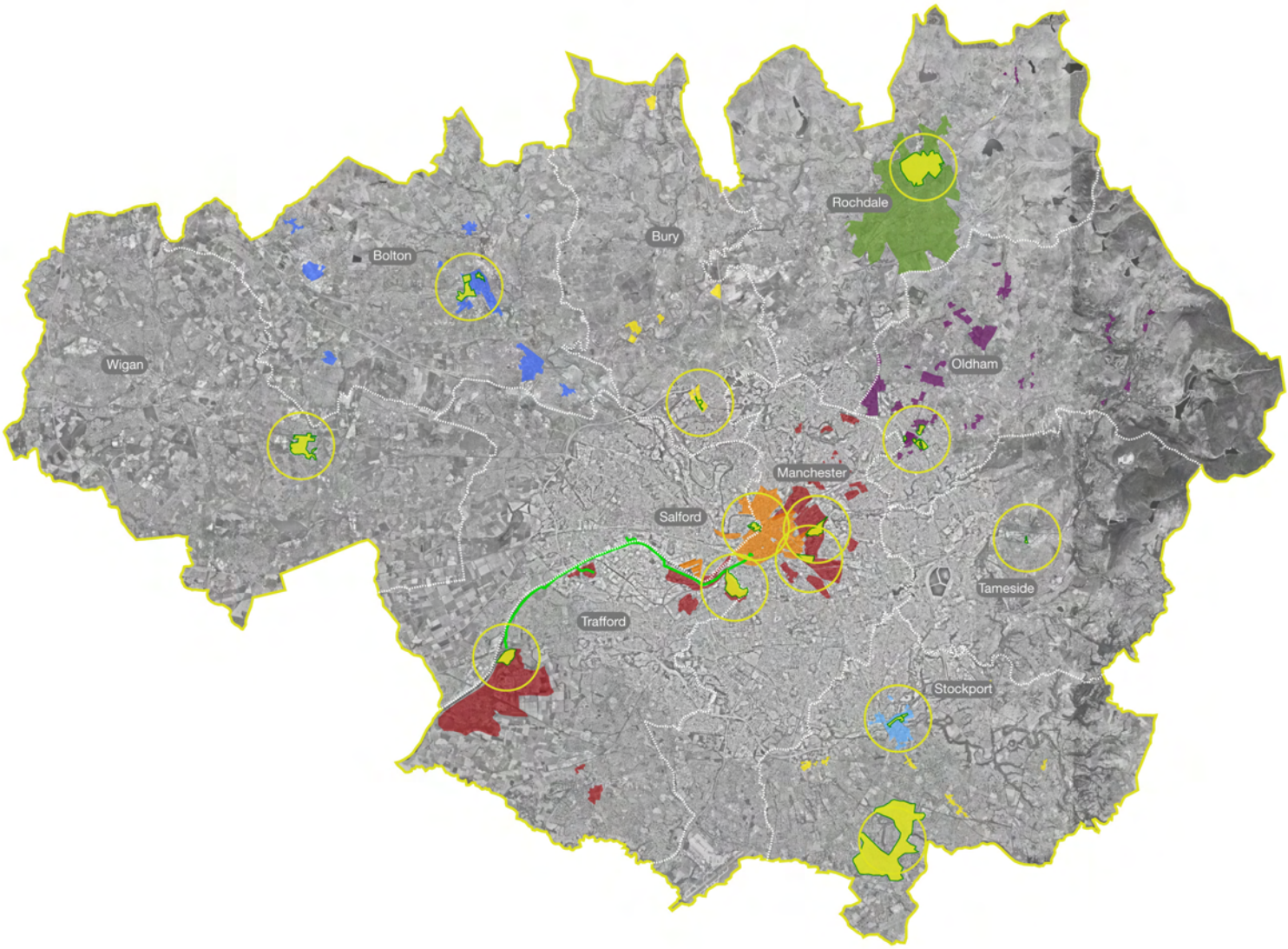
A report prepared for AGMA by URBED, AECOM and Quantum Strategy & Technology

Decentralised and zero carbon energy planning

January 2010



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Contents

Executive summary

1. Background and study objectives

With ascent to City Region status and significant projected growth the delivery of zero carbon buildings and decentralised energy presents a major challenge for Manchester City Region. This study was commissioned in response to this challenge and the opportunity to realise the benefits of a co-ordinated response by the ten districts.

The National Planning Policy Statement (PPS) 1 supplement on planning and climate change provides the context for the study. Whilst information on feasibility, implementation and technologies will continue to evolve the study represents a first step towards putting in place a strategic sub regional framework and evidence base to support emerging Core Strategies and other development projects across the City Region. The strategic objectives of the study were to:

- Provide strategic evidence to enable Core Strategies to set minimum targets for low and zero carbon energy;
- Identify opportunities for linking new development and supporting energy infrastructure with existing communities;
- Identify the most appropriate energy mix for delivering new development and growth aspirations across Greater Manchester;
- Clearly set out the spatial planning actions required to deliver this 'new' critical infrastructure, supported by targets for low and zero carbon energy.

