

# Visit to Albertslund

Lowtemperature District Heating

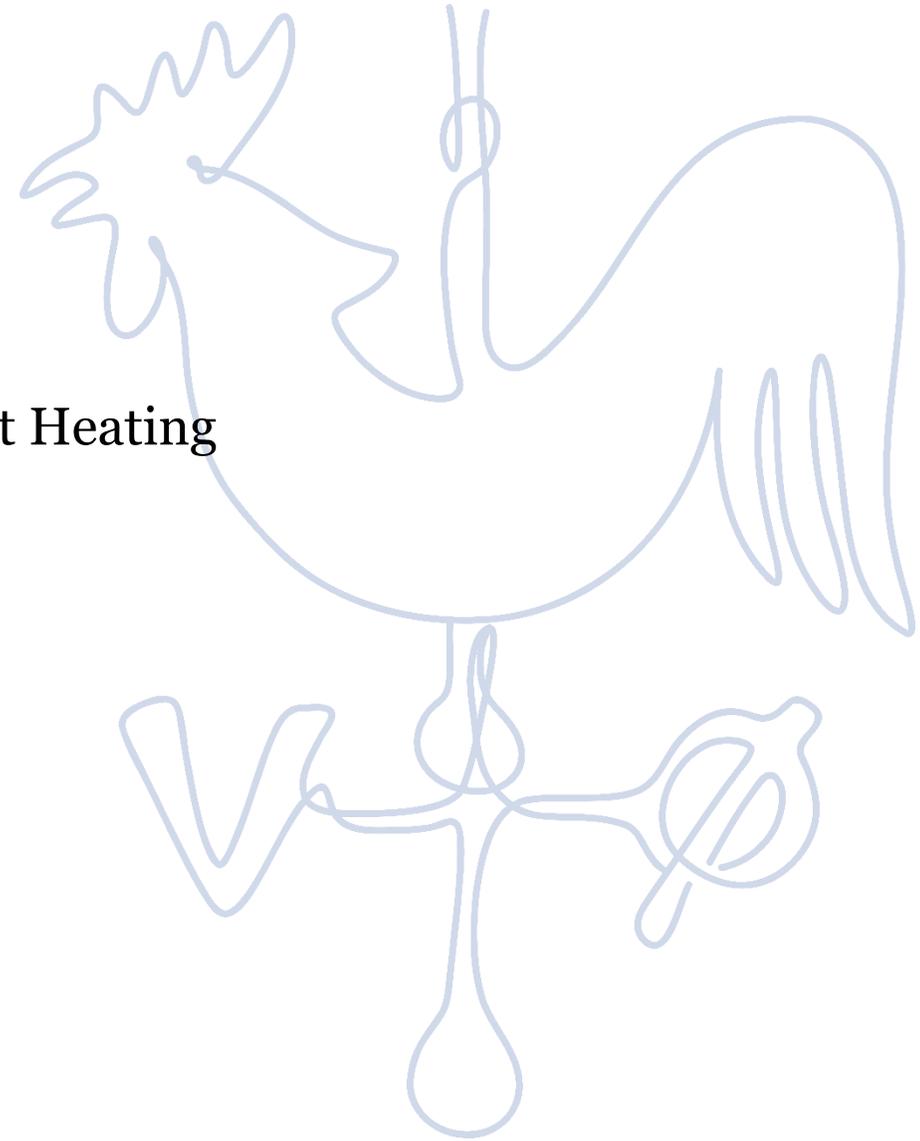
Wednesday 29th of October 2025



**Albertslund Kommune**  
*Den bæredygtige by for børnene, det grønne og fællesskaber*

# Agenda

- Welcome
- Introduction to Albertslund Municipality
- Albertslund Utility and Low Temperature District Heating
- Multiple heat sources
- Planning – and project proposals
- Tariffs ?





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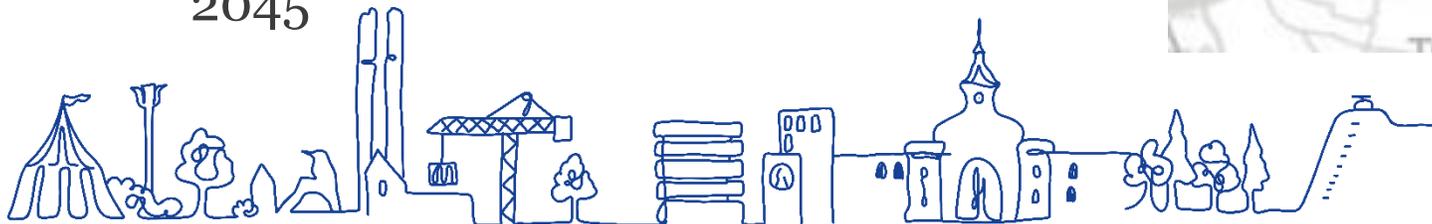
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# Albertslund Municipality

