

Decentralised and zero carbon energy planning

A summary report

June 2010



AGMA
ASSOCIATION OF
GREATER MANCHESTER
AUTHORITIES

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This is a summary report of the 'Decentralised and Zero Carbon Energy Planning' study which was published in January 2010. The full report together with supporting evidence base can be downloaded from:
http://www.agma.gov.uk/planning_housing_commission/index.html

The summary report was written and designed by Nick Dodd and Paul Bower from URBED. The full report was prepared by Nick Dodd, Paul Bower and Jamie Anderson from URBED with support from Matthew Cotton, Rob Shaw and Timothy Kay from AECOM, Richard Pearce and Teleri Cousins from Quantum Strategy & Technology, Pernille Overbye from Rambøll Denmark (the Carrington case study), and Michael King (Chapter 8).

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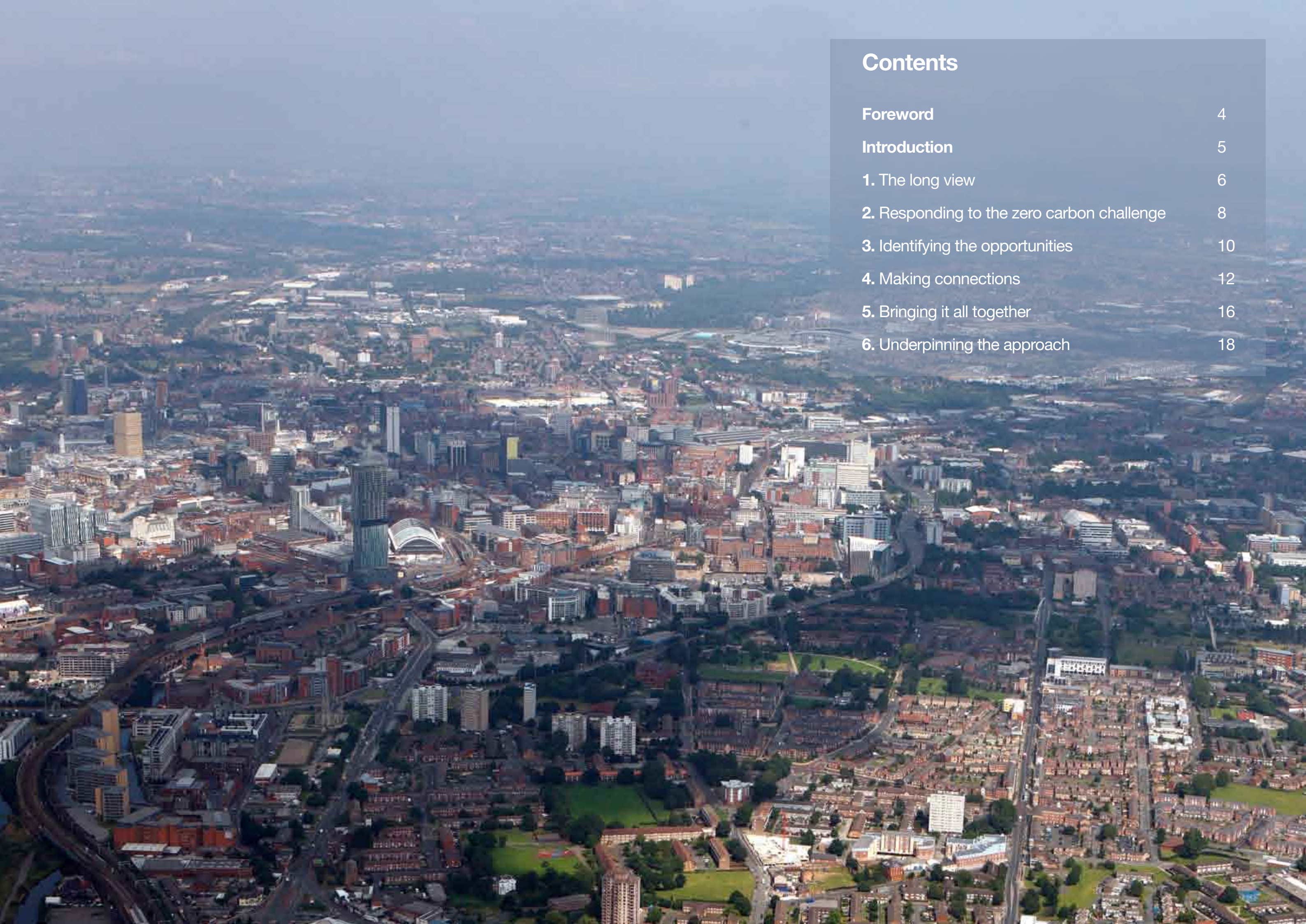
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The spatial plans, case studies and associated costs and performance specifications presented and described in association with the main report are indicative (based on 2009 data) and should only be used as such.





