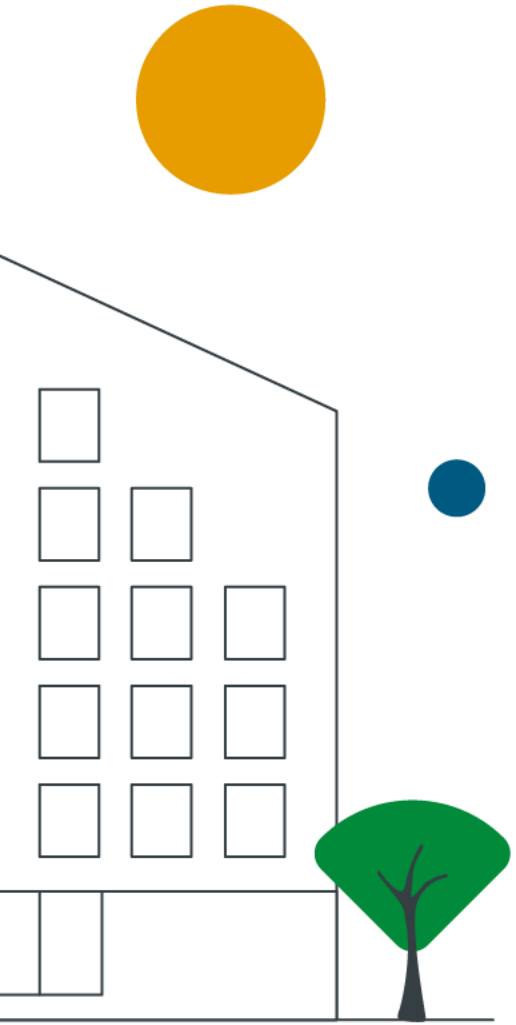
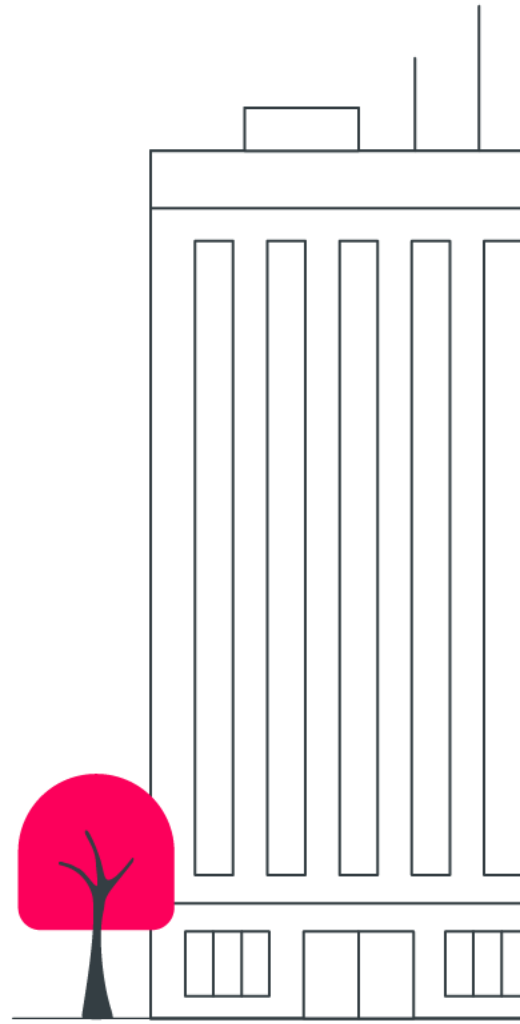
MAYOR OF LONDON

Zero Carbon Accelerator

Heat networks deep dive





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Introduction to heat networks

Introduction to heat networks

- Heat networks use insulated underground pipes to distribute heat from centralised sources to a variety of different customers.
- These systems remove the need for individual boilers in each building and can utilise low carbon heat sources and waste heat - which would otherwise be lost.
- In 2023, around 2-3% of heat in the UK was provided by heat networks.
- It is estimated that heat networks will need to be supplying almost 20% of heat by 2050 to enable the UK to reach net zero. This percentage will be higher in dense urban areas.
- London's waste heat study indicates what heat networks using waste heat could look like and provide the impetus for London Boroughs to explore the opportunity further.
- The report estimated that seven strategic heat networks could deliver up to approximately 40 million tonnes of carbon savings for London over the next 40 years

Introduction to heat networks

GLA London Plan (Policy SI3) requires major development proposals within Heat Network Priority Areas to have a communal heating system and points to a hierarchy of connection. GLA have published a study of waste heat within London that considers high level connection between large waste heat sources and large energy consumption.

Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

The heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

- connect to local or existing planned heat networks
- use zero emission or local secondary heat sources (in conjunction with heat pump, if required)
- use low emission combined heat and power (CHP) only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network.

Introduction to heat networks

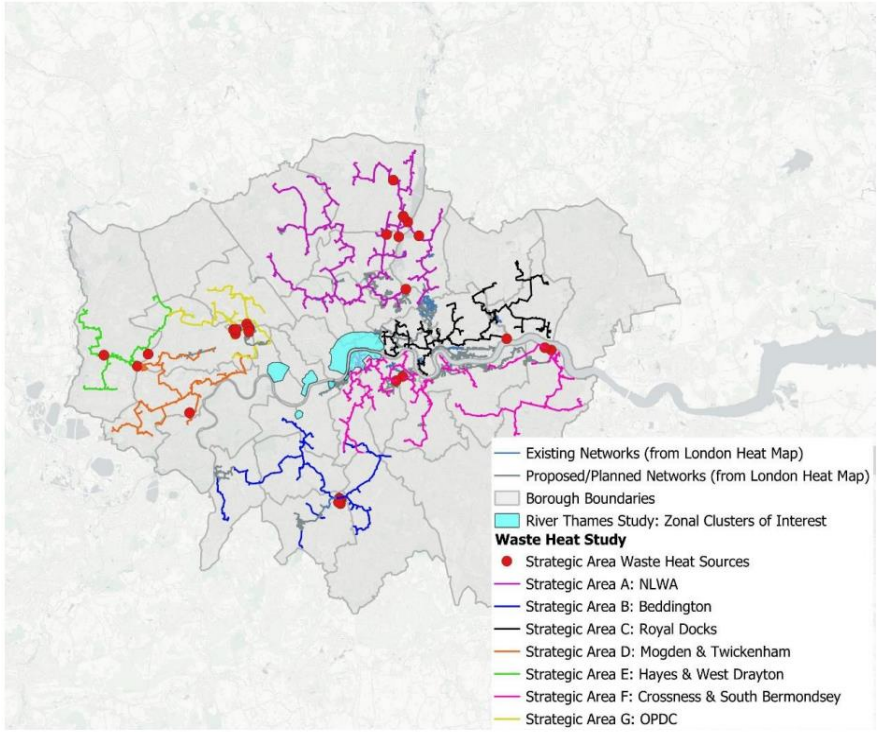
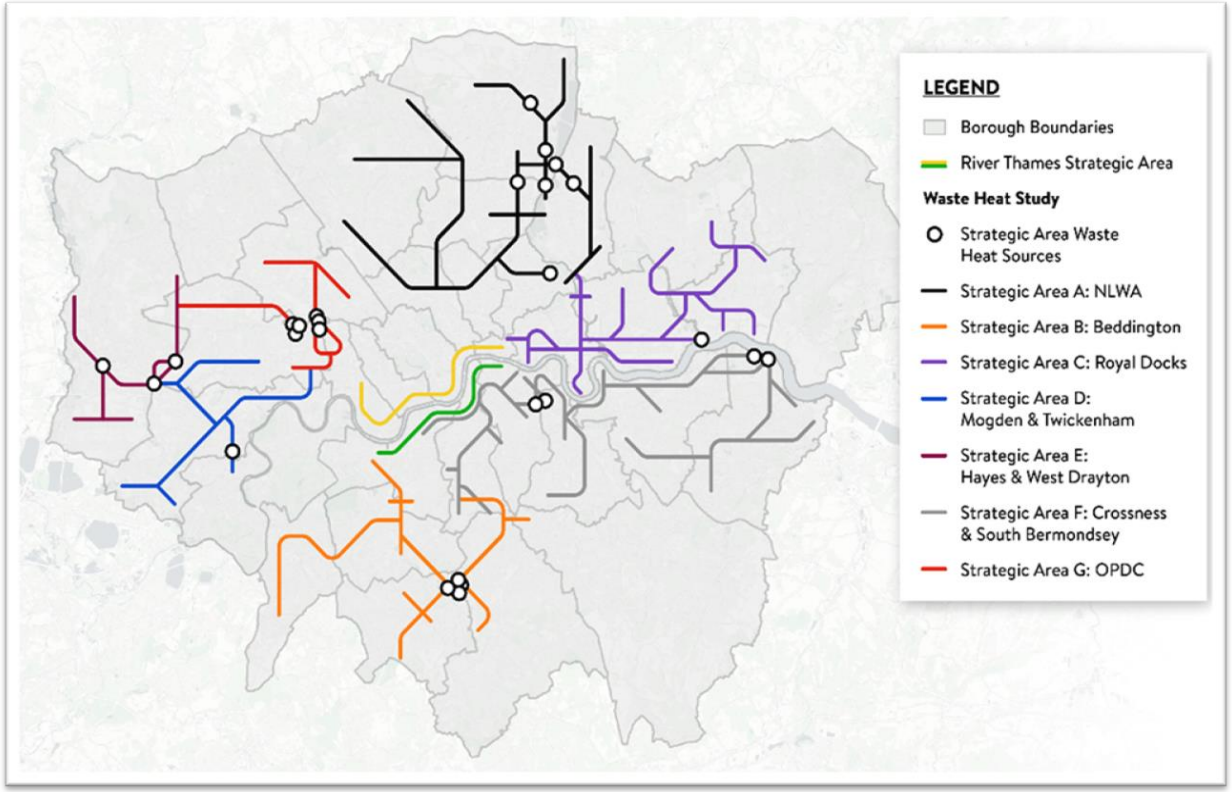


