

LOCAL ENERGY NETWORKS

Executive Summary



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Cheshire West
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Warrington
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Introduction

This study has been undertaken as part of the Climate Change Skills Fund Programme to build skills, capacity and knowledge in the use of low carbon energy networks.

Local energy networks including decentralised energy generation, district heating and smart grid technology are thought to be potentially appropriate for parts of the Cheshire and Warrington sub-region, due to the number of large towns within the sub-region; and the clusters of large energy users, including a mix of residential, industrial and commercial building uses within them.

This study outlines the key stages in taking a local energy network project from an opportunity to an operational scheme. In describing the requirements at each step in the process, the report makes reference to three opportunity areas within Cheshire and Warrington.

This summary report presents an overview of the 'Cheshire & Warrington Local Energy Network Roadmap', details of the requirements at each step and a summary of the key opportunities that have been identified for the three case study locations. Further detail about the roadmap steps and the case studies can be found in the main report.

Background and policy context

The need to address the rising levels of CO₂ in the atmosphere in order to mitigate the impacts of climate change is increasingly urgent. There is now a comprehensive range of legislation and policy at various scales which supports the development and

implementation of decentralised, renewable and low carbon energy infrastructure to reduce the consumption and reliance of fossil fuels for energy production.

The UK [Climate Change Act \(2008\)](#) sets a legally binding target for reducing UK CO₂ emissions by at least 80% by 2050. It also established the [Committee on Climate Change](#) which is responsible for setting binding carbon budgets for 5 year periods, the first of which, in 2009, set a target of achieving a 34% reduction in emissions by 2020. The Act is supported by the UK [Low Carbon Transition Plan \(2009\)](#), which sets out the Government's approach to meeting their carbon reduction commitments and includes commitments to reducing greenhouse gas emissions from the existing housing stock by 29% on 2008 levels by 2020 and by 13% for places of work. Also, in response to an EU target to increase the proportion of energy supplied from renewable sources to 20% the [Renewable Energy Strategy \(2009\)](#) sets out the UK's commitment to supply 15% of all the energy it uses from renewable sources by 2020.

The [Planning and Compulsory Purchase Act \(2004\)](#) places sustainable development at the heart of the planning system. The [Planning Act \(2008\)](#) established a single development consent regime and a new planning process for nationally significant infrastructure projects. The Act also introduced the enabling legislation for the [Community Infrastructure Levy \(CIL\)](#) which will empower Local Authorities to levy a charge on development to support infrastructure development. The key national planning policy in relation to energy and climate change

is set out in **PPS1** and the **PPS1 Supplement on Planning and Climate Change**.

The **Building Regulations** requirements in regards to the energy consumption and CO₂ emissions were made increasingly stringent in the most recent revision in 2010 as part of the proposed requirement for all new dwellings to be 'zero carbon' by 2016 and all new non-domestic buildings to be 'zero-carbon' by 2019.

More recently the government has included a number of key financial incentives for the uptake of energy efficiency measures and decentralised, low and zero carbon energy technologies. These include the **Feed in Tariff**, for the use of low and zero carbon technologies that generate electricity, and the **Renewable Heat Incentive**, for the use of technologies that generate heat from renewable sources. Also, the Carbon Reduction Commitment (**CRC**) **Energy Efficiency Scheme** requires major energy users to monitor and report on their energy consumption and CO₂ emissions and will use behavioural, reputational and financial drivers to encourage better management of energy use.

At the local level the three Authorities each have strong policies supporting actions to address climate change and promoting the uptake of decentralised, low and zero carbon energy technologies:

Cheshire East

'Ambition for All', Sustainable Community Strategy (2010-2025) – Vision includes a step change in local production of energy from renewable sources.

Council's Corporate Plan, 2010-2013 – A headline objective to grow and develop a sustainable Cheshire East

Local Development Framework Core Strategy Issues and Options Paper (Nov 2010) – Includes an objective to "Incorporate low and zero carbon energy requirements into new developments, through decentralised energy supply, as well as through the use of combined/district heating networks."

Cheshire West and Chester Council

'Together We Can Aim High' Sustainable Community Strategy 2010-26 – Sets out a priority to increase the proportion of energy produced and consumed locally

LDF Core Strategy Issues and Options Paper (Nov 2009) – Proposes the following as a Key Issue: "Decentralising energy production and securing energy sources, including renewable sources of electricity"

Warrington Borough Council

'One Warrington: One Future' Sustainable Community Strategy for Warrington 2009-30 – Commits to a reduction in the per capita CO₂ emissions by 40% by 2030

Warrington Climate Change Strategy - Sets a 20% CO₂ reduction target for Warrington by 2020

Core Strategy Objectives and Options Paper (2010) – *Objective S1 aims to "reduce emissions of greenhouse gases and the borough's carbon footprint", including by "generating more energy from renewable and low carbon sources.*

Overview of local energy networks

Local energy networks seek to create connections between local sources of decentralised, low and zero carbon energy generation with local energy demands. Such networks provide an opportunity for communities to produce their own low-carbon energy in a commercially

viable way and directly profit from the financial and environmental benefit.

