

# Act!onHeat in a nutshell

From heating and cooling strategies to action



This project has received funding from the EU's Horizon 2020 programme under grant agreement no 101033706.



[www.actionheat.eu](http://www.actionheat.eu)



# Content

- 1. What?**
- 2. Who can benefit from Act!onHeat?**
- 3. Support facility**
- 4. THERMOS tool**
- 5. Hotmaps tool**
- 6. Research**
- 7. Exemplary cases**
- 8. MANU: Insights from a recent case study**



## What?

How you can benefit from Act!onHeat:

- ➔ Apply to the **support facility** for receiving guidance on the development of Heating & Cooling plans, project pre-feasibility studies, financing and implementation;
- ➔ Sign up to the **online training** for designing and rolling-out strategic Heating & Cooling plans with the open source planning tools: [THERMOS](#) and [Hotmaps](#);
- ➔ Join policy, planning and financing **events** hosted by partners on local Heating & Cooling transitions.



## Who can benefit from Act!onHeat?

- ➔ **Local and regional authorities**
- ➔ **Utilities**
- ➔ Consultancies and energy companies
- ➔ **Energy agencies**
- ➔ Researchers and academia
- ➔ Policy makers
- ➔ H&C industry and industry associations
- ➔ Local government networks



Next call online: 15.01.2024

## Support Facility

A Call for Application will be published directed to local and regional governments, energy agencies and city planners interested in receiving strategical support on H&C infrastructure. Overall, Act!onHeat will support up to:

- ✓ 120 municipalities to start, continue or improve strategic heating and cooling planning;
- ✓ 30 pre-feasibility studies will be carried out for individual projects within the municipalities;
- ✓ 15 projects shall benefit from an additional analysis on financing options.

**DON'T MISS THE CHANCE!**

[www.actionheat.eu](http://www.actionheat.eu)



Next call online: 15.01.2024

## Support Facility

Successful applicants will be clustered into groups depending on the topic of focus, that can vary from the development of a heat inventory to the assessment of DH potential, estimation of RES potential, etc. The support package will consist of:

- ✓ Interactive webinars / online workshops
- ✓ Guidance documents for the different topics
- ✓ **Individual support activities when considered**

**DON'T MISS THE CHANCE!**



## Hotmaps tool



Allows users to:

- Identify the location of H&C demand, supply, renewable energy potential and waste heat potential
- Estimate the potential for district heating and compare to the costs of individual heating
- Develop scenarios for decarbonisation pathways of H&C

[www.hotmaps.eu](http://www.hotmaps.eu)



## THERMOS tool

Allows users to identify and assess performance of:

- Optimal solutions for the expansion of a DHC network
- Local heat demand and network paths to match a known energy source
- Optimal network solutions to match available energy sources and demand

[www.thermos-project.eu](http://www.thermos-project.eu)

THERMOS





## Research contribution

- ➔ In the initial phase, act!onheat conducted **research** to develop support adequately, but also to get evidence on successful H&C plans.
- ➔ The research design included an EU-wide **meta-study**, a **survey** with around 350 respondents and 15 **expert interviews**.
- ➔ The results are summarised in a report available **online**.



**Strategic H&C planning success factors**

From heating and cooling strategies to action: how public authorities can strategically plan the decarbonisation of the heating and cooling sector and initiate impactful projects

 ActionHeat has received funding from the EU Horizon 2020 programme under Grant Agreement No 101033706

Meta  
study

Data  
collection




# Survey Data collection

## Methods

- Survey with 15 questions (8 minutes)
- 10/4/2021 to 11/5/2021

## Key Questions

- Objectives of heating and cooling plan?
- Contents of heating and cooling plans?
- Important and challenging aspects




**Welcome to our short online survey!**

The survey contains questions on local heating and cooling planning and takes only about 8 min. The questions refer to your assessment as well as your experiences with local heat planning. The aim is to identify successful approaches as well as challenges and obstacles in local heat planning. The evaluation of your answers is anonymous and the results of the survey will only be published in aggregated form.

Thank you for your participation and support!

