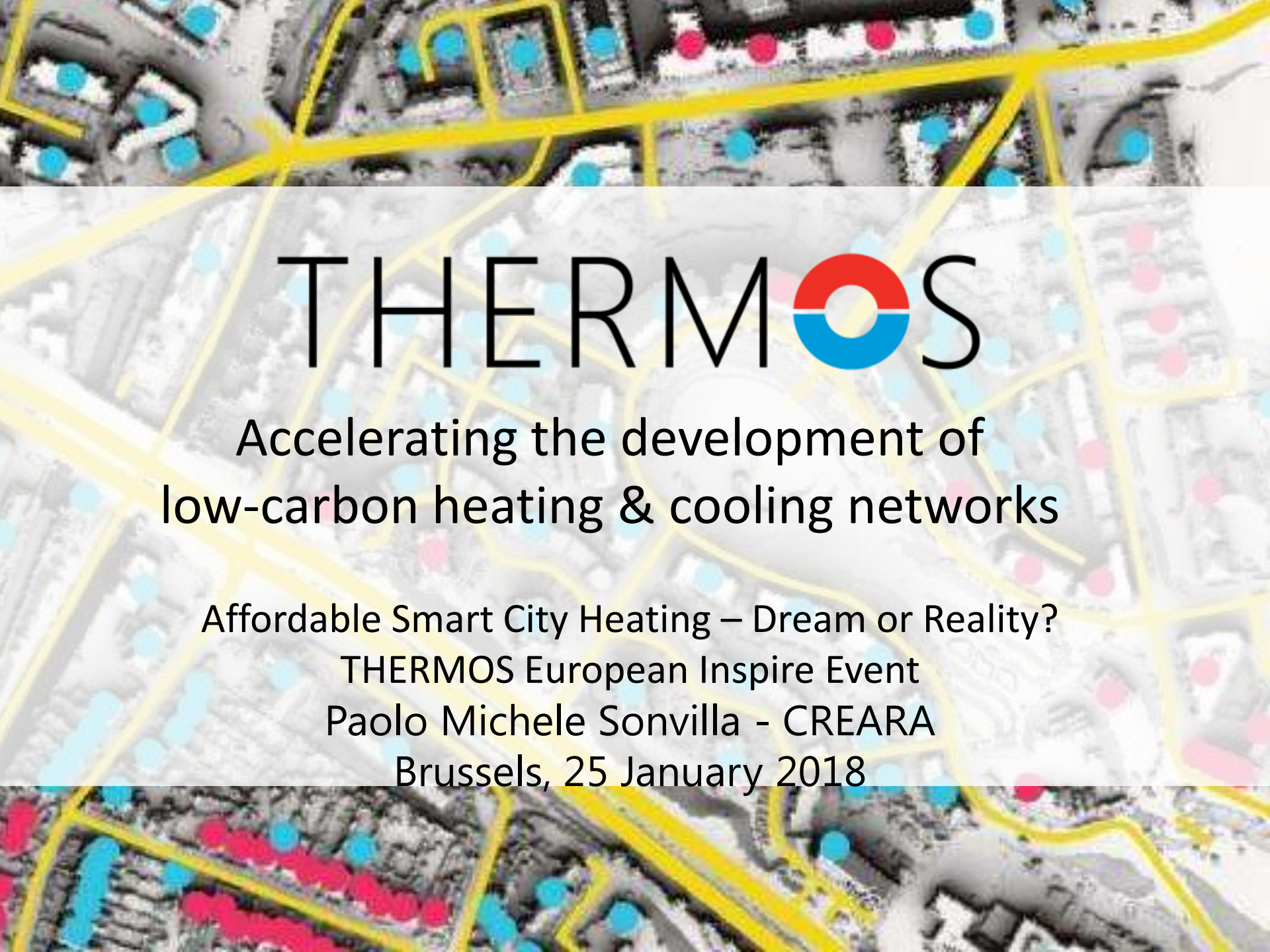


THERMOS

Accelerating the development of low-carbon heating & cooling networks

Affordable Smart City Heating – Dream or Reality?
THERMOS European Inspire Event
Paolo Michele Sonvilla - CREARA
Brussels, 25 January 2018