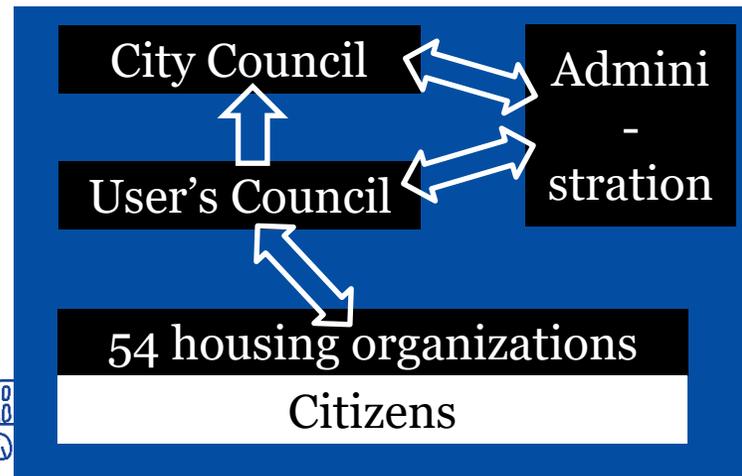
- Located 15 km West of Copenhagen
- Around 28.000 inhabitants
- Mainly built in the 60's and the 70's
- More than 50 % non-profit social housing – which has been refurbished in the last 10 years
- City Development Plans:
  - Two industrial areas, and one former prison is transformed into residential
    - The vision is 45.000 inhabitants by 2045



# Cooperation with the citizens and housing companies

## ”The User’s Council”

- **Representatives** from each housing area in town more than 54 non-profit housing and homeowners' Associations
- The members discuss and can influence the budgets and activities for waste, water, lighting and **energy** (heat)
- The **politicians in the city council** usually follow their recommendations



# Albertslund Utility

Municipal district heating since 1964

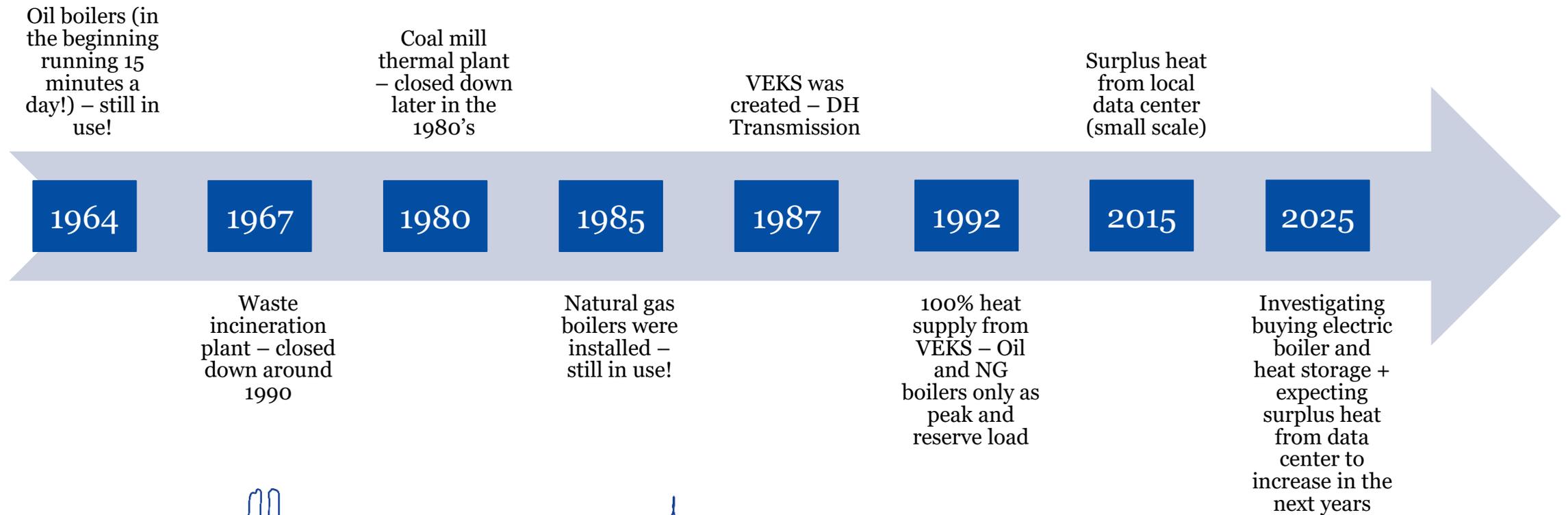
Since 1987, the heat is bought from VEKS – today mainly produced from biomass and waste incineration.

