Advantage West Midlands

improving infrastructure

heat mapping and decentralised energy feasibility study

Malcolm Semple, Eccleshall Biomass Ltd, Staffordshire

Advantage West Midlands

www.advantagewm.co.uk

Advantage West Midlands

The Regional Development Agency (RDA) for the West Midlands Region

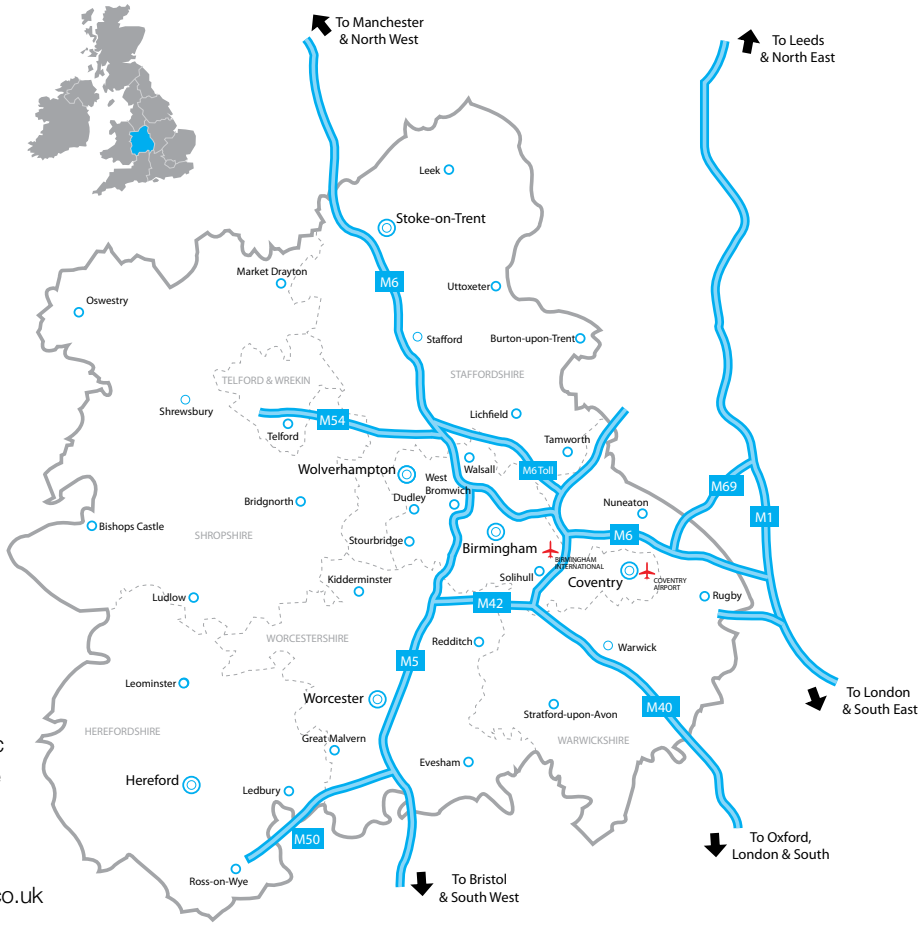
Advantage West Midlands is the Regional Development Agency (RDA) for the West Midlands and one of nine RDAs in England.

Our role is to lead the economic development of the West Midlands Region, working alongside public, private and voluntary sector partners to help our region to prosper. We build upon our region's many strengths and address our unique challenges.

Our key task is to lead the development and delivery of the **West Midlands Economic Strategy (WMES)**, the framework for our region's growth. Through working in partnership, we speak with one voice for the region and make a far greater impact than we would acting in isolation.

We have an annual budget of over £300 million to invest in the West Midlands Region and, at any one time, we manage around 2,500 projects which change the lives of people across our region. We drive economic development by identifying where we can make the greatest impact, either by targeting specific needs or investing in success.

For more information visit www.advantagewm.co.uk



Cover image: Advantage West Midlands supports the Eccleshall Biomass Demonstrator project. The project has pioneered the development of one of the first dedicated bio-energy power plants in the UK. At the centre of this groundbreaking project is a 2.6 megawatt generator, fuelled by the energy crop miscanthus, other energy crops and clean wood chip. The plant generates enough electricity to run 2,600 homes equivalent to the local town of Eccleshall, making it one of the first carbon neutral towns in the country. It is also supporting the rural economy by creating local jobs and providing the opportunity for farms to diversify into energy crops. The plant generates electricity using steam turbine technology. It will contribute 20,000 mega watt hours of renewable energy direct to the network. It is also negotiating with a range of potential users to provide heat from the surplus steam.