This study has focussed on two key opportunities: district heating and smart grids but the same approach can potentially be used to apply to a range of other projects at varying scales.

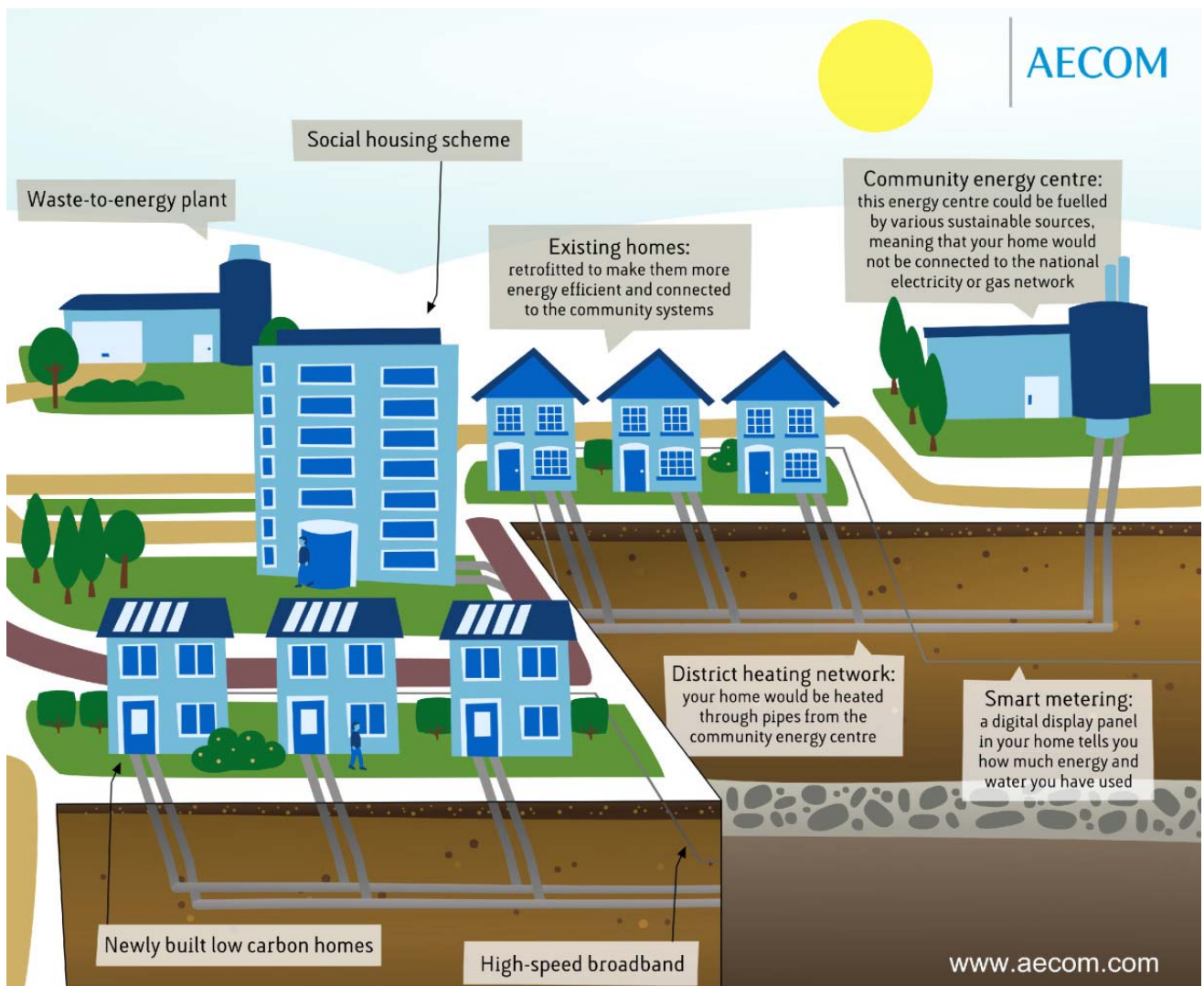


Figure 1: Diagram of a local energy network showing potential components including district heating network and smart metering

District Heating

District heating networks supply heat to buildings and homes via the delivery of hot water through a network of insulated pipes from a central energy centre as shown in Figure 1. Heat from the network is transferred to individual properties through a heat exchanger and this is used to provide all the heating and hot water to the building in the same way as a conventional heating system, controllable from within the property. Heat meters are usually used to measure the amount of energy taken from the network for billing purposes.

