



Hotmaps

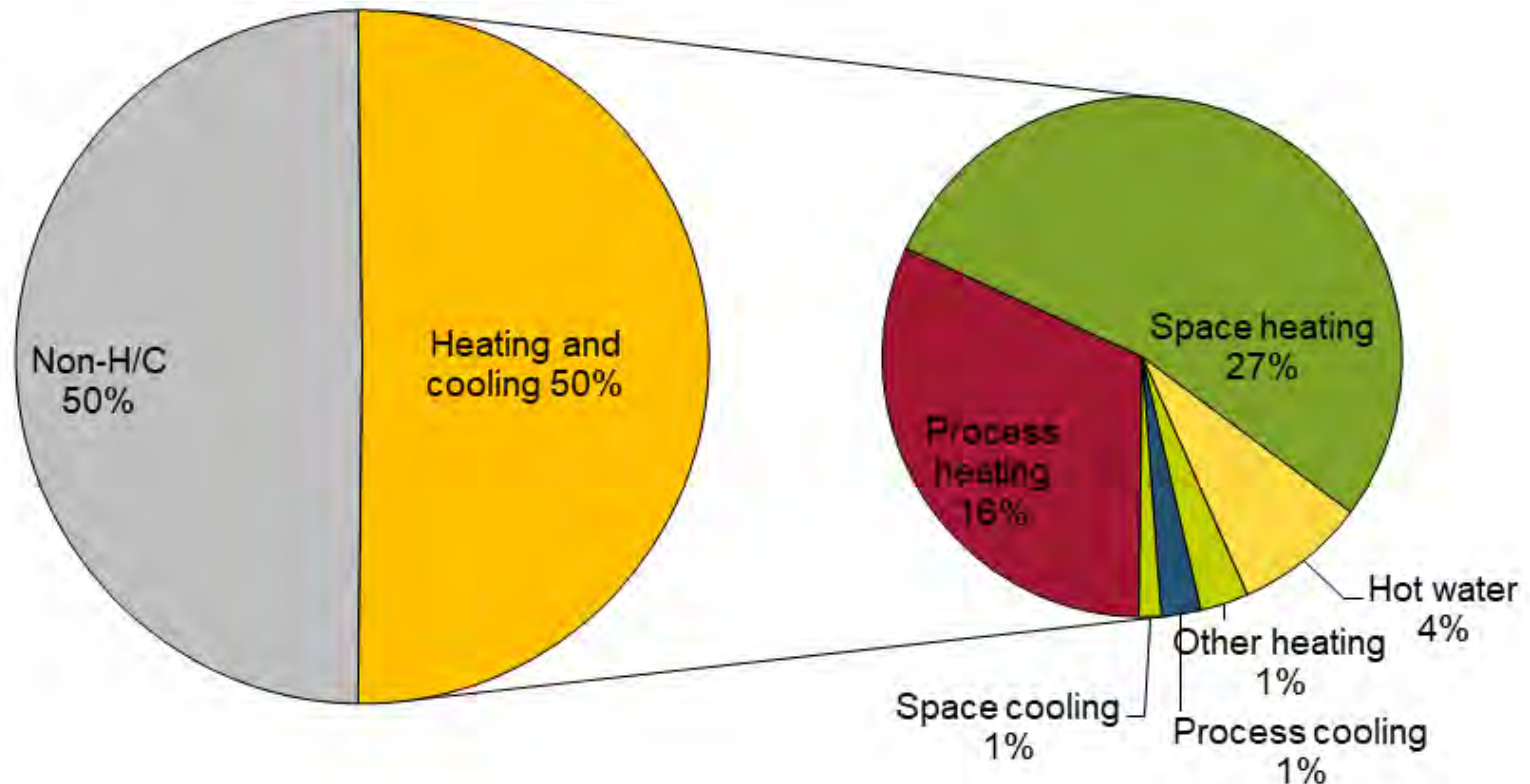
Heating and Cooling: Open Source Tool for Mapping and Planning of Energy Systems