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Foreword

Greater Manchester will need to change the way it plans and designs new development in order to reduce carbon emissions. This report prepared for AGMA sets out a practical way forward for developing a spatial planning approach for the city region.



Providing energy and infrastructure in new, sustainable ways is vital for the future of Greater Manchester.

We need to change the way we plan and design new development, and the way we supply energy to both new and existing development - if we are to achieve our goals for reducing carbon emissions and delivering growth and prosperity.

Government sees spatial planning as having a key role in putting in place the new “decentralised and zero carbon infrastructure” we need. With new policies and legally binding targets for new developments, planning has major responsibilities to fulfil. By working across the ten Districts which

make up Greater Manchester we can put in place the strategic, spatial framework which can allow these challenges to be met.

In agreeing with Government to become one of the first Statutory City Regions, Greater Manchester has agreed to pioneer a new approach to energy planning, and to establish at GM level an Energy Group of key stakeholders to take this forward.

As a Low Carbon Economic Area for the Built Environment, designated by Government in December 2009, Greater Manchester has committed to a long term process to transform

buildings and new development so that we reduce carbon emissions whilst establishing a low carbon economy of the future.

The report prepared by URBED for AGMA, which is summarised here, is a landmark study, setting out a way forward for developing a spatial planning approach to energy strategy. It provides pioneering research and yet is grounded in the reality of what can be achieved in Greater Manchester, given our geography and the likely pattern of future development. It

offers a practical way forward which can ensure that we remain a competitive location whilst meeting our carbon obligations.

We commend the report to you as a helpful new approach, which complements the many other initiatives we are taking in the energy field on which we must work collectively across Greater Manchester in the coming years.

Councillor Derek Antrobus

Chair of AGMA Planning and Housing Commission

Councillor Dave Goddard

Chair of AGMA Environment Commission

Introduction

The study was commissioned in response to the challenge of delivering decentralised energy infrastructure and zero carbon buildings, with the aim of realising the benefits of a coordinated response by the ten districts of Greater Manchester.



Background and study objectives

Having been designated as a statutory City Region by Government, and with significant projected economic and housing growth, Manchester City Region faces both challenges and opportunities. One of these is to reduce carbon emissions, through the delivery of decentralised energy infrastructure and development of zero carbon buildings.

The study which is summarised here was commissioned in response to this challenge, and the opportunity to realise the benefits of a co-ordinated response by the ten districts which make up Greater Manchester. National Planning Policy Statement (PPS) 1 on planning and climate change provides the context for the study.

This is a first step towards putting in place a strategic sub regional framework 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 District Core Strategies to set targets for low and zero carbon energy use;
- 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;
- Set out the spatial planning actions required to deliver this 'new' critical infrastructure';
- Propose targets which relate to the need to achieve zero carbon buildings by 2016 and 2019 through on and off site delivery mechanisms.

Scope of the study

The study covered a lot of ground the key elements of which were:

- A review of growth and development projections for the City Region;
- A review of current and future electricity, gas and district heating networks across Manchester City Region;
- A review of the main low and zero carbon energy technologies
- Undertaking 13 detailed case studies, representative of different 'character areas of change' across the City Region, in order to assess the potential of these new technologies in a range of different developments;
- A review of finance and delivery mechanisms needed to enable the introduction of low and zero carbon energy technologies;
- A suggested outline planning policy framework and energy spatial plan vision for the City Region.

There are two key overarching messages:

Firstly, that **the provision of decentralised energy infrastructure, placing Low and Zero Carbon Technologies (LZC) at its core, is critical** – both to the delivery of economic growth and prosperity and to reducing carbon emissions within the Manchester City Region;

And secondly, that **the use of spatial planning is a key tool in delivering this infrastructure, but it needs to be supported by complementary enabling mechanisms**. These include new finance and development models, a co-ordinated approach across the public sector, new energy services delivery vehicles, and new skills.

Key terms:

What is decentralised energy?

'Local renewable and low carbon energy usually but not always on relatively small scale. Decentralised energy is a broad term used to denote a diverse range of technologies, including micro-renewables, which can locally serve an individual building, development or wider community and includes heating and cooling energy'

Department for Communities and Local Government, 2010

What is zero carbon?

'A building in which the net carbon dioxide emissions resulting from all energy used are zero. This includes the energy consumed by all appliances used within the building. Zero carbon buildings will need to achieve a minimum energy efficiency standard, and may obtain some of their emissions savings by contributing to off-site infrastructure ('allowable solutions').'