District heating networks can be applied at a variety of scales from a few buildings to whole cities. In the UK there are numerous examples, including various schemes across housing estates, university campuses and hospitals as well as city-wide schemes such as those in Birmingham, Southampton, Pimlico, Sheffield and Nottingham.

District heating generally helps to deliver energy more efficiently because the system can run at relatively constant levels, smoothing out the demands of the various buildings, although to some extent this is mitigated by losses across the network. Similarly the ability to consolidate heat supply, together with the ability to bulk buy fuel, means that district heating can often provide cheaper energy, although the savings are to some extent offset by operational and maintenance costs.

Reduction in CO₂ emissions can be achieved more easily with district heating schemes because of the ability to incorporate low or zero carbon technologies

which are often not efficient or effective at smaller scales. It also enables strategic connection to waste heat from industrial or other sources and/or connection to energy from waste systems.

Key benefits for Local Authorities include:

- Delivering significant and very cost effective reductions in CO₂ emissions from the public and private sectors
- Possible cost savings and profit share
- Improved Energy Performance Certificates and Display Energy Certificates for public buildings
- Contribute to CRC targets
- Possible mechanism to address fuel poverty
- Enabling new development to meet forthcoming energy requirements
- Providing energy security
- Deliver reputational benefits for the Authority and the area

Benefits for developers and building owners/occupiers include:

- Reduced capital costs for energy plant (if connecting to an existing system)
- Significant contribution towards compliance with future Building Regulation standards (particularly the incoming Zero Carbon standard)
- Reduced plant room space
- CO₂ savings (around 20% reduction on standard systems)
- Management and operation risks mostly taken by a third-party operator

Smart Grids

A significant transformation of the national electricity grid is underway that will see a complete modernisation of the technologies of generation, transmission, distribution and final use of electric energy.

A Smart Grid should be understood more as a concept than as specific technology or equipment. It is based on the use of information technology, automation and communications to monitor and control the supply and consumption of electricity in a way that makes the whole system function more efficiently. Smart Grids will demand the development of new methods of control, automation and optimisation for the operation of the electrical grid including:

- Better monitoring equipment based on the use of smart meters that will allow two way communication between generators and users;
- Processors and sensors to better protect the network against disruptions

- Demand management systems to operate equipment in response to peak demands and price fluctuations
- Easy connection/disconnection of different energy generating systems and energy storage devices

The potential benefits offered by smart grids include:

- Real time management of supply and demand to reduce peaks in demand
- Reduce the need for investment in central generation capacity
- Real time feedback to occupants on energy use and cost from individual smart meters
- Remote management of building services
- Enable greater uptake of electric vehicles

All of the above will help to reduce the CO₂ emissions associated with the national grid, both directly from the improved efficiency of generation and consumption, and indirectly by enabling the use of more decentralised, low and zero carbon energy technologies.

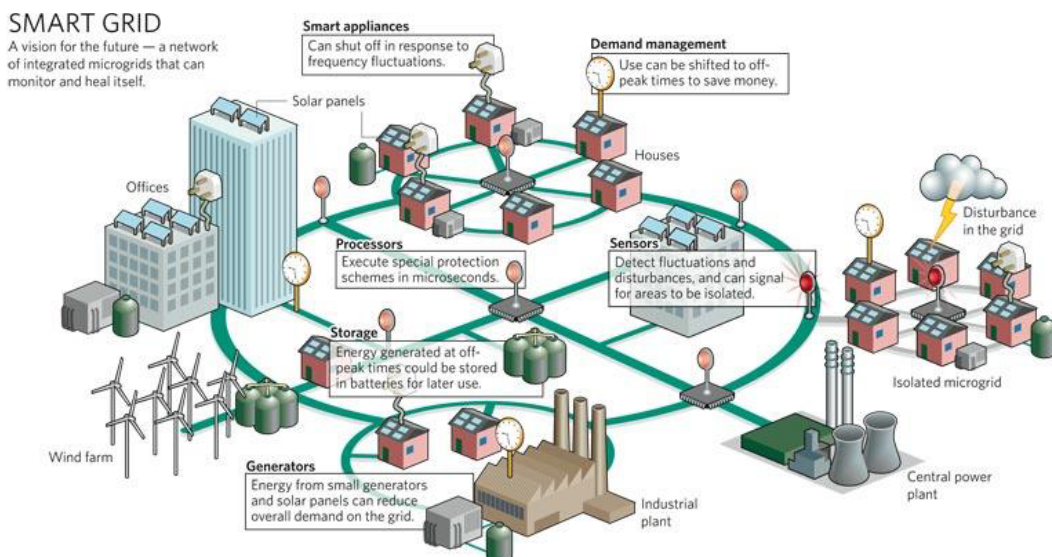


Figure 2: Diagram showing the components of a smart grid and the potential benefits that they could offer to an energy network