Figure 1-1 Waste heat and River Thames study key outputs

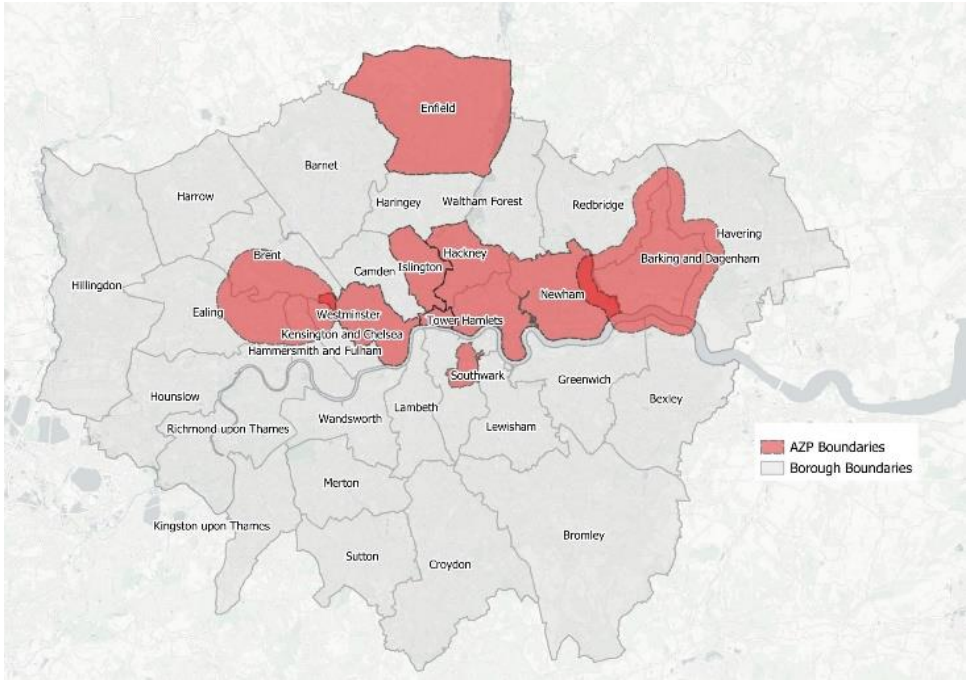


Introduction to heat network zoning

Heat network zoning will support project development in the future, with the heat network zoning algorithm identifying locations where heat networks can provide the lowest cost, lowest carbon solution to heat decarbonisation.

Heat network zoning regulation in England is designed to:

- Establish methodology for identifying heat network zones
- Create Zoning Coordinator role to designate heat network zones
- Require heat networks in zones to meet a low carbon requirement
- Certain buildings and heat sources to connect to a heat network.