Lukas Kranzl
Final Conference, 30 June 2020



Heating and Cooling: Need for transformation

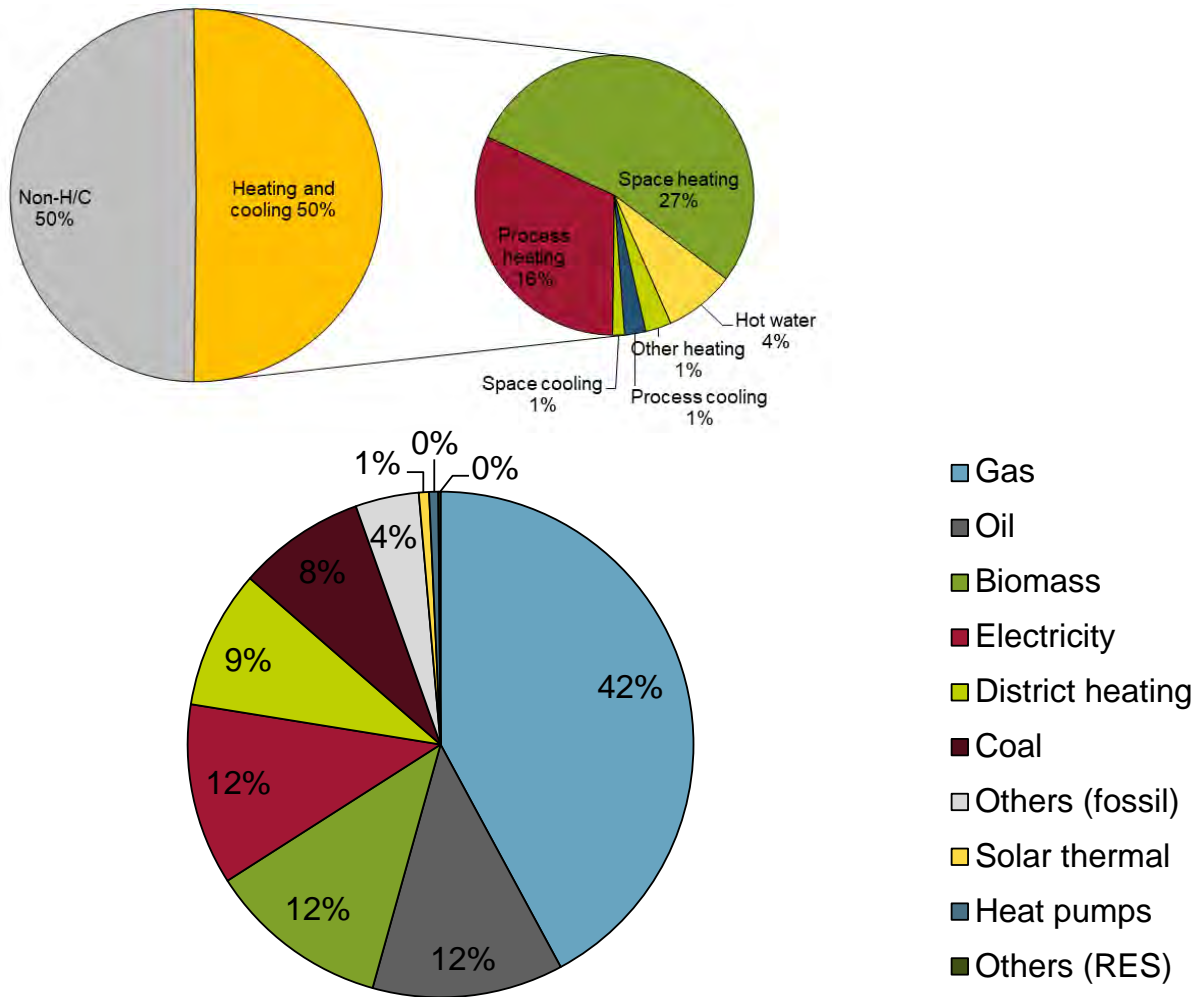
Final energy consumption, EU-28, 2015





Heating and Cooling: Need for transformation

Final energy consumption, EU-28, 2015





Challenges of local heat planning

- How high is heating and cooling demand in different areas?
- Where are potential and most economic areas for district heating and cooling?
- How high are potentials of building renovation, renewable heating and industrial excess heat?
- What are favourable pathways of decarbonizing the heating sector?



