Application of Hotmaps toolbox in the project DeCarb
Supporting the Clean Energy Transition of Coal-Intensive EU Regions

Magda Kowalska, PlanEnergi

Funded by the Horizon 2020 programme of the European Union

Powered by
Content

1. Project DeCarb – overview
2. Hotmaps – functionalities
3. Hotmaps – tool application in DeCarb
4. Project results
1. PROJECT DECARB – OVERVIEW
Project DeCarb

- Interreg Europe funding
- DeCarb addresses the challenge of combining the clean energy transition and job creation in coal-intensive EU regions.
- The project aims to support the regions in securing sustainable development, economic and social stability, and a role in the 2030 energy mix.
- [https://www.interregeurope.eu/decarb/](https://www.interregeurope.eu/decarb/)
DeCarb’s territories

- Nordjylland, DK
- Brandenburg, DE
- Extremadura, ES
- Savejniska, SL
- Łódzkie, PL
- Řezkov-Álföld Region, HU
- South-West Oltenia, RO
- Yugoiztochen, BG
- Western Macedonia, EL
DeCarb - SWOT analysis

What: Key strengths, weaknesses, opportunities and threats of the clean energy transition.


How: Energy data collection from DeCarb territories.

Why: to determine decarbonisation growth pathways, and reduce economic and social risk of diversifying sources of energy production.
2. HOTMAPS – FUNCTIONALITIES
Mapping tools
- Energy consumption
- Gross Internal Area
- Excess heat from processes
- Population
- RES potential
- Climate data
- Electricity emissions

Calculation modules
- Heat and cooling scaling
- DH potential areas
- DH economic assessment
- Decentralised heat supply
- Excess heat supply cost
- Demand projection
- Heat load profiles
3. HOTMAPS – TOOL APPLICATION IN DECARB
Data collection Manual

The list of figures to be collected with the example values

<table>
<thead>
<tr>
<th>Total potential of district heating supply</th>
<th>Min. heat demand in a DH area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (MWh/ha)</td>
<td>150 (MWh/ha)</td>
</tr>
<tr>
<td>1 (GWh/year)</td>
<td>92%</td>
</tr>
<tr>
<td>5 (GWh/year)</td>
<td>84%</td>
</tr>
<tr>
<td>10 (GWh/year)</td>
<td>78%</td>
</tr>
</tbody>
</table>

The example view of the data source with the results for DH potential that need to be extracted is illustrated on the following picture.

- Extract the required figures for your region, please follow the steps:
  - Go to the website address.
  - Select the NUTS2 in the territorial NUTS scale on the right-hand side of the screen.
  - Find on the map and select your region (you can use the search tool in the top left corner or ‘Go to place’ or using the mouse move the map to the desired area and click on your region).
  - Open filter panel using the icon and select the tab ‘Calculation modules’.
  - In the ‘Buildings’ category click on the button ‘District Heating Potential’.
  - Insert input variables and run calculations by selecting the button ‘Run cm’. There are two variables that should be defined.
    - A minimum capacity of a single heat network that could be built - 1 GWh, 5 GWh and 10 GWh were selected for Nordjylland.
    - A minimum heat demand required per one hectare in order this area could be connected to the DH - 1 MWh/ha, 150 MWh/ha and 300 MWh/ha were selected for Nordjylland.
  - A few different values should be tested to show the range of district heat potential.
  - After running the tool, copy the result ‘Potential share of district heating from total demand in selected zone (%)’.
  - Repeat the calculation for each combination of these two variables to get different figures of DH potential and collate them in the table as shown below which enable to make a graph.
DeCarb – Supporting the clean energy transition of coal-intensive EU regions

Final Report

Reference case study and SWOT analysis identifying the most advantageous growth areas in relation to the existing workforce and territorial specificities in order to create alternative to coal-driven activities

5th International Conference on Smart Energy Systems
Copenhagen, 10-11 September 2019
#SESAAU2019
Energy consumption
Heat and cooling demand - total annual and consumption per area
Gross Internal Area
A density of gross floor area for buildings per hectare of land
Excess heat - Industrial
Potential for spare heat from industrial processes and plants

5th International Conference on Smart Energy Systems
Copenhagen, 10-11 September 2019
#SESAAU2019
Excess heat – Waste water
Potential for spare heat from industrial processes and plants
RES potential

Agricultural residues (straws, prunings and residues from agro-industrial processes), Livestock effluents (liquid and solid residues from breeding pig, cattle, poultry)
RES potential cont.

Forest residues, Municipal solid waste
RES potential cont.
Wind speed, Solar radiation, Geothermal heat conductivity potential

---

**WIND POTENTIAL AT 50 METERS**

**SOLAR RADIATION ON BUILDING FOOTPRINT**

**GEOTHERMAL POTENTIAL HEAT CONDUCTIVITY**

---

**Overall**

<table>
<thead>
<tr>
<th>INFORMATION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average solar radiation</td>
<td>1 686.14 kWh/(m²*yr)</td>
</tr>
<tr>
<td>Minimum solar radiation</td>
<td>1 601.3 kWh/(m²*yr)</td>
</tr>
<tr>
<td>Maximum solar radiation</td>
<td>1 805.3 kWh/(m²*yr)</td>
</tr>
<tr>
<td>Counted cells</td>
<td>22 137 cells</td>
</tr>
<tr>
<td>Restricted solar thermal potential</td>
<td>167 966.91 GWh/yr</td>
</tr>
</tbody>
</table>

**WIND POTENTIAL AT 50 METERS**

<table>
<thead>
<tr>
<th>INFORMATION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average wind speed</td>
<td>2.45 m/s</td>
</tr>
<tr>
<td>Maximum wind speed</td>
<td>11.52 m/s</td>
</tr>
<tr>
<td>Minimum wind speed</td>
<td>0.31 m/s</td>
</tr>
<tr>
<td>Counted cells</td>
<td>3 169 382 cells</td>
</tr>
</tbody>
</table>

**GEOTHERMAL POTENTIAL HEAT CONDUCTIVITY**

<table>
<thead>
<tr>
<th>INFORMATION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average heat conductivity</td>
<td>71.5 W/m²K</td>
</tr>
</tbody>
</table>
4. PROJECT RESULTS
Project DeCarb
results and next steps

- The SWOT provided a thorough overview of the strengths and weaknesses regarding energy resources and also emphasized a diversity in environmental, social and economic conditions across all investigated locations.
- The findings increased the awareness among local authorities helping them to prioritise the adoption of alternative and diversified growth trajectories in the decarbonisation of the economies.
- The SWOT analysis is being used in developing the main deliverable: Energy Action Plans which will address policy instruments on territorial needs and decarbonisation pathways.