

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

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COO at Viborg District Heating



Viborg Fjernvarme

NEMT TRYGT BILLIGT

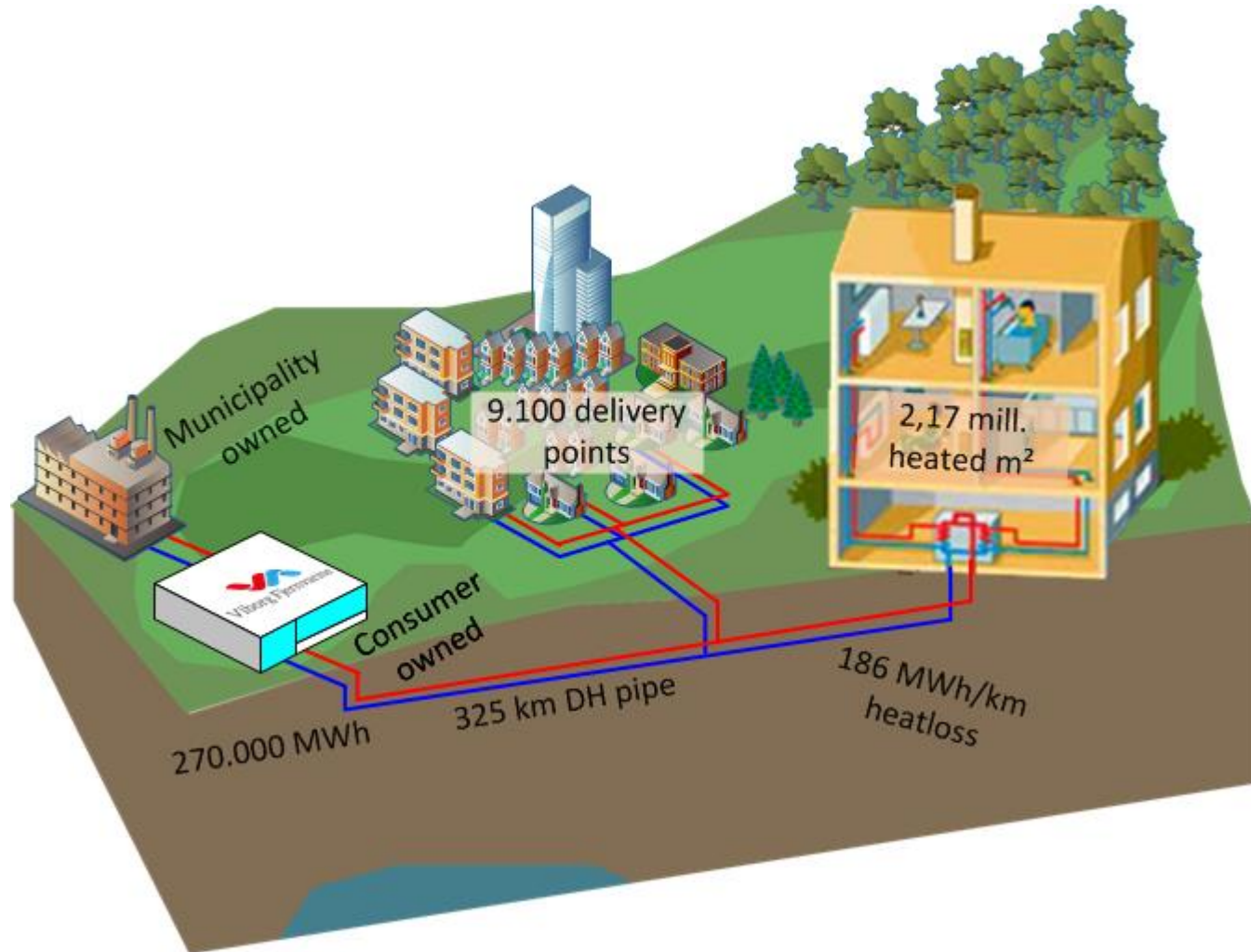
OWNERSHIP

- 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 the a part of the debt, unless their is a positive amount of new owners
- On the Annual meeting the consumers point out 7 board members