Advanced Zoning Pilots (AZP)
Southwark, Enfield, Barking and Dagenham, OPDC, Westminster, Islington, City of London, East London Energy

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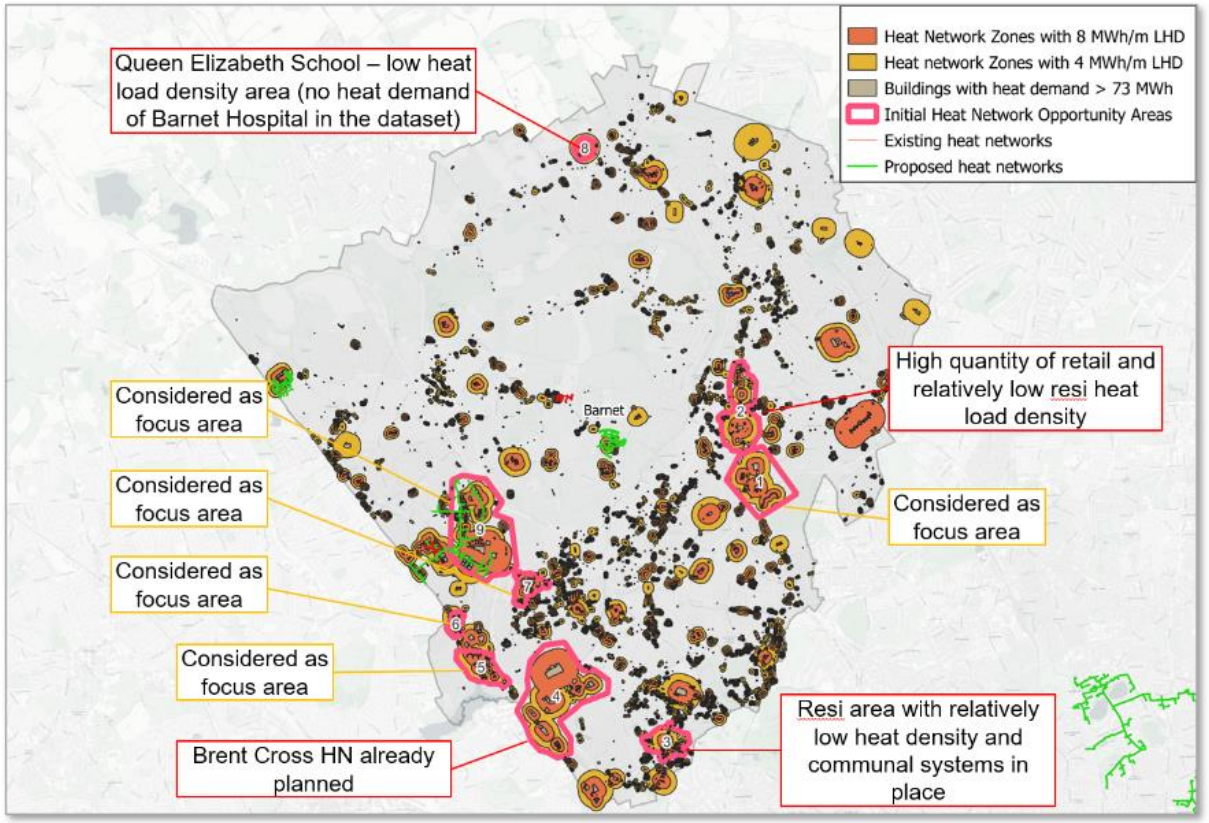
Prepare – Finchley & Hendon (Barnet)

Barnet project identification

- Linear Heat Density assessment used to identify priority areas.
- Finchley and Middlesex University highlighted as priority areas – due to number of public sector buildings and land ownership

Data:

- Brent Cross
- EPC
- Existing heat networks
- LHM Dump
- LSOA Fuel Poverty
- Maps created
- Public land registry
- Shallow retrofit scenario
- Social housing
- Statistical london boundaries
- UKPN
- Waste Heat Sources



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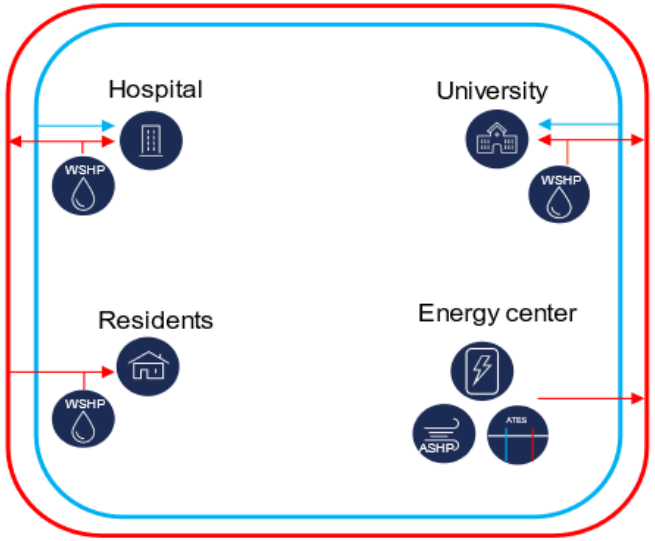
Barnet: Site screening