The Case Study Areas

To illustrate the steps in creating local energy networks we have used the following three case studies:

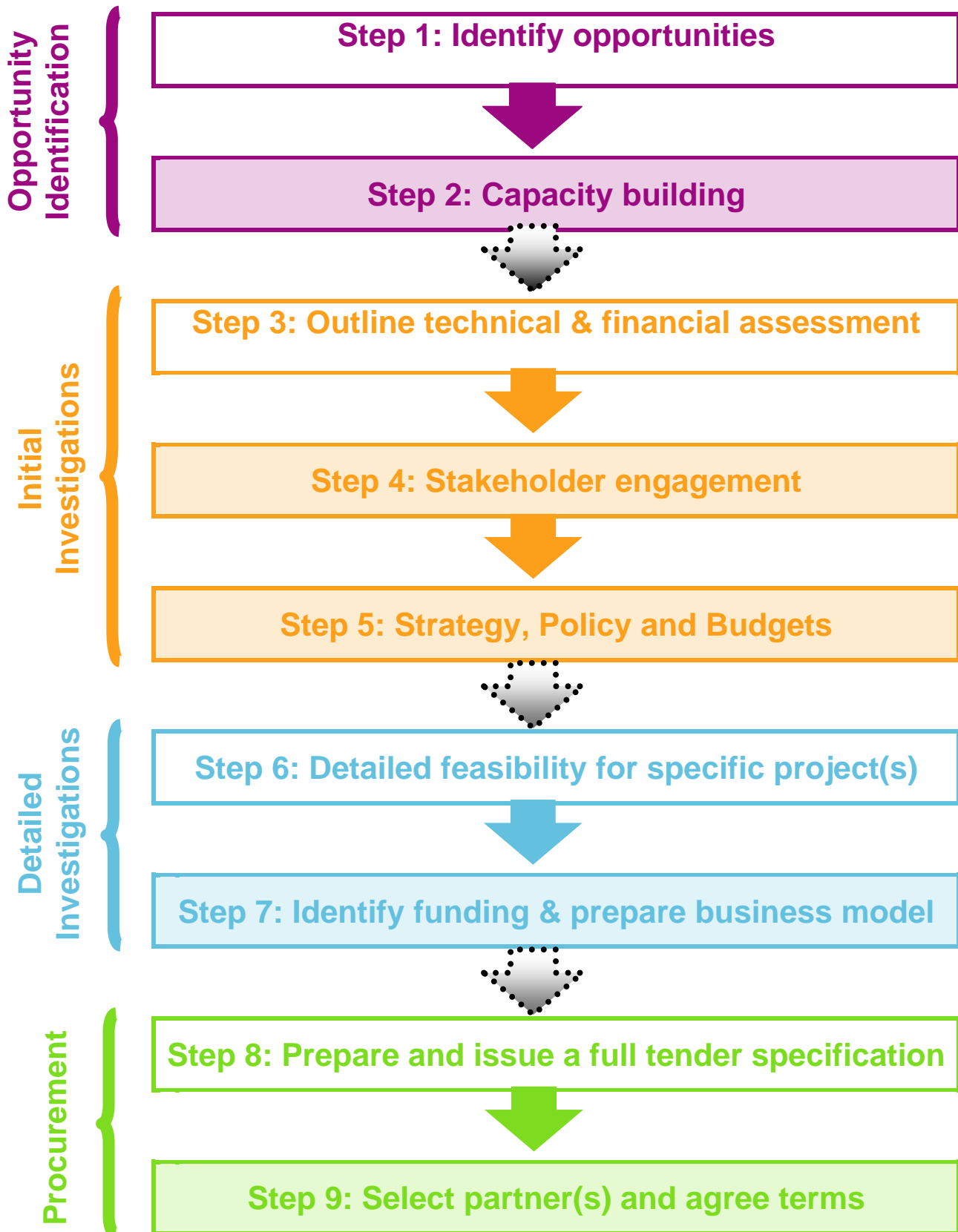
- Warrington town centre - Focussing particularly on the Bridge Street Development
- Crewe town centre - Focussing on the key development opportunities from the Crewe Vision
- Chester city centre - Focussing on the proposed Business Quarter

Roadmap

The Cheshire and Warrington Local Energy Network Roadmap set out on the following page outlines the steps required in setting up a local energy network.

The roadmap stages that are highlighted indicate steps where the Local Authority is directly responsible for delivery, whereas the other steps are likely to require technical support from consultants or other experts. The dotted arrows indicate key decision points, which occur where further financial investment and political support will be required for the project to be continued.

Cheshire & Warrington Low Energy Network Roadmap



Step 1: Identifying opportunities

The first step in the process is to assess the scale and type of opportunities within the Local Authority area.