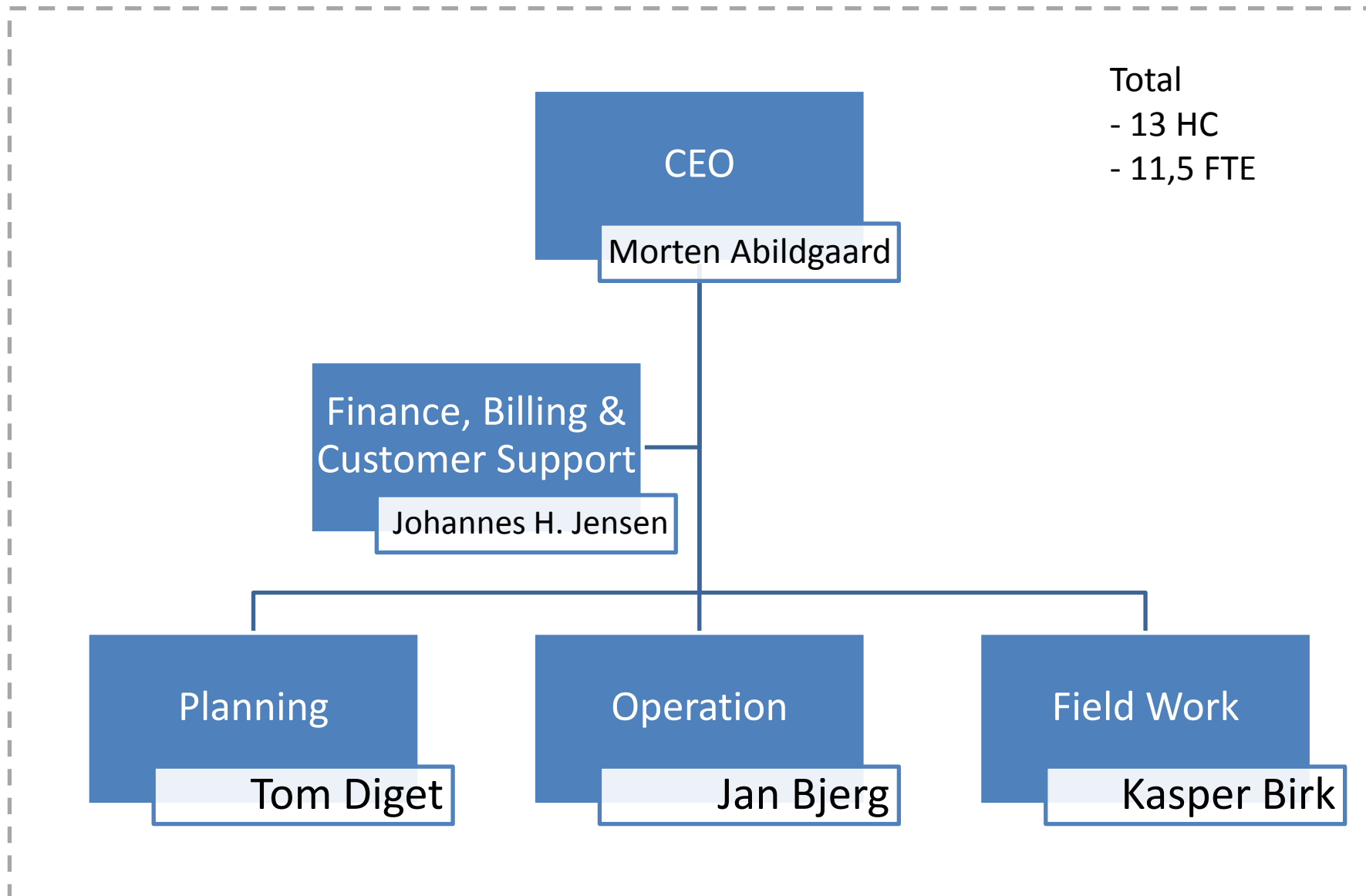
PURPOSE

- **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

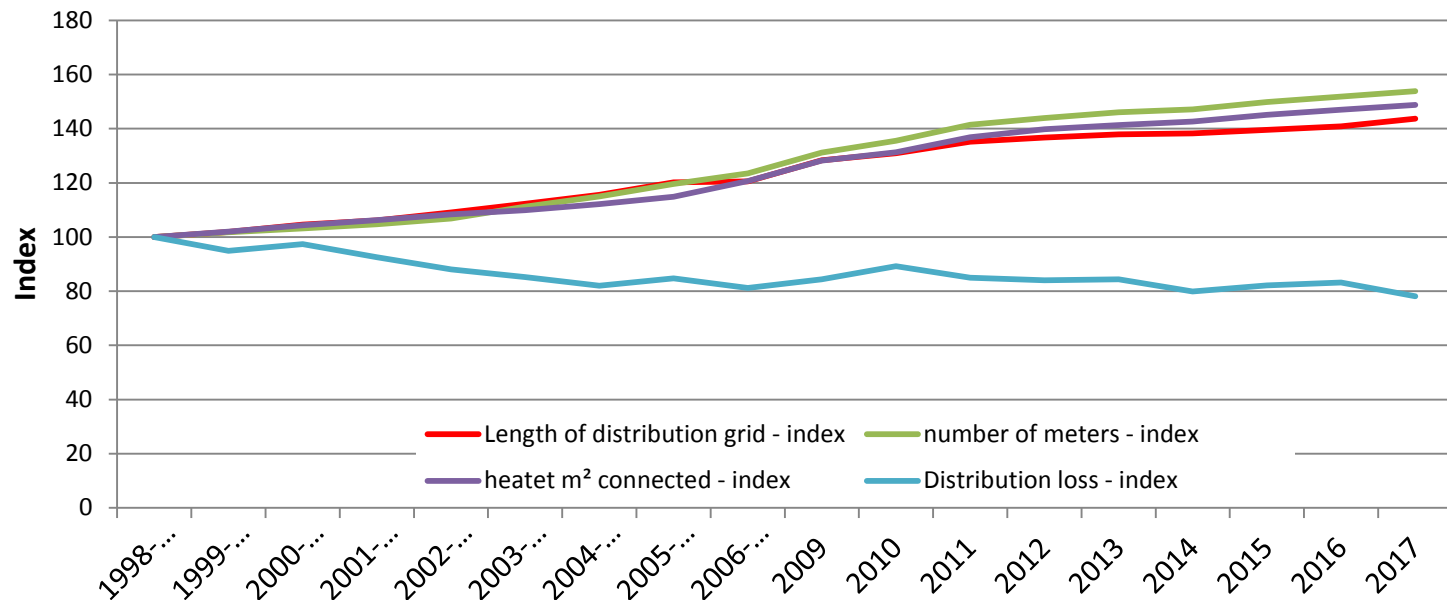


ORGANIZATION



THE GRID IS IMPROVED

Development of key figures

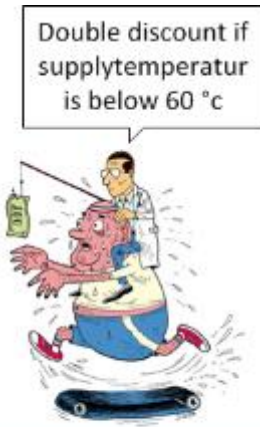


| | Length [m] | Distributions loss [MWh] | Meters | Heatet area [m ²] |
|---------|------------|--------------------------|--------|-------------------------------|
| 1998-99 | 232.889 | 73.846 | 6.012 | 1.499.000 |
| 2017 | 334.745 | 57.707 | 9.251 | 2.231.000 |