Hotmaps toolbox

Designed to address challenges of strategic heating and cooling planning

The screenshot displays the Hotmaps web application interface. The top navigation bar shows the user is logged in as 'Connect' in 'Brüssel, Stadt'. The main map area shows a satellite view of Brussels with a red heatmap overlay indicating heat density. The 'LAYERS' panel on the left is open, showing a list of layers under the 'BUILDINGS' category. The 'HEAT DENSITY TOTAL' layer is selected and checked. Other layers include 'HEAT DENSITY RESIDENTIAL SECTOR', 'HEAT DENSITY NON-RESIDENTIAL SECTOR', 'COOLING DENSITY TOTAL', 'GROSS FLOOR AREA TOTAL', 'GROSS FLOOR AREA RESIDENTIAL', 'GROSS FLOOR AREA NON-RESIDENTIAL', 'BUILDING VOLUMES TOTAL', 'BUILDING VOLUMES RESIDENTIAL', 'BUILDING VOLUMES NON-RESIDENTIAL', 'SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BEFORE 1975', 'SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1975 AND 1990', and 'SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1990 AND 2000'. The legend on the right shows options for administrative boundaries (NUTS 0, 1, 2, 3, LAU 2, Hectare) and map styles (OSM, Satellite). The URL 'www.hotmaps.eu' is overlaid in large white text across the center of the map. The bottom of the interface includes a scale bar (5 km / 5 mi), a map data attribution for Leaflet, Esri, and other providers, and a European Union funding logo.



Hotmaps offers ...

- **Starting data set**
- **Calculation modules** for assessing the potential of renewable heating and comparing future scenarios
- Opportunity to upload and **use own data sets** for your calculations,
- **Training** and support services
- **Customisation of the software** for your specific needs



Hotmaps' value added for ...

- **City planners:** support for stakeholders engagement, allowing to speed up the process; data-driven decision making tool; support to develop SECAP thanks to forecasting modules
- **Consultants:** open access to data and source codes that you can potentially use for your own tools; calculation modules to perform studies for your clients, possibility to work abroad easily as it offers data for EU 28
- **Utilities:** identify potential areas of interest for projects; easily perform pre-planning studies to be sent to potential customers, share common data with your stakeholders
- **Researchers:** data and methodologies to produce knowledge, development platform for further projects

The experts behind the project

Scientific partners



Pilot areas for developing and testing the tool



Bistruta Municipality



Kerry County Council



DONOSTIAKO GARAPEN EKONOMIKOA



Funded by the Horizon 2020 programme of the European Union

Project duration: October 2016-September 2020

Hotmaps: the key role of pilot areas





Challenges of local heat planning

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How high is heating and cooling demand in different areas of a region?