Your Addressed Team



Please enter the following information:

- Participation in the survey is voluntary.
- You can interrupt your participation in the survey at any time and continue or cancel it at a later time.
- The survey serves exclusively the purpose stated in the invitation text or the invitation email.
- The data is only evaluated by persons who are bound to data secrecy according to § 6 DSGVO-46 or to other Fraunhofer data protection policies.
- The evaluation of the data is anonymous and only for groups of at least 5 people who have submitted an and your actual answers.
- Insofar as your data is personal, you are entitled to the data subject rights in accordance with the GDPR, in particular the right to lodge a complaint with the supervisory authority. The technical and organisational requirements so that your data is not accessible to other employees not involved in the evaluation.
- If your data is personal, it will be deleted in March 2022.

If you have any questions about the survey please contact:


Contact:  
 Markus Fritz, Fraunhofer ISI: [markus.fritz@isi.fraunhofer.de](mailto:markus.fritz@isi.fraunhofer.de)  
 Ali Akperli, Fraunhofer ISI: [ali.akperli@isi.fraunhofer.de](mailto:ali.akperli@isi.fraunhofer.de)  
 Anna Bitterbeck, Fraunhofer ISI: [anna.bitterbeck@isi.fraunhofer.de](mailto:anna.bitterbeck@isi.fraunhofer.de)

Fraunhofer Data Protection Officer:  
 Ralph Marter: [ralph.marter@isi.fraunhofer.de](mailto:ralph.marter@isi.fraunhofer.de)

Contact person for technical problems:  
[isibeta@isi.fraunhofer.de](mailto:isibeta@isi.fraunhofer.de)

Tip: Maximize the window size!  
 After answering the questions on each page, click on "Continue" oder "Back" do not use the backarrow!

---



**Your opinion on the objectives, content and organisation of heat plans**

Which objectives should a local heating and cooling plan pursue?

	I do not agree at all					I fully agree				
Security of supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Affordability of heating and cooling supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CO2 neutrality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add value in the municipality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase transparency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Implementation of measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other objectives:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which contents do you think should be in a good/successful heating and cooling plan?

	I do not agree at all					I fully agree				
Objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prerequisites for renewable heat and cold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spatial information (e.g. areas for renewables, heat, energy storage)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Future heating and cooling demand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentation of the future target scenarios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presentation of (different) analysed scenarios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Measures for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsibilities for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(Estimated) costs of implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other content:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Who do you think should be involved in the preparation of the local heating and cooling plan?

