

THERMOS Overview

G-Cloud Service definition document
January 2026

Who we are





The Centre for Sustainable Energy

We're a charity supporting people and organisations across the UK to tackle the climate emergency and end the suffering caused by cold homes.

We do this by sharing our knowledge, practical experience and policy insights. For over 40 years, we've supported people to take effective action on energy in their homes.

We help communities and local councils to understand energy issues, set priorities, and put plans into action. Our research and analysis focuses on making the energy system greener, smarter and fairer.

Find out more at www.cse.org.uk or watch our [impact highlights](#) from 2024-2025.



Supporting local delivery for net zero

We support local authorities of all types and sizes, to lead and drive forward energy-related net zero goals in a timely, socially just and locally resonant way.

We provide access to the knowledge, data and expertise required to drive forward decarbonisation. We pioneer new approaches and analytical techniques for local energy decision-makers.

CSE has pioneered open access, net zero planning tools used extensively by local actors such as [THERMOS](#) [Solar Wizard](#) [Future Energy Landscapes](#) and [Impact Tool](#) - combining rigorous technical modelling with proven engagement processes, ensuring support is robust and socially grounded.

What is THERMOS



THERMOS for fast, cost-effective heat network planning

THERMOS simplifies planning for a futureproof energy system; helping urban areas or building clusters reach net-zero emissions and tackle climate change through heat decarbonisation.

Using state-of-the-art modelling techniques, THERMOS will identify place-based, user-specific optimal heat network solutions for any given area within minutes.

THERMOS estimates the heat demands of every building in a city and deploys a set of purpose-built algorithms to optimise the design and layout of local heating and cooling networks.

THERMOS offers robust support to heat network pre-feasibility studies, producing optimised network scenarios enabling those with most potential to be prioritised for further investment and analysis.



THERMOS solving your heat network planning problems

THERMOS delivers planning analysis deciding which buildings to connect and how to connect them, from the thousands of possibilities.

It allows users to identify the optimal solution without the need for extensive training or experience of heat network planning.

Key benefits

- Rapid results
- Rigorous and credible analysis
- Cost-effective solution
- Replicable and scalable
- Easy-to-use, accessible and shareable.

