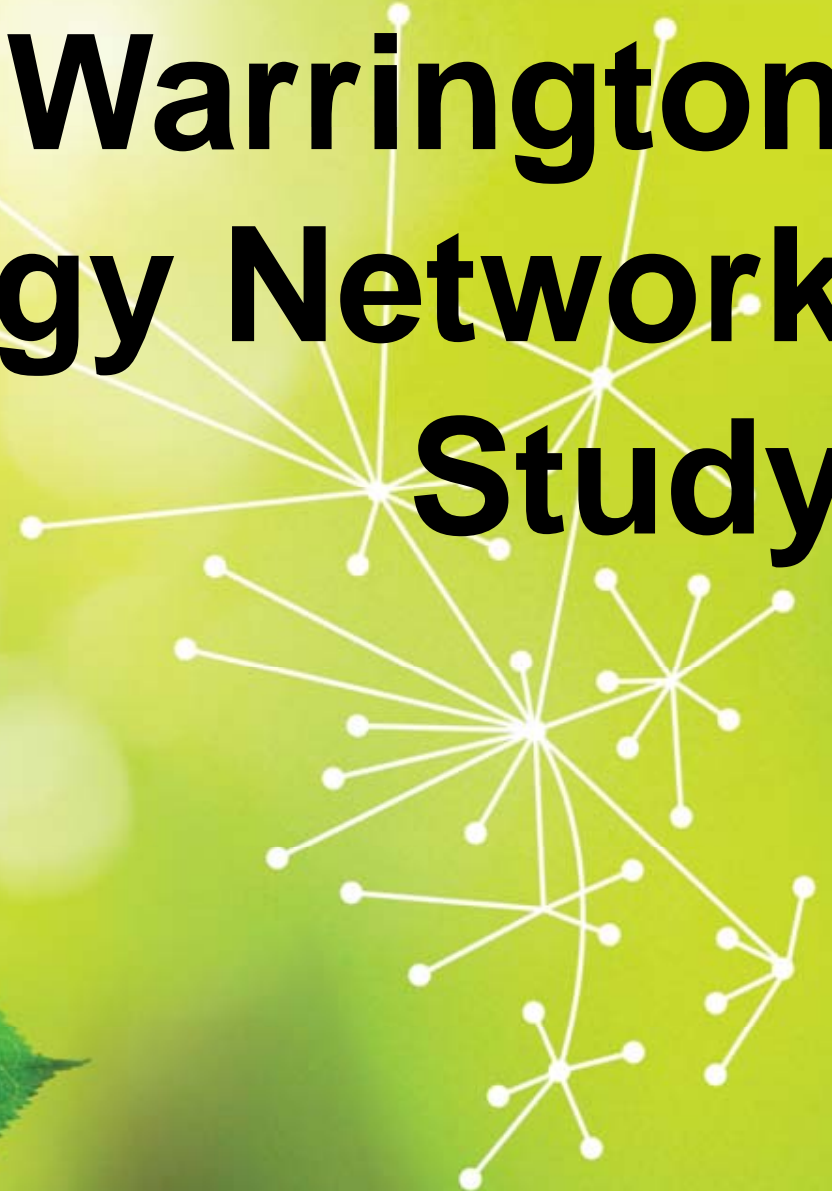


# Cheshire & Warrington Local Energy Network Study



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# Introduction to the Study



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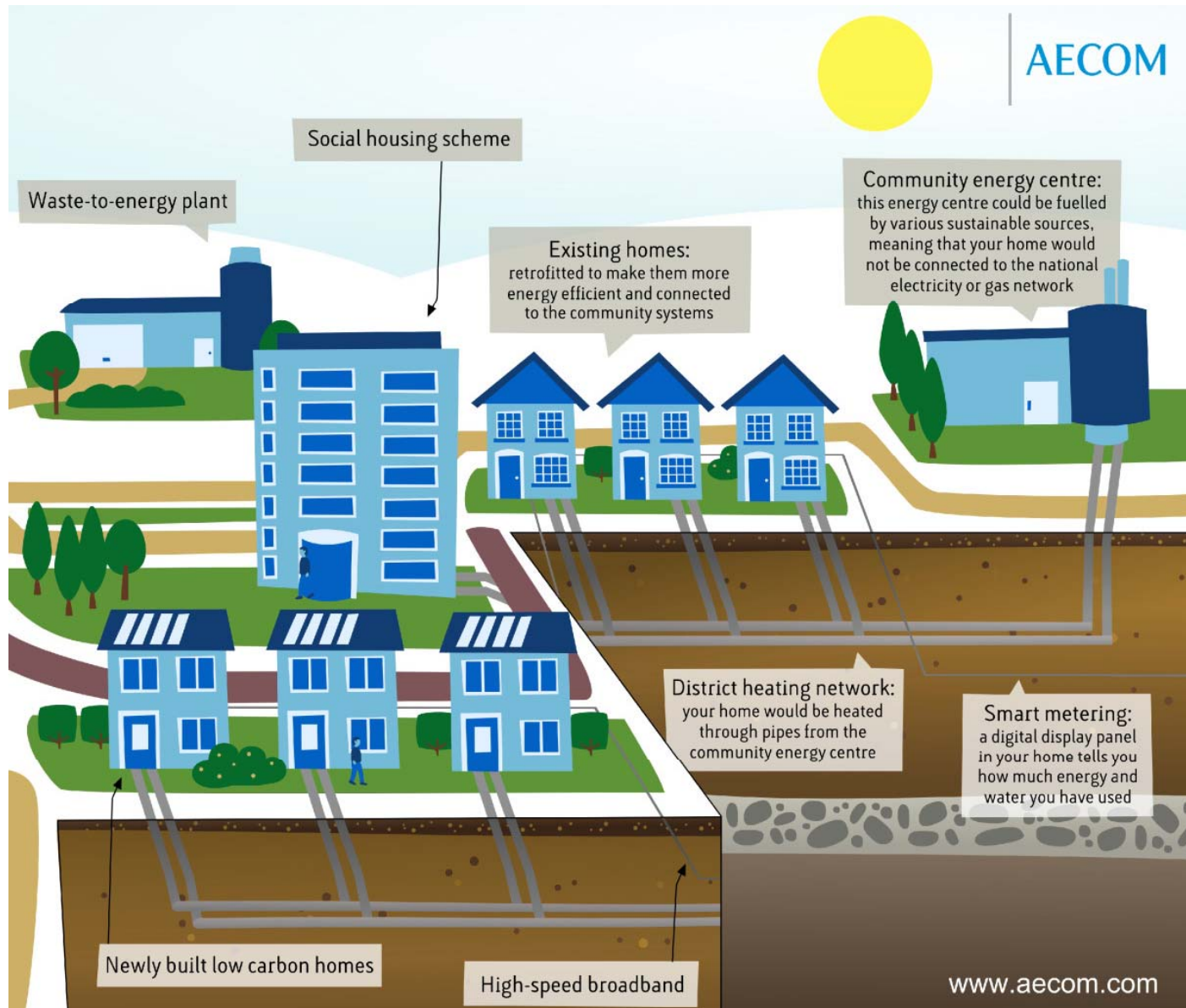
 Cheshire West  
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 Cheshire East  
Council

 Warrington  
Borough Council

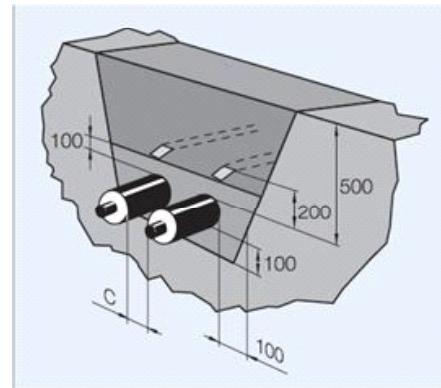
## What are local energy networks?