A secure, low-carbon energy infrastructure for the West Midlands will have at its heart an extensive Decentralised Energy network that unlocks the regional potential for Combined Heat and Power (CHP). This study examines the opportunities and challenges that the West Midlands face as the region begins the transition to a more sustainable energy infrastructure. Advantage West Midlands is working with regional partners to make this ambition a reality.

What is decentralised energy?

This is energy supply (electricity, heat, cooling or a combination) from on- or near-site sources. This can include renewables such as wind, solar, biomass or lower-carbon sources such as gas-fired boilers. As the energy is produced near the customer there are improved efficiencies in reducing loss through transmission. This is further improved if the energy generated is part of a Combined Heat and Power (CHP) district energy network which recycles the heat from generation or local users.

Why was the study undertaken?

The recent Energy White Paper (EWP) asked Regional Development Agencies (RDAs) to identify opportunities as to how they could bring forward Decentralised Energy (DE) projects. This work was commissioned in response to the EWP and ongoing low-carbon economy work and sought early feedback and buy in to the approach from key external stakeholders at a workshop in June 2008. Advantage West Midlands published the first low-carbon regional economic strategy "Connecting to Success" in December 2007 and delivery plan in April 2008. This study fulfills commitments within the delivery plan and Regional Climate Change plan.

What does the study show?

The study shows the potential for combined heat and power networks in the region. The study maps domestic and non-domestic heat and electricity demand by super output areas (LSOA) and has identified a series of scenarios that have been put through economic and technical modelling to identify the best options for supporting CHP. The report 'Heat Mapping and Decentralised Energy Feasibility Study' is now available on the Regional Observatory website (www.wmro.org) and the data can be downloaded in GIS format.

What were the key findings and recommendations?

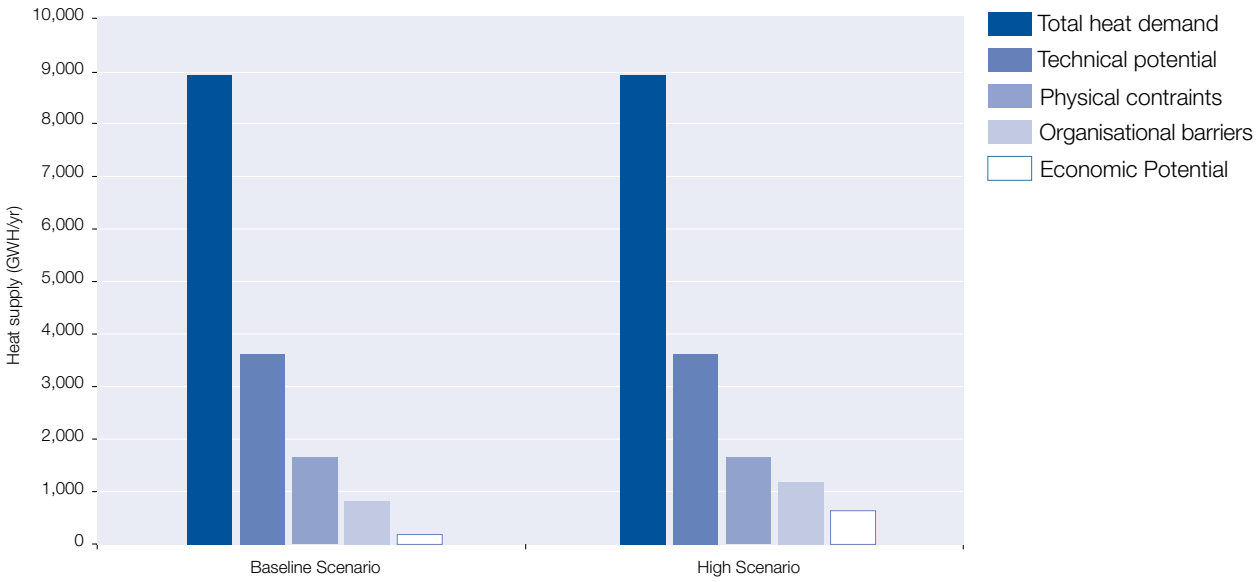
- The key opportunities for CHP are in the domestic, public and commercial sectors, principally in flats, hospitals, offices and retail premises
- The opportunities can be realised by awareness raising and some form of financial incentive
- There is the potential to treble uptake of CHP in the region in the public and commercial sector, yielding over 500 GWH/yr additional heat supply, saving over 57,000 tonnes of CO_2 per year and driving an additional £143m capital investment
- Awareness raising alone in the public and commercial sector would increase uptake by 28%, yielding an additional heat supply of almost 50 GWH/yr (5,700 tonnes of CO_2 and £14m of capital investment)
- The study estimates that industry (mainly chemicals, food and drink and pulp and paper) could double its uptake of CHP, yielding over 1000 GWH/yr additional heat (over 100,000 tonnes of CO_2 and almost £300m capital investment)
- These figures are complimented with other studies (eg URS 'Low-Carbon Evidence Base' report estimated that regional support for DE could result in 530,000t CO_2 assuming 8-12% conventional electricity replaced by gas-fired CHP.) This figure would be higher if the sources were renewable or more existing heat sources were used.