This requires the collection of energy demand data from existing and new buildings as well as information about existing and planned energy generation systems and infrastructure.

This data can then be analysed and mapped to provide an indication of the nature and location of possible opportunities for developing local energy networks that could be explored in more detail.

Step 1: Identifying Opportunities			
Ref	Action	Discrete tasks	Responsibility
1.1	Collect Council Energy Data	<ul style="list-style-type: none"> Collect energy consumption data for council buildings Prepare a spreadsheet with building name, postcode, annual gas/oil/electricity use 	<ul style="list-style-type: none"> Local Authority
1.2	Collect data for other key buildings	<ul style="list-style-type: none"> Identify other buildings with high energy/heat demands Prepare a spreadsheet with the building name, postcode and building type Find contact details for those building owners Prepare a standard letter to issue as a request for information 	<ul style="list-style-type: none"> Local Authority Technical Consultant
1.3	Collect data for other opportunities	<ul style="list-style-type: none"> Identify locations and details of existing energy generation systems Identify locations and details of any existing communal and district heating systems Identify locations and details of existing and planned waste sites Identify locations and details of existing and planned power stations and other large energy generation systems 	<ul style="list-style-type: none"> Local Authority Technical Consultant
1.4	Collect existing GIS maps	<ul style="list-style-type: none"> Identify areas of Air Quality, Conservation Areas, Archaeology/Protected sites and Allocated development sites 	<ul style="list-style-type: none"> Local Authority
1.5	Map the data	<ul style="list-style-type: none"> Process the data collected in steps 1.1 to 1.3 and use to create maps to display the information geographically 	<ul style="list-style-type: none"> Local Authority Technical Consultant
1.6	Quantify the potential CO₂ savings	<ul style="list-style-type: none"> Use some benchmarks to estimate the CO₂ savings that could be expected from a potential scheme 	<ul style="list-style-type: none"> Local Authority Technical Consultant

Step 2: Capacity Building

If an opportunity is identified then work will be required to build up the internal support necessary to commission a more detailed study. This work will require a few key members to be identified within the Local Authority that can form a working group to present the case for further work to key personnel within the Authority and, if necessary, with other external stakeholders.

The most commonly cited lesson from large local energy network projects in the UK has been the need for a high profile champion to secure the political will to drive the project forward, be a focal point for engagement with external stakeholders and obtain the support and funding required at each of the key decision points.

Step 2: Capacity Building			
Ref	Action	Discrete tasks	Responsibility
2.1	Develop a vision	<ul style="list-style-type: none"> • Prepare a clear picture of the opportunity and benefits from the development of a local energy network in the Local Authority area for both the Local Authority and other key stakeholders • Frame the vision around key strategies and policies • Establish a clear rationale for further studies 	<ul style="list-style-type: none"> • Local Authority
2.2	Identifying leaders and champions	<ul style="list-style-type: none"> • Identify a Council member to champion the project • Identify an officer champion to project manage further work and to co-ordinate the required actions set out in this checklist • Set up a working group of key personnel 	<ul style="list-style-type: none"> • Local Authority
2.3	Internal support	<ul style="list-style-type: none"> • Set up a workshop with key personnel within the Authority to make them aware of the initial study and the plans for moving forward 	<ul style="list-style-type: none"> • Local Authority
2.4	Obtain sufficient support to commission the next stage of work	<ul style="list-style-type: none"> • Lobby for the financial and political support to continue to the next stage of the Roadmap. 	<ul style="list-style-type: none"> • Local Authority

Step 3: Technical and Financial Assessment

A technical and financial assessment is likely to require an external consultant due to the complexity of the modelling work required and the need to have an independent assessment of the viability of a possible project.

Once a study is commissioned the Local Authority will need to provide some key information about the potential

location of infrastructure, details of existing buildings, internal and external contacts and other local issues and constraints.

The more input that the Local Authority can have in this stage the more likely that key considerations and risks will be identified and the viability assessment will present a more accurate picture of the opportunities.

Step 3: Capacity Building			
Ref	Action	Discrete tasks	Responsibility
3.1	Commission a technical and financial feasibility study	<ul style="list-style-type: none"> Contact Carbon Trust for support under the Strategic Design Advice service (if required) Prepare a brief, tender the work and select a preferred bidder to undertake the work 	<ul style="list-style-type: none"> Local Authority Working Group
3.2	Provide input to the study	<ul style="list-style-type: none"> Provide commentary and input on the location of infrastructure, such as an energy centre, network routes and buildings to be connected Provide further details on specific buildings, opportunities and constraints as required or the contact details of other officers who can provide this Assess the technical and financial assumptions for their relevance to the local area Consult with colleagues in planning department regarding issues especially in relation to the Energy centre site 	<ul style="list-style-type: none"> Local Authority Working Group Planning Officers

Step 4: Stakeholder consultation and engagement

If the technical and financial assessment identifies a viable opportunity then the results of the study will need to be presented to key stakeholders to get their views on the proposals and seek their engagement if a project is to go ahead.