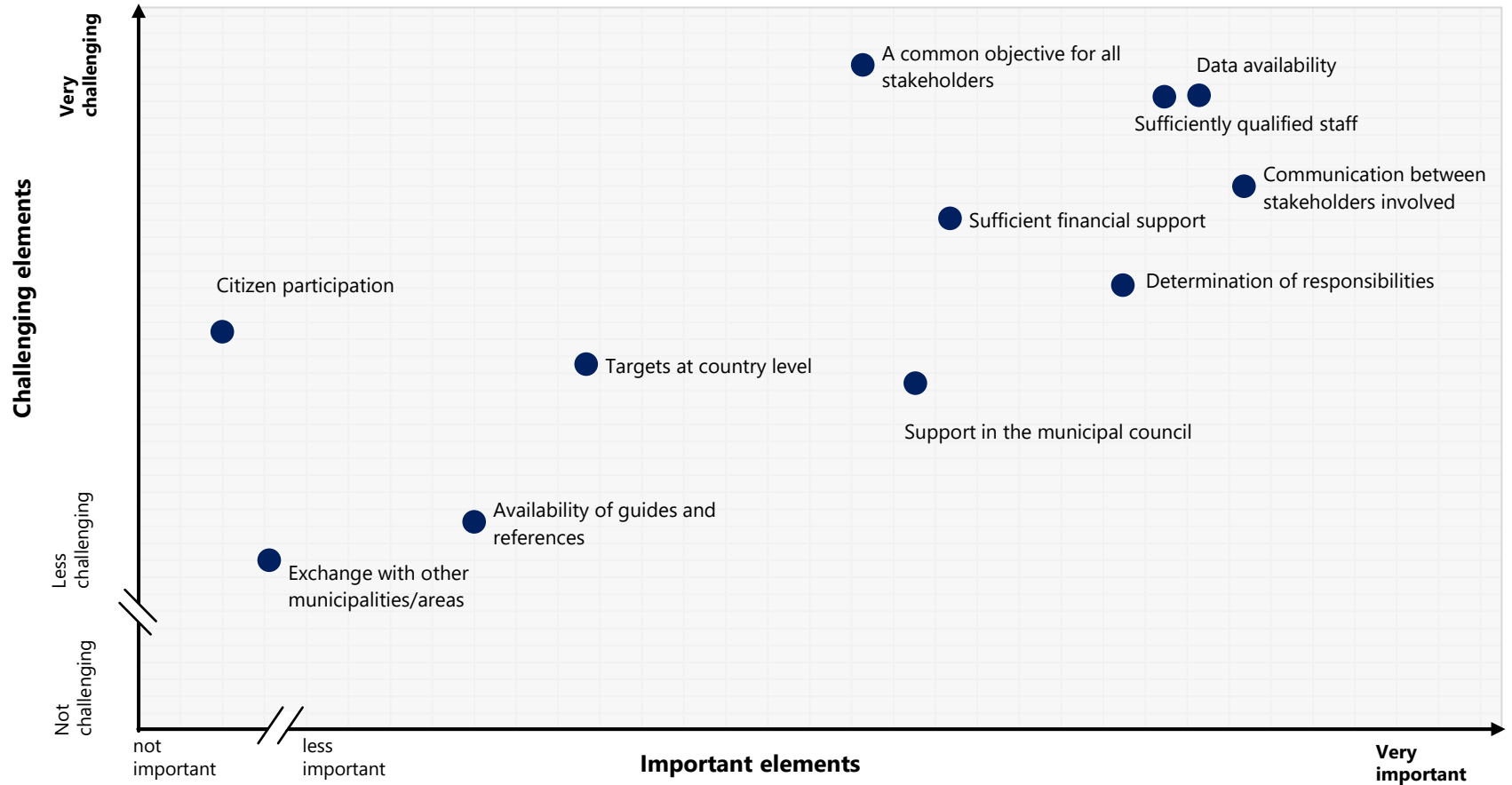
Public utilities/Energy provider

Environment/Climate agency

City/City administration/City planning/Other public authority

Consulting company/Engineering company/Research institute/University

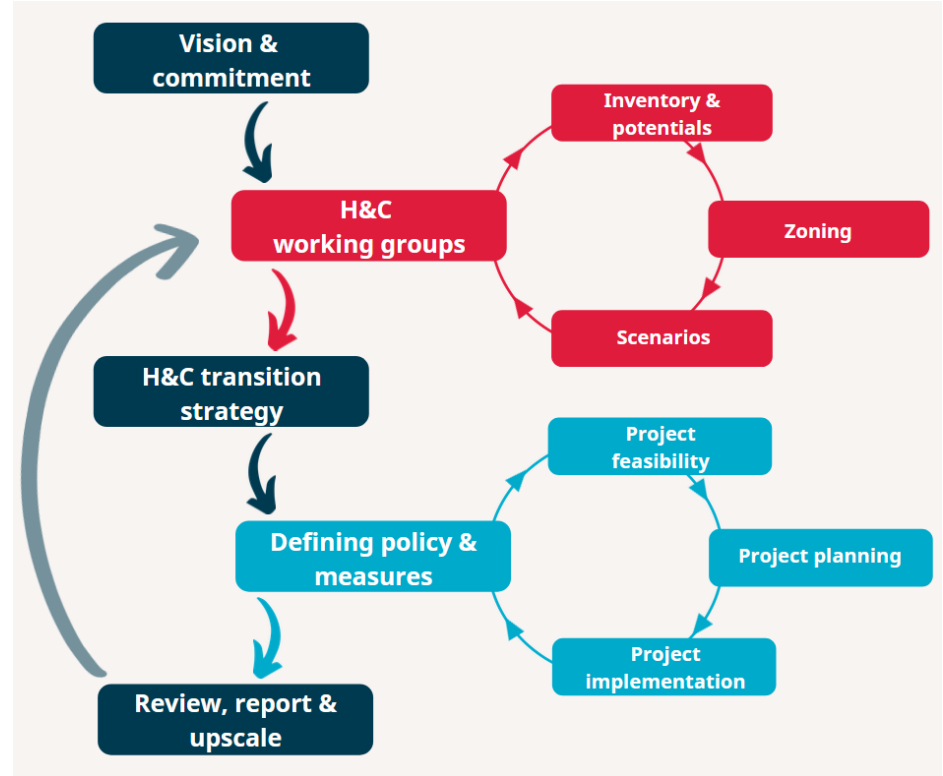
## Research results from survey



Graph shows distribution and weighted mean of responses (**n=349**)

# H&C Workflow

This workflow is addressed to energy agencies, consultants and local authorities to guide them with questions that help to structure the strategic heating and cooling planning.



## Support Facility Case Studies



- Energy agency in Hessen (Germany)
- Heat planning will be mandatory next year
- First point of contact for the municipalities on heat planning

3 comprehensive workshops attended by numerous Hessian municipalities. Experts from the Act!onHeat consortium gave keynote speeches.

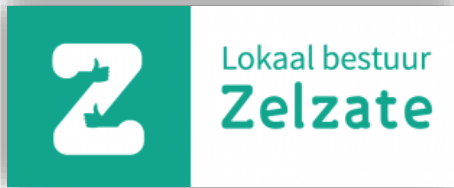
Targeted *training webinars* for members of LEA Hessen. The topics are:

- "Data for municipal heating and cooling planning"
- "Developing a data inventory for heat planning"
- "Using the hotmaps database and toolbox for strategic heating and cooling planning"

Provide advice for a quick advisory service for district heating. Thus a *best-practice slide deck for RES in district heating networks* has been developed for LEA.



## Support Facility Case Studies



- Zelzate Town in East Flanders (Belgium)
- Sources of a large amount of residual heat nearby
- Already identified a potentially economically viable heat network



ActionHeat - Presentation at the 9th International Conference on Smart Energy Systems

As part of the Support Facility, THERMOS tool has been used to answer specific heat network related questions for the local government.

Experts from the Act!onheat consortium have been **meeting regularly with various stakeholders** to gather the required data on building heat demands, drilling costs, and heat supply costs for THERMOS to produce accurate results.