Connect Brussels

Wiki HOTMAPS

Type in the location you want to analyse

Brussels

- NUTS 0
- NUTS 1
- NUTS 2
- NUTS 3
- LAU 2
- Hectare

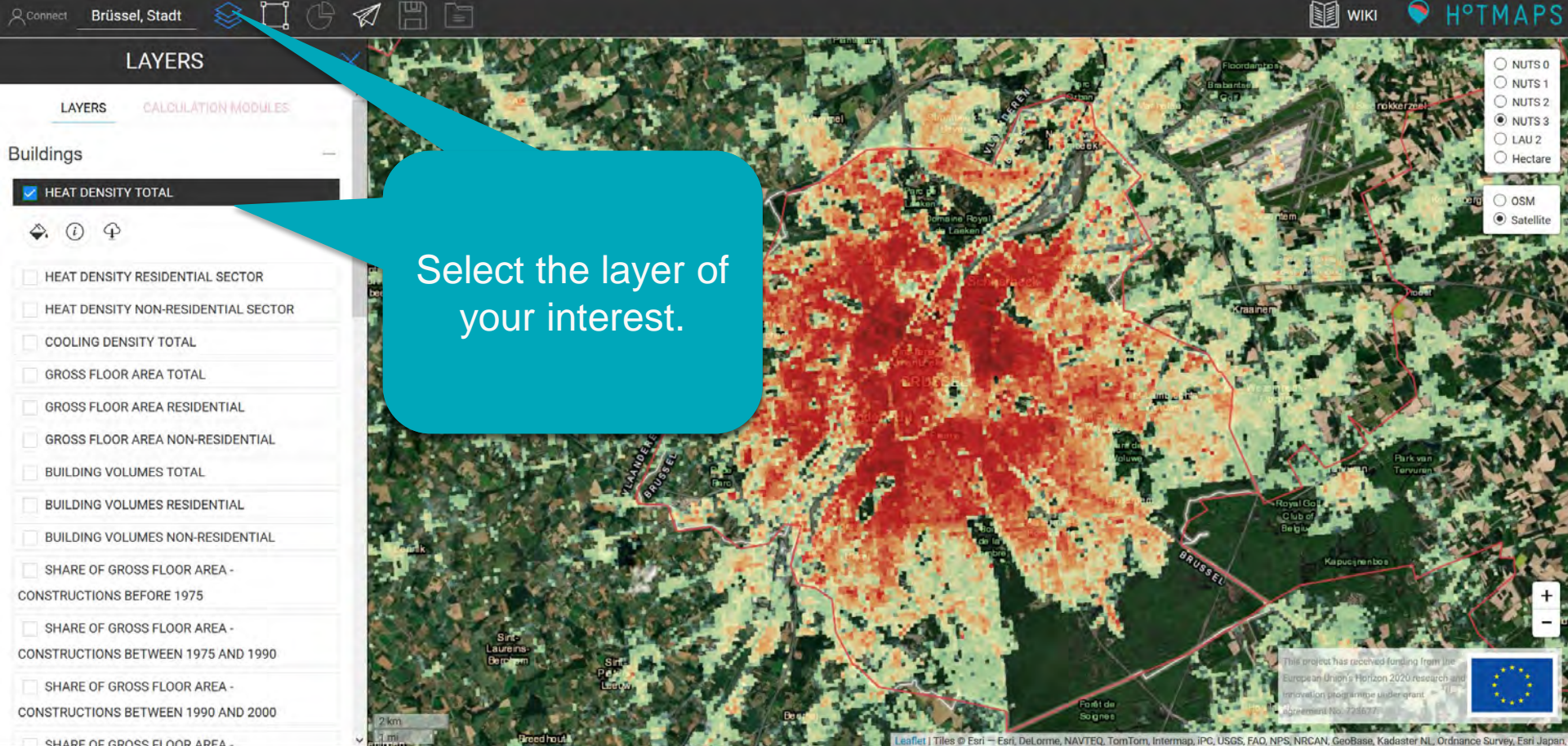
- OSM
- Satellite

300 km
200 mi

Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, IPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, Swisstopo, IGN, etc. © 2014 Esri. All rights reserved. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 723677.



How high is heating and cooling demand in different areas of a region?





How high is heating and cooling demand in different areas of a region?

Connect Brüssel, Stadt

WIKI HOTMAPS

LAYERS

LAYERS CALCULATION MODULES

Buildings

- HEAT DENSITY TOTAL
- HEAT DENSITY RESIDENTIAL SECTOR
- HEAT DENSITY NON-RESIDENTIAL SECTOR
- COOLING DENSITY TOTAL
- GROSS FLOOR AREA TOTAL
- GROSS FLOOR AREA RESIDENTIAL
- GROSS FLOOR AREA NON-RESIDENTIAL
- BUILDING VOLUMES TOTAL
- BUILDING VOLUMES RESIDENTIAL
- BUILDING VOLUMES NON-RESIDENTIAL
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BEFORE 1975
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1975 AND 1990
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1990 AND 2000
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS AFTER 2000

Zones selected 1

Bounding box 88 km²

Scale Hectare

LOAD RESULTS

CLEAR 1 ZONE

NUTS 0

NUTS 1

NUTS 2

NUTS 3

LAU 2

Hectare

OSM

Satellite

Leaflet | Tiles © Esri - Esri, DeLorme, NAVTEQ, TomTom, Intermap, IPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri, Japan, ...