- Local generation and supply of energy
- Supplement or replace the traditional centralised infrastructure
- Opportunity for local authorities to deliver **significant and cost effective reductions in CO<sub>2</sub> emissions**
- Focusing on two applications
  - District Heating Networks
  - Smart Grids



## District Heating Networks Overview

- Heat supplied from a central energy centre(s) to multiple buildings
- Large demands allow the use of low carbon technologies
- Large plant and aggregated demands allows systems to run more efficiently
- Hot water distributed using a network of insulated pipes
- Individual boilers replaced with heat exchangers
- Range from a few buildings to city-wide schemes



## District Heating: The Benefits for Local Authorities

- Potential for significant reduction in CO<sub>2</sub> emissions
- Energy cost reductions and possible long-term financial returns
- Energy supply security
- Improved EPC's and DEC's for LA buildings
- Contribute towards CRC returns
- Can be used to address fuel poverty
- Assist other sectors to meet CO<sub>2</sub> targets

## District Heating: The Benefits for Customers & Developers

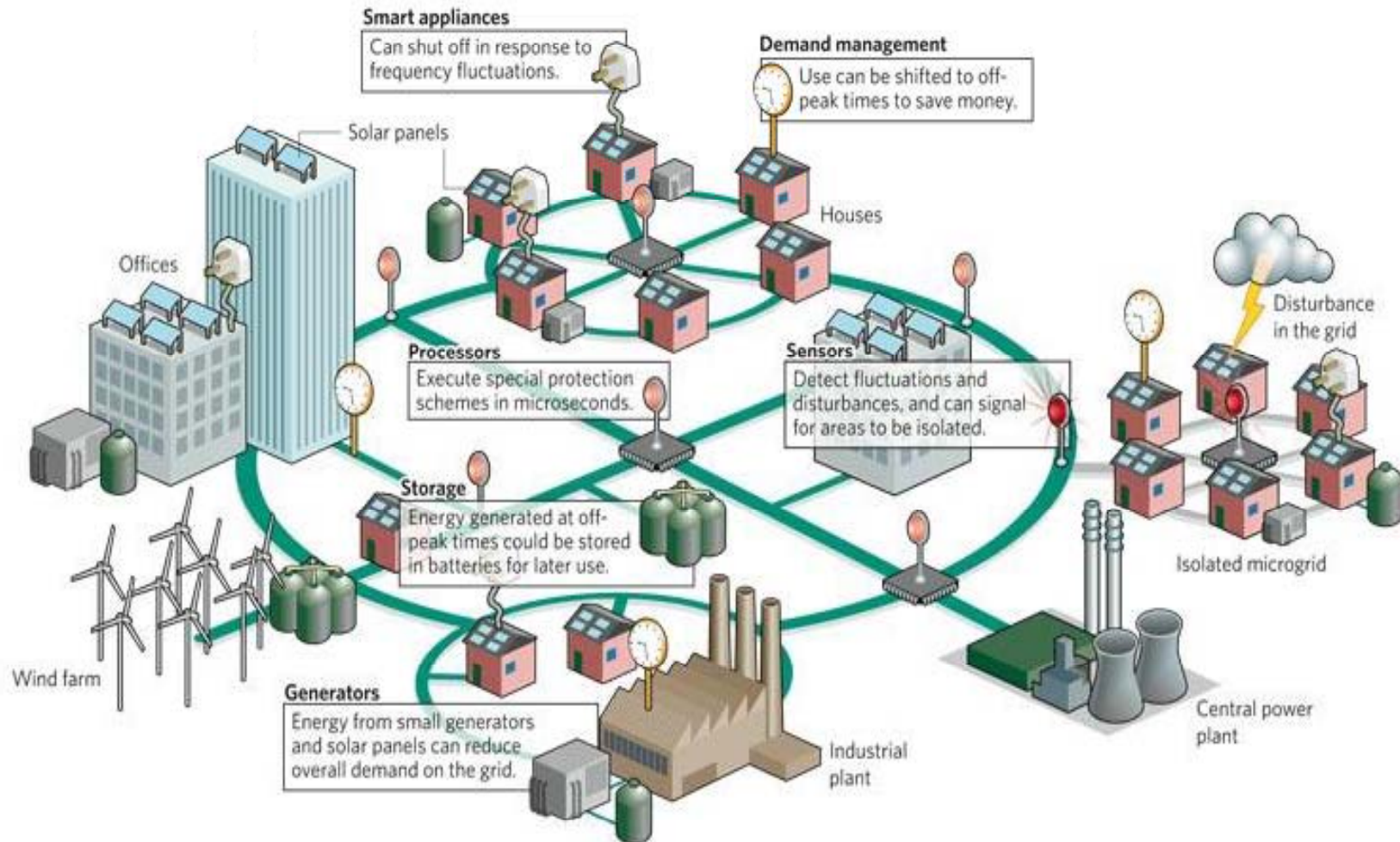
- Reduced capital costs
- Significant contribution to complying with Building Regulation standards for new developments (Zero Carbon standard in 2016/2019)
- Possible savings to energy bills
- Reduces plant room space
- CO<sub>2</sub> savings (around 20% reduction on standard plant)
- Management and operation risks passed to a third-party

## Smart Grid: Overview

- Uses meters and information networks to control and optimise energy networks
- Allows interaction between generation, transmission and use
- Key differences:
  - Allows easy connection of generators and storage devices
  - Sensors and processors
  - Smart appliances and demand management control



# Smart Grid: Overview



## Smart Grid: The benefits

- Real time management of supply and demand to enable more efficient energy use and reduce CO<sub>2</sub> emissions
- Support for uptake of microgeneration and EVs
- Enables financial incentives to encourage efficient use
- Real time information
- Automation and remote access for buildings
- Reduced bills for consumers
- Green-collar jobs

# Relevance for Cheshire and Warrington



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## Sub-Regional Policy

- ‘Northwest Renewable and Low Carbon Energy Capacity and Deployment Project Report’ (2010):
  - CHP could provide 4400MW of energy in Cheshire & Warrington by 2020 (18% of the NW low carbon technology potential)
  - Shows that Cheshire has the potential to supply over 37.5MW of electricity from biogas – the highest in the NW.
- ‘Economic Impacts of Climate Change for Cheshire and Warrington’ report (2009) identified pursuing renewable energy projects as a key intervention for the sub-region.



## Cheshire East

- Vision set in Cheshire East's Sustainable Community Strategy 2010-25 of being:
  - *“less reliant on oil and gas for our energy and [making] a step change in local production of energy from renewable sources.”*
- Core Strategy Issues and Options Paper (2010) proposes 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.”*



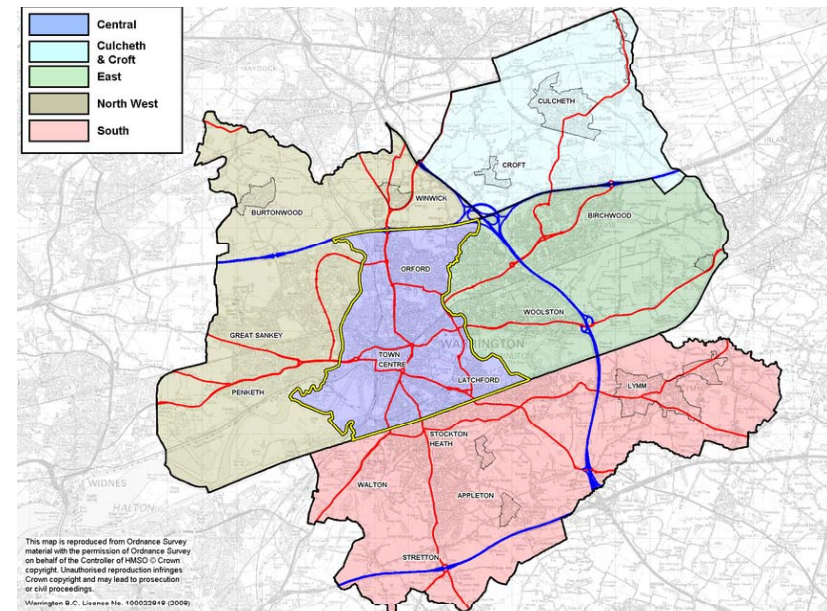
## Cheshire West and Chester

- Priority set in Cheshire West's Sustainable Community Strategy of:
  - Supporting local communities to take positive action on climate change, including increasing the proportion of energy produced and consumed locally. (Section 4.1.5)
- Core Strategy Issues and Options Paper (2009) proposes as a Key Issue:
  - *“Decentralising energy production and securing energy sources including renewable sources of electricity”* (Section 3.38).
- Affordable Warmth Strategy (2010), aims to reduce fuel poverty



# Warrington

- Sustainable Community Strategy 2009-30:
  - Commits Warrington to reducing its per capita CO<sub>2</sub> emissions by 40% by 2030, based on 1990 levels.
- Climate Change Strategy (2007):
  - Sets a 20% CO<sub>2</sub> reduction target by 2020 over 2006 levels (2.4m tonnes, excluding Fiddlers Ferry power station)
- Affordable Warmth Strategy (2000).
- Core Strategy Objectives and Options Paper (2010) includes strategic objective:
  - “To reduce emissions of greenhouse gases and the borough’s carbon footprint”, including by “generating more energy from renewable and low carbon sources.”