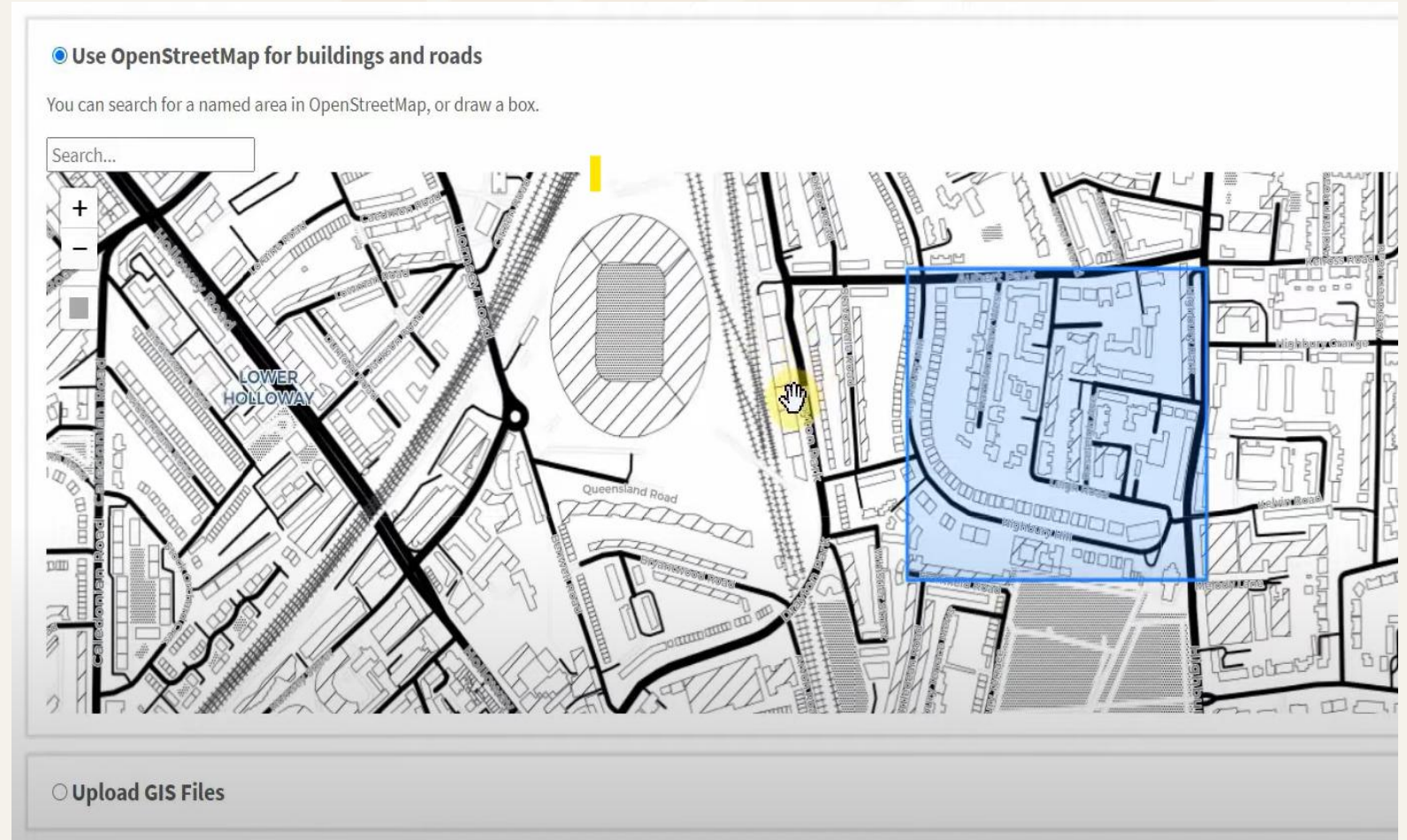


Preloaded with Open StreetMap

Heat demands and supplies are linked with buildings on a map, while potential heat pipe routes are associated with roads and paths in the map.

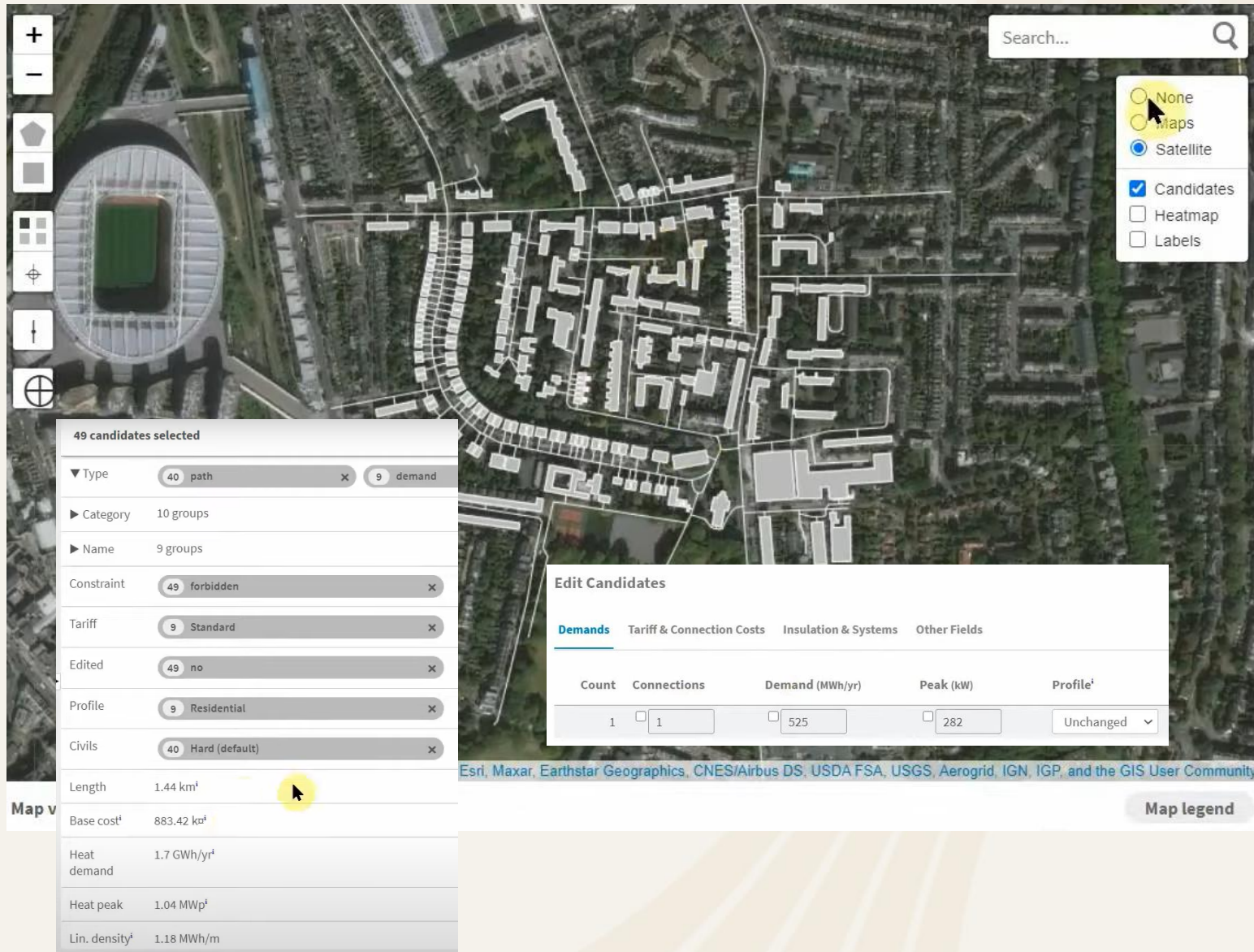
THERMOS is preloaded with OpenStreetMap data for basic analysis, removing the need for costly licensed data.