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Select your region



How high is heating and cooling demand in different areas of a region?

Connect Brüssel, Stadt

WIKI HOTMAPS

LAYERS

LAYERS CALCULATION MODULES

Buildings

- HEAT DENSITY TOTAL
- HEAT DENSITY RESIDENTIAL SECTOR
- HEAT DENSITY NON-RESIDENTIAL SECTOR
- COOLING DENSITY TOTAL
- GROSS FLOOR AREA TOTAL
- GROSS FLOOR AREA RESIDENTIAL
- GROSS FLOOR AREA NON-RESIDENTIAL
- BUILDING VOLUMES TOTAL
- BUILDING VOLUMES RESIDENTIAL
- BUILDING VOLUMES NON-RESIDENTIAL
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BEFORE 1975
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1975 AND 1990
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS BETWEEN 1990 AND 2000
- SHARE OF GROSS FLOOR AREA - CONSTRUCTIONS AFTER 2000

Zones selected: 1
Bounding box: 88 km²
Scale: Hectare

LOAD RESULTS
CLEAR 1 ZONE

Legend:
NUTS 0
NUTS 1
NUTS 2
NUTS 3
LAU 2
Hectare
OSM
Satellite

RESULTS

Overall

INDICATORS GRAPHICS

INFORMATION	VALUE
HEAT DENSITY TOTAL	
Heat demand total	1 872.66 GWh/yr
Counted Cells	3 192 cells
Heat density min	0.43 MWh/(ha*yr)
Heat density max	3 167.23 MWh/(ha*yr)
Average heat density	586.67 MWh/(ha*yr)

EXPORT INDICATOR

Leaflet | Tiles © Esri - Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, Swatch, Swatch, Bing Maps, Mapbox

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Use your own data

CONNECT Brüssel, Stadt

LAYERS

Buildings

- HEAT DENSITY TOTAL
- HEAT DENSITY RESIDENTIAL SECTOR
- HEAT DENSITY NON-RESIDENTIAL SECTOR
- COOLING DENSITY TOTAL
- GROSS FLOOR AREA TOTAL
- GROSS FLOOR AREA RESIDENTIAL
- GROSS FLOOR AREA NON-RESIDENTIAL
- BUILDING VOLUMES TOTAL
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RESULTS

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EXPORT INDICATOR

Click on „connect“



Use your own data

LOGIN

Email

Password

CANCEL CONNECT REGISTER RECOVER

RESULTS

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EXPORT INDICATOR

Create own, secure, private user account to upload and use own data



Explore much more ...

LAYERS

DEMAND

- CM - SCALE HEAT AND COOL DENSITY MAPS
- CM - DISTRICT HEATING POTENTIAL AREAS: USER-DEFINED THRESHOLDS
- CM - DISTRICT HEATING POTENTIAL: ECONOMIC ASSESSMENT
- CM - DEMAND PROJECTION
- CM - HEAT LOAD PROFILES