Content

1. Key facts about THERMOS
2. How does THERMOS work?
3. Opportunities to engage

The aim of THERMOS is to develop and share tools and data for identifying and selecting low-carbon heating options in real geographies

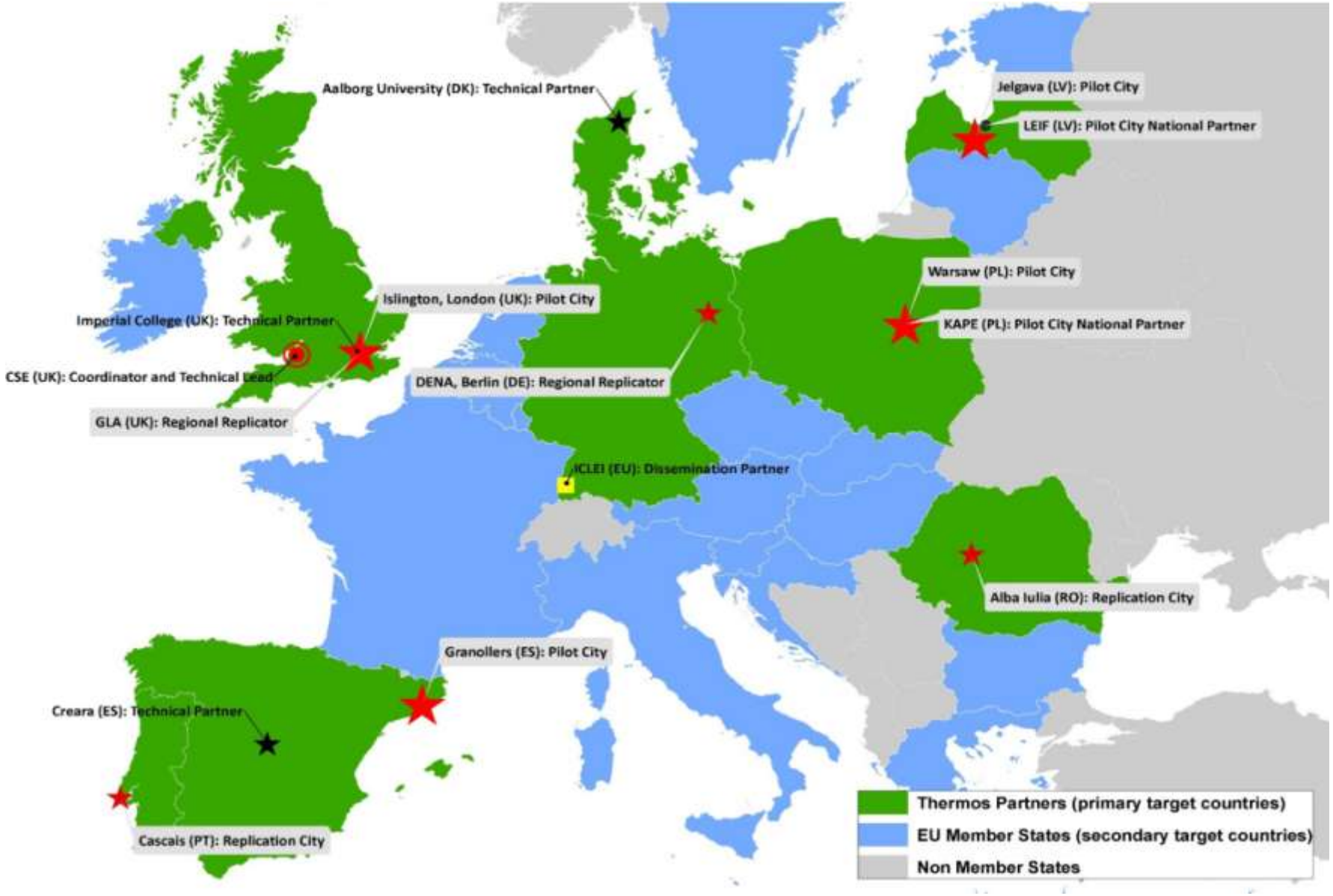
1. Generalise, implement and share and methods and data for **high-resolution energy system mapping**
2. Develop thermal **energy system models and optimisation** procedures which run on these maps
3. Integrate the maps and the models in an **open-source software** application developed in close collaboration with pilot local authority users
4. **Support the use** of the new tools with replication partners
5. **Promote and disseminate** our results to maximise post-project exploitation

