THE ROAD TO DIGITALIZATION, AND USAGE OF CUSTOMER DATA FOR OPTIMIZATION

Tom Diget – Distribution manager td@viborgvarme.dk
HEAT PRODUKTION 2026

8 MW AirtoWater Heatpump
50 MW elektrical boiler

8 MW Air to Water Heatpump

Existing gasboilers – will eventually be on biogas

5 MW groundwater Heatpump

Datacenter Heatpump
• Why optimization is more important now
• Having the right temperature has 6 times more impact on the production price in the future

### Table 1. Overview of projected economic effects, according to the cost reduction gradient (CRG) in euro/(MWh °C), of reduced system temperatures.

<table>
<thead>
<tr>
<th>Chapter section and heat supply technology (either the technology itself or as the dominant component of a system)</th>
<th>Cost reduction gradient (CRG) in euro/(MWh °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment cases where investment costs are reduced</td>
<td>Existing cases where operation costs are reduced</td>
</tr>
<tr>
<td>2.1 Low-temperature geothermal heat</td>
<td>0.45–0.74</td>
</tr>
<tr>
<td>2.2 Heat pump</td>
<td>0.41</td>
</tr>
<tr>
<td>2.3 Low-temperature waste heat</td>
<td>0.65</td>
</tr>
<tr>
<td>2.4 Solar thermal – flat plate collectors</td>
<td>0.35–0.75</td>
</tr>
<tr>
<td>2.4 Solar thermal – evacuated tube collectors</td>
<td>0.76</td>
</tr>
<tr>
<td>3.6 Biomass-CHP with back-pressure turbine</td>
<td>Not available</td>
</tr>
<tr>
<td>3.6 Biomass-CHP with extraction turbine</td>
<td>Not available</td>
</tr>
<tr>
<td>3.6 Waste-CHP with flue gas condensation</td>
<td>Not available</td>
</tr>
<tr>
<td>3.7 Daily storage as tank thermal storage</td>
<td>0.01</td>
</tr>
<tr>
<td>3.7 Seasonal storage as pit thermal storage</td>
<td>0.07</td>
</tr>
<tr>
<td>3.8 Heat distribution loss</td>
<td>Not available</td>
</tr>
</tbody>
</table>

**Future production sources**

**Old production sources**
DEMAND SIDE
WHAT CAN DATA BE USED FOR AT DEMAND SIDE

• Optimize return temperature by feedback to customer
  • This is what we primarily have done for the last 25 years

• Lowering the supply temperature in buildings

• Optimize performants of rental heat interface units

• Lowering the network pressure and optimize cirkulation loops

• Maybe peak shaving of larger buildings
MORE DATA CAN RESULT IN HIGHER KNOWLES AND ENERGY SAVINGS

• By having more data from e.g. Frese circulation Valves – gives Knowles of necessary pressure further out in system

• Example
  • 1.3 bar to 1.0 bar on main pumps
  • Savings 31.000 kWh on main pump
  • Extra energy consumption at distributed pump 3.600 kWh
  • Total savings 26,3 MWh electricity at 700 kr. per MWh (2019 prices)
  • 18.400kr per year
DATA FROM RENTAL UNITS

- Possibility of online optimization of the units
- A lot of new data points

Vis alle ECL'er på kort, 485 ECLer

22£ per month
DATA POINTS IN CRITICAL POINTS OF THE NET

- We install a GSM card to secure the data flow by 30 sek. datapacked
- We install 2 pressurepoints
- We bundle datapoints to get and average differential pressure
- We get access to the data in the scada system
- We hope to be able to control the pumps from this average bundle differential pressure
- We expect to be able save a lot of pump energy in the system
• Can be used to calculate the optimized temperatures
• And can be used to find critical apartments – or failures in the system
THOUGHTS ON NEW DATA INFRASTRUCTURE

More and more hardware to come
Need to reduce infrastructure technologies
And have a plan for data frequency

Ownership of data need to be ours
Can choose and change to the company with the best product

Main server – all data with a time-stamp

Billing Meters
Scada System
Frese – circulation valves
Pipe leak detection
ECL-Customer scada
Grundfos IGrid
Vexve valves

Billing system
Scada system
Meter-data system
Produktion planning system
External partners
OUR TEMPERATURE HISTORY  
8 STEPS TO LOW TEMPERATUR

Tom Diget – Distribution manager 
td@viborgvarme.dk
+45 40752167

Figure 17. Tools and methods in the transition to lower temperatures [14].
DIGITALISATION OF THE PIPE NETWORK