with a focus on plan frameworks and supporting policies – to include carbon budget statements, proposals plan preparation and the role of business planning.
 - A consistent methodology for preparing carbon budget statements should be developed and agreed, drawing on the approach piloted by this study, and other examples of best practice;
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