TEMPERATURE FOCUS SINCE MID 1990



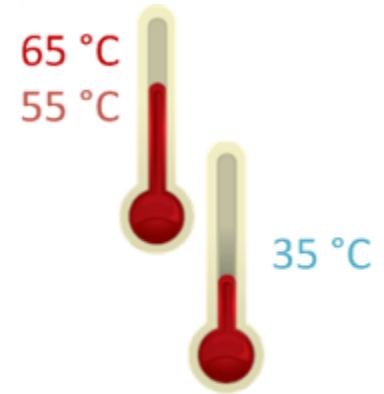
Smart meters
1999



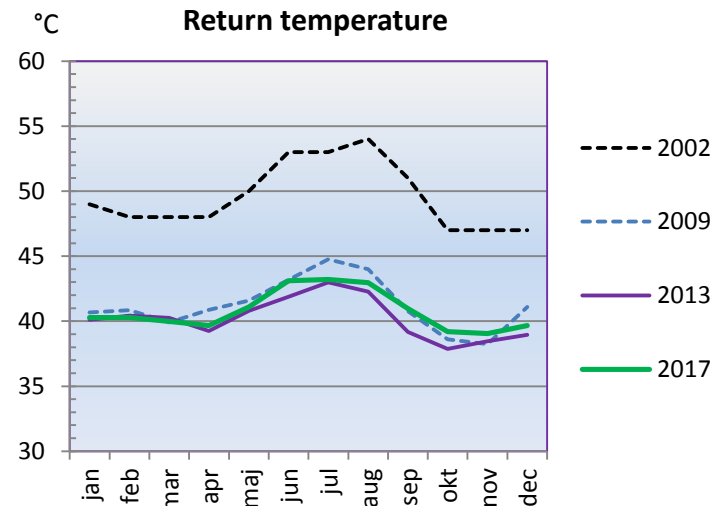
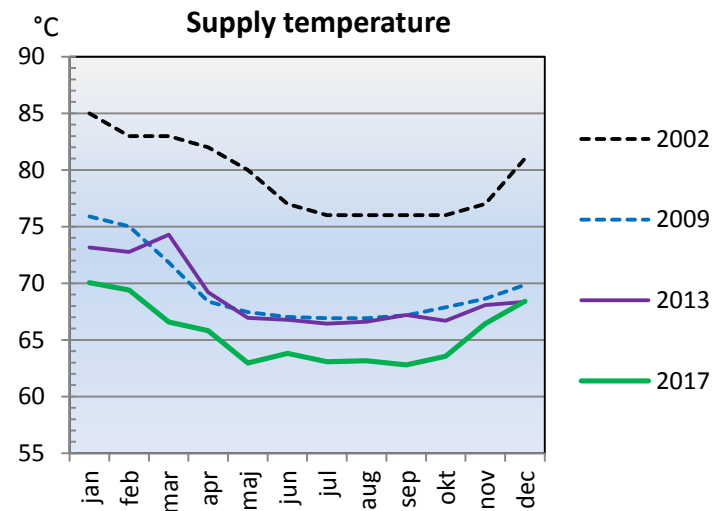
Motivation
tariff 2002