# Introduction to the study



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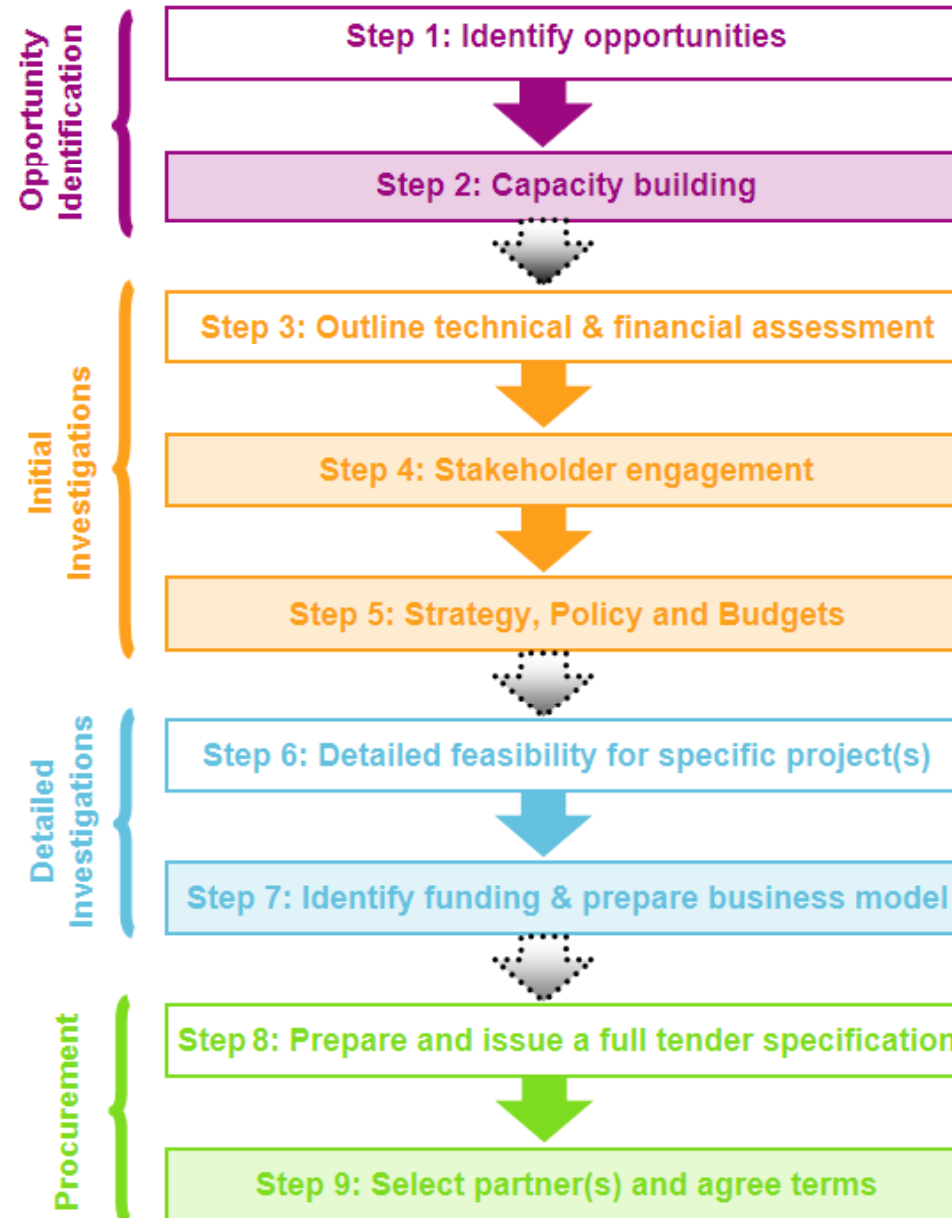




## Aims of the Study

- Identify the opportunities and benefits of creating local energy networks within the Cheshire and Warrington sub-region
- Provide a 'roadmap' showing the steps to setting up local energy networks
- Highlight actions required by the local authorities at each stage
- Provide examples through the use of specific case study areas in Warrington, Crewe and Chester

# Roadmap



## Case Study 1: Warrington

### *Potential for District Heating*

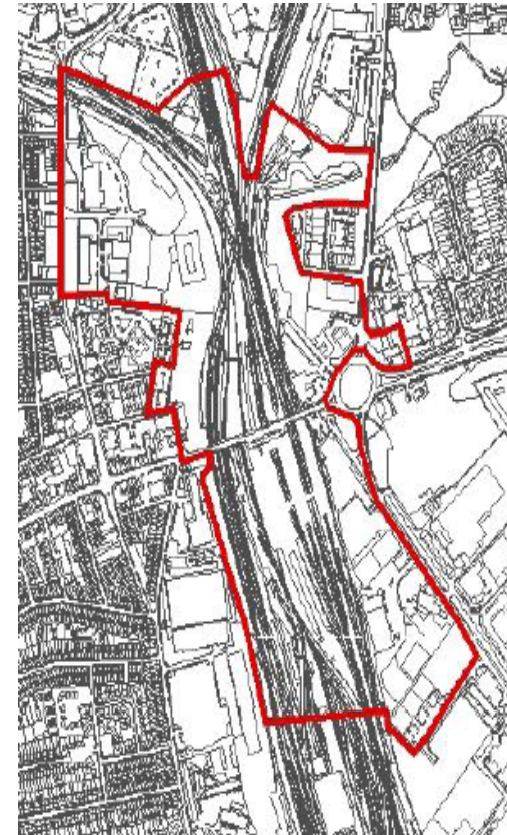
- Potential opportunity for the Bridge Street Quarter redevelopment to act as the catalyst for DHN
- Includes offices, leisure, retail, hotel, residential and public buildings – good range of demand
- Annual demand estimated at 9,707MWh/yr with a Peak Load of around 6MW
- Also neighbouring Council offices, retail, HMRC, schools and leisure in the area



## Case Study 2: Crewe

### *Potential for District Heating*

- Evidence base study for LDF Core Strategy indicates the potential for District Heating within the city
- Significant redevelopment planned which could act as the trigger
- Key development sites
  - Basford East and West
  - Gateway Site
  - City centre
- Other locally specific opportunities include:
  - Geothermal
  - Anaerobic digestion



## Case Study 3: Chester

### *Potential for a Smart Grid*

- Creation of the Chester Business Quarter – substantial office space and public realm works
- Northgate redevelopment site within the city centre
- Generation schemes being considered include:
  - Biomass CHP
  - Hydro
  - Biogas
- Contrast between implementation on new build and retrofitting to existing buildings



