OPTIMIZE YOUR NETWORK WITH LOW TEMPERATURE ZONES IN DISTRICT HEATING
“I NEED TO LOWER THE TEMPERATURES IN MY DISTRICT HEATING NETWORK TO BE PART OF THE ENERGY TRANSITION AND/OR TO REDUCE THE HEAT LOSSES”
“HOW CAN I LOWER TEMPERATURES IN MY DISTRICT HEATING NETWORK??”
A typical district heating network

- Supply temperature, made to serve the ‘worst’ customers
- High heat losses
- Main pumps delivering all flow and pressure
- Big pressure drops
A zone-divided district heating network

- Demand driven supply
- Temperature and pressure adjusted according to consumer, reducing heat losses
- Distributed pumping, reducing pressure and energy consumption
### 3 levels of temperature optimization

<table>
<thead>
<tr>
<th>Temp-O unit</th>
<th>IHG controller</th>
<th>IHG measure points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makes it possible to lower the temperature for a specific city zone</td>
<td>Adjusts the standard temperature setting based on weather compensation and peak shaving</td>
<td>Further optimization based on the actual achieved temperature in the critical parts of the zone (wireless and real-time data)</td>
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Different temperature optimisation units

Classic solution
- Pressure independent
- Pressure limitation

Free flow solution
- Pressure independent
- No loss in valves
- Highest reliability

Shunt solution
- Pressure dependent
- No even-pressure control
- Cost-efficient
VERY low ROI when reducing temperatures in zones

Examples: Existing heat loss 20% and avg. $T_{\text{out}}$ 9°C

Return on investment < 3 years

Indirect surplus heat (heat pumps)
Geothermal, solar thermal and surplus wind
A case from Gentofte, Copenhagen

In doing so, we reduce our loss in the network considerably -
Savings in an extension area with a low temperature zone
(highly insulated piping)

Annual customer demand:
9,000 MWh for 300 older houses

<table>
<thead>
<tr>
<th>Avg. temperatures (flow/return)</th>
<th>USUAL DESIGN</th>
<th>EXPECTED NEW TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>79°C - 48°C</td>
<td>60°C - 38°C</td>
</tr>
<tr>
<td>Heat loss in pipes per year</td>
<td>2.570 MWh</td>
<td>1.950 MWh</td>
</tr>
<tr>
<td>Pump energy per year</td>
<td>0 MWh</td>
<td>14 MWh</td>
</tr>
<tr>
<td>Carbon emission due to heat loss</td>
<td>195 tonnes</td>
<td>148 tonnes</td>
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</tbody>
</table>

Calculated based on the calculation principles of the Danish District Heating Association CTR that is delivering energy to Gentofte with a carbon emission of only 76 g/kWh.
Lower temperatures in existing networks for immediate implementation

Temperature zones
- Over-sized installations
- Reduced heat demand (energy renovation)
- Design loads too high

Balancing
- First buildings missing heat
- Balancing few buildings

New installations
- Balancing not enough
- Replace few installations (mainly heat exchangers)

Re-design
- Re-design required
- More installations out
- For new LTDH areas only

Investments

Temperature
- 40°C
- 110°C

Lower temperatures in existing networks for immediate implementation...
The advantages of low temperature zones and real-time control

**REDUCED HEAT LOSSES (OFTEN >20%)**
- Improved total capacity
- Lower return temperature, higher production efficiency
- Integration of more renewable energy sources

**INDUSTRIALISED SOLUTION, ADAPTED TO YOUR NEEDS**
- Plug’n’pump solutions
- Dimensioning and price estimate within 48 hours
- Short return on investment

**IMPROVED SYSTEM CONTROL**
- Improved asset lifetime due to intelligent control of p and T
- Peak shaving & weather control
- Improved system overview and optimisation possibilities

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THANK YOU FOR LISTENING!

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Challenges of low temp. heating

PRESSURE LOSS

Solve the challenge of high pressure and loss by distributing pumps and adding the pressure when needed:

\[ \Phi = Q \cdot \Delta t \]