Sunny MINE concept
A solution for sustainable heat

Genk, Sep’17

Project team
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Tomaž Rakar
Agenda

- **Background & Goals**
  - New DHC
  - Value proposition
  - Financials
  - Executive Summary
Background & Goals

- Population is aprox. 165k (Genk, Hasselt)
- 30,000 tCO2/a
  - Using synergies and local resources
  - A future with zero emissions
Agenda

• Background & Goals
• **New DHC**
• Financials
• Executive Summary
# Heat demand

## Knot Ranking

<table>
<thead>
<tr>
<th>Knot</th>
<th>Ranking</th>
<th>Heat demand in GWh/a</th>
<th>Heat density in kWh/m²*a</th>
<th>Order of DHC supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genk Central</td>
<td>1</td>
<td>33</td>
<td>106</td>
<td>1</td>
</tr>
<tr>
<td>Hasselt East</td>
<td>2</td>
<td>23</td>
<td>51</td>
<td>5</td>
</tr>
<tr>
<td>Nieuw Veld</td>
<td>3</td>
<td>10</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>Hasselt South</td>
<td>4</td>
<td>27</td>
<td>41</td>
<td>6</td>
</tr>
<tr>
<td>Hasselt Central</td>
<td>5</td>
<td>18</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>Sleederloo</td>
<td>6</td>
<td>11</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>Hasselt West</td>
<td>7</td>
<td>10</td>
<td>41</td>
<td>8</td>
</tr>
<tr>
<td>Kolderbos</td>
<td>8</td>
<td>17</td>
<td>34</td>
<td>2</td>
</tr>
</tbody>
</table>

## Heat demand summary:

- **Genk Central**: 88 GWh/a
- **Hasselt East**: 62 GWh/a

## Map:

- 88 GWh/a
- 62 GWh/a
- 6.1 km
- 9.9 km
- 3.6 km
- 1 to 8 knots

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**Sunny MINE**
# Local heat sources

<table>
<thead>
<tr>
<th>Heat sources</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geothermal heat from mine</td>
<td>Use like storage tank</td>
<td>Already there</td>
</tr>
<tr>
<td>Solar power</td>
<td>Undcoverd solar colektors</td>
<td>Low prices</td>
</tr>
<tr>
<td>Waste energy</td>
<td>Steal factory</td>
<td>Low price for heat</td>
</tr>
<tr>
<td>Wood chips</td>
<td>Wood chips boilers</td>
<td>Renewables resorces, have 2 big compant 80km from Genk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only in summer time, need a lot free space</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need agreement with factory, Hight investions</td>
</tr>
</tbody>
</table>
Scheme of DHC network

- **Old buildings**: 90 °C
- **Genk central**: 60 °C
- **Sleederloo**: 40 °C
- **Biomass boiler**: 25 MW<sub>th</sub>
- **Industrial waste heat**: 10 MW<sub>th</sub>
- **Heat pumps**: 70 °C
- **Coal mine / seasonal storage**: 30 °C
- **Winter**: 10 MW<sub>th</sub>
- **2 MW<sub>el</sub>**
- **5 mio. m<sup>3</sup>**
**Scheme of DHC network**

- **Old buildings**
  - 90 °C

- **Genk central**
  - 60 °C

- **Sleederloo**
  - 40 °C

- **Biomass boiler**

- **Industrial waste heat**

- **Heat pumps**
  - 70 °C

- **Coal mine / seasonal storage**
  - 30 °C

- **Regeneration**
  - 110°C

- **Uncovered Solar thermal collectors**
  - 20,000 m² (=3 football fields)

Summer
Heat supply

<table>
<thead>
<tr>
<th></th>
<th>GWh/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
Heat supply

<table>
<thead>
<tr>
<th>Heat Source</th>
<th>GWh/a</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>150</td>
<td>100%</td>
</tr>
<tr>
<td>Excess heat</td>
<td>85</td>
<td>56%</td>
</tr>
</tbody>
</table>

Storage
Heat supply

<table>
<thead>
<tr>
<th>Source</th>
<th>GWh/a</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>150</td>
<td>100%</td>
</tr>
<tr>
<td>Excess heat</td>
<td>85</td>
<td>56%</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>40</td>
<td>26%</td>
</tr>
</tbody>
</table>
Heat supply

Overall -98 % CO2 Reduction !!!

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<tr>
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<td>56%</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>40</td>
<td>26%</td>
</tr>
<tr>
<td>Biomass</td>
<td>25</td>
<td>16%</td>
</tr>
<tr>
<td>Solar</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Storage
Agenda

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Future Development Plan

STEP 1
Genk (1,5 years)

STEP 2:
Extend to Hasset (2,5 years)

Step 3:
Other extension's
Financials Indicators

<table>
<thead>
<tr>
<th>Activity</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid cost</td>
<td>26.000.000</td>
</tr>
<tr>
<td>10 heat pumps</td>
<td>150.000</td>
</tr>
</tbody>
</table>

Return of investment

Year 1 to Year 15

mio. €
Communication strategy

Objectives:
• To achieve that, we need to build awareness and educate relevant stakeholders about our solution, why and how it brings value to them.

Target group:
• Industry with heat waste
• Inhabitants
• Commercial buildings

Actions:
• Existing customers – first wave (power plants, POWERDALE)
• New potential customers – second wave

Messages:
• We will build our messages based on value proposition, for each target group separately

Tools and activities:
• We will utilize an integrated communication mix, which is appropriate for the target group and messages

Timeline and budget:
• Will be defined based on previous activities
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Executive Summary

WHY
• Reduce 29 986 tCO2 annually (- 98 % CO2)
• Benefits for local economy

WHAT
• Innovative concept using local synergies

HOW
• District heating and optimised System engineering with renewable energy
Thank you