- Covers above 99 % of the heat demand in Albertslund
- District heating is a non-profit business in Denmark
- Knowledge is shared between municipalities and DH distributors

## Facts

- 25 employees
- +400 km dh pipes
- +8.000 customers
- 9 peak load oil and NG boilers with a total effect of 132,5 MW
- Surplus heat from datacenter 2,2 MW

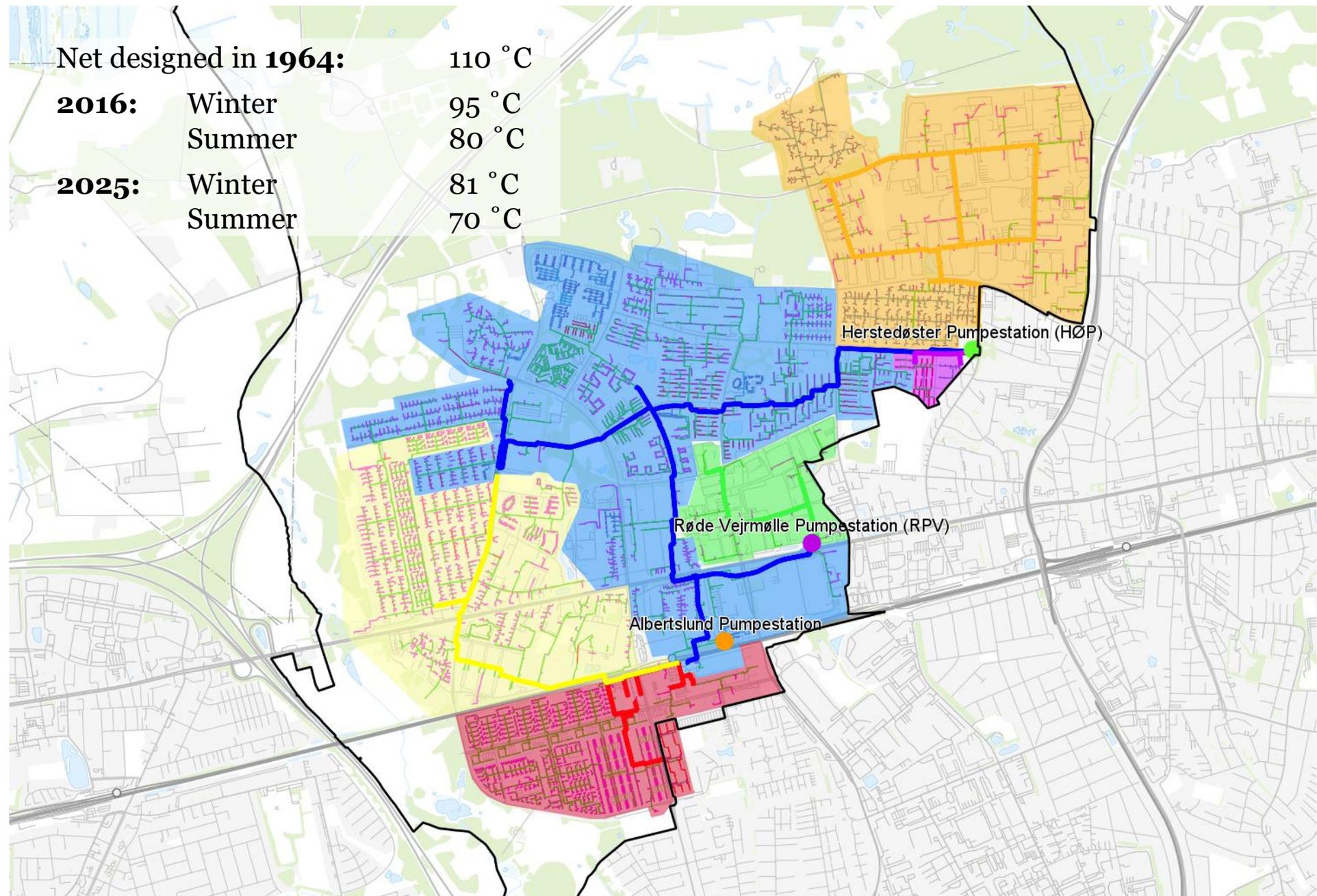
# District Heating in Albertslund – timeline