Accuracy can be further enhanced by uploading building height data or alternative geospatial datasets in a range of open GIS formats.





Automated energy demand estimation



THERMOS automatically analyses your chosen area, applying a sophisticated heat-demand model to deliver heat demand estimates.

Easily explore individual buildings or whole clusters to view clear summaries of peak and annual heat demand, helping you quickly understand energy needs.

And when you have real-world figures, you can simply update the model with your own data, ensuring accuracy and confidence in every assessment.



User refinement of the scope of the heat network

Use simple tools to select the buildings and roads or paths to include in your heat network.

Refine your selection by marking buildings that are required to connect, are optional, or should be excluded.

Constraints are displayed using distinct colours, providing quick and clear visual cues throughout the selection process.

Search...

- ☐ None
- ☐ Maps
- ☐ Satellite
- ☒ Candidates
- ☐ Heatmap
- ☐ Labels

One candidate selected

Type	1 demand
Category	1 Residential
Constraint	1 required
Tariff	1 Standard
Edited	1 no
Profile	1 Residential
Base cost ^t	0
Heat demand	462.22 MWh/yr
Heat peak	251.24 kWp



Select a heat source

Choose the best location for your energy generation plant. Do this either by selecting an existing building or drawing your own custom point on the map.

Add key plant information such as maximum supply capacity and fixed and operational costs. This allows the model to generate accurate, robust cost benefit analysis tailored to your project.

The screenshot shows a software interface for selecting a heat source location and configuring its parameters. The background is a map with building outlines. A search bar is in the top right. A legend on the right shows options: None (selected), Maps, Satellite, Candidates (checked), Heatmap, and Labels. A dialog box is open over the map, containing the following fields:

Cost and capacity	
Maximum capacity	0.0 MW
Fixed cost	0.0 k€
Capacity cost	0.0 €/kW
Annual cost	0.0 €/kW
Supply cost	0.0 c/kWh
Emissions factors	
co2	0 g/kWh
pm25	0 mg/kWh
nox	0 mg/kWh

At the bottom of the dialog are 'Cancel' and 'OK' buttons. The map interface also includes a 'Map legend' button at the bottom right and a 'Type' dropdown at the bottom center.



Uses clear, flexible financial inputs

THERMOS empowers you to assess heat networks using clear, flexible financial inputs that help you identify the most cost-effective and profitable network designs.

Users can fully customise tariffs, pipe costs, and other key financial parameters to match real-world conditions.

The model can run using two financial objectives: Maximise revenue by identifying the most commercially attractive network layout; or Minimise total heat-supply costs for an area by considering how measures such as insulation or individual heat pumps would reduce costs on or off a network.