The output of the collaboration is a **pre-feasibility study** for the local government. The study was presented at a conference. Available online.

<https://actionheat.eu/resources/presentation-9th-international-conference-smart-energy-systems>

# MANU



Insights from a recent case study



This project has received funding from the EU's Horizon 2020 programme under grant agreement no 101033706.



[www.actionheat.eu](http://www.actionheat.eu)





## Background

Looking for best practices on energy planning in neighbouring countries, we found that these countries have heat demand maps, but North Macedonia does not. Thus, research into this gap was started in 2020.

- Challenges to get proper data
- Overcome with collaboration with municipalities regarding the building stock
- Integrated within EU project Heat Roadmap
- Bottom-up and top-down approach used for 3 municipalities in city of Skopje

In 2022, we heard about the Actionheat project. We applied to cover our remaining research gaps. In addition, a need for a techno-economic analysis was quickly identified.

## Regulation in North Macedonia

- Energy related policy context
  - Energy Law (adopted 2018, last amendments 2022)
  - Energy Efficiency Law (Official Gazette 32/2020)
  - Energy Strategy (adopted 2019) and Program for realization of the Energy Strategy (2021)
  - Fourth Energy Efficiency Action Plan until 2021
  - National Energy And Climate Plan (2022)
- Climate change related policy context
  - Law on Climate change (ongoing) and Strategy on Climate Change (2021)
  - Enhanced NDC (2021)
  - 4th National Communications on Climate Change (2023)
  - 3rd Biannual report on Climate Change (2020)



## Early results from the support facility

To create a heat map on national level, analyses on regional level are needed for validation. Thus, a survey to assess the baseline situation in 8 municipalities on data availability, knowledge, ... was carried out. This was also to prepare a workshop.