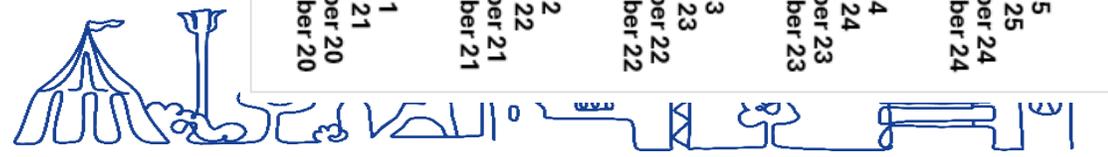
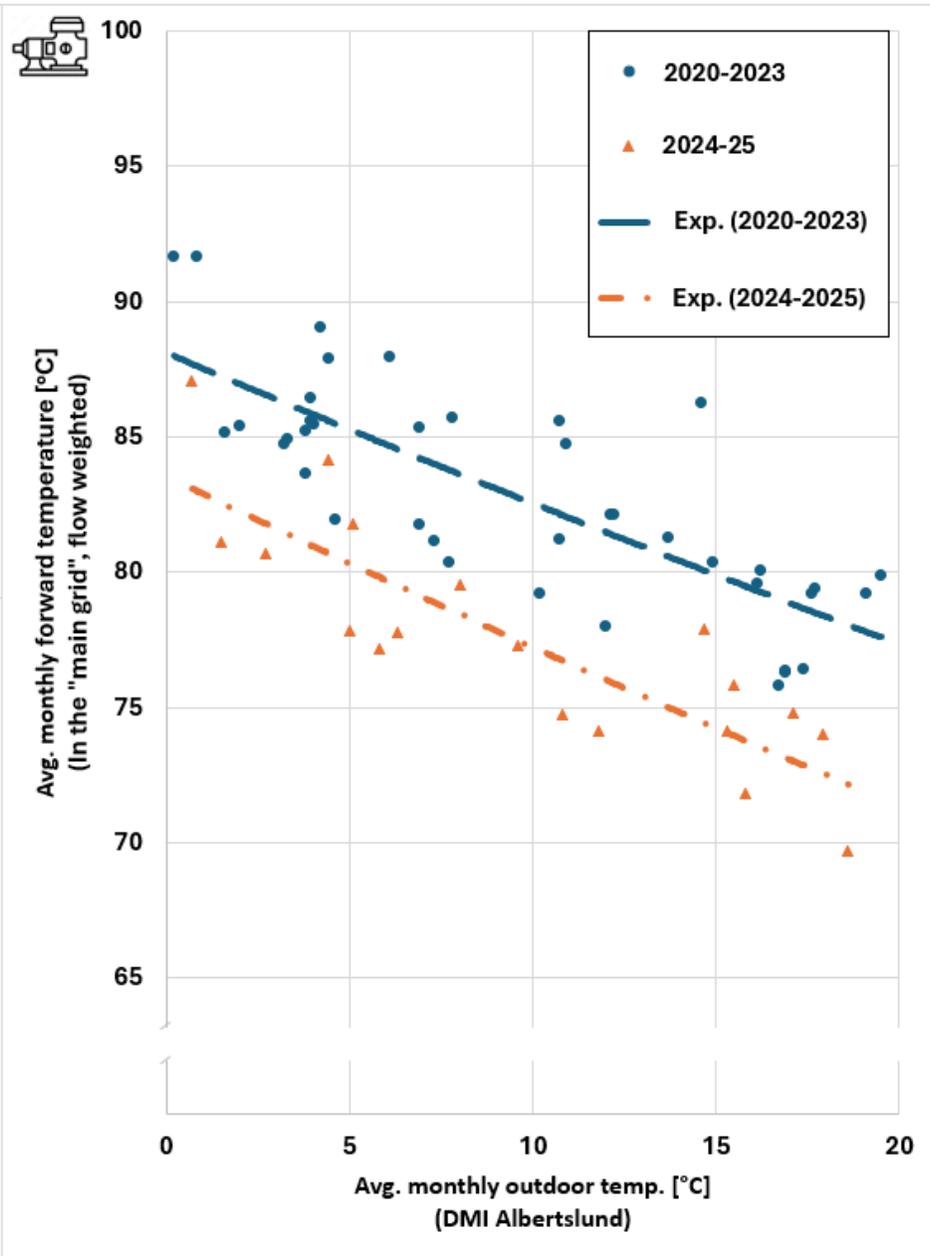