Department for Communities and Local Government, 2010

What is a spatial plan?

In this context a spatial plan is a map that illustrates the relationships and connections between different activities and land uses across a geographical area.

1. The long view

The past as a key to the present

The City Region was an energy pioneer in the 19th Century and if we look back at its growth we can find both inspiration and lessons in delivering decentralised energy and in seeking to respond to the challenges ahead.

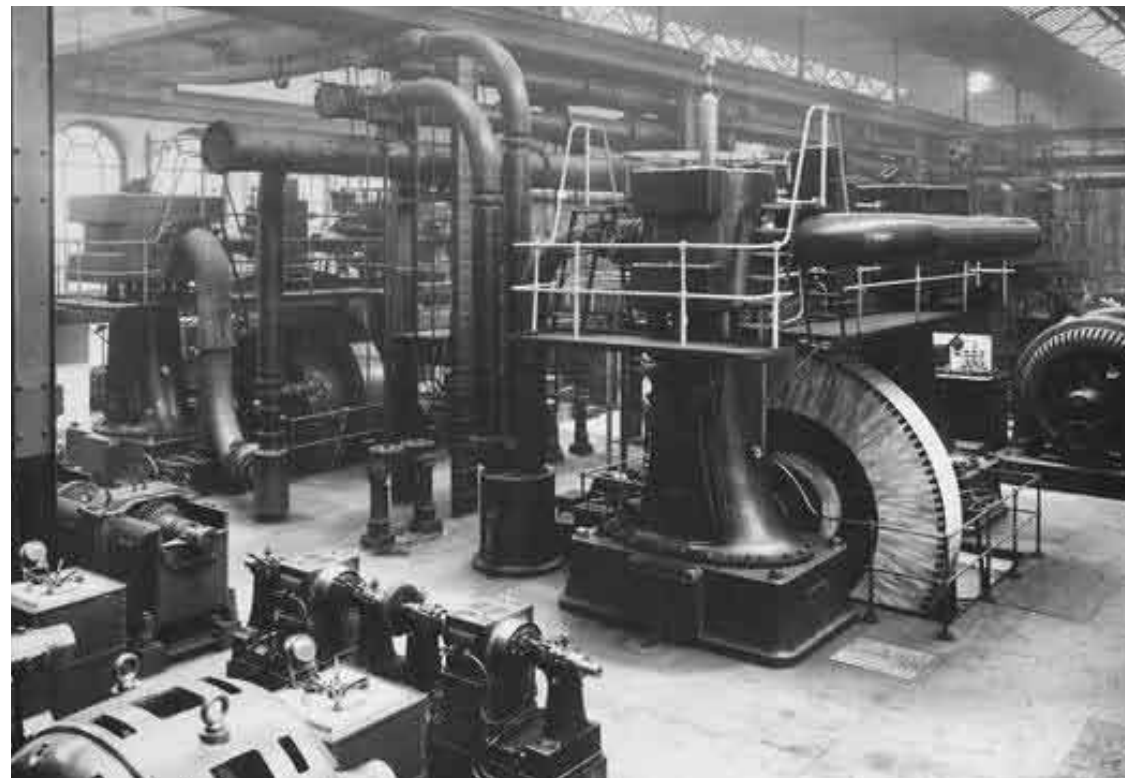
The industrial revolution drove increasing demand for energy, with town gas being introduced first in 1817, followed by the first electricity network in 1890.

Industrialists worked together to provide the first energy networks, followed by the public corporations. Each used pioneering decentralised energy technology and the latest expertise. Innovations included one of the world's first Combined Heat and Power (CHP) generating plants.

The industrial revolution was driven by local energy resources, starting with the waterways and later switching over to coal as demand grew.

Once they had seen the benefits demonstrated by the private sector the public corporations, starting with Manchester Corporation, established their own utility companies in order to support growth of the economy and improve the wellbeing of their citizens.