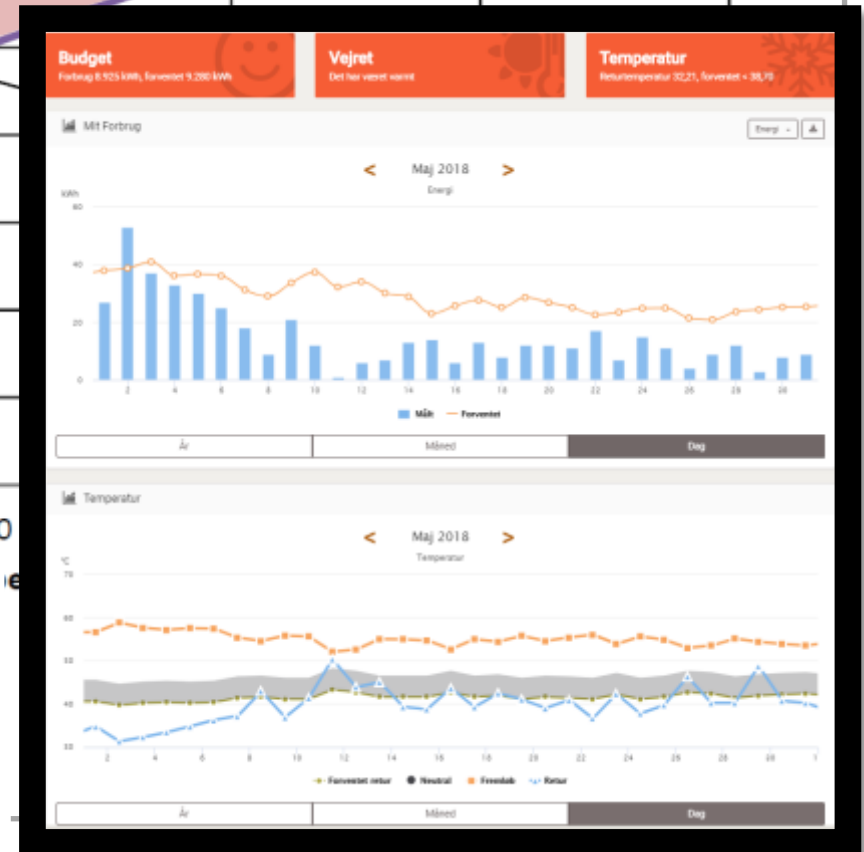
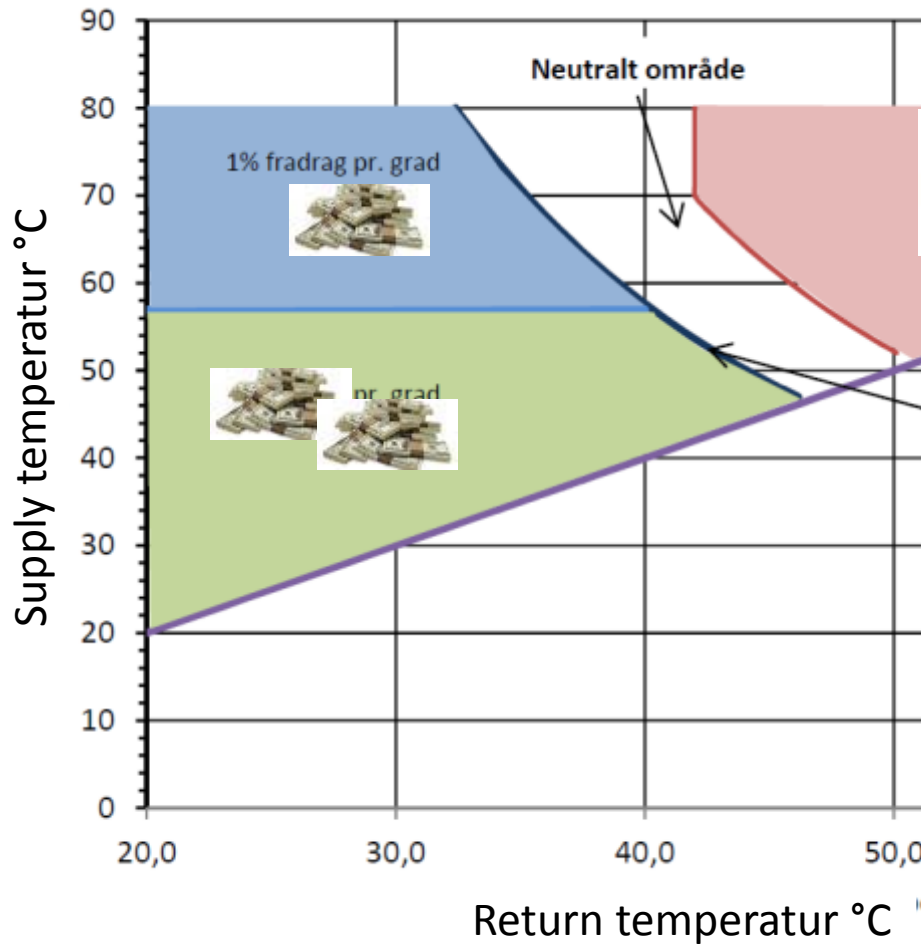
New regulation
2004
2007
2013



Temperature
strategy 2011



MOTIVATION OF CONSUMER



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?