SUPPLY

- CM - SOLAR THERMAL AND PV POTENTIAL
- CM - DECENTRAL HEATING SUPPLY
- CM - EXCESS HEAT TRANSPORT POTENTIAL

RESULTS

Overall

INDICATORS GRAPHICS

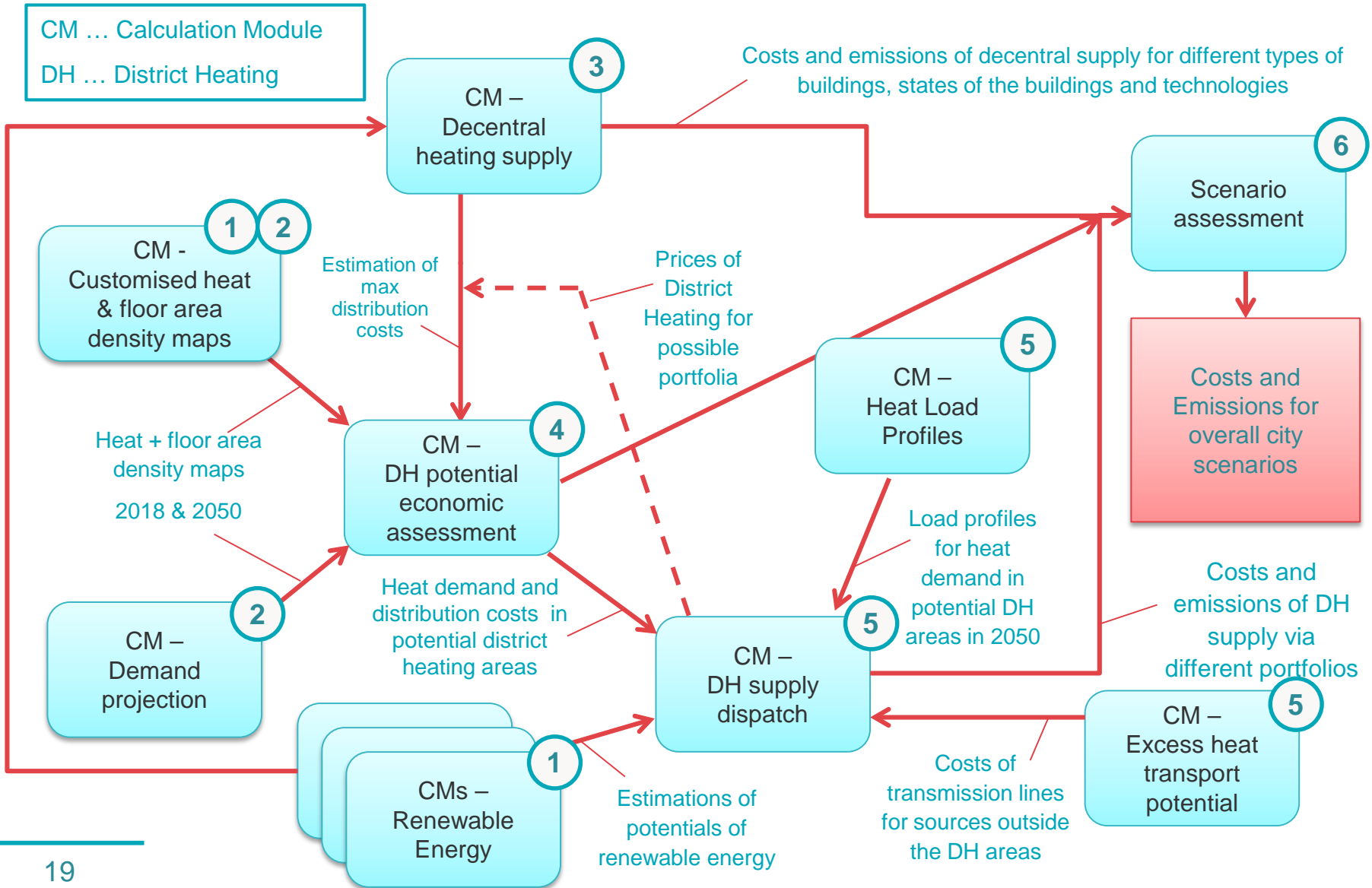
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EXPORT INDICATOR

Click on calculation modules to identify potential district heating areas, renewable energy potentials and much more ...



Scenario Toolchain Hotmaps





Need help? Hotmaps Wiki!

The screenshot displays the Hotmaps Wiki interface for 'Brüssel, Stadt'. The 'LAYERS' panel on the left shows 'HEAT DENSITY TOTAL' selected. The central map shows a color-coded heat density distribution. The 'RESULTS' panel on the right provides a summary of the data.