Added Value

1. **Building-level energy system mapping** – scalable to cities, regions and countries
2. **Energy system models** with direct representation of networks: **going beyond 2D heat mapping**
3. **Optimisation** to identify best solutions
4. **Free, open-source** product, aimed at local authorities: no requirement for expensive third-party software
5. Use of **open-data** for inputs whenever possible
6. Close collaboration with **Pilot local authority partners** to make sure we build tools with the most meaningful features
7. Supported rollout to **Replication partners** to ensure post-project sustainability

Who and where we are

thermos-project.eu



What kinds of question will THERMOS help with?

The purpose of THERMOS is to support the identification and development of low-carbon heating and cooling options.

The interests of the Pilot and Replication City users imply a need to support the following activities, and this is how we are designing the tool:

1. Adding new sites and connections to an existing network
2. Designing a new network based on an existing energy source
3. Designing a new network to supply a given set of buildings, with one or more potential energy sources
4. Assessing / comparing the performance of specific networks and non-networked solutions

What's in an answer?

The Thermos application identifies the *best solution*, given a set of available energy supplies, demands, and distribution routes and the choice of certain decision-making parameters

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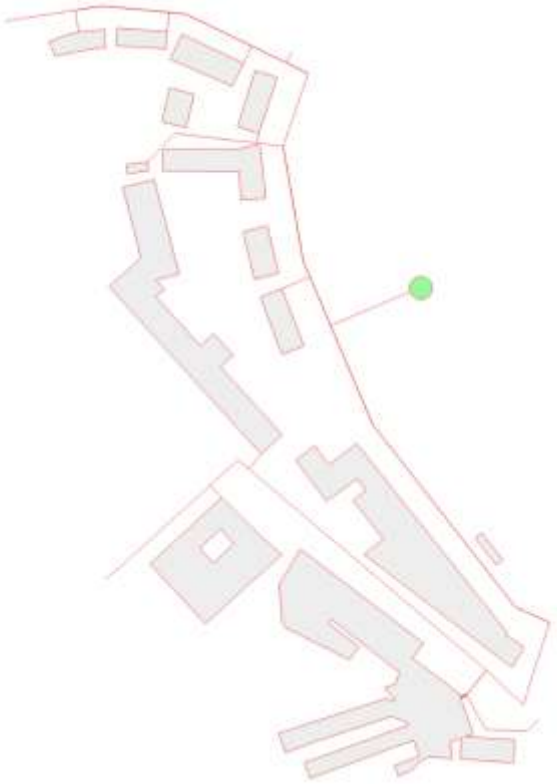
Here, a solution is a set of energy supplies connected to the set of demands they satisfy. The connections can be in the form of a distribution network, or as building-integrated heating technologies like individual gas boilers.



Asking a question

There are often lots of possibilities. The question is which supplies and demands to include, and how to join them up to get a viable system?