# Step 1: Identify Opportunities



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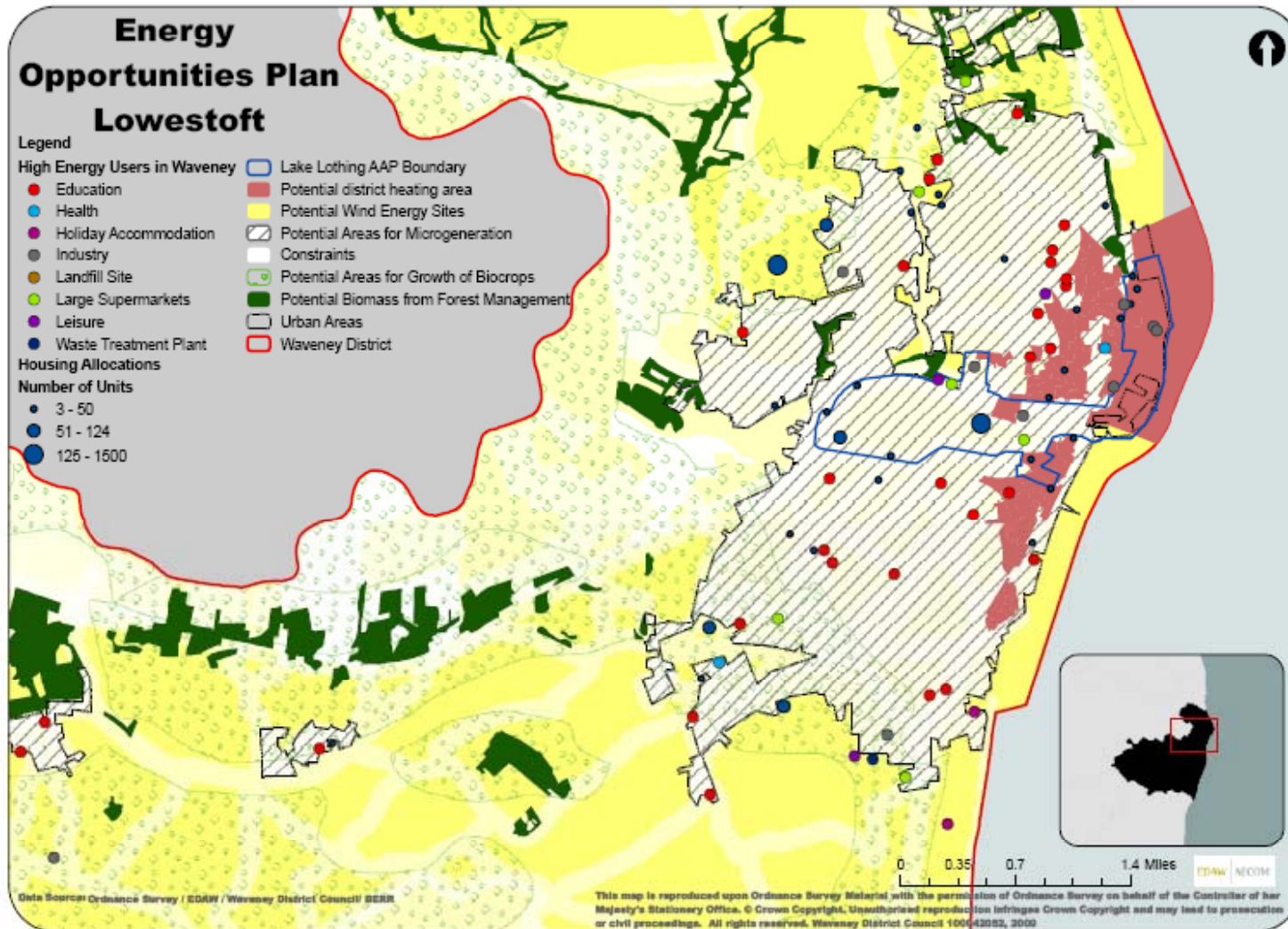
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## First steps

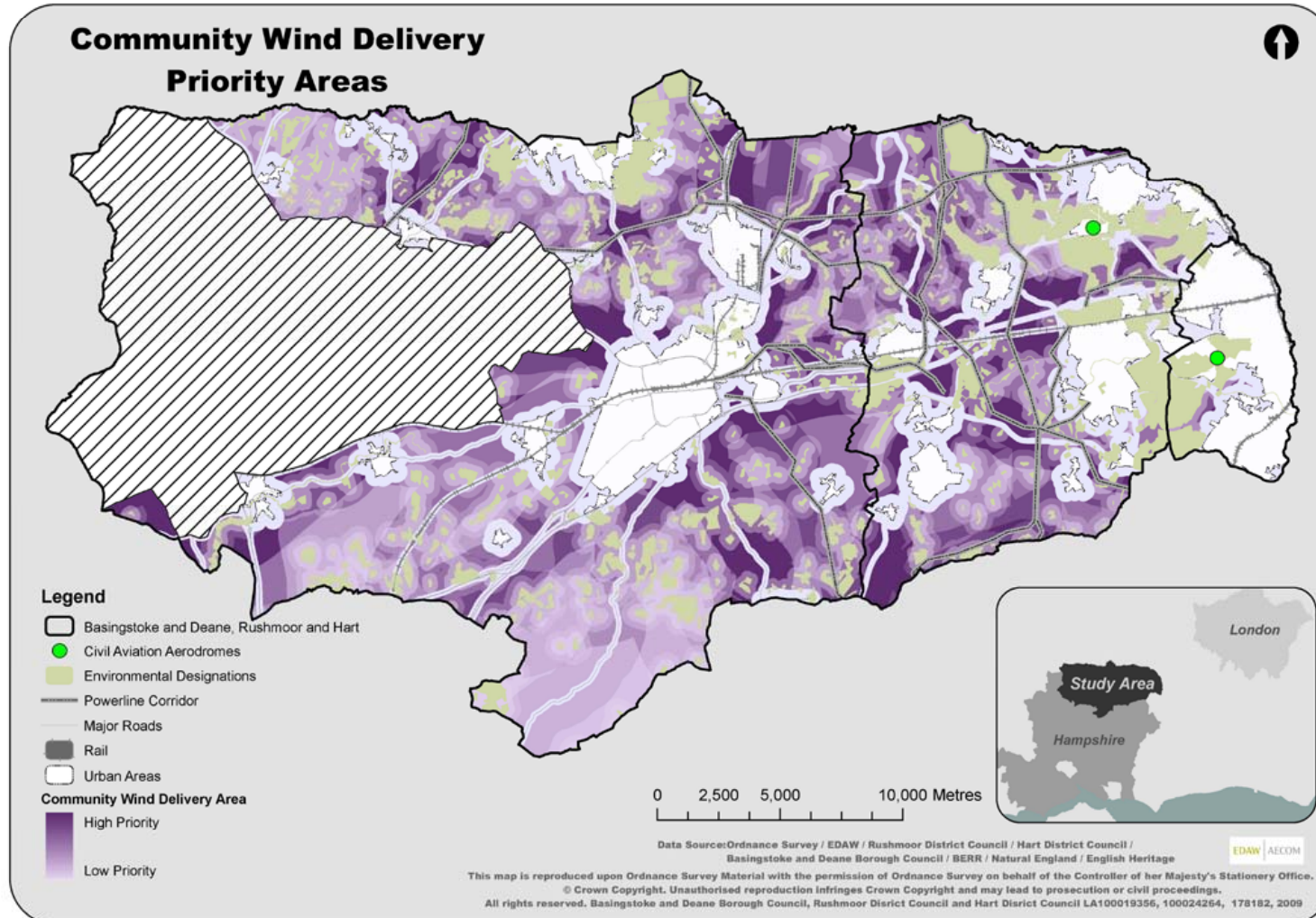
- Need to identify possible locations that could have the potential for local energy networks
- Can be undertaken internally or with external support
- Energy opportunity studies provide the initial scoping
- Needed to:
  - Provide the basis for building internal capacity
  - Provide evidence to support policies and strategies
  - Build the case for further work