How could this be achieved?

By introducing a package of measures such as:

- Support for targeted awareness raising campaigns, information and demonstrations to help build confidence and address organisational barriers
- Agreeing mechanisms to address ownership and occupancy issues in flats and other shared premises
- Providing grant support, to a level of around £30/tonne of CO_2 saved

Combined Heat and Power Potential in Buildings Applications



This shows the potential heat demand from buildings in the region can be partly addressed through potential schemes once technical, physical, organisational and economic barriers are considered. With rising fuel prices the potential increases.

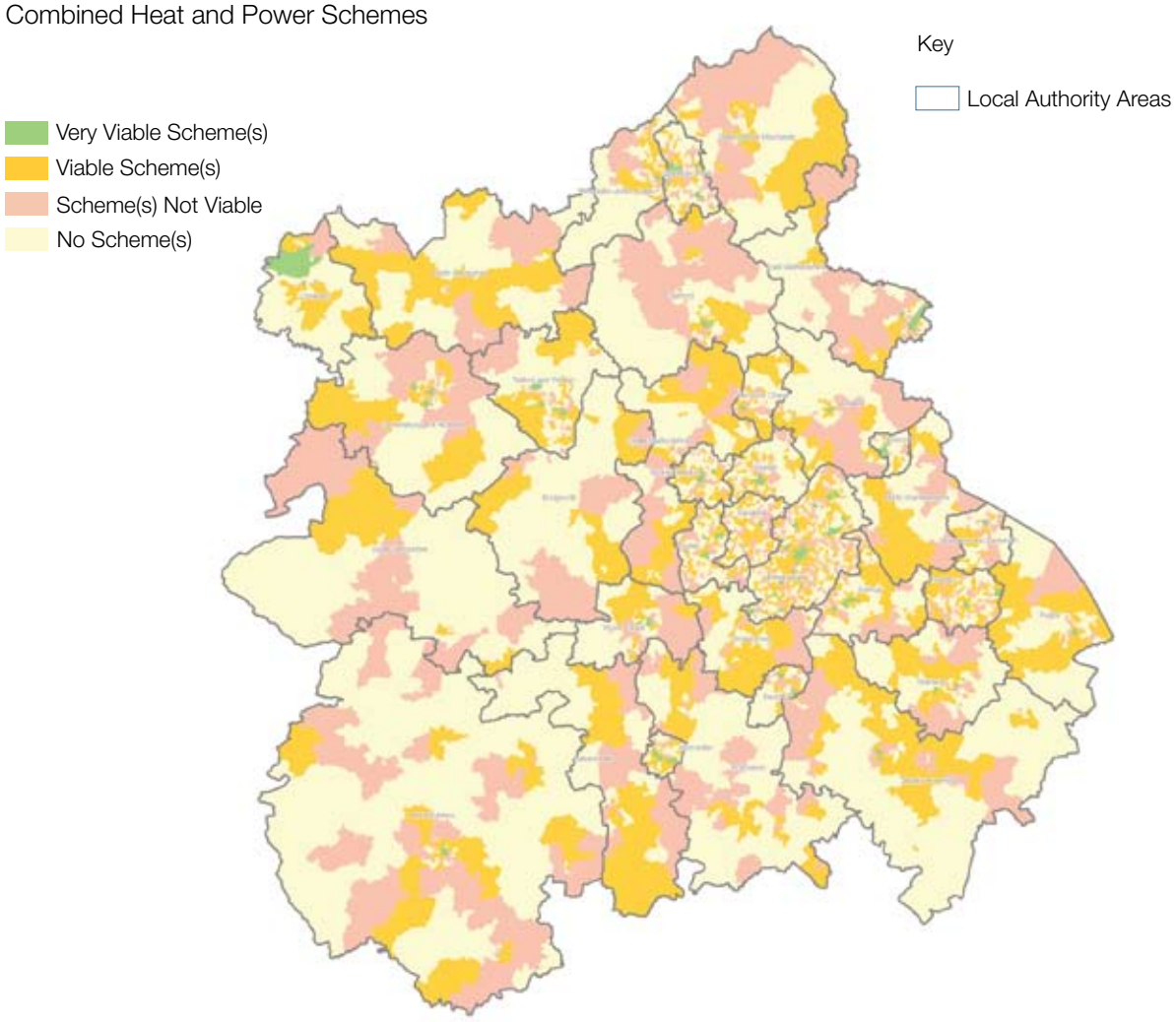
- Undertaking site level scoping studies for applications for CHP and district heating targeting the domestic, health, public admin and retail sectors and for CHP in the chemicals, food and drink, pulp and paper, metal casting, large engineering and textiles industries