This is the set of decisions that the tool supports the user in making

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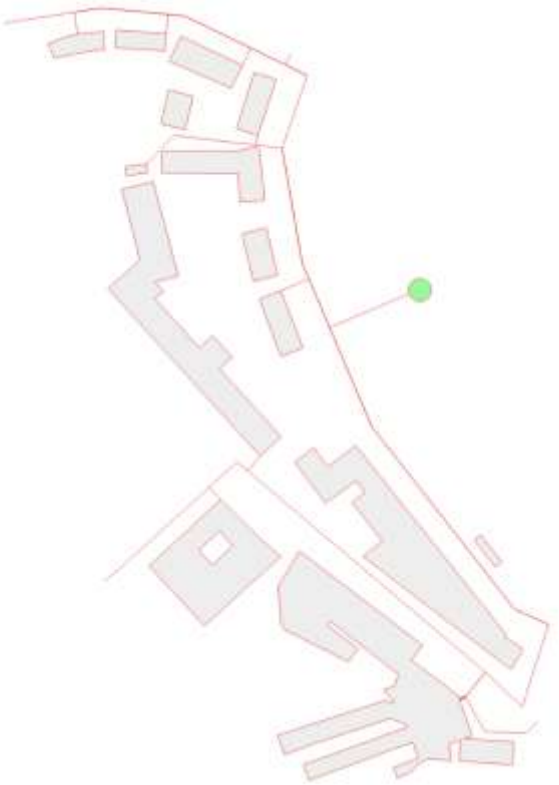
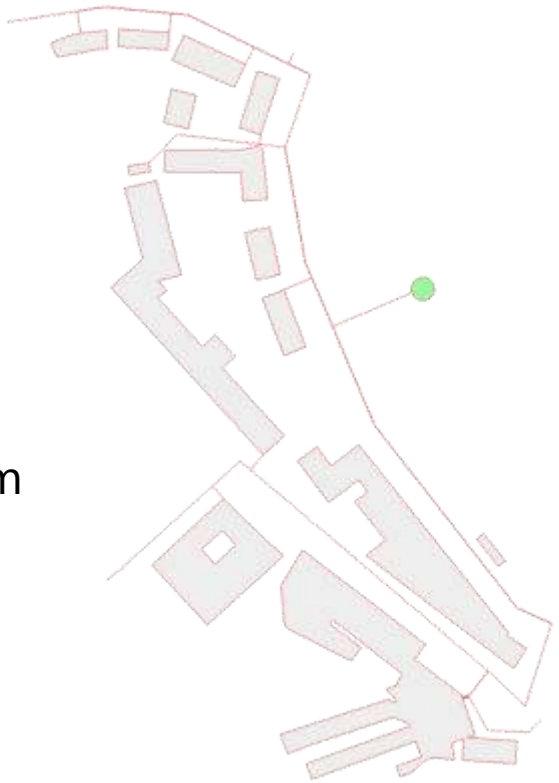


Question structure

In THERMOS, a question comprises a set of elements which either could, or alternatively must, be in the resulting solution.

The elements are:

- Energy demands - usually buildings
- Energy supplies - e.g. CHP, boiler, heat pump
- Connections – these combine to form a distribution network



And importantly: we also have to say what we mean by the "**best**" solution

Question structure

"Best" defines what quantity energy system model is trying to optimise. For example, we might want as our answer the solution with the:

- Highest net present value
- Lowest capital expenditure
- Lowest emissions
- Highest total demand met
- (other criteria are possible)