2013 New CEO

Efficient DH Network

New Customers

Existing Customers



Article in "Fjernvarmen" december 2013

FOKUS POINTS



Viborg Fjernvarme

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

Distribution
grid

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

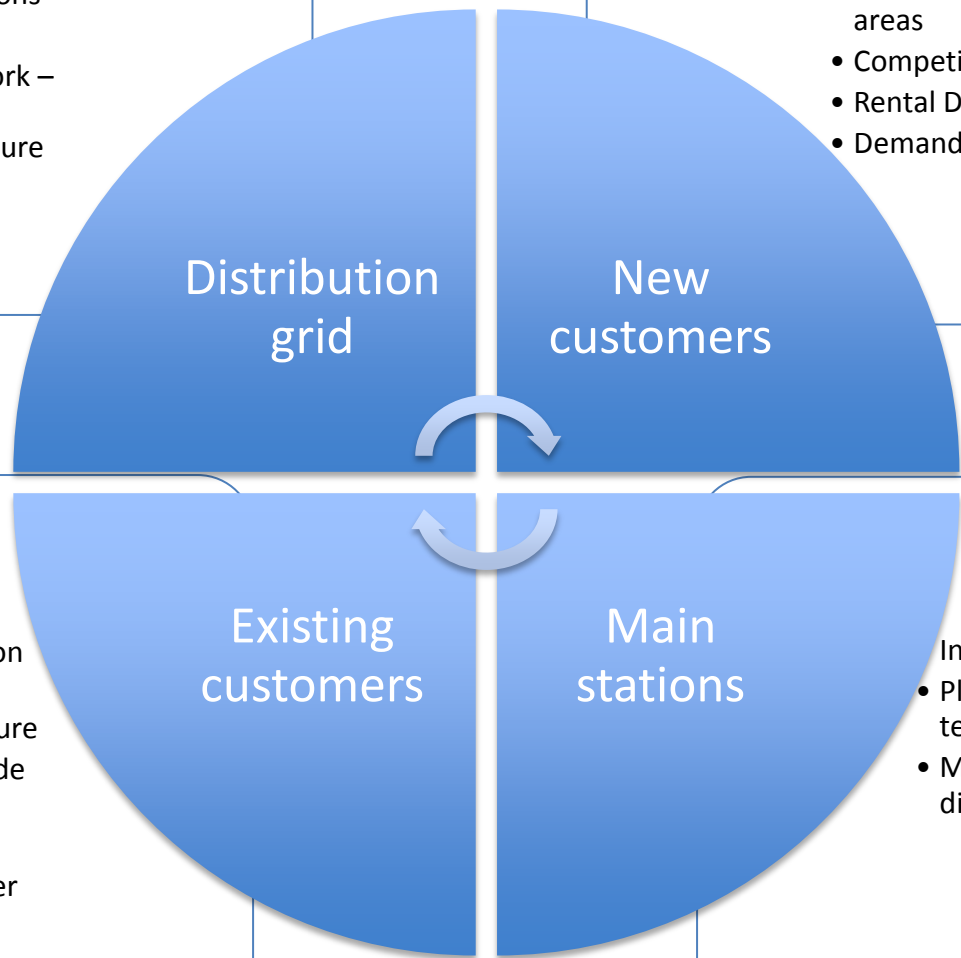
New
customers

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

Existing
customers

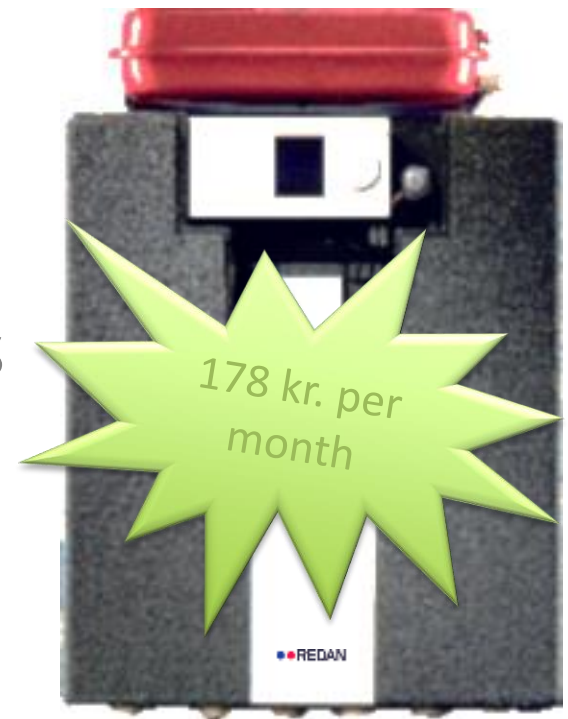
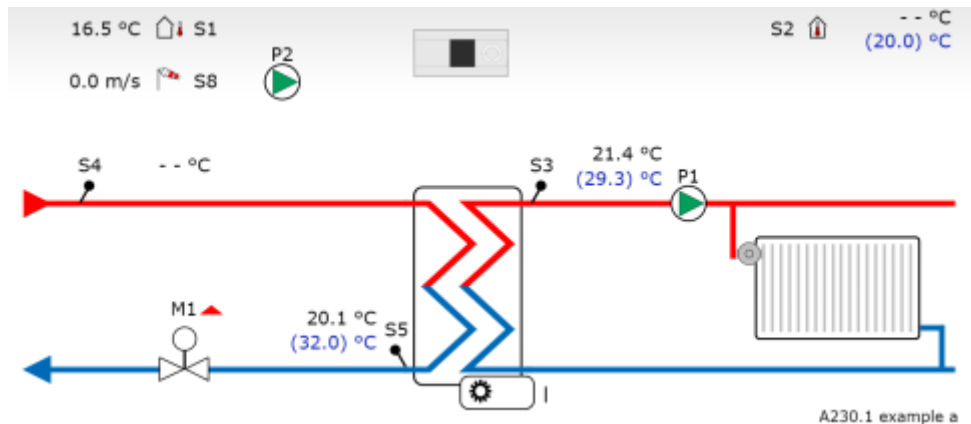
- Insulation of components