# Local Energy Opportunities





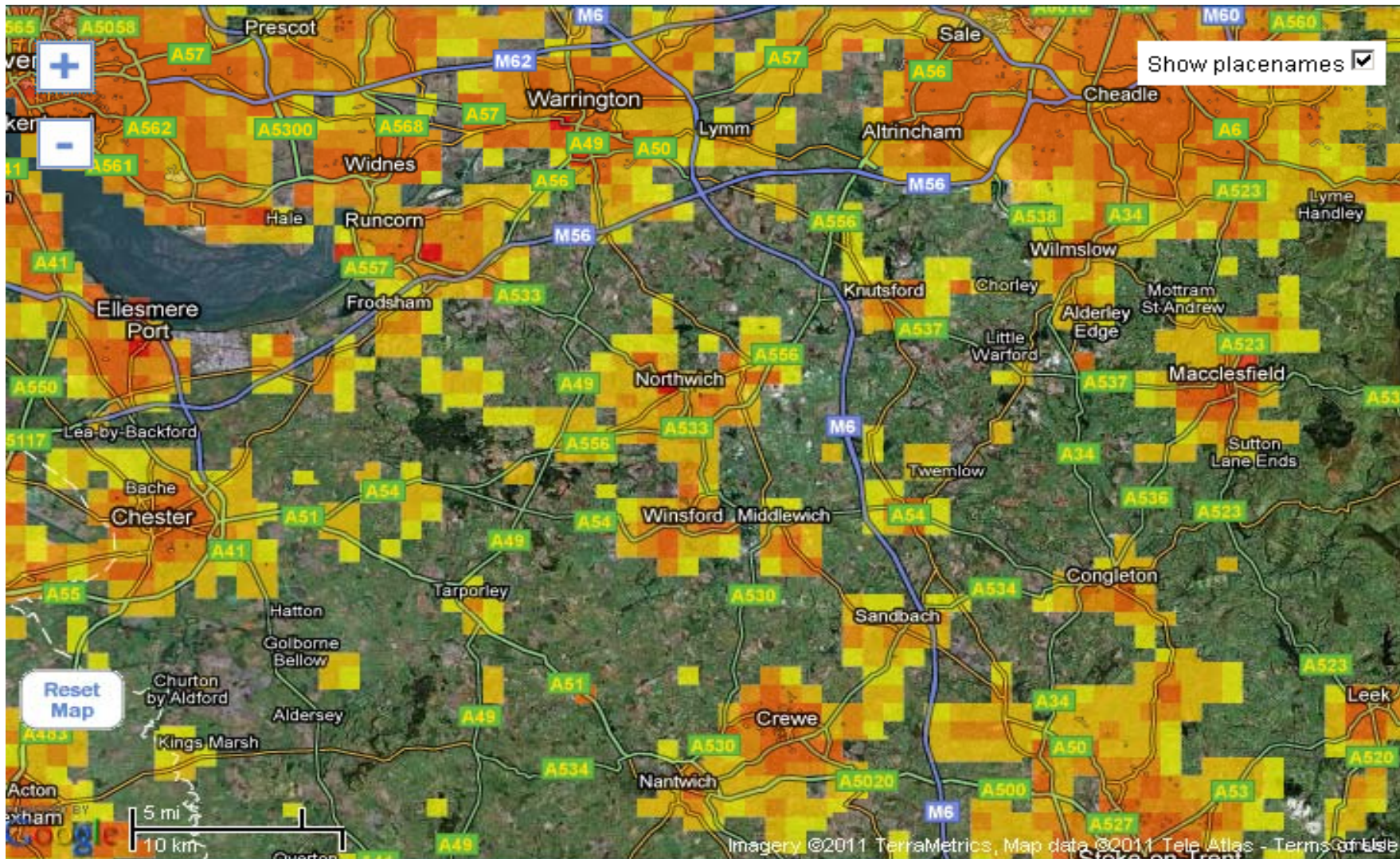
# Local Energy Opportunities



## Identifying opportunities for District Heating

- Heat density key to technical and commercial viability – large demands in small areas
- Buildings such as universities, schools, hospitals and leisure centers give a good ‘anchor load’
- Public buildings are better able to sign up to long contracts
- Systems operate better when meeting a constant heat demand so a diversity of use helps

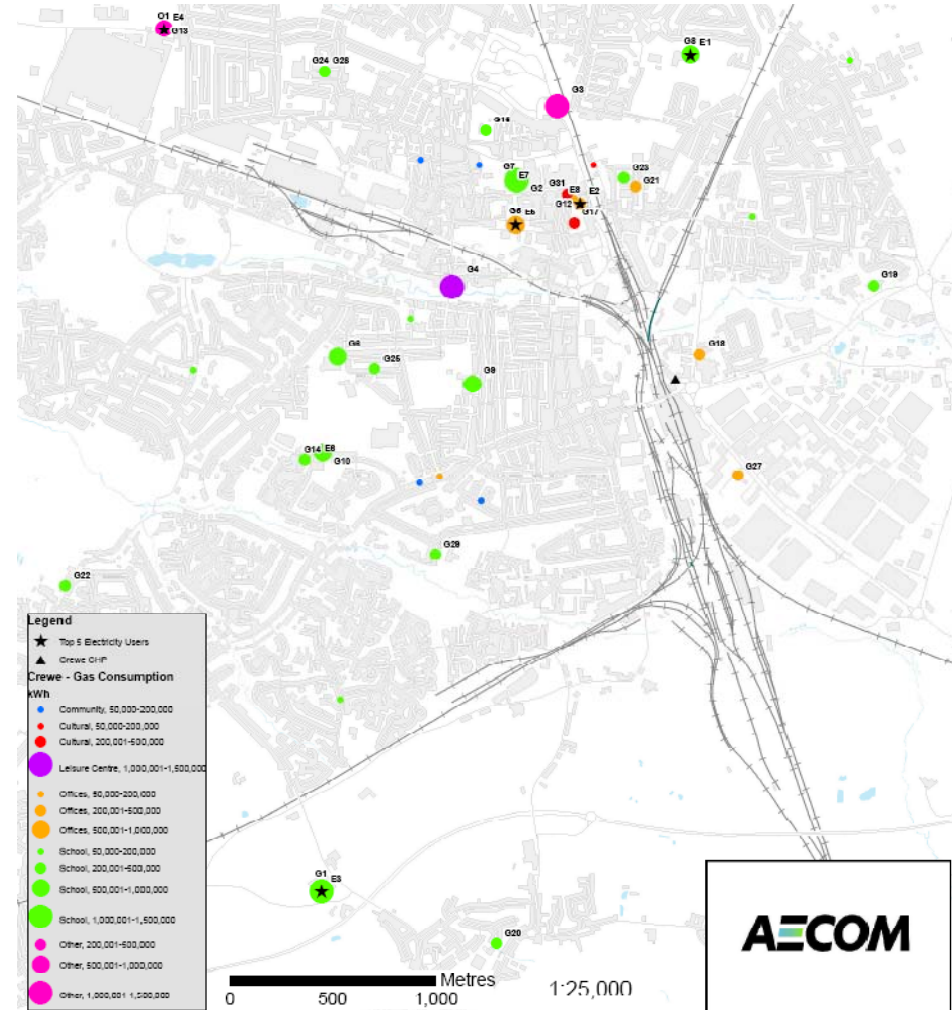
## Heat Demand across the Sub-region



# Creating District Heating Opportunity Maps

## Data collected:

- Heat mapping from national datasets
- Future development locations
- Future development heat demands
- Local authority energy data and locations of and other key buildings
- Locations of existing and planned energy generation systems



# Cluster evaluation

## Technical

- Load size, ownership, type, phasing
- Density of key loads
- Potential for expansion

## Financial

- Ownership of building
- Delivery mechanisms possible
- Capital cost and long term returns

## Deliverability

- Refurb proposals/energy strategies, timing/phasing issues
- Barriers or constraints

Technical							Financial	Deliverability
Indicators of the technical potential of the scheme in the following categories:							A combined indicator of the cost effectiveness of the scheme based on the following: delivery mechanisms/ capital costs / viability	A combined indicator of the deliverability of the scheme based on the following: Proposals/ timing/ land ownership/ site constraints
Load size	Density of loads	Existing services	Phasing	Expansion potential	Carbon Savings	Benefit to Council		
Green	Yellow	Red	Green	Yellow	Green	Yellow	Yellow	Yellow
Yellow	Green	Red	Red	Yellow	Yellow	Green	Yellow	Green
Red	Red	Red	Yellow	Red	Red	Yellow	Red	Red
Red	Red	Red	Green	Red	Red	Yellow	Yellow	Green
Yellow	Yellow	Red	Yellow	Red	Green	Yellow	Yellow	Yellow
Yellow	Yellow	Red	Green	Red	Yellow	Yellow	Red	Yellow
Yellow	Yellow	Red	Yellow	Red	Yellow	Yellow	Yellow	Yellow
Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Red
Green	Green	Green	Red	Green	Green	Green	Yellow	Green
Red	Red	Yellow	Yellow	Red	Red	Red	Green	Yellow
Green	Green	Yellow	Yellow	Green	Green	Green	Green	Red
Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Red	Yellow