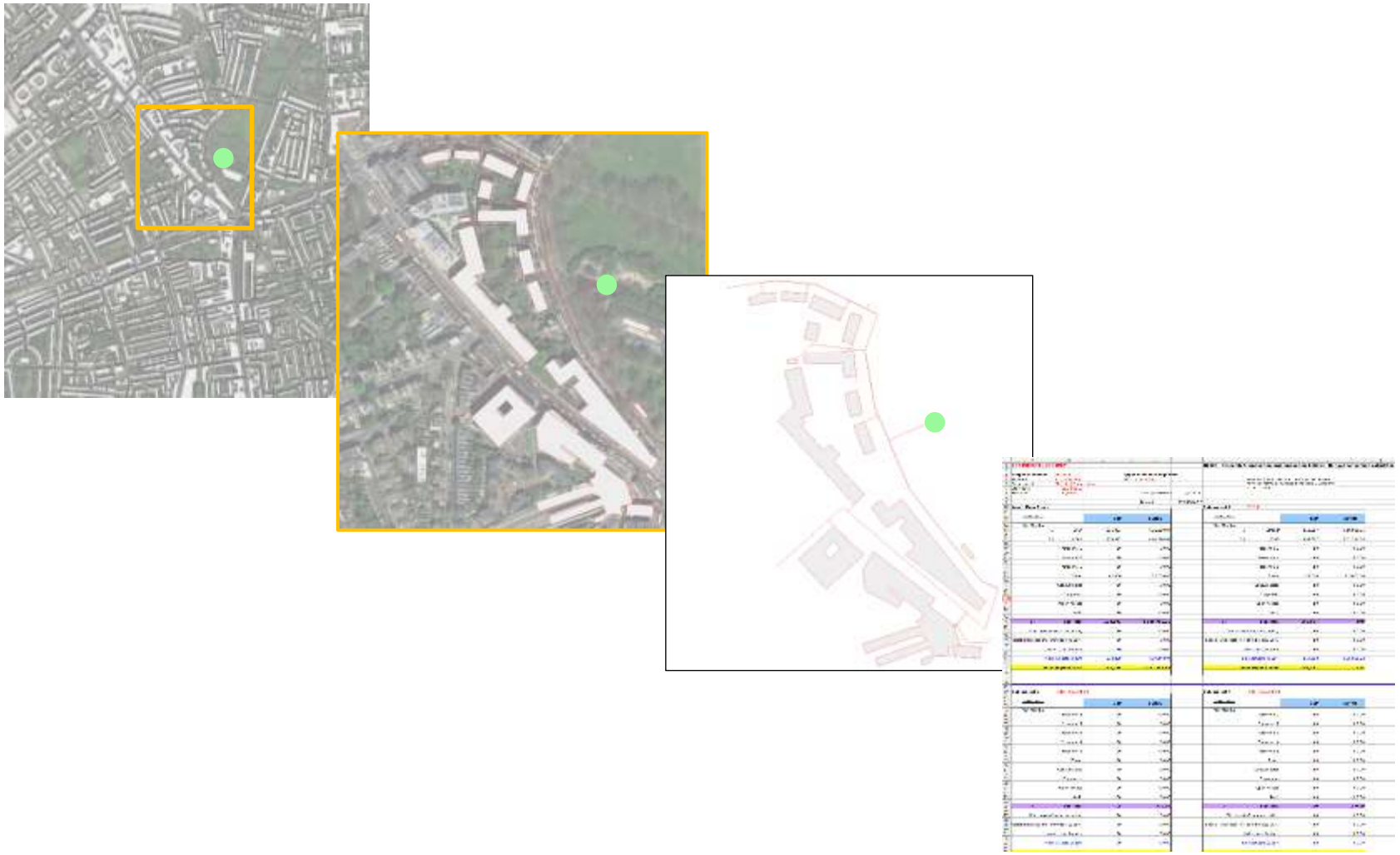
Getting an answer

When presented with a question in this way, the application will return a description of the solution. This will include things like

- Costs (capital, fuel, NPV)
- Fuel inputs and heat outputs
- Emissions
- A list and a map of the sites (supplies and demands) and connections
- Some detail on the properties of each of the sites and connections

The user will be able to export some or all of this data for use in other applications

Recap



To make the most of THERMOS, you will need:

- An understanding of thermal energy systems for buildings
- Good local knowledge of the study area
- Ideally this will include access to local data on:
  - building demands
  - supply locations
  - technology and fuel costs
- Specific questions which map to the THERMOS features
- GIS skills and software, for creating reports on the results

How to engage with us

- Learn about case studies developed by pilot and replication cities
  - Local stakeholder liaison groups
- Become a THERMOS trainer
  - In each participating country the project partners will train external stakeholders on the use of the THERMOS tools
  - EU and country specific **Train-the-Trainer** modules
- 5 European and 8 national workshops
- 4 webinars
- Stakeholders dialogues
- 3 European and 8 national inspire events

EU and country specific Train-the-Trainer modules

- Thermal energy supply and demand in Europe
- Energy system mapping and modelling with THERMOS
- Embedding THERMOS in your city
- Optimising thermal planning, resources and technologies
- Heating and cooling market and finance
- Local stakeholders involvement for adopting THERMOS
- Decarbonising the heating and cooling sector towards 2050

- Complementary material:
  - HEATING AND COOLING INNOVATION CATALOGUE
  - THERMOS USER MANUAL

THERMOS

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