Decarbonizing district heating in two parallel phases

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Upper Nitra introduction

2 mining lignite mines, 1 Mio t
state aid to support mining industry represents approx. 120 Mio. €
power station produces 5.22% of the total electricity in Slovakia + heat for 15 000 households
55% of the region's population lives in environmentally degraded area
alarming forecasts in the aging population
Coal phase-out by 2023

**2018**
The termination of state aid by 2023

**2019**
Coal phase out in electricity production

**2022**
TJTP to be approved by Government and EC
What the coal phase-out means for district heating?

- 1982-2023
- 2023
- 2030+
Designed heat sources for Prievidza, Nováky and Zemianske Kostoľany since 2023

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Heat sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prievidza</td>
<td>Gas boilers (2 x 15 MW + 1 x 5 MW)</td>
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<tr>
<td></td>
<td>Biomass boilers (2 x 3 MW)</td>
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<td></td>
<td>HP for mine water (4 x 1,025 MW)</td>
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<td>Cogeneration unit (1,15 MW)</td>
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<td>Thermo-solar system for preheating of mine water for HP (2,5 MW)</td>
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<tr>
<td>Nováky</td>
<td>Biomass boilers (2 x 3 MW)</td>
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<tr>
<td></td>
<td>HP for mine water (2 x 1,85 MW)</td>
</tr>
<tr>
<td>Zemianske Kostoľany</td>
<td>Gas boiler (1 MW)</td>
</tr>
</tbody>
</table>
Entrance to abandoned lignite mine
Mining water
Future thermosolar field
Place for future cogeneration unit
Pipelines will be almost all replaced
Why we do think the solution cannot be considered a long-term solution?

It uses fossil fuel

It is based on non-optimized heat consumption

By renovating buildings in Prievidza, we can save 53.5 - 63.3% of heat for residential buildings and 29.1 - 34.7% in schools and kindergarden.
2nd phase of DH

Based on renewable energy sources that heat buildings with optimized heat demand
2nd phase of DH - several scenarios

**Northern DHS – Scenario A₂**

- Heat demand to cover – 41,1 GWh/a
- Expected annual coverage of heat sources:
  - solar system, PTES with HP – 75%
  - biomass boiler – 25%

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<table>
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<tr>
<th>Solar collectors</th>
<th>61 300 m²</th>
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<tr>
<td>PTES</td>
<td>110 300 m³</td>
</tr>
<tr>
<td>Discharging HPs</td>
<td>5.1 MW; SPF: 3.4</td>
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<tr>
<td>Biomass boiler</td>
<td>5.1 MW; efficiency 85%</td>
</tr>
</tbody>
</table>
A clear direction: reduce annual CO2 emissions

1982-2023

64,285

2023

17,913

2030+

1,035

in metric tons per year