Objective

☐ Maximize network NPV

In this mode, the goal is to choose which demands to connect to the network so as to maximize the NPV *for the network operator*. This is the sum of the revenues from demands minus the sum of costs for the network.

The impact of non-network factors (individual systems, insulation, and emissions costs) can be accounted for using the *market* tariff, which chooses a price to beat the best non-network system.

☒ Maximize whole-system NPV

In this mode, the goal is to choose how to *supply heat* to the buildings in the problem (or abate demand) at the *minimum overall cost*. The internal transfer of money between buildings and network operator is not considered, so there are no network revenues and tariffs have no effect.

☒ Offer insulation measures ☒ Offer other heating systems¹

Accounting period

Sum costs and benefits over years. Discount future values at % per year.

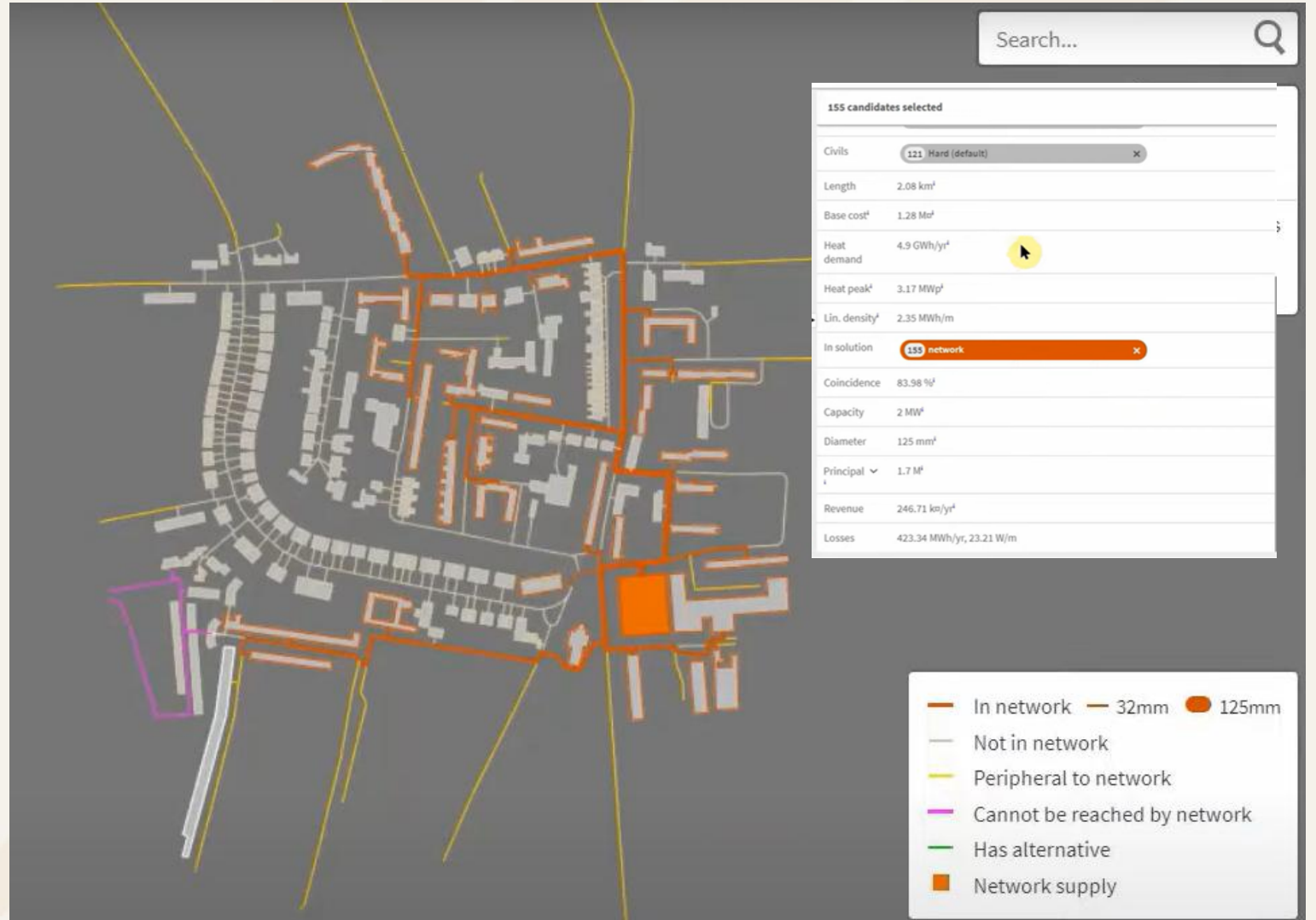


Rapid heat network generation and optimisation

In real time THERMOS creates the optimal heat network for your selected area based on your chosen financial model.