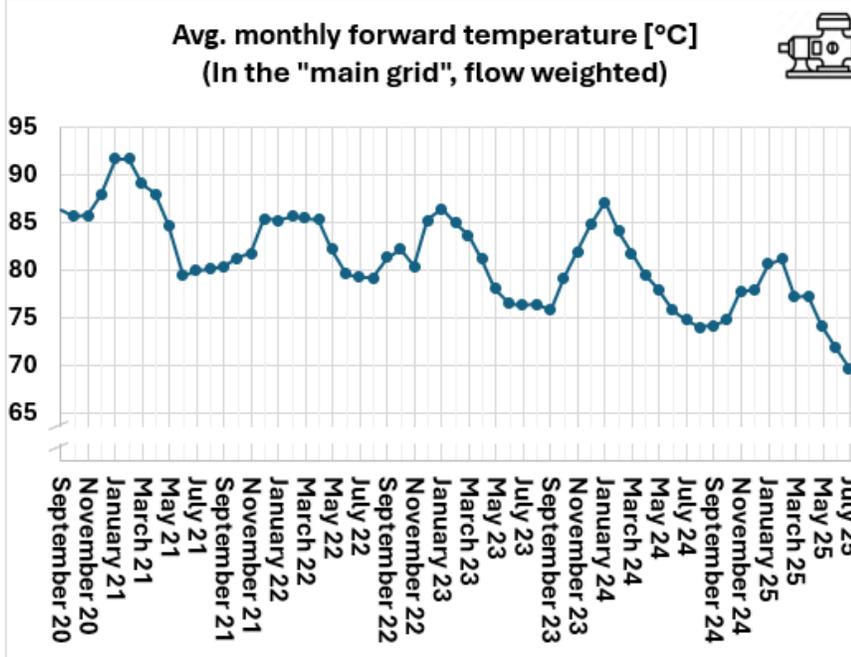
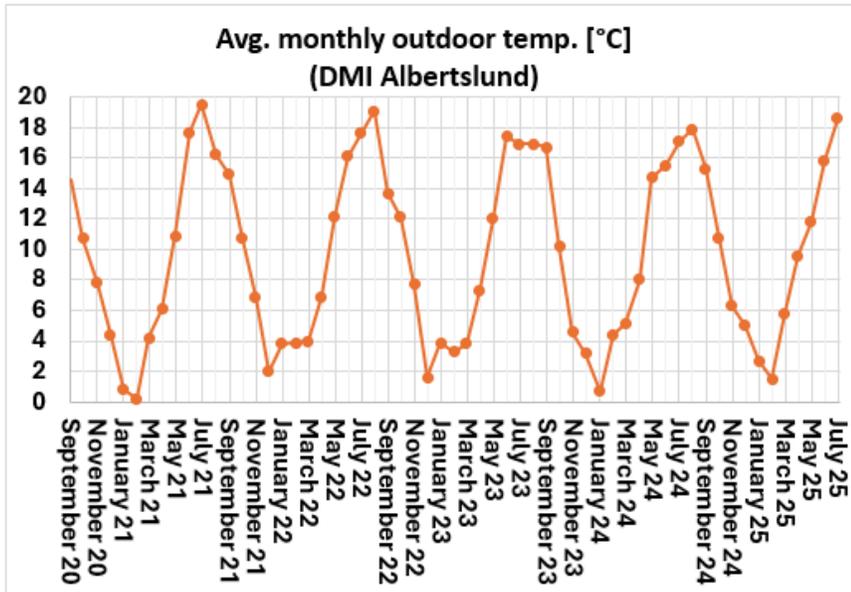