Barnet: Scenarios assessed

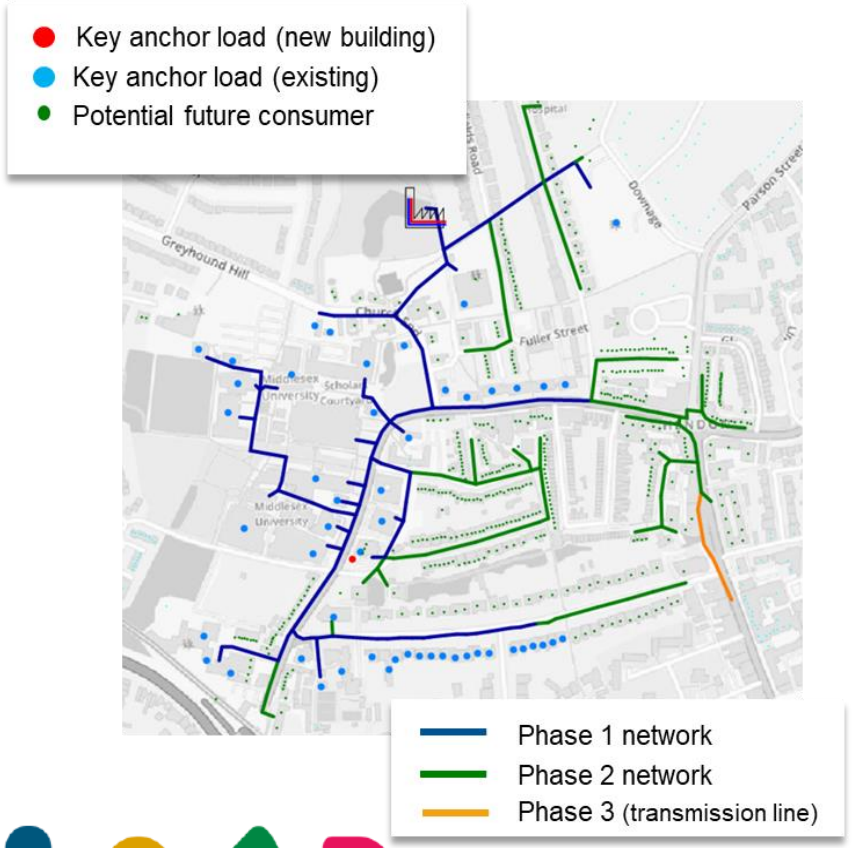
Scenario 1
Air Source Heat Pump
4th Gen District Heat Network

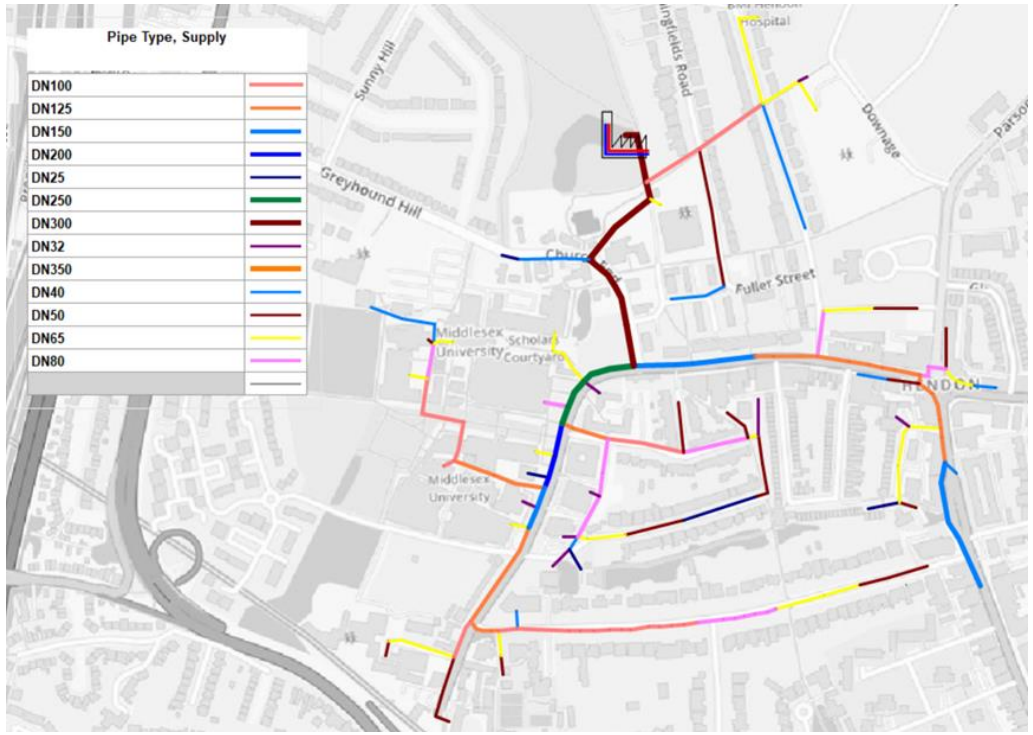
Scenario 2
Aquifer Thermal Energy Storage
4th Gen District Heat Network



