EXPERIENCES OF A HEATING ASSOCIATION IN DENMARK – FROM SUPPLY TEMPERATURE AT 95 DEGREE TO 65 DEGREE

Tom Diget
COO at Viborg District Heating
OWNERSHIP

• Established in 1953

• Viborg District Heating is owned by the consumers

• Ownership like this is a Danish recipe, a bit like a cooperation
  • The surplus of the years, is divided for the members according to their turnover (energy consumption)
  • If a member wants to leave the cooperation, they have to pay a part of the debt, unless there is a positive amount of new owners

• On the Annual meeting the consumers point out 7 board members
VIBORG DISTRICT HEATING
PURPOSE

• The company’s main goal is to give our customers more value for less money.

• And the strategy consists of four main areas.
  • Competitiveness of product to gain more customers.
  • Customer support to reduce customers consumption of energy.
  • More efficient low temperature district heating system to reduce heat loss.
  • A more efficient administration to be able to include more customers.
VIBORG DISTRICT HEATING

Municipality owned

9,100 delivery points

Consumer owned

270,000 MWh

325 km DH pipe

186 MWh/km heat loss

2,17 million heated m²
ORGANIZATION

CEO
Morten Abildgaard

Finance, Billing & Customer Support
Johannes H. Jensen

Planning
Tom Diget

Operation
Jan Bjerg

Field Work
Kasper Birk

Total
- 13 HC
- 11.5 FTE
THE GRID IS IMPROVED

Development of key figures

<table>
<thead>
<tr>
<th>Year</th>
<th>Length [m]</th>
<th>Distributions loss [MWh]</th>
<th>Meters</th>
<th>Heatet area [m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>232.889</td>
<td>73.846</td>
<td>6.012</td>
<td>1.499.000</td>
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<tr>
<td>2017</td>
<td>334.745</td>
<td>57.707</td>
<td>9.251</td>
<td>2.231.000</td>
</tr>
</tbody>
</table>

Legend:
- Red: Length of distribution grid - index
- Green: Number of meters - index
- Purple: Heatet m² connected - index
- Cyan: Distribution loss - index
TEMPERATURE FOCUS
SINCE MID 1990

- Smart meters 1999
- Motivation tariff 2002
- Temperature strategy 2011

Temperature Focus since mid-1990

Supply temperature

Return temperature

- 2002
- 2009
- 2013
- 2017
MOTIVATION OF CONSUMER

Supply temperature °C

Return temperature °C
CUSTOMER SUPPORT

• We have a free customer support
• Gives advice by mail, over the phone or use facetime if possible to "point" at the right valve or pump.
• Gives onsite demonstration to new customers
NEW GOALS

How can we attain 10% heatloss?

Efficient DH Network

New Customers

Existing Customers

Benefit

Prioritize

Cost

2013 New CEO

Vi skal tage et kvantespring, forbrugerne kan mærke

Article in "Fjernvarmen" december 2013
FOKUS POINTS

- New twin pipes
- Optimized pipe dimensions
- Less circular pipe sections
- Shorter service pipes
- Pump stations in network – with possibility to lower supply temperature sections with differentiated temperatures

- Insulation of components
- Planing tools to lower supply temperature
- Move some pump capacity into distribution grid

- Consumption visualisation
- Prioritize the ones with highest return temperature
- Insulated pipes on DH side of meter
- Rental unit
- Circulations loops in larger buildings
- Danish Clean Water

- Individual oil boilers
- Hospital
- Individual ATW Heat pumps – new areas
- Competiveness
- Rental DH unit
- Demands for equipment

Distribution grid
New customers
Existing customers
Main stations
UNIT TO RENT FOR 1-FAMILY HOUSES

- New project – helps consumers to a new efficient house installations.
- Low monthly rent which pays back in internal savings.
- Makes hot water (45°C) at 50 °C supply temperature.
- Online access to data at settings.

178 kr. per month
HOW WE ANALYSE

• Sectioning the network
  • Heatloss and demand
  • Type of buildings and age
  • Geography
PIPE LAYOUT

- Calculation tool
  - Hydraulic
  - Heatloss
  - Budget
- Twinpipes
- Optimized dimensions
- Less circulations loops in network
- Distributed pumps

- Renovation of 25 year old pipes, saves 65 % of heatloss
NEW AREAS ALREADY LOW TEMPERATURE

- 50 °C most of the year
- 65 °C peak load