The stakeholders could include a wide range of Local Authority officers and members, as well as developers, residents and owners/occupiers of key buildings.

Step 4: Stakeholder Consultation and Engagement

Ref	Action	Discrete tasks	Responsibility
4.1	Identify the stakeholders	<ul style="list-style-type: none"> Identify the specific stakeholders within the Authority Identify external stakeholders Map out the likely point of involvement or engagement with each stakeholder 	<ul style="list-style-type: none"> Local Authority Working Group
4.2	Marketing and communication	<ul style="list-style-type: none"> Contact key stakeholders to make them aware of the project and identify a contact for further communications Prepare a simple document to provide to stakeholders highlighting the opportunities and next steps 	<ul style="list-style-type: none"> Local Authority Working Group
4.3	Stakeholder event	<ul style="list-style-type: none"> Once the feasibility stage is complete organise a presentation to introduce the concept, disseminate the results of the feasibility study 	<ul style="list-style-type: none"> Local Authority Working Group
4.4	Provide information for developers	<ul style="list-style-type: none"> Set out the expectations for delivering local energy networks and the implications for developers within an Supplementary Planning Document (SPD) or similar 	<ul style="list-style-type: none"> Local Authority Working Group Planning Officers

Step 5: Strategic support

The existing policies, aims and objectives from Local Development Frameworks and Council Strategies should be reviewed to determine whether the project will be able to help to deliver some of the Council's key objectives and targets. This could include social and financial goals, such as fuel poverty, as well as environmental goals.

In addition any further strategic support that could be provided should be identified. This could include planning policies to safeguard key sites or network

routes or stronger and more detailed requirements for specific developments to connect or be designed to be ready to connect to a planned network.

At the end of this stage a decision will need to be taken as to whether to proceed to the detailed design stage, which will require further resources.

Step 5: Strategic Support			
Ref	Action	Discrete tasks	Responsibility
5.1	Identify existing policies and strategies that will support the case for a Local Energy Network	<ul style="list-style-type: none"> Review support in existing planning policy Review support in other Council strategies Review finances available for the next stage of the project including both internal funding and funding that may be available from external sources Council asset plans and refurbishment/plant replacement plans for Council-owned buildings 	<ul style="list-style-type: none"> Local Authority Working Group
5.2	Assess what further support may be required in future policies and strategies	<ul style="list-style-type: none"> Identify proposed Development Plan Documents or Supplementary Planning Documents that could provide more support for local energy networks Identify work programmes that could have links with the infrastructure work required 	<ul style="list-style-type: none"> Local Authority Working Group
5.3	Obtain support to progress to the next stage of the Roadmap	<ul style="list-style-type: none"> Obtain political and financial support to continue the project 	<ul style="list-style-type: none"> Local Authority Working Group

Steps 6 & 7: Detailed Investigations

Further detailed investigations may be required to provide more detailed analysis of the technical and financial viability of a project before tendering the scheme.

Alongside this, the Local Authority will need to identify an appropriate delivery model for a project. This is likely to depend upon a number of factors but the most significant will be the level of financial investment and the allocation of risk. Examples of existing projects

should be reviewed; there are a variety of different models for existing district heating projects in the UK.

At the same time funding options should be assessed. This may be partly met by an Energy Services Company partner, but may also include direct funding by the Local Authority or through mechanisms like prudential borrowing as well as developer contributions, national or European funding schemes, the Community Infrastructure Levy and Allowable Solutions payments.

Steps 6 & 7: Detailed Investigations			
Ref	Action	Discrete tasks	Responsibility
6.1	Further technical work	<ul style="list-style-type: none"> Determine whether more work is required to assess the technical viability and if so commission this 	<ul style="list-style-type: none"> Local Authority Working Group Engineering Consultant
6.2	Further cost analysis	<ul style="list-style-type: none"> Determine whether more work is required to assess the financial viability and if so commission this 	<ul style="list-style-type: none"> Local Authority Working Group Cost Consultant
7.1	Evaluate delivery models	<ul style="list-style-type: none"> Review possible delivery vehicle options and their applicability to the project 	<ul style="list-style-type: none"> Local Authority Working Group Procurement & Legal Officers
7.2	Identify funding	<ul style="list-style-type: none"> Assess possible funding sources and applicability to the project 	<ul style="list-style-type: none"> Local Authority Working Group Procurement & Legal Officers
7.3	Risk assessment	<ul style="list-style-type: none"> Review the risks associated with the project and which will need to be taken by the Local Authority and which can be placed on the ESCo 	<ul style="list-style-type: none"> Local Authority Working Group Procurement & Legal Officers

Steps 8 & 9: Procurement

A significant decision point will be reached at the end of the Detailed Investigations stage as to whether to proceed to tender for the project.