Net designed in **1964**: 110 °C

**2016**: Winter 95 °C  
Summer 80 °C

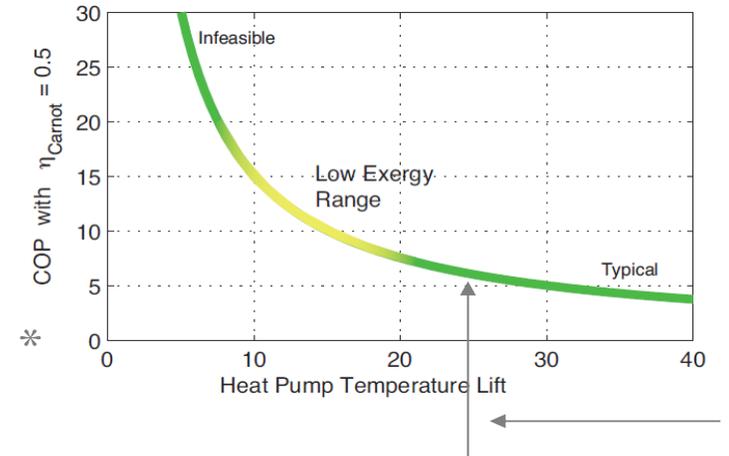
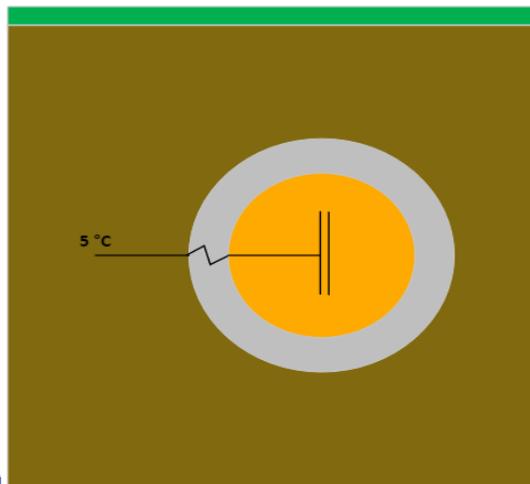
**2025**: Winter 81 °C  
Summer 70 °C





# Why lower the temperature?

- Less difference in temperature between the district heating water and the ground.
  - Lower heat loss
- Improves opportunities to use new energy sources.
  - Provides better COP when using waste heat recovery and heat pumps
- Better sector coupling opportunities



# Waste Heat Recovery from Data Center

## Waste Heat Recovery since 2015:

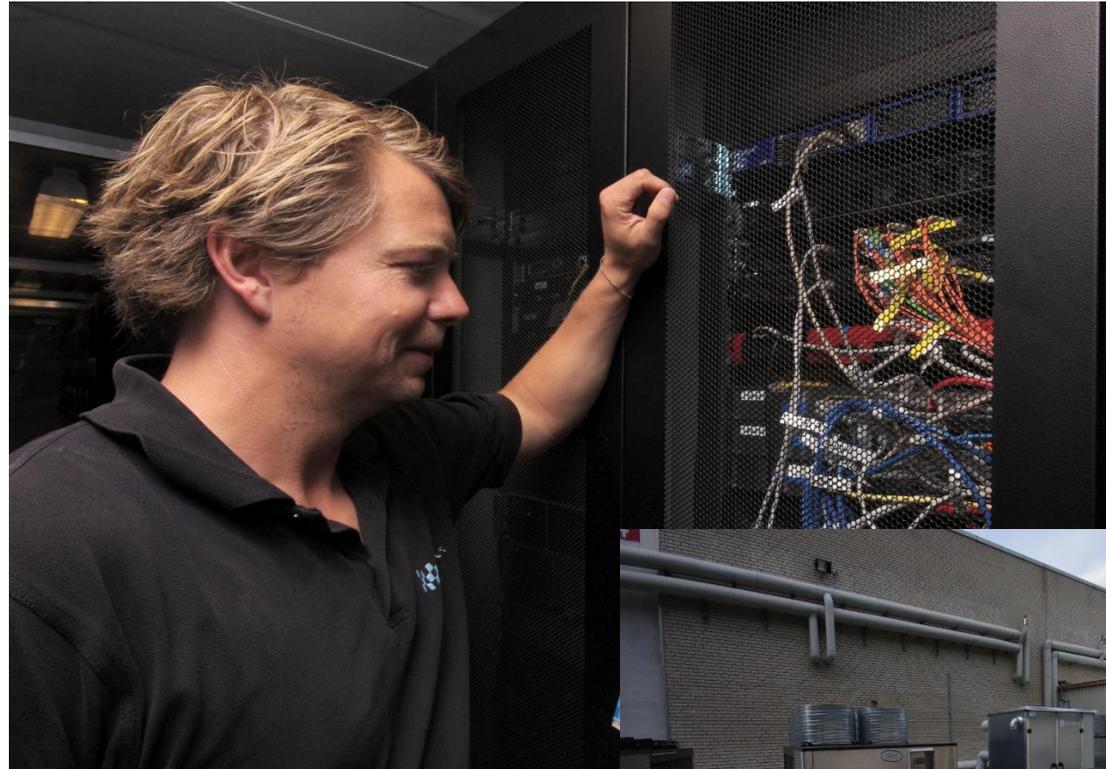
- 2 heat pumps 180 kW
  - Supplied 1.400 MWh/year