## Step 1: Identifying Opportunities

Ref	Action	Discrete tasks	Responsibility
1.1	Collect Council Energy Data	<ul style="list-style-type: none"> <li>Collect energy consumption data for council buildings</li> <li>Prepare a spreadsheet with building name, postcode, annual gas/oil/electricity use</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> </ul>
1.2	Collect data for other key buildings	<ul style="list-style-type: none"> <li>Identify other buildings with high energy/heat demands</li> <li>Prepare a spreadsheet with the building name, postcode and building type</li> <li>Find contact details for those building owners</li> <li>Prepare a standard letter to issue as a request for information</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> <li>Technical Consultant</li> </ul>
1.3	Collect data for other opportunities	<ul style="list-style-type: none"> <li>Identify locations and details of existing energy generation systems</li> <li>Identify locations and details of any existing communal and district heating systems</li> <li>Identify locations and details of existing and planned waste sites</li> <li>Identify locations and details of existing and planned power stations and other large energy generation systems</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> <li>Technical Consultant</li> </ul>
1.4	Collect existing GIS maps	<ul style="list-style-type: none"> <li>Identify areas of Air Quality, Conservation Areas, Archaeology/Protected sites and Allocated development sites</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> </ul>
1.5	Map the data	<ul style="list-style-type: none"> <li>Process the data collected in steps 1.1 to 1.3 and use to create maps to display the information geographically</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> <li>Technical Consultant</li> </ul>
1.6	Quantify the potential CO <sub>2</sub> savings	<ul style="list-style-type: none"> <li>Use some benchmarks to estimate the CO<sub>2</sub> savings that could be expected from a potential scheme</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority</li> <li>Technical Consultant</li> </ul>

# Step 2: Capacity Building



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## Key steps

- Create a clear vision
  - Set out the locations under consideration
  - Highlight key opportunities and benefits for the stakeholders in the area
- Leaders and Champions
  - Project manager
  - Working group
  - Member support
- Internal support and dissemination
  - Engage with officers that will be required in later steps
  - Establish roles and responsibilities



## Step 2: Capacity Building

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

# Step 3: Outline technical & financial assessment



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## Commissioning a study

- Technical expertise will be required for this step
- Carbon Trust can provide some support via the Strategic Design Advice scheme
- Study will provide:
  - Evidence base for planning policies, strategies and further budget commitment
  - Indication of level of CO<sub>2</sub> saving
  - Key financial parameters for an initial business case and identification of funding
  - Key practical considerations: land to be safeguarded for network or energy centre, key risks, further work required etc
  - Focus for more detailed stakeholder discussions

## Role of the local Authorities

- Provide data and information
  - Energy consumption and energy costs
- Feed into decision making
  - Locations for an energy centre
  - Network routes
  - Buildings suitable for connection
  - Specific local opportunities and constraints
  - Contact details for key stakeholders

### Step 3: Capacity Building

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

# Step 4: Stakeholder Engagement



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## Who are the stakeholders

### Internal

- Members
- Planning
- Highways
- Property Services
- Development Control
- Air Quality
- Procurement
- Legal services

### External

- Customers (owners of key buildings identified as possible network connections)
- Developers
- Landowners
- Social Landlords
- Resident groups
- Energy companies
- Relevant local groups
- Consultants

## How to reach out

- Workshops
  - Provide opportunity for stakeholder involvement and get buy-in
- Marketing and Communications
  - Clear vision with information on benefits for stakeholders
  - Target to key stakeholders
- Information and guidance for developers
  - Plans and timescales for network roll-out
  - Benefits of connection
  - Design implications of connection
  - Planning requirements



## Step 4: Stakeholder Consultation and Engagement

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

# Step 5: Strategic support



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## Identify existing strategic support

- Review project outputs against Council policies and strategic aims and objectives:
  - Possible contribution to CO<sub>2</sub> reduction targets (and cost effectiveness of CO<sub>2</sub> mitigation)
  - Potential to address areas with fuel poverty
  - Financial case
- Review strength of support in planning policy relative to scale and locations of opportunities identified
- Ideally review relative to other possible projects
- Identify further support required

## Additional support

- Planning
  - Designate 'opportunity areas' and encourage/require new developments to connect or be ready to connect
  - Enable the use of the Community Energy Fund, Community Infrastructure Levy and Allowable Solutions to help fund future network and connections
  - Safeguard sites and routes for future infrastructure
  - Potential to use Local Development Orders to remove need for planning permission requirements
- Review asset management plans, infrastructure work programmes for potential

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

# Steps 6 & 7: Detailed Investigations



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## Further work

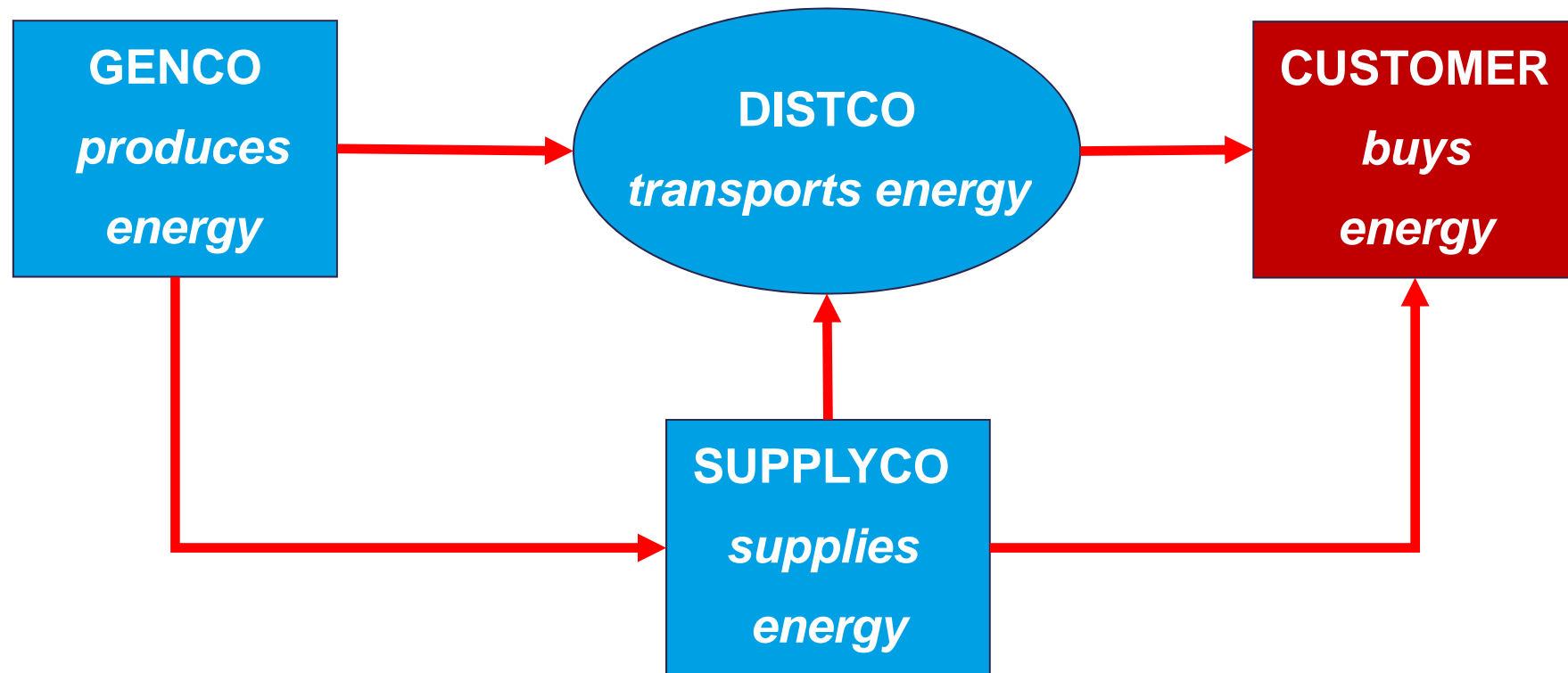
- More detailed work or further investigations may be required
  - Technical assessment
  - Design constraints
  - Legal advice
  - Financial modelling
  - Other work to reduce potential risks
- Enabling work
  - Planning
  - Utility infrastructure