- Planing tools to lower supply temperature
- Move some pumpcapacity into distribution grid

Main
stations



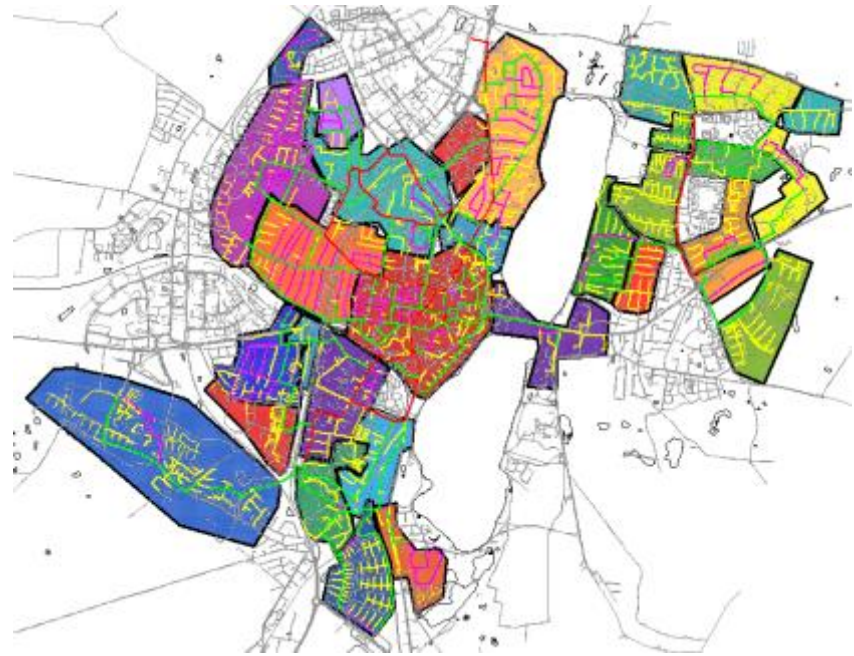
UNIT TO RENT FOR 1-FAMILY HOUSES

- 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



HOW WE ANALYSE

- Sectioning the network
 - Heatloss and demand
 - Type of buildings and age
 - Geography



PIPE LAYOUT

- Calculation tool
 - Hydraulic
 - Heatloss
 - Budget
- Twinpipes
- Optimized dimentions
- 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