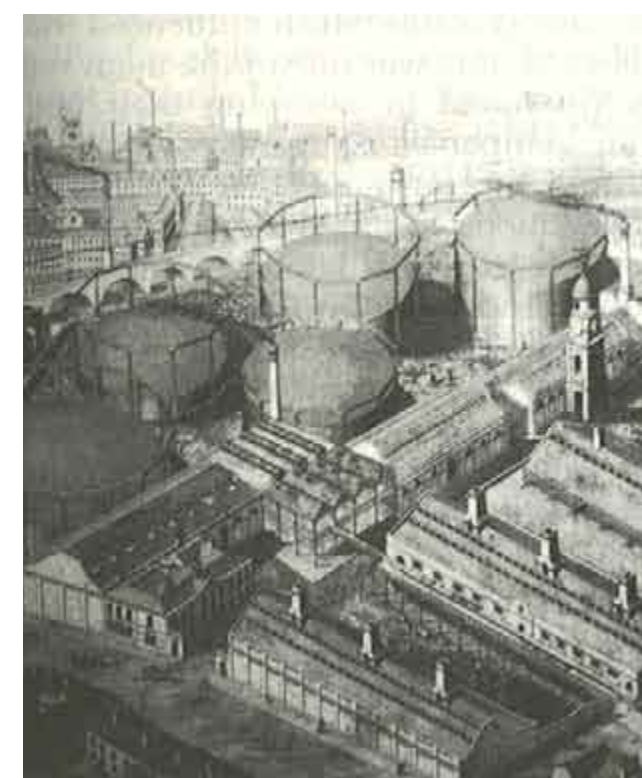
With further growth in demand for energy into the 20th Century new power generation could no longer be located within the city. Energy became an issue for national rather than local policymakers and it moved away from local control.



Dickinson Street power station, which was located in Manchester's city centre.



Laying the first electricity networks in Ancoats.



Rochdale gas works, which was developed by industrialists.



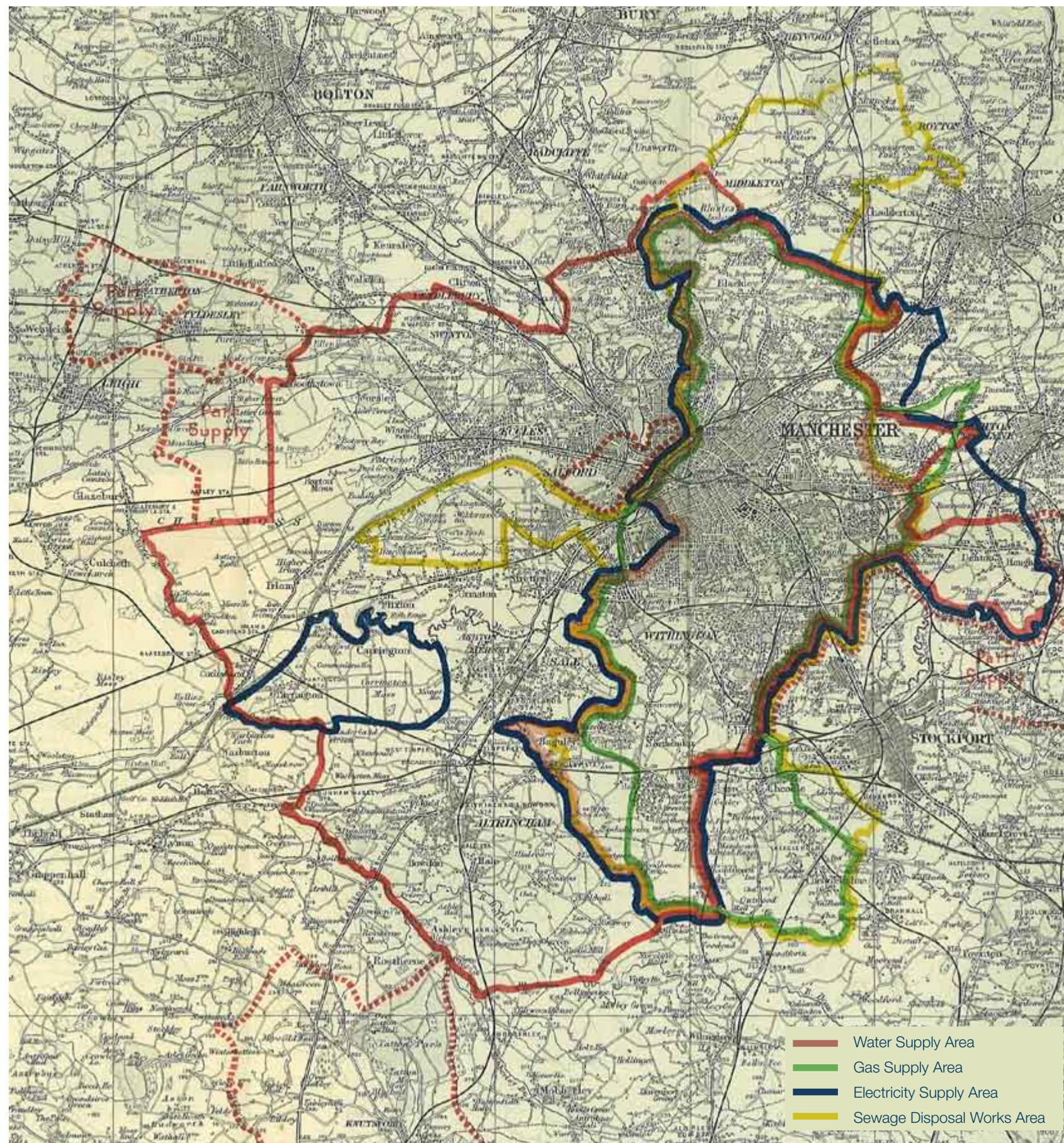
The world's first municipal gas works.