The resulting optimal network is clearly marked on the map, with a simple legend to help you quickly understand what has and has not been included.

To support deeper insight, THERMOS displays key project information alongside a detailed cost breakdown, helping you understand how the network is expected to perform based on net present value.





Quick and effortless to explore alternative scenarios

Easily adjust any aspect of your project, including adding more buildings or modifying the heat supply, before re-running the model to instantly see how each change impacts the network and its financial performance.

The screenshot displays a software interface for network optimization, divided into several sections:

- NETWORK PROBLEM:** Includes options for Map view, Objective, Tariffs, Pipe & connection costs, Insulation, and Individual systems.
- NETWORK SOLUTION:** Includes Solution summary and Run log.
- SUPPLY PROBLEM:** Includes Profiles, Technologies, and Objective.
- HELP:** Includes a search bar and links to Help contents and Network editor help.

The central map view shows a network of buildings and pipes. A search bar is located at the top right of the map. A legend on the right side of the map includes options for None, Maps, Satellite, Candidates, Heatmap, and Labels. A tooltip for the selected candidates is visible, showing the following data:

155 candidates selected	
Civils	121 Hard (default)
Length	2.08 km ⁴
Base cost ⁴	1.28 M€ ⁴
Heat demand	4.9 GWh/yr ⁴
Heat peak ⁴	3.17 MW ⁴
Lin. density ⁴	2.35 MWh/m
In solution	155 network
Coincidence	83.98 % ⁴
Capacity	2 MW ⁴
Diameter	125 mm ⁴
Principal	1.7 M ⁴
Revenue	246.71 kn/yr ⁴
Losses	423.34 MWh/yr, 23.21 W/m

On the right side of the interface, a panel shows the results of the optimization:

- 155 candidates selected**
- Type:** 121 path, 33 demand
- Category:** 14 groups
- Name:** 21 groups
- Constraint:** 154 optional
- Tariff:** 34 Standard
- Edited:** 152 no
- Profile:** 34 Residential
- Civils:** 121 Hard (default)
- Length:** 2.08 km⁴
- Base cost⁴:** 1.28 M€⁴
- Heat demand:** 4.9 GWh/yr⁴
- Heat peak⁴:** 3.17 MW⁴
- Lin. density⁴:** 2.35 MWh/m



Easy to follow workflow methodology

1

Select your area from Open StreetMap

2

Automatically calculate energy demand.