Scenario 3
Aquifer Thermal Energy Storage
5th Gen District Heat Network

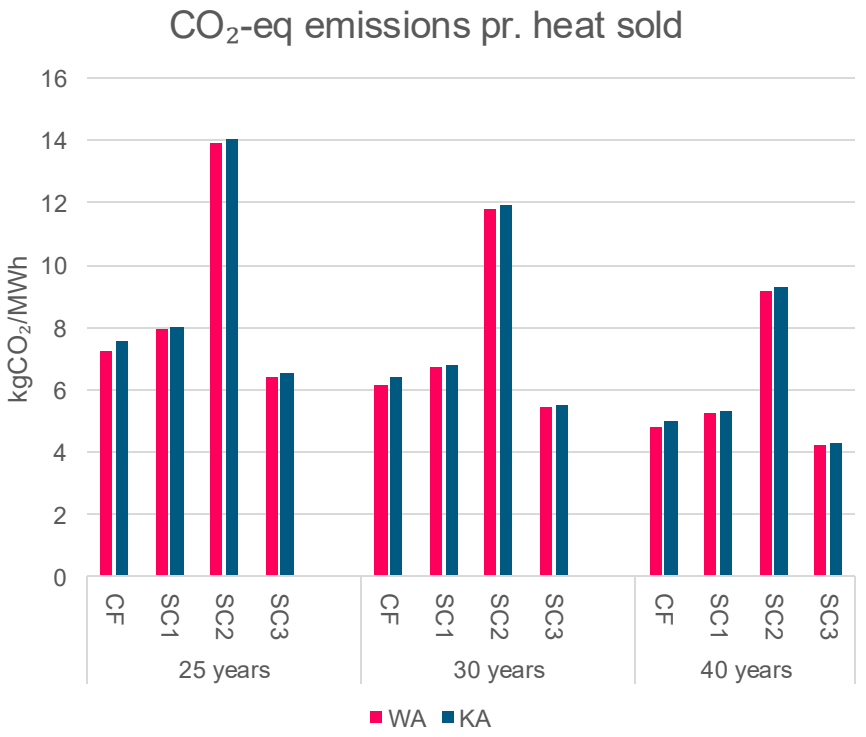
Barnet: Network boundaries

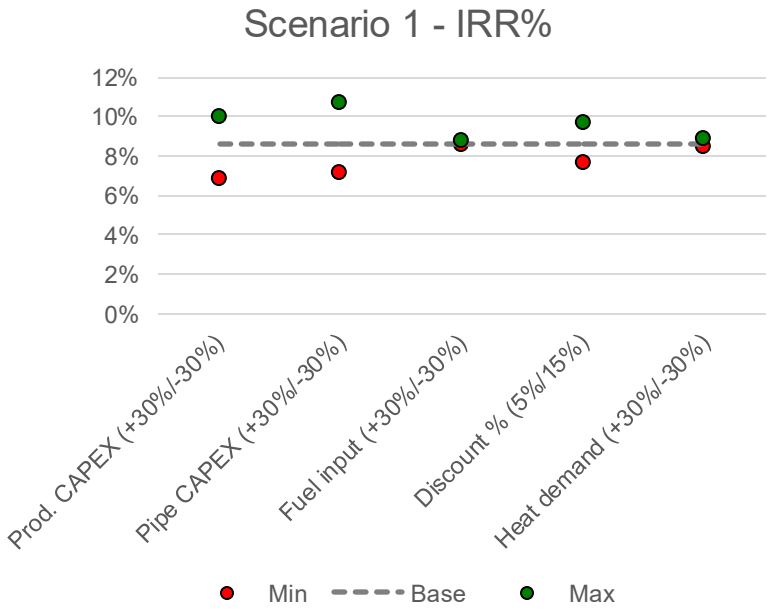




Barnet: Capex and sensitivity

- CAPEX range £13-29M
- Carbon <100g/kWh GHNF carbon gate
- Hendon network demonstrated stronger financial metrics and less sensitivity