This activity could be co-ordinated by the Regional Energy Office, working with other key bodies such as Salix Finance, the Carbon Trust and Energy Savings Trust and Local Authorities.

What are the benefits to the region?

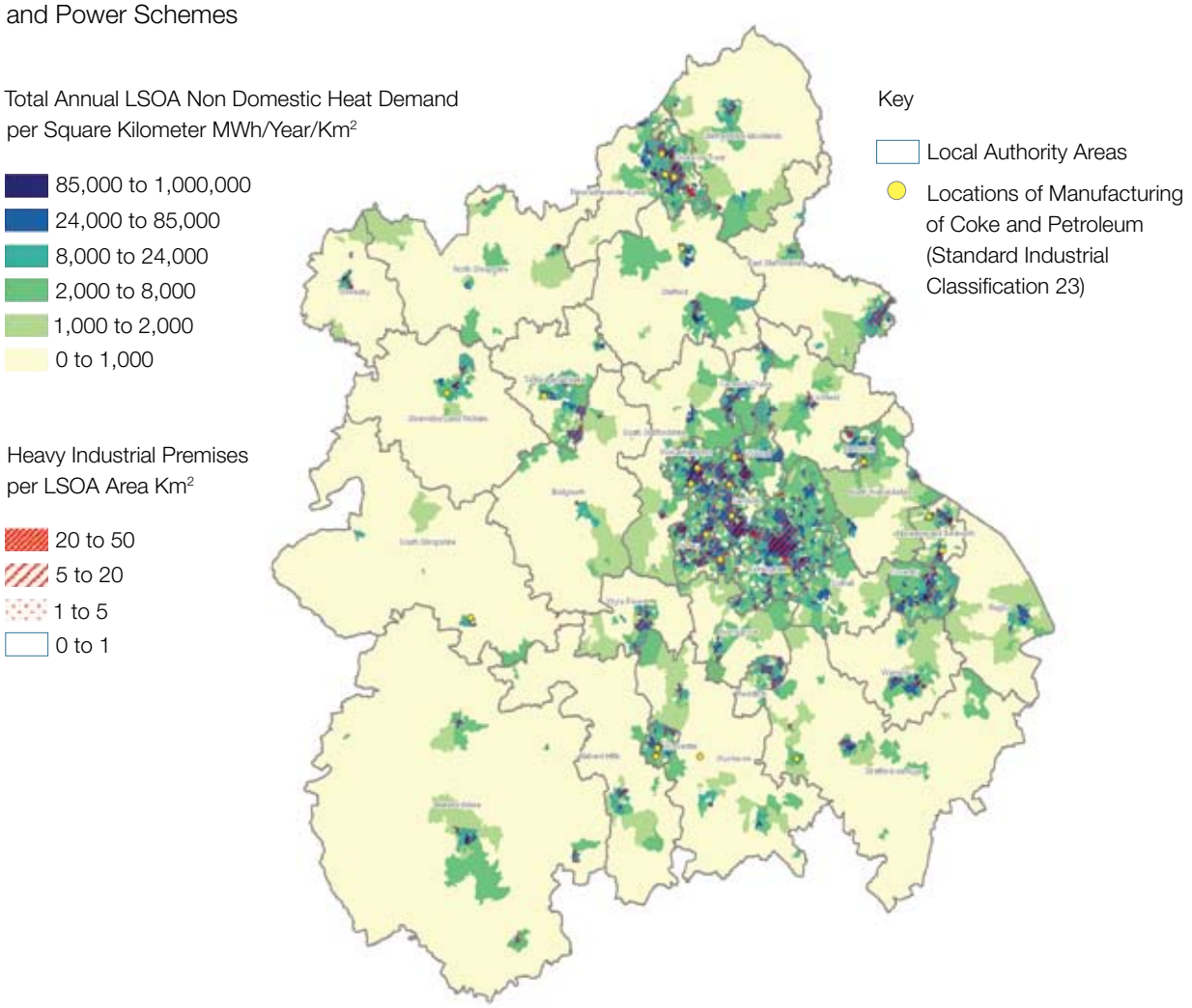
- Regional organisations, businesses and individuals would benefit from improved energy security and reduced costs which would improve the competitiveness of the region
- It will support the region to achieve a low-carbon economy
- There would be significant investment in the region with downstream benefits for regional businesses and Environmental Technology, supply chain stimulation and increase employment opportunities
- The experience gained could become an export opportunity
- It provides opportunities to build on regional expertise in some of the renewable or lower-carbon fuel sources such as biomass or waste to energy