It is anticipated that the Local Authority will be well accustomed to the procurement process and in many

ways procuring a local energy network project will follow a well defined approach. The Carbon Trust's Good Practice Guide 377 provides useful details of the specific requirements for procuring district heating systems including the likely content of a tender package.

Steps 8 & 9: Procurement & Implementation

Ref	Action	Discrete tasks	Responsibility
8.1	Output specification	<ul style="list-style-type: none"> Commission sufficient work to ensure the contractors are provided with sufficiently detailed information on which to base tender returns 	<ul style="list-style-type: none"> Technical Consultant Local Authority
8.2	Preparatory work (if required)	<ul style="list-style-type: none"> Secure planning approval for an energy centre Review utility connections for the energy centre with providers 	<ul style="list-style-type: none"> Technical Consultant Local Authority
9.1	Preparation of the Invitation to Negotiate	<ul style="list-style-type: none"> Tender instructions Output specification Project Agreement Risk Matrix Details of requested information 	<ul style="list-style-type: none"> Technical Consultant Local Authority
9.2	Pre-qualification stage	<ul style="list-style-type: none"> Place an OJEU notice including Prior Information Notice if appropriate Carry-out prequalification and select list of tenderers 	<ul style="list-style-type: none"> Local Authority procurement team
9.3	Tender Stage	<ul style="list-style-type: none"> Issue tender package to bidders Review tender returns and assess responses Issue clarification requests Interviews with shortlisted bidders (if required) Select preferred contractor 	<ul style="list-style-type: none"> Local Authority procurement team
9.4	Select partner and agree contract	<ul style="list-style-type: none"> Negotiate contract with the preferred contractor 	<ul style="list-style-type: none"> Local Authority Contractor

Opportunities in Warrington

A large redevelopment project, known as Bridge Street Quarter, has been proposed in the town centre of Warrington which could have the potential to be catalyst for the implementation of a district heating network.

Existing Buildings

The Local Authority buildings with the most significant energy demands in the centre of the city are shown in the following table:

Building	Fuel Type	Annual Consumption (kWh/year)
Retail Market	Gas	2,983,745
Poll Tax House	Gas	583,960
Warrington Library & Museum	Gas	430,524
Pyramid (crown Court)	Gas	299,657
West Annexe	Gas	296,927
Pyramid (centre Sport)	Gas	255,138
Town Hall	Gas	223,652
Retail Market	Elec	857,389
New Town House	Elec	832,224

Other key buildings in the area include:

- HM Revenue and Customs, also located in the vicinity of the Bridge Street development area
- The Unilever facility located near to Bank Quay Station which, although it is a relatively long way from the Bridge Street site, it is worth investigating to understand if there are high heat demands and/or heat waste that could be of use.

New Development

The Bridge Street Development project encompasses the area around the market in the centre of Warrington. The masterplan proposals include a large food store, a new market, retail units, a hotel, offices, apartments and car parking. Muse Developments were selected as the preferred developer for this scheme in summer 2011. In their tender Muse stated an ambition to look into the implementation of a local energy network. The Council has a major stake in this scheme both as landowners for

the majority of the site as well as future tenants (the scheme will involve the creation of new Council offices) and is therefore in a strong position to negotiate for a design which addresses the priorities in the Core Strategy.



An indicative assessment of the likely heating loads of the building areas and uses proposed for Bridge Street development suggests a heat demand in the order of 8,512MWh/year.

Other Opportunities

- The site is located next to a non-navigable section of the river which could be used to site a heat pump
- The council is currently considering rolling out PV to schools through a recycle fund
- A previous district heating scheme was proposed for another site which included retail uses and a college with possible connection to an Energy-from-Waste facility but this opportunity did not proceed.

Recommendations

The assessment of the Bridge Street redevelopment project suggests that a district heating system, either limited only to the buildings on the site or connected to neighbouring existing buildings, could be viable. This study has completed some parts of Steps 1 and 2 but further work may be required to build up the evidence and support required to commission a technical and financial viability study (Step 3).

Opportunities in Crewe

Crewe has been identified as a major growth area within the sub-region and significant regeneration and development is planned. This redevelopment has the potential to act as a catalyst for the implementation of one or more local energy networks within the town.