## Delivery vehicles

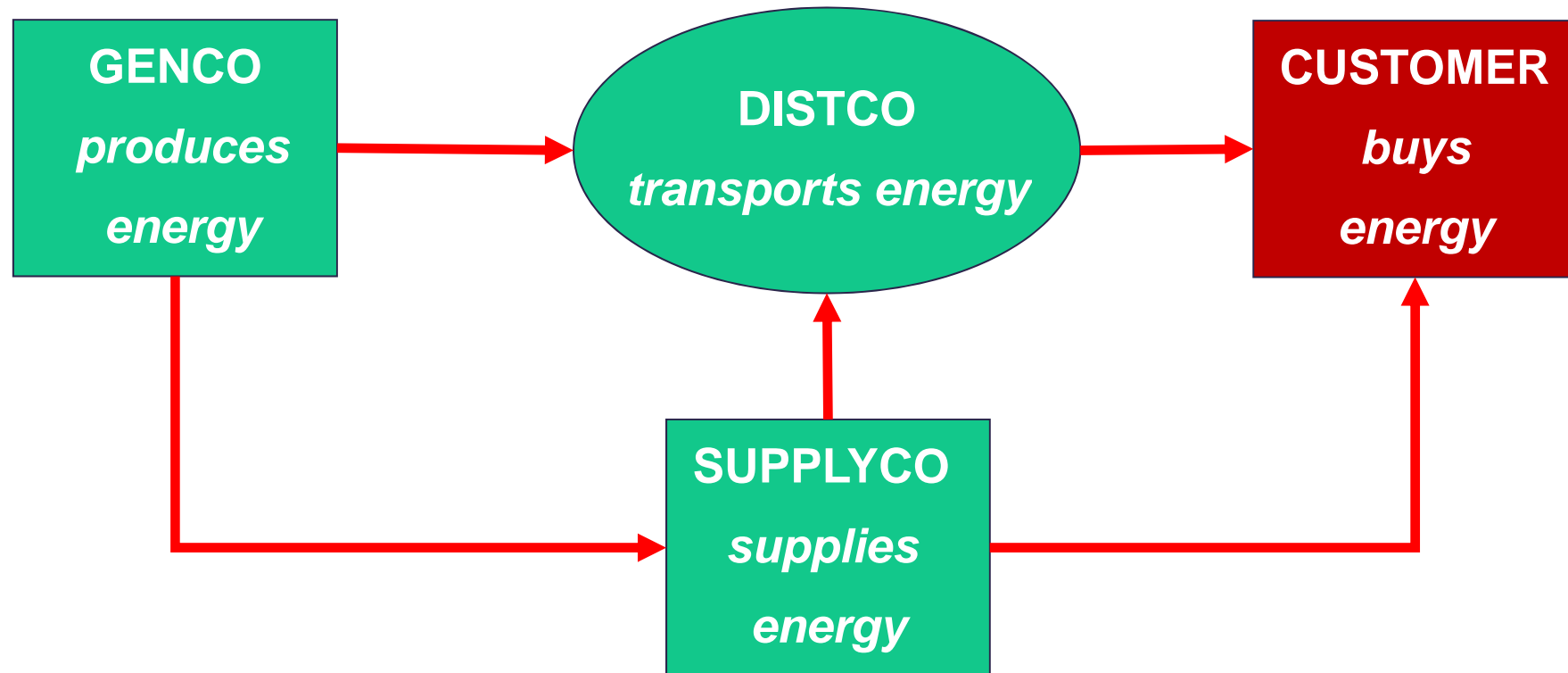
- Public sector
  - Advantages: Lower cost finance, not profit driven, low set-up costs, anchor customers, strategic view
  - Disadvantages: Limited expertise, less willing to take risks, limited access to private finance
- Private sector (Energy Services Company)
  - Advantages: Commercial and technical expertise and experience, access to capital funding, better able to manage risks
  - Disadvantages: Profit driven, less drive for strategic expansion,
- Examples of models for existing district heating systems in the UK:



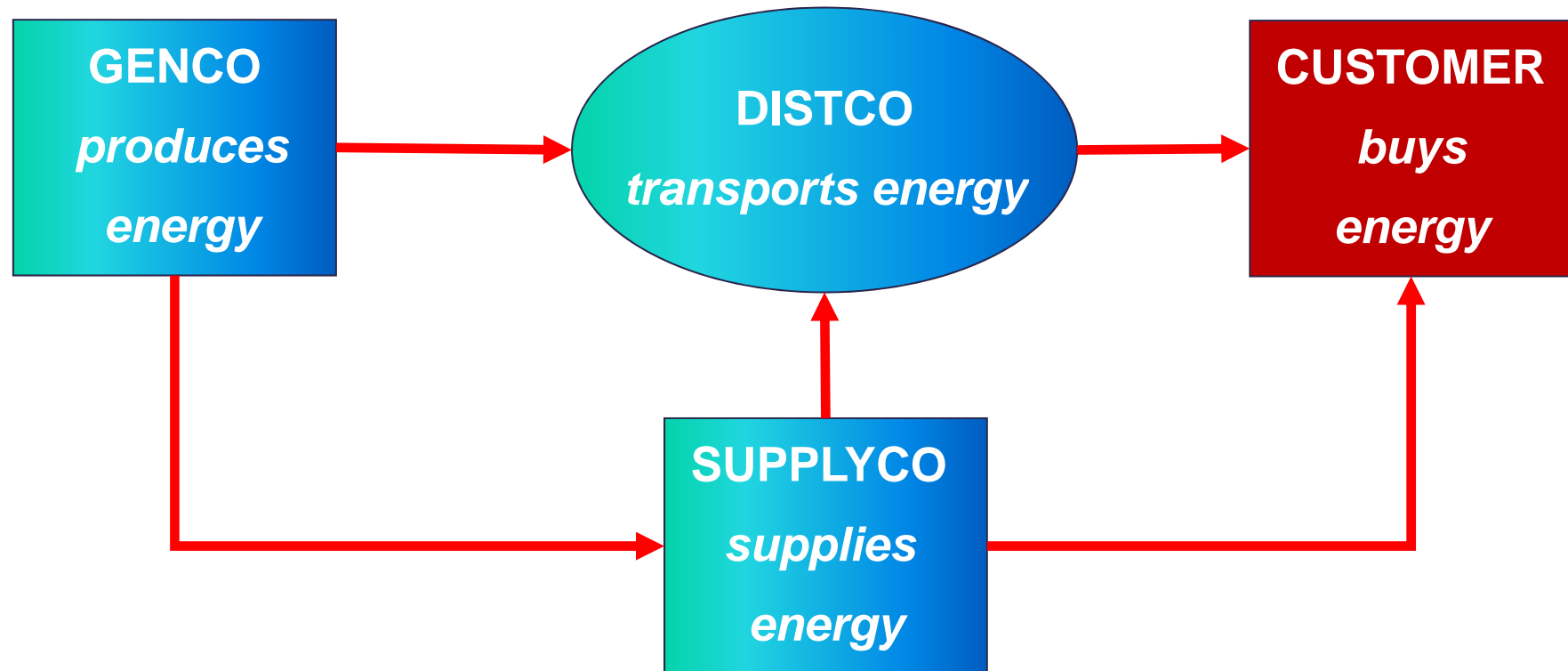
Private sector ownership e.g. Southampton, Citigen, Sheffield