Mostly sensitive to:

- Heat sales price
- Pipe CAPEX

Barnet: Conclusion

Heat network more attractive than the low carbon counterfactual

An ASHP led heat network constitutes the most promising business case

The “ambient loop” constitutes the most energy efficient and low carbon option

A wider area network preferable

Grant funding required to achieve a more desirable IRR

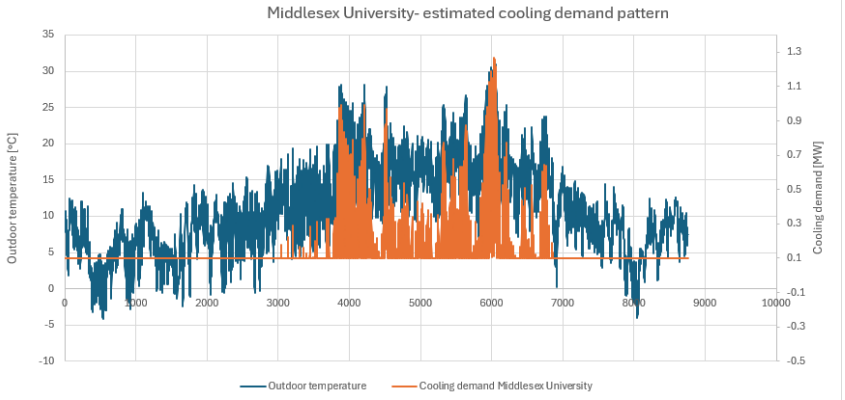
Plan

Feasibility

To determine if the project is technically possible and if there is an internal appetite to commit resource.

Does the project have:

- Time available to develop
- Funding
- Someone with passion
- Permission to develop
- Support (Technical, Commercial etc.)



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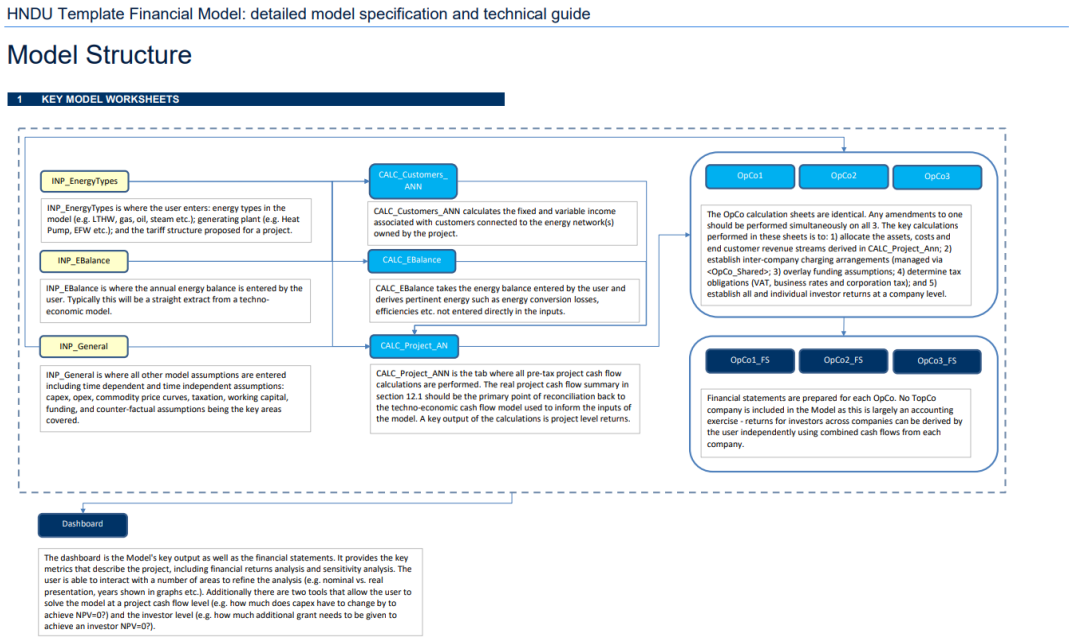
Stakeholder engagement

Stakeholder type	Proposed engagement
Key enablers	Keep informed throughout the project development, demystify the project to help gain support
Heat suppliers	Have introductory meetings to present the project. Key waste heat suppliers to receive letters and have individual meetings with the project team as soon as the network route that will proceed is defined. Support organisations with waste heat availability plan and design their system to engage with heat networks.
Potential customers	Reach out to developers to introduce the project and keep them aware of project progress. Gauge developers/building owners' interest in connecting to the network.
Regulation and policy	Maintain awareness on heat network zoning regulations as they develop. Some organisations if they are within a heat network zone and are above specific consumption or generation threshold may be mandated to connect to a heat network. Rasing awareness and supporting organisations will help their understanding.