Targets arising from the study should clearly relate to a broad framework for achieving zero carbon buildings by 2016 and 2019 and on and off site delivery mechanisms.

2. Scope of the study

The study was carried out during the period between November 2008 and September 2009 by a team led by URBED together with AECOM and Quantum Strategy & Technology. Additional expert input was provided by Michael King, an associate of the Combined Heat and Power Association (CHPA), and Pernille Overbye, a district heating specialist from Rambøll Denmark.

The methodology sought to develop an evidence base comprising a 'top-down' spatial review of the City Region's strategic potential and a 'bottom up' analysis of a representative selection of case studies. These two elements were considered against the wider context of planning policy and infrastructure provision, organised into the following work streams:

- The present position: A review of growth and development projections for the City Region and the issues raised going forward;

- Existing network infrastructure: A review of current and future electricity, gas and district heating networks across Manchester City Region;
- Top-down evidence base: An outline spatial review of the main low and zero carbon energy technologies and their potential for application across Manchester City Region;
- Bottom-up evidence base: Development of outline carbon budget analysis and energy planning frameworks for 13 case studies representative of different 'character areas of change' across the City Region;
- Enabling mechanisms: A review of finance and delivery mechanisms for low and zero carbon energy technologies;

The findings were then brought together into a proposed planning policy framework and energy spatial plan vision for the City Region. Example energy proposal plans and the supporting carbon budget analysis for each case study have been compiled as a separate volume of this report.

3. 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.

Manchester City Region led the way in the 19th Century with development of the countries first gas and electricity networks. With the 21st Century challenge of creating new growth points for 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 infrastructures.

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, CO_2 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 CO_2 emissions at a time when there in increasing pressure to demonstrate that CO_2 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.

What is therefore needed is a model for low, or even zero, carbon growth. Furthermore, 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 CO_2 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.

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 CO_2 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;

3. The role of spatial planning at different levels

In order to make progress effective 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 a range of different scales, reflecting opportunities to harness energy resources, and focus areas for development. The four distinct scales identified are:

- Regional scale: The regions renewable energy resources will be required to supply the major economic centres, including Manchester City Region.
- City Region scale: Cross boundary energy planning would overcome the distinct constraints faced by major economic centres in seeking to deliver higher CO_2 reductions, providing 'allowable' solutions such as wind power, biogas production and power station heat off take.
- District scale: Core Strategies would incorporate strategic opportunities identified at a City Region scale, as well as highlighting the distinct opportunities and resources to be found in each district.
- Development scale: The specifics of infrastructure investment in each district would be guided by the preparation of energy proposals plans for distinct 'character areas' of change, also to be identified in Core Strategies.

It is proposed that this is co-ordinated by an overall energy spatial plan for the City Region – a vision for which is outline within this study.

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;

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 scales. This has enabled a range of planning and enabling mechanisms to be identified:

- Energy proposals plans: Proposed as the overarching approach to low/zero carbon infrastructure planning. 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.
- Supporting planning mechanisms: A suite of planning mechanisms, in support of each energy proposals plan, with provision made in Core Strategies:

    - Energy and carbon budget statements: Developers would be required to submit projected energy demands and a carbon budget;
    - Carbon reduction targets: Targets that require reductions in regulated and unregulated carbon emissions;
    - Network connection requirements: Provision to require developers to connect buildings to existing or planned district heating networks;
    - Allowable solution funds: Provision to collect infrastructure contributions from developers in order to underwrite investment in 'allowable' solutions;
    - Infrastructure allocations and safeguards: Provision to allocate or safeguard existing low carbon infrastructure in order to support planning objectives;
    - Greenbelt site allocations: Agreed policies relating to landscape character and cumulative impacts;

This study also proposes a framework of infrastructure driven carbon reduction targets. It is proposed that these targets take North West RSS policy targets as a starting point, expressing them in terms of carbon, and providing minimum and maximum targets from low and zero carbon energy infrastructure, with the potential for revision upwards where lower cost area and site-specific opportunities are available to developers.

A strategic and technical justification for these higher targets, and the inclusion of unregulated emissions, is provided within this study. Thresholds for the application of these targets are not proposed for homes but further consideration may be needed for commercial property and consequential improvements.

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;

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 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 they create the potential to manage the cost of carbon reduction to the benefit of the City Region. Each energy proposal plan would need to be supported by a corresponding business plan.

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.

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.

In order to make interim progress on the ground it is recommended that a series of live 'pilot' projects are used to develop an understanding of the energy planning process – with a focus on carbon budgeting, proposals plan preparation and business planning.

Strategic policy development should be supported by ongoing networking between the ten districts, supported in the short term by AGMA working with projects such as PEPESEC and in the medium to long term by the Climate Change Agency. Networking of the ten districts would also support interim progress by enabling the sharing of emerging experience and best practice.

Strategic recommendations

- A series of live 'pilot' projects should be used to engage planning, regeneration and building control representatives in the energy planning process;
- A generic training programme should be devised to be rolled out across the districts – with a focus on carbon budgeting, proposals plan preparation and 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;