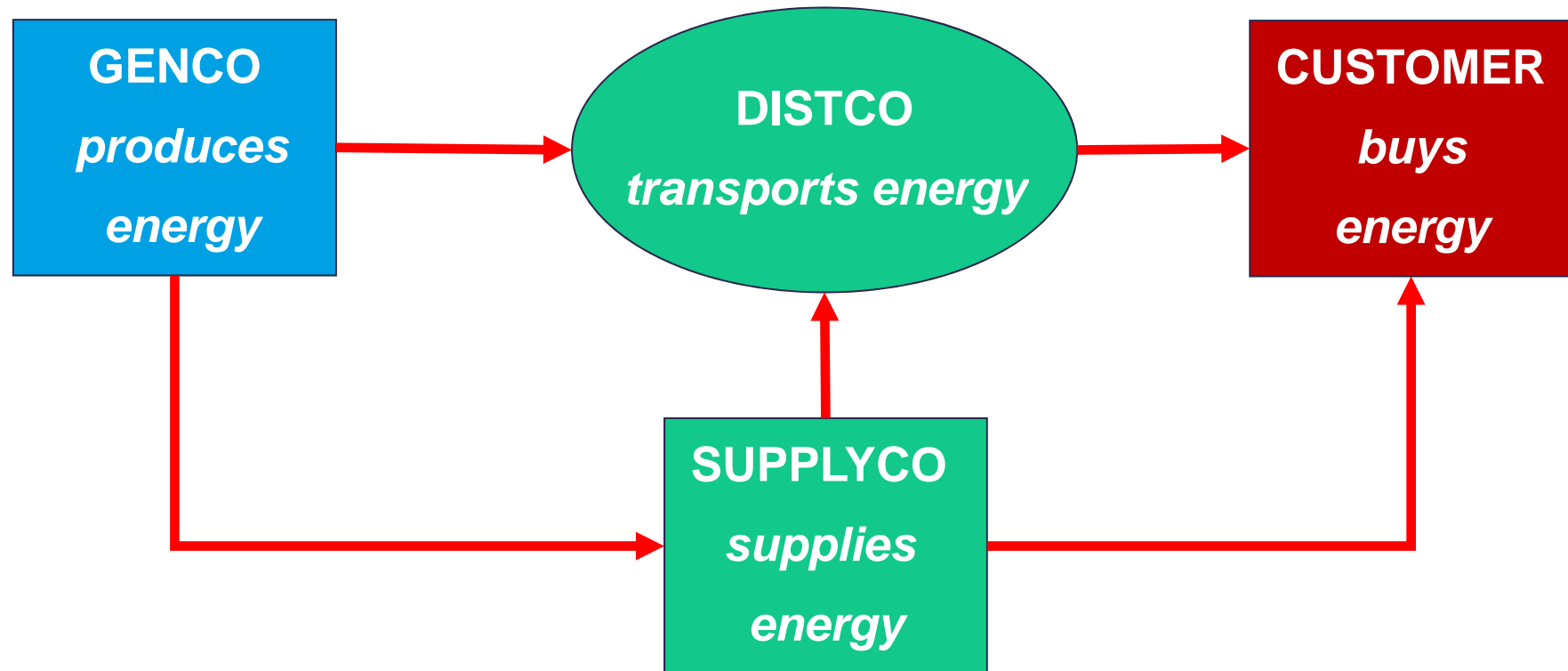
### LA Ownership e.g. Pimlico



## Joint Ownership e.g. Birmingham



LA owns network and supply business, private sector owns heat source, e.g. London Thames Gateway (proposed)



## Sources of Funding

- ESCo capital funding
- Local Authority capital funding
- Community Energy Fund/Allowable solutions
- Developer contributions
- Community Infrastructure Levy
- Renewable Heat Incentive, Feed In Tariff and ROCs
- EU Funding – ELENA and JESSICA
- Prudential borrowing
- Ofgem Low Carbon Networks Fund

## Steps 6 & 7: Detailed Investigations

Ref	Action	Discrete tasks	Responsibility
6.1	<b>Further technical work</b>	<ul style="list-style-type: none"> <li>Determine whether more work is required to assess the technical viability and if so commission this</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority Working Group</li> <li>Engineering Consultant</li> </ul>
6.2	<b>Further cost analysis</b>	<ul style="list-style-type: none"> <li>Determine whether more work is required to assess the financial viability and if so commission this</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority Working Group</li> <li>Cost Consultant</li> </ul>
7.1	<b>Evaluate delivery models</b>	<ul style="list-style-type: none"> <li>Review possible delivery vehicle options and their applicability to the project</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority Working Group</li> <li>Procurement &amp; Legal Officers</li> </ul>
7.2	<b>Identify funding</b>	<ul style="list-style-type: none"> <li>Assess possible funding sources and applicability to the project</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority Working Group</li> <li>Procurement &amp; Legal Officers</li> </ul>
7.3	<b>Risk assessment</b>	<ul style="list-style-type: none"> <li>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</li> </ul>	<ul style="list-style-type: none"> <li>Local Authority Working Group</li> <li>Procurement &amp; Legal Officers</li> </ul>

# Steps 8 & 9: Procurement, & Delivery



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## Preparing a Tender

- Either look to delivery partner to prepare full design or commission a third party to prepare a design for issue with a tender
- Tender will include:
  - Output specification
  - Details of risk allocation
  - Project agreement
  - Information requests
- Carbon Trust GPG377 provides a guide to procuring district heating networks including an example output specification and project agreement



## Procurement

- Contract period likely to be around 20-30 years
- An agreement on level and indexation of energy sales price will form part of the project agreement
- Procurement process likely to take around 12 months from the prequalification to the financial close with the selected partner
- Delivery timescale of a scheme will be project specific

## Steps 8 & 9: Procurement & Implementation

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

# Opportunities in Cheshire & Warrington



 | **CLASP.**

SUPPORTED BY

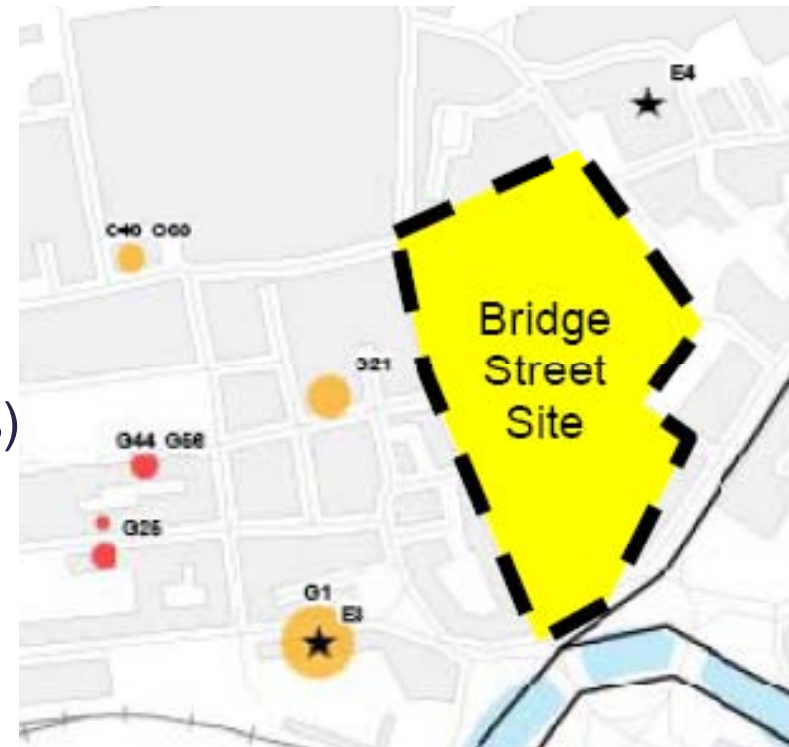
 Cheshire West  
and Chester

 Cheshire East  
Council

 Warrington  
Borough Council

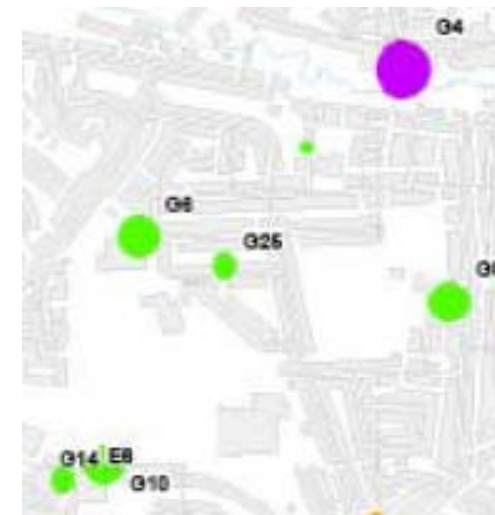
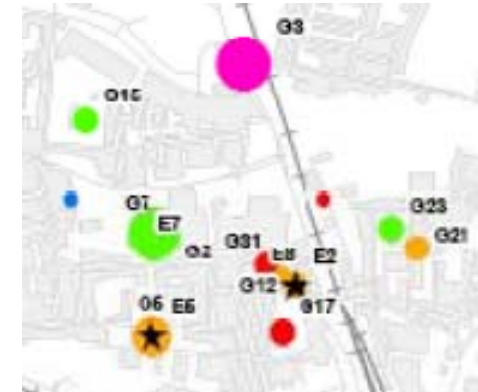
## Warrington

- Bridge Street Development identified as a potential catalyst for district heating in the city centre
- Potentially limited to the development or linked to neighbouring buildings
- Parts of Steps 1 (Opportunity Analysis) & 2 (Capacity Building) completed
- Opportunity identified but further work may be required prior to moving to Step 3
- Discussions with the preferred developer will be key



## Cheshire East

- Two potential sites identified with opportunity for district heating: city centre and cluster of schools & colleges
- Geothermal potential should be explored further
- Parts of Steps 1 & 2 completed but further work may be required prior to moving to Step 3



## Cheshire West & Chester

- Smart Grid trial would require partnership with DNO and key stakeholders
- Limited Council ownership so need to work closely with other building owners
- Potential generation opportunities need to be better understood
- District Heating opportunities could also be explored further