Test commercial viability

- Prepare Techno Economic Model (TEM) and derisk project
- Engage internal teams using a SoC
- Get approval to progress to OBC or market engagement for opportunity brief/prospectus
- Routes spilt based on delivery vehicle and ownership



Detailed feasibility

Will the local authority / organisation be taking an active role in delivery?

Is the project technically and commercially viable

Will they become a Zone Coordinator and how will the LA appoint a heat network developer if they are an investor in project?

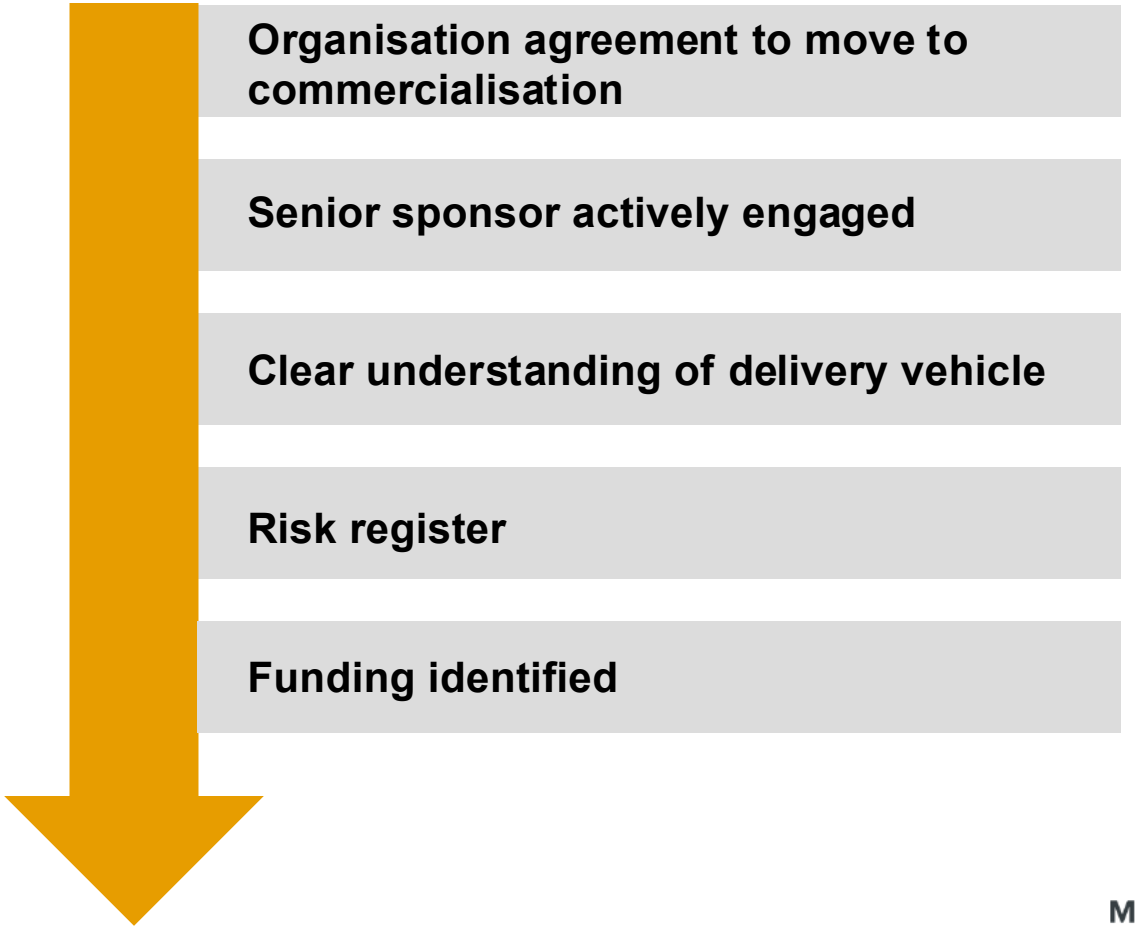
Is there a clear view on the delivery vehicle?

- Owner operator model
- Joint venture
- Concession
- Third party

Has the funding been identified?

Do they need a outline business case or a prospectus for the opportunity?

After a detailed feasibility, what's needed to take the project forward?



Project stages