Existing Buildings

The Cheshire East Climate Change and Sustainable Energy Planning Research Study, carried out to support the Local Development Framework, includes heat mapping work which identifies the centre of Crewe as a potential location for the use of district heating. The Local Authority buildings with the most significant energy demands include:

Building Type	Fuel Type	Annual Consumption (kWh/year)
Swimming Pool	Gas	1,026,622
Delamere House	Gas	906,736
Kings Grove School	Gas	888,516
Sir William Stanier School	Gas	727,556
Ruskin Sports and Languages College	Gas	638,480
St Thomas More Catholic High School	Gas	573,191
Municipal Buildings	Gas	393,017
St Mary's Catholic Primary School	Gas	337,339
Crewe Library	Gas	318,835
Brierley Business Centre	Gas	262,332
Brierley Primary School	Gas	239,915
Municipal Buildings	Electricity	654,334
Pym's Lane Depot	Electricity	405,210
Delamere House	Electricity	369,936

Other key existing buildings are:

- Manchester Metropolitan University Campus
- South Cheshire College
- Leighton Hospital
- Sports Centres (Total Fitness, Fitness First & Legends Fitness Centre)
- Bentley Factory
- Orion Business Park and Crewe Business Park

New Development

The Crewe Vision Framework provides a guide for the next 10-15 years and beyond for planning, investment and delivery in the town. Amongst the measures planned for Crewe are:

- The regeneration of the town centre
- Regeneration of the railway corridors
- Development of the Basford sites and associated access works
- Sustainable urban extensions and regeneration of Crewe's priority neighbourhoods
- New manufacturing facilities are planned along the A5078 and A532, northwest of the town centre.

Other Opportunities

- Bentley manufacturing site to the west of the town
- Waste site located off Pym's Lane
- Medium-scale biomass supplier located in Middlewich
- High potential for Anaerobic Digestion due to the number of livestock farms in the area (existing facility at Reaseheath College)
- Middlewich Energy from Waste plant – this is currently at appeal stage, it is not an existing facility
- Maw Green landfill site, which has permission to operate until 2017. The potential to use the landfill gas should be explored, if not already being pursued
- Crewe sits on top of the Cheshire saline aquifer which could be a possible source of ground source heat for a district heating network.

Recommendations

The initial assessment of opportunities in Crewe suggests that two sites are worth looking at in more detail: the city centre and the cluster of schools and colleges to the south-west of the centre. This study has completed some parts of Steps 1 and 2 but further work may be required but build up the evidence and support required to commission a technical and financial viability study (Step 3). The geothermal potential should also be explored further.

Opportunities in Chester

The key development site in Chester is the proposed Business Quarter in the area adjacent to the railway station. The Council are interested in understanding the potential for the redevelopment to act as a catalyst for the implementation of a smart metering trial scheme, possibly looking at the differences between integration on new building and retrofitting to existing buildings.

Existing Buildings

The Council does not own a significant number of buildings within the city centre but the following buildings do have relatively high gas and/or electricity consumption and should therefore be considered as part of any proposed project:

Building Type	Fuel Type	Annual Consumption (kWh/year)
The Catholic High School	Gas	1,334,294
Chester Town Hall and Forum	Gas	1,287,353
Overleigh St Mary's Primary	Gas	774,859
Goldsmith House	Gas	536,610
Lightfoot Lodge	Gas	469,897
Grosvenor Museum	Gas	391,729
County Hall	Gas	369,590
The Forum	Elec	1,633,813
HQ Building	Elec	945,382
The Catholic High School	Elec	586,672
Queen's Park High School	Elec	413,921
Library	Elec	331,662
Goldsmith House	Elec	271,590

As noted above, the combination of historic buildings and new development could be of interest for a smart grid trial to compare and contrast the difficulties and successes of both the installation and operation of smart meters, controls and possibly electric vehicle infrastructure. It should be cheaper and easier to 'design-in' the smart grid infrastructure to the buildings within the new business quarter but potentially there are greater savings to be made from addressing the existing building stock, particularly if other interventions are limited due to conservation issues.

New Development

The Business Quarter is located to the south of the railway station. The majority of the site is now owned by Muse Developments and the current proposals are for around 500,000sqft of office space along with significant new public realm works.



The Northgate development is located in the historic centre of the city. The scheme, which includes retail, commercial, leisure and entertainment facilities, a new library, a new market hall, homes, a performing arts centre, restaurants and cafes, has recently been granted an extension on the planning approval.

Other Opportunities

The following low and zero carbon energy opportunities have been identified in Chester. Future feasibility studies should investigate these further to assess the potential to contribute to a local energy network:

- Hydropower scheme at Cheshire Weir
- Biomass CHP scheme at Tower Blocks
- Biogas from the sewage plant
- Possible PFI waste scheme
- New 'Superhub' data centre.

Recommendations

To pursue a Smart Grid trial the local authority would need to engage with the local Distribution Network Operator as well as the developers for the two new development sites, key building owners in the city centre and the other energy generation opportunities listed above to identify a possible project. The potential viability of a district heating network in the city centre could also be explored further.