3

Select your heat sources

4

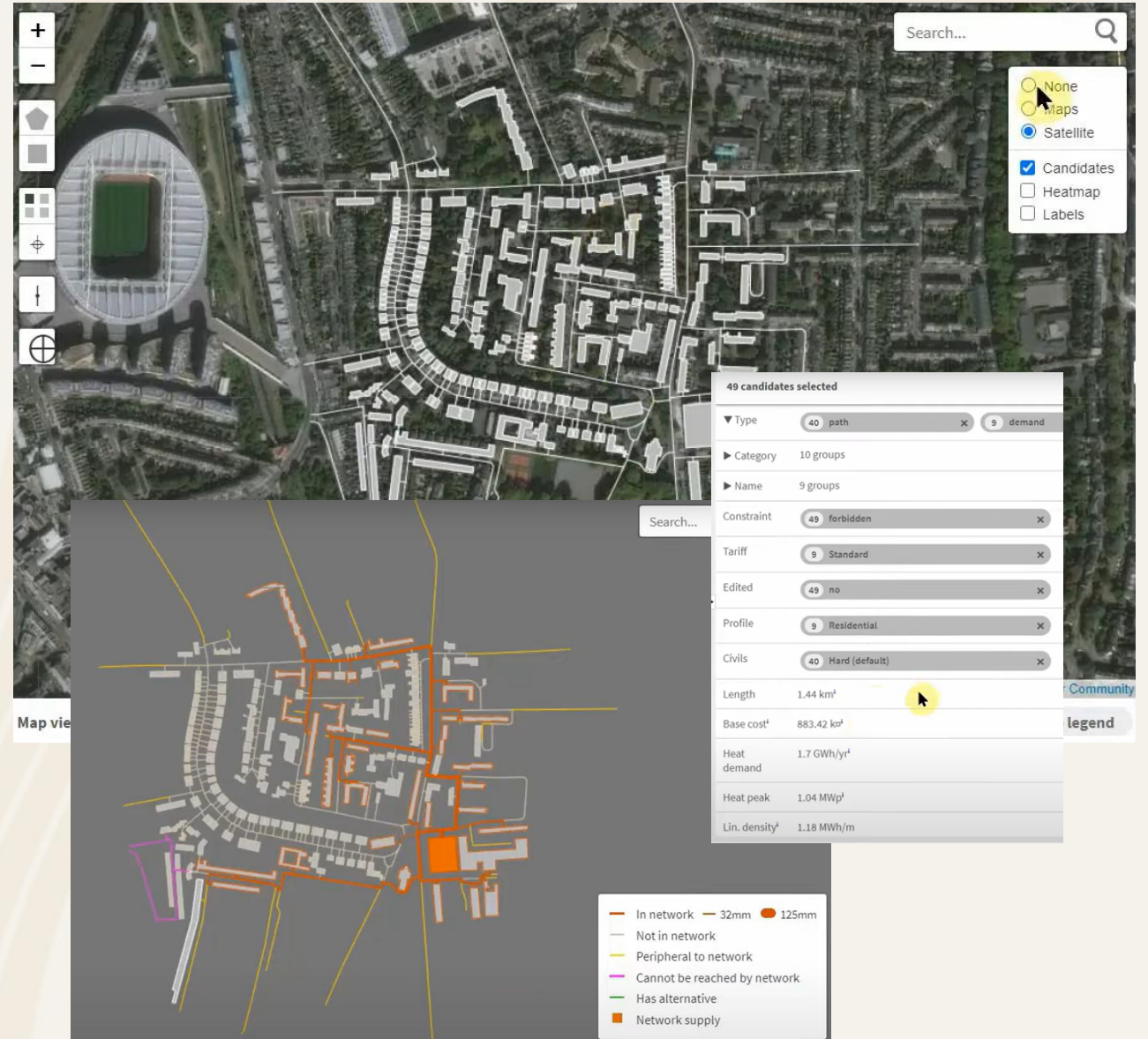
Set financial objectives

5

Rapid generation of the optimal network

6

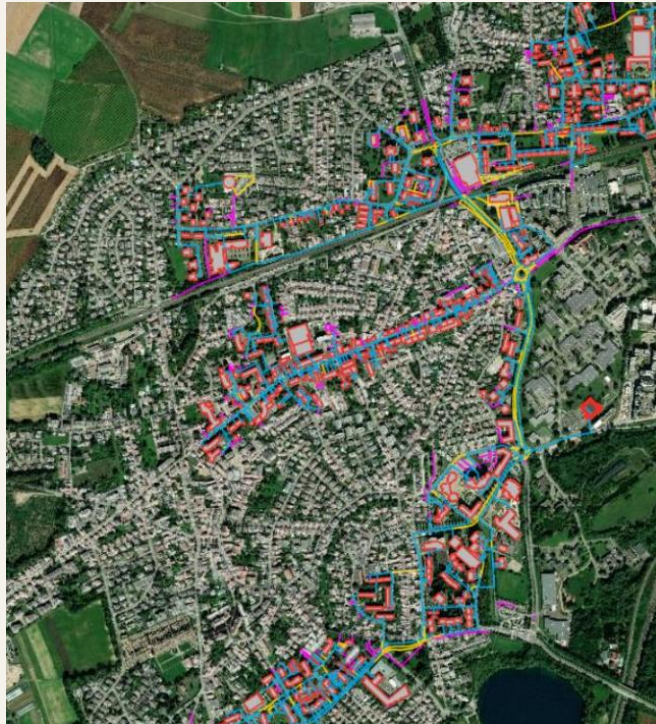
Change parameters and re-run the model



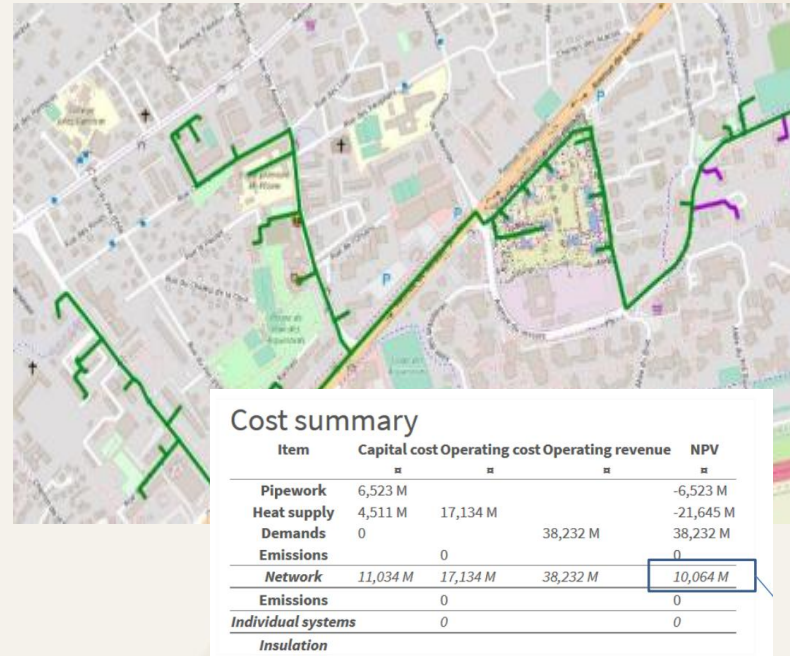


Use cases

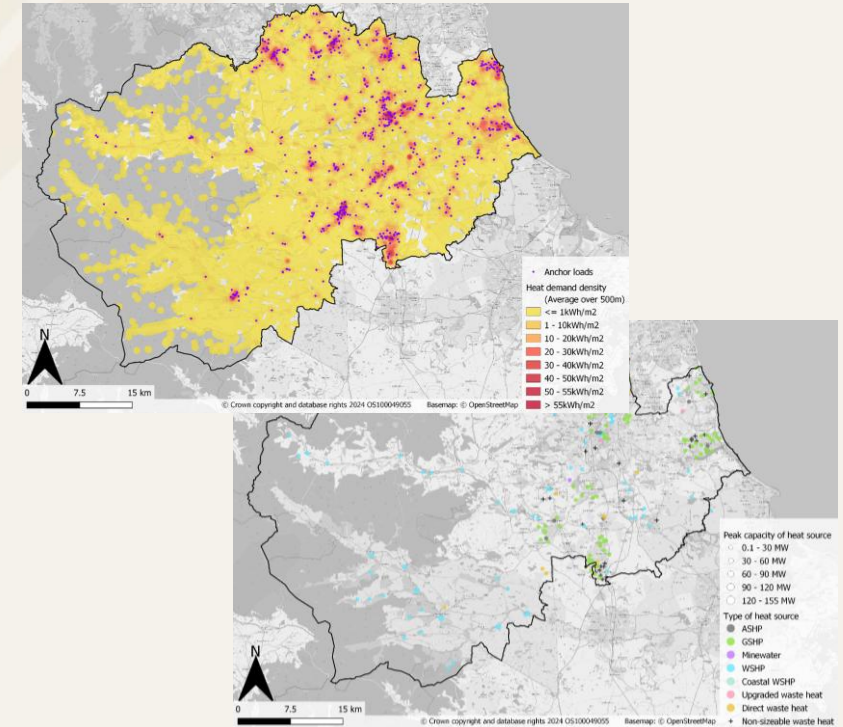
Accelerate heat network planning on the path to net zero.



Accurate pre-feasibility study with detailed cost and benefit analysis



Heat source and heat demand mapping to quickly identify heat-network potential.





Keep in touch



[Centre for Sustainable Energy](#)



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cse.org.uk

Sign up for our monthly e-newsletter
at cse.org.uk/newsletter.

Want to know more about THERMOS?

Visit the THERMOS [website](#)

Watch the [videos](#)

Start your free trial [now](#)



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