Bloom Street, one of the world's first CHP plants.



Barton power station, Manchester Corporation.



The extent in 1938 of Manchester Corporation's gas, electricity, water and sewerage undertakings.

2. Responding to the zero carbon challenge

Protecting future prosperity by investing in low carbon infrastructure

The study explored how promoting economic growth can be reconciled with meeting the Government’s challenging targets for zero carbon buildings and renewable energy.

The scale of growth within the City Region creates challenges and opportunities to reduce CO₂ emissions and protect the economy from rising fossil fuel prices – a new model is needed to secure future competitiveness.

The UK is committed to challenging targets and ‘Carbon Budgets’ to reduce CO₂ emissions, set out by the Government’s ‘Low Carbon Transition Plan’. This includes delivery of zero carbon buildings, a substantial increase in renewable energy and a ‘Carbon Reduction Commitment’ for business - as shown in the adjacent timeline.

The Mini-Stern report commissioned by AGMA and the Commission for New Economy in 2009 looked at the economic implications of climate change. It was estimated that the costs of not adapting the economy could amount to £20bn over the next 12 years.

The report also highlighted the strong role planning will need to play in co-ordinating action. National planning guidance in Planning Policy Statement (PPS) 1 highlights

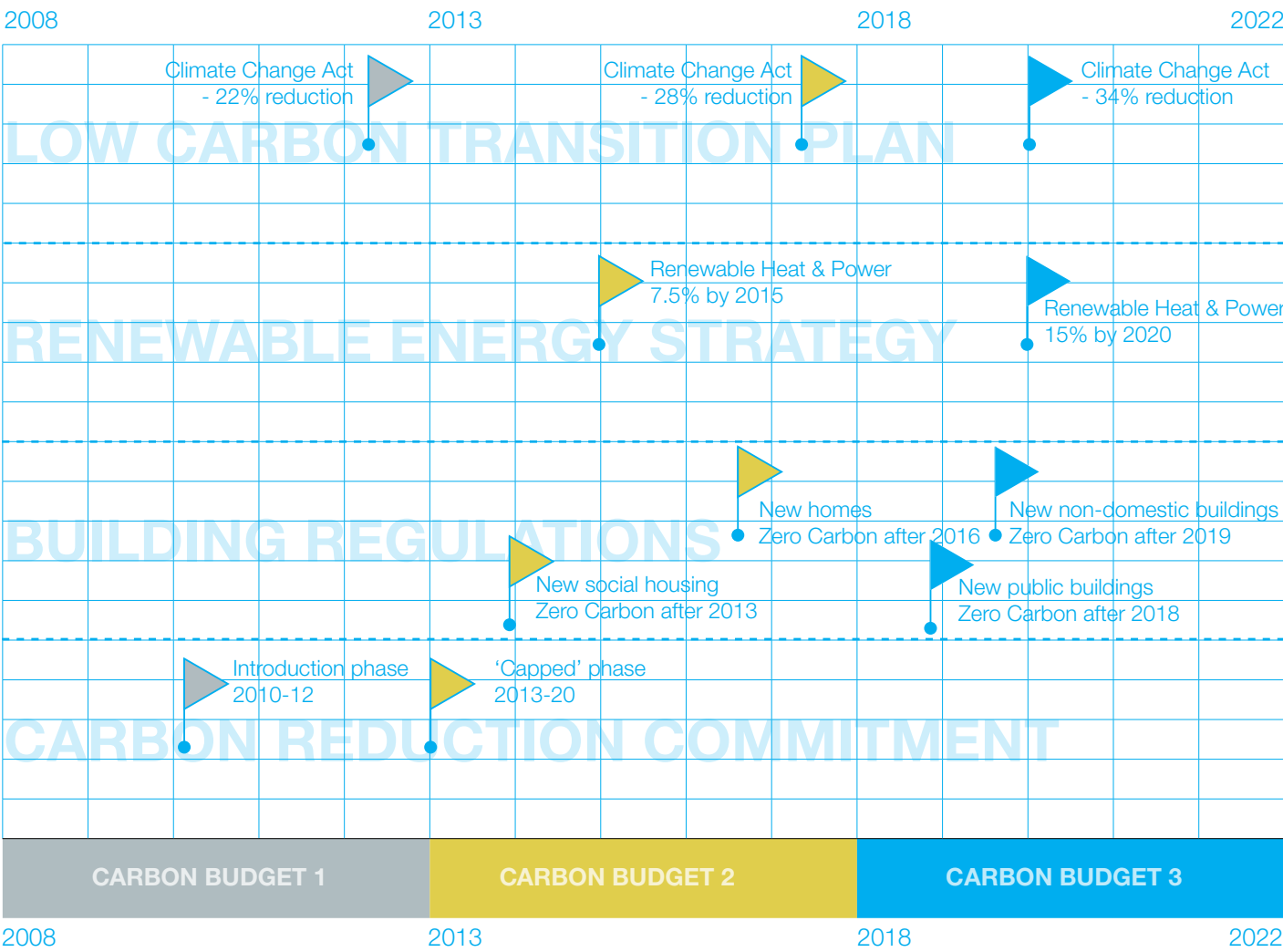
the key role of planning in helping to cost effectively deliver zero carbon developments. The challenges for planning are significant. Future projections suggest that the City Region will have to deliver at least 75,000 units of new housing to a ‘zero carbon’ standard between 2013 and 2021.