Public Service and Commercial Sector Potential for Combined Heat and Power Schemes



Note: Mapping is also available at Local Super Output Area level.

Industrial Sector Summary of Potential Combined Heat and Power Schemes



This figure presents Total Annual Local Super Output Area (LSOA) Non Domestic Heat Demand per respective LSOA total area in square kilometers and the Number of Heavy Industrial premises per respective LSOA area in square kilometers.

How could the results be used by regional organisations?

There are three key constituencies that would find the results of direct relevance to their work:

1. Public sector agencies such as regional and local government, local authorities and urban regeneration partnerships, for:

- Providing an evidence base for policy and delivery
- Developing regional and sub-regional energy strategies
- Identifying locations for site level studies for CHP
- Supporting the implementation of district energy solutions, such as CHP, as part of local planning and site development requirements

2. Service providers, particularly energy companies specialising in CHP, for:

- Developing strategies for targeting CHP opportunities
- Identifying locations for more detailed site level studies
- Identifying potential partners to work with (eg local authorities)

3. Private property developers, particularly those active in the region, for:

- Considering CHP options as part of new development/refurbishment
- Identifying locations for more detailed site level studies
- Identifying potential partners to work with
- Strengthening development proposals as part of an overall site development package

What are the limitations?

The study has been developed using a series of data-sets, most of which are in the public domain, but particularly with the scenario mapping work, has necessarily involved a number of assumptions. Care needs to be exercised by anyone wishing to draw firm, definitive conclusions when using the data or the approaches outlined in the study to specific sites or locations since the methods used are, in the main, based on generic approaches and would not support this type of application. This is particularly true in rural LSOAs which tend to be geographically larger and therefore individual elements of the data-sets are less readily identified (eg LSOA category could be mainly a single large energy user or many medium level but spread over a wide area).

However the results are robust at levels down to LSOA and are useful for prioritising more detailed site level studies with the relevant partners.

Future work

Decentralised energy requires not only combined heat and power networks but also a range of different renewables and lower-carbon generation and the ability to provide electricity back into the district network. Advantage West Midlands are working with partners to address this in studies that will build on this work.

For further information contact:

Graham Waddell
Energy and Carbon Policy Manager
Advantage West Midlands
3 Priestley Wharf
Holt Street
Aston Science Park
Birmingham B7 4BN

Tel: 0121 380 3500
Email: grahamwaddell@advantagewm.co.uk

or,

John Walker, West Midlands Regional Observatory

West Midlands Regional Observatory
Research Enquiries: 0121 202 3243

www.wmro.org

Advantage West Midlands

www.advantagewm.co.uk

3 Priestley Wharf • Holt Street • Aston Science Park • Birmingham B7 4BN

Tel: +44(0)121 380 3500 • Fax: +44(0)121 380 3501 • www.advantagewm.co.uk

Text-only versions of this brochure can be provided on request in large print, Braille and other languages.

Please contact the Communications Team on 0121 380 3500.