- Dedicated sector for energy on municipal level ?
- Knowledge about heat demand ?
- Previous knowledge with tool for heat demand ?
- Potential waste heat or RES for H&C ?
- Existence of strategy to integrate climate neutral solutions for H&C ?
- Benefits from usage of heat demand planning tools ?

Responses came from various stakeholders: Local economic development, EE and RES, environmental protection, etc.

An important result is the recommendation to create heat maps as part of the energy efficiency programme. Further joint work is focused on two key outputs

- Preparation of national and regional heat demand maps
- Techno-economic analysis for the improvement of H&C



# Hotmaps - Heat demand map (bottom-up approach)

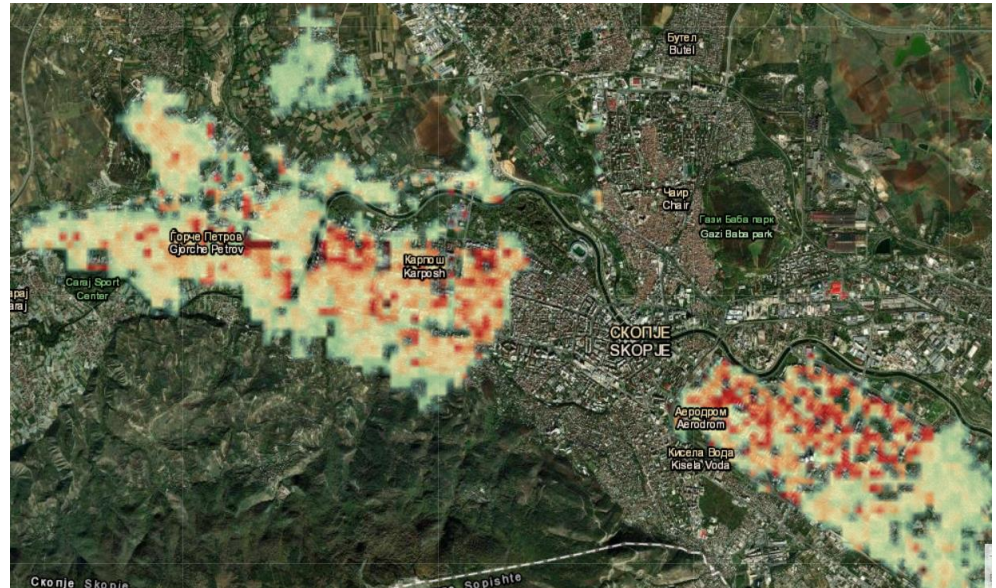
- Data required: Area; Floors; Classification of objects by purpose; Specific heat demand
- Calculation flow: Gross area; Net area; Annual heat demand

$$A_{bruto} = A_t \cdot N_{kat}$$

$$A_{neto} = A_{bruto} \cdot f_{pov}$$

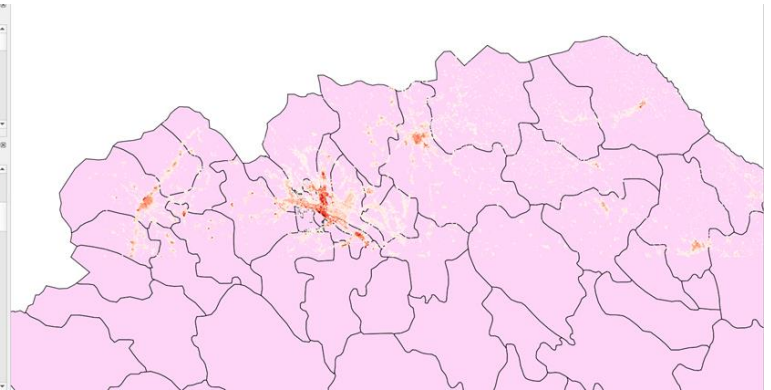
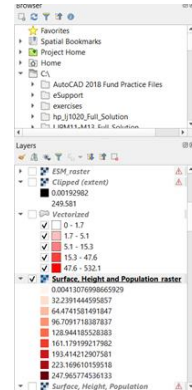
$$E_{gr} = A_{neto} \cdot e_{gr}$$