The study considered the role of the existing gas and electricity networks. In some key areas of the City Region network capacity to accommodate development has become a major issue, and without pre-planning this could become the case for future decentralised electricity generation.

Existing energy networks will need to accommodate new decentralised energy technologies, but investment will be needed, together with greater co-ordination in order to manage the costs and realise the benefits.

Overall, investment in decentralised energy offers greater control over the City Region’s energy needs, with potential benefits including greater resource efficiency, local control, and diversity and security of energy supply.

Timeline and National policy context for zero carbon



The cost of not taking action

‘unless [the City Region] achieves significant emissions cuts, improves its resilience to Climate Change, and leverages its assets, the Manchester City Region could fall substantially short of its economic regeneration goals and targets.

New approaches to energy generation and distribution are required and a more comprehensive approach to energy planning creates a significant economic opportunity for the Manchester City Region.’

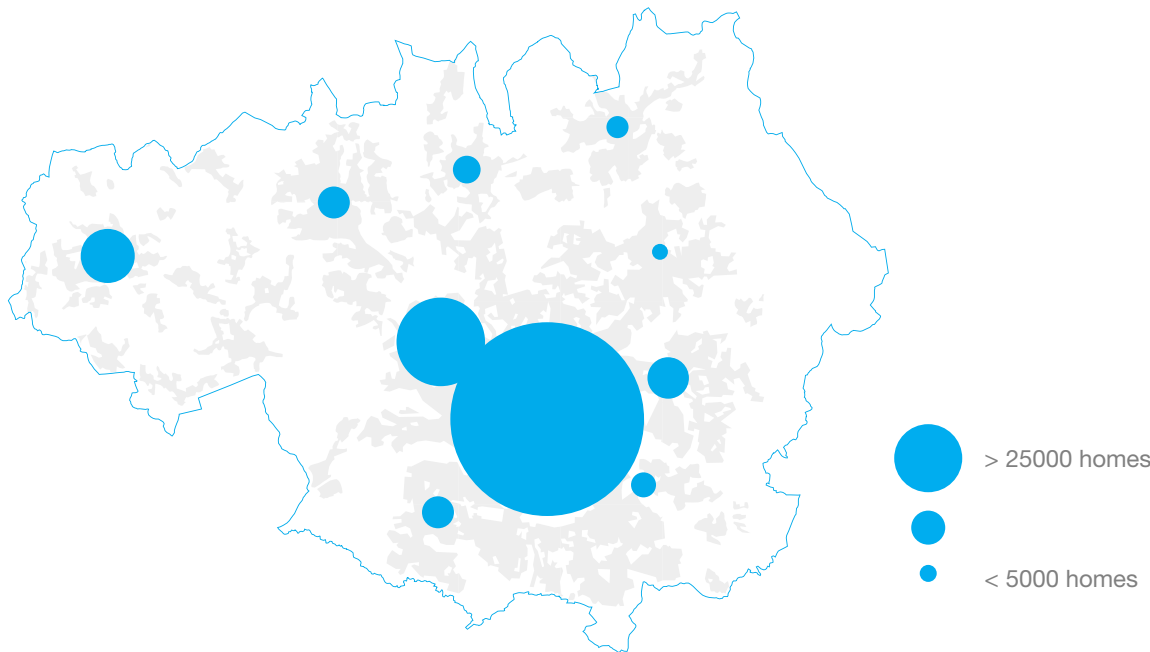
Mini-Stern for the Manchester City Region (2007)

Manchester City Region: Capacity for growth

The first plan is a simplified illustration of the scale of future housing growth agreed by each of the districts of Greater Manchester, which was reflected in the North West Regional Spatal Strategy (Government has indicated that this tier of policy will be removed). AGMA's 'growth point'programme has sought to increase these numbers further to support City Region status.