## Expansion 2023:

- 5 heat pumps
- 2,2 MW (not at full capacity yet)
  - Supplied 4,530 MWh in 2024

## Future expansion plans:

- 6-8 MW
  - Potentially our whole base load



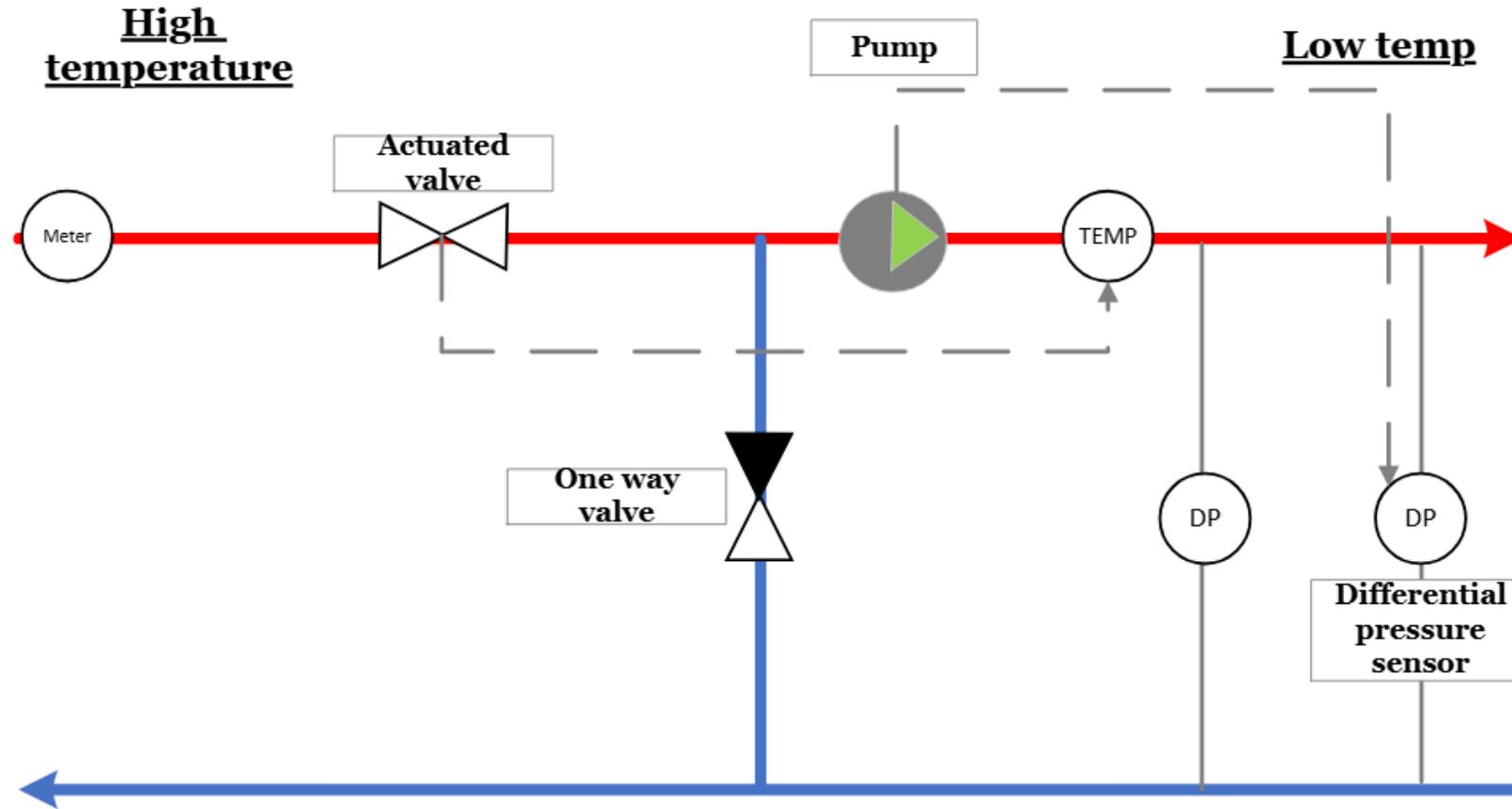
# How to lower the temperature?