- Number of buildings: 21,000 in 3 municipalities
- Input data: excel format, csv format, python code



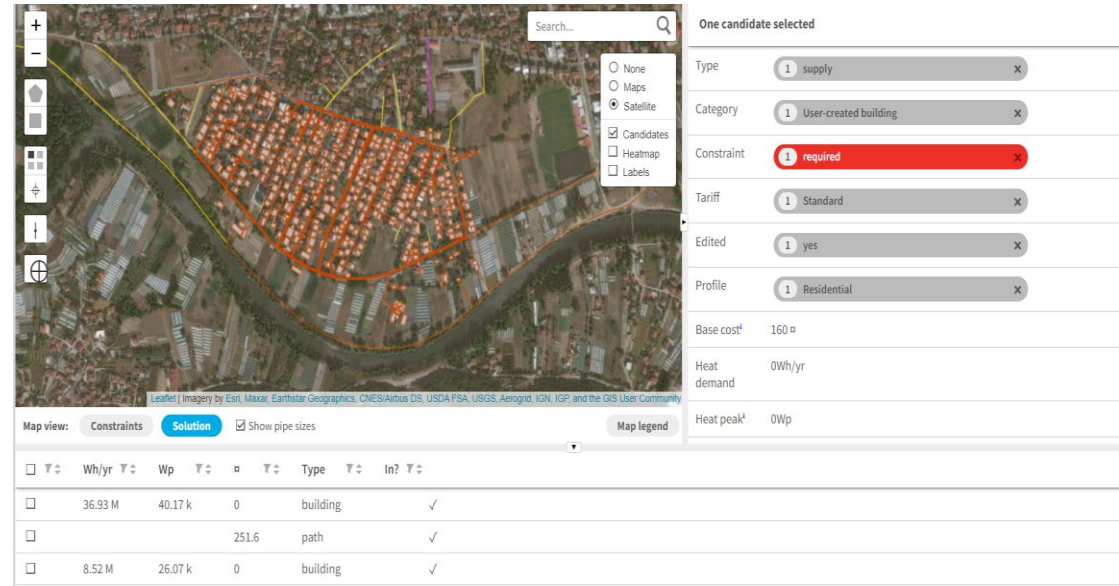
# Hotmaps - Heat demand map (top-down approach)

- Population density: GHS population grid (R2023):
- Gross floor area: GHS built-up surface (R2023):
- Heating degree days: Hotmaps dataset
- Surface to volume ratio: Open Street Map
- Historical construction periods: Copernicus: Imperviousness Classified Change (3-yearly)
- Current state: QGIS raster
- Following steps: validate with bottom-up and integrate in Hotmaps



# Thermos – heat demand maps (bottom-up approach)

- Number of buildings: 1000 in 1 municipality
- Residential area
- Current heating: individual (firewood stoves/pellet boiler)
- Selected supply technologies: Heat pump and PV
- Data adaptation: Tariffs, Pipe and connection cost (network problem) & profiles and technologies (supply problem)
- Objective: heating solution with techno-economic analysis



## Partners

The Act!onHeat consortium brings together leading European experts in strategic H&C planning and policy analysis, various coalitions working to increase the speed of the transition, and specialists in capacity building as and investment support.



Next call online: 15.01.2024

Apply here

[https://actionheat.eu/Call\\_for\\_applicants](https://actionheat.eu/Call_for_applicants)



Stay tuned by subscribing to our newsletter



This project has received funding from the EU's Horizon 2020 programme under grant agreement no 101033706.



[www.actionheat.eu](http://www.actionheat.eu)