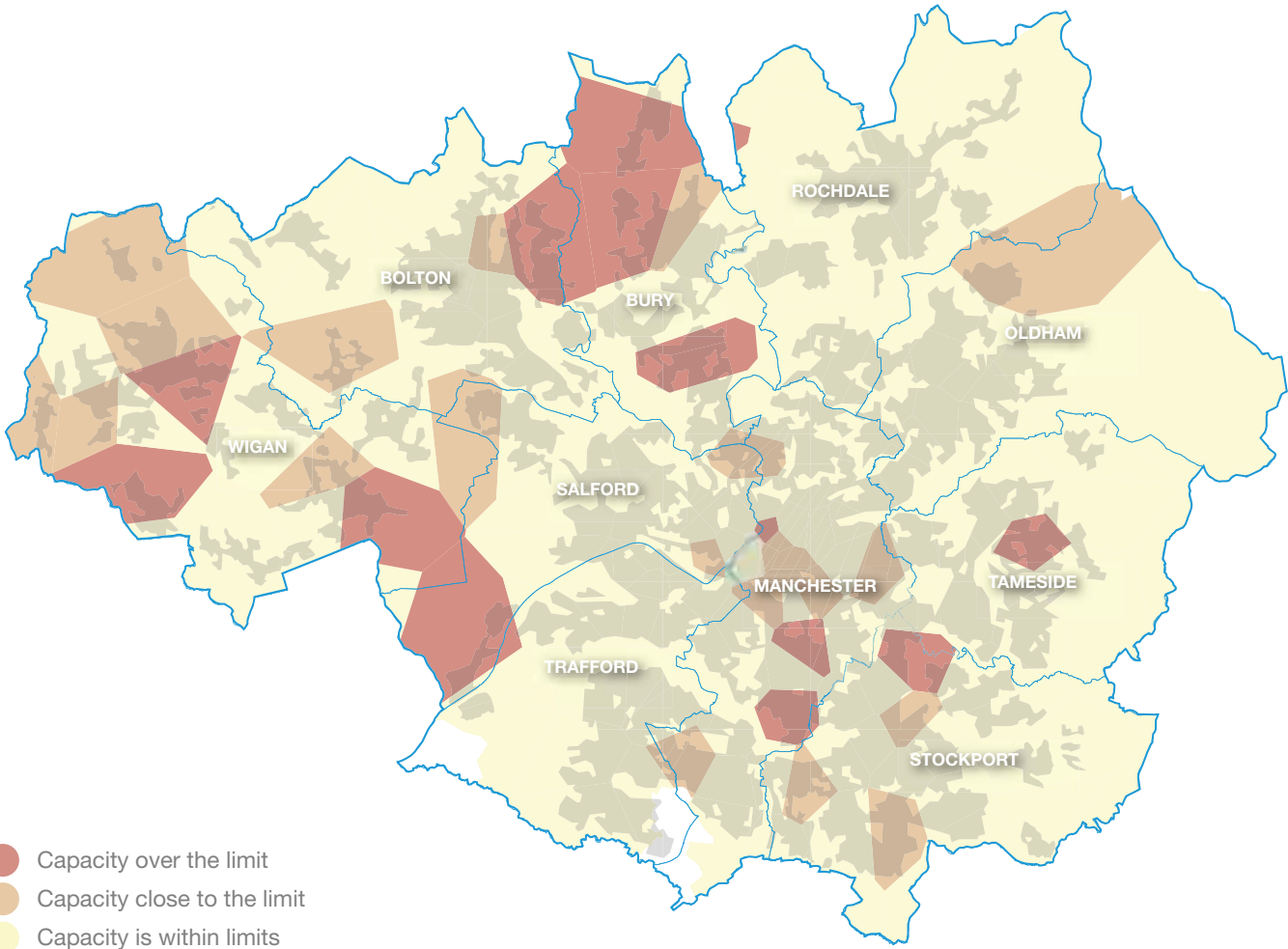
The two plans below illustrate the capacity of the electricity network to accomodate, firstly, new demand from development and, secondly, new supply from decentralised energy generation. Where capacity is red or orange innovative solutions may be needed to manage the costs of network connections.