INDICATORS	VALUE
HEAT DENSITY TOTAL	
total	1 872.66 GWh/yr
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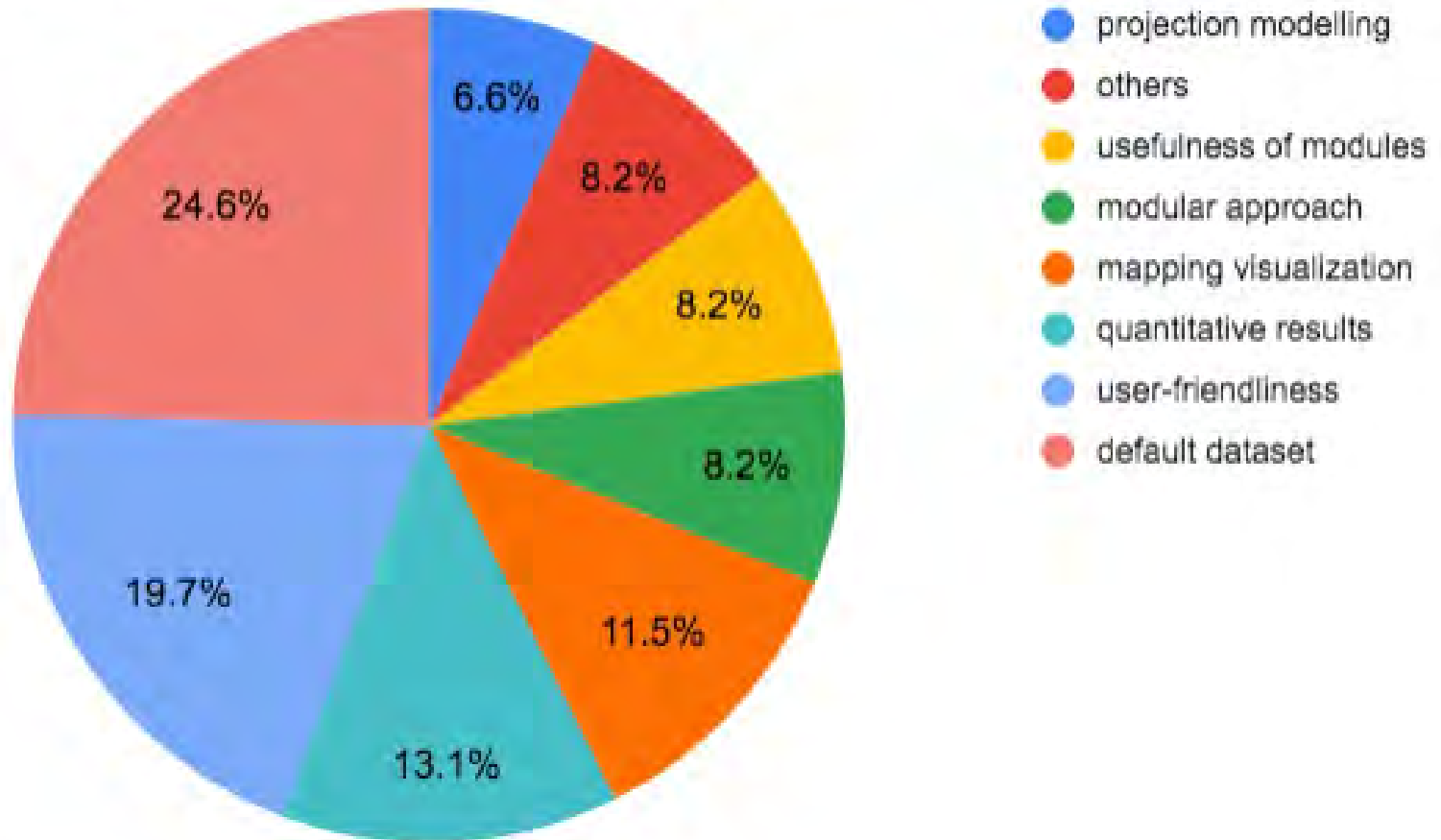
EXPORT INDICATOR

Hotmaps Wiki:
<https://wiki.hotmaps.eu/Home>



What Hotmaps trainees like most ...

What do you like the most in the toolbox?





Funded by the Horizon 2020 programme
of the European Union



Contact

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