Scale of future housing growth across Manchester

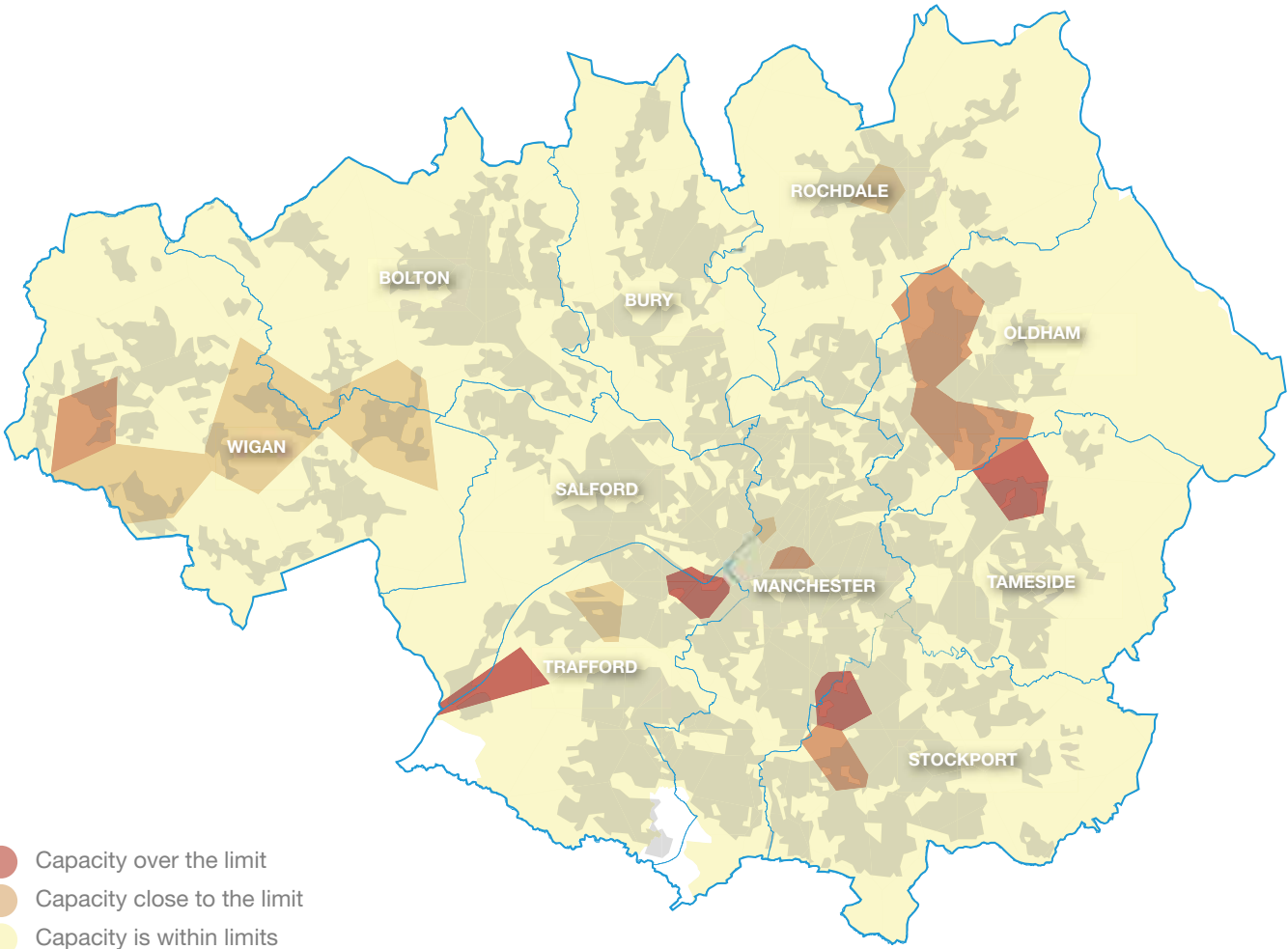


Regional Spatial Strategy (RSS) Housing Targets for 2003 - 2021
(Source GM SFRA, 2008)

Capacity to accomodate new energy demand



Capacity to accomodate new energy supply



These plans are based on data provided by Electricity North West for primary substations (2009). The extent of remaining capacity on all substations will depend on the scale of new supply or demand. The maps do not indicate capacity constraints and/or fault levels that may occur on secondary distribution substations fed from the primary substations.