- How do we test how low a temperature the buildings can handle?
  - We could just lower the temperature
    - But what if they cannot handle it?
    - How do we get the insight we need? – We did not know
  - New buildings can handle it
    - So we only lowered the temperature for them
- Sectioning of the grid
  - Shunts – (a choice between shunts or heat exchangers)



# Shunt basic principle

Mix return water with forward flow



# Experiences with LTDH for new and refurbished buildings

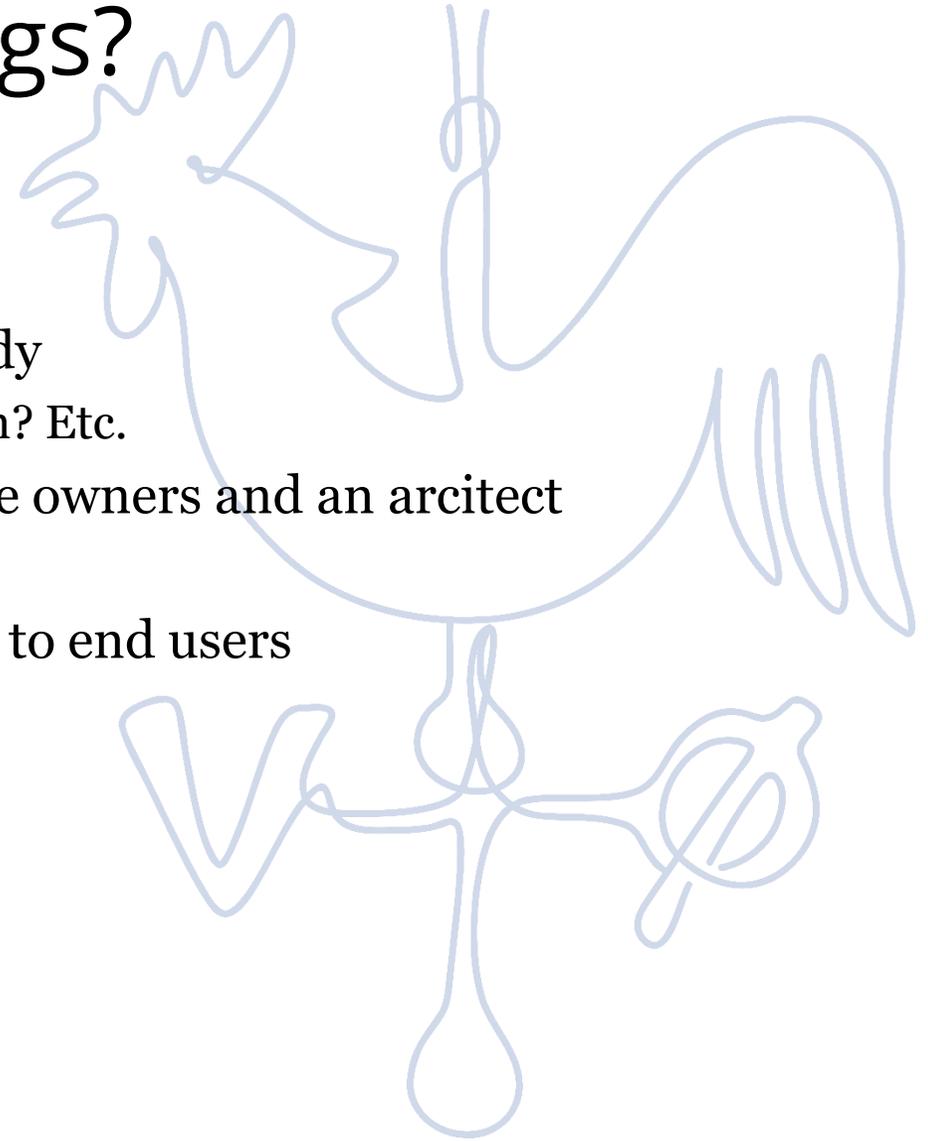
- Since 2010, new housing areas have been supplied with LTDH
- From around 2013, refurbished housing areas have been supplied with LTDH





# What about existing buildings?

- We didn't know how to be ready
- We developed software to test if houses were ready
  - What is the effect of new windows? Extra insulation? Etc.
- We developed refurbishment concepts with house owners and an architect
  - Privately owned row houses, etc.
- We started renting out substations/heating units to end users
  - Better service – and better cooling/exploitation
- We changed all the meters to smart meters
  - But we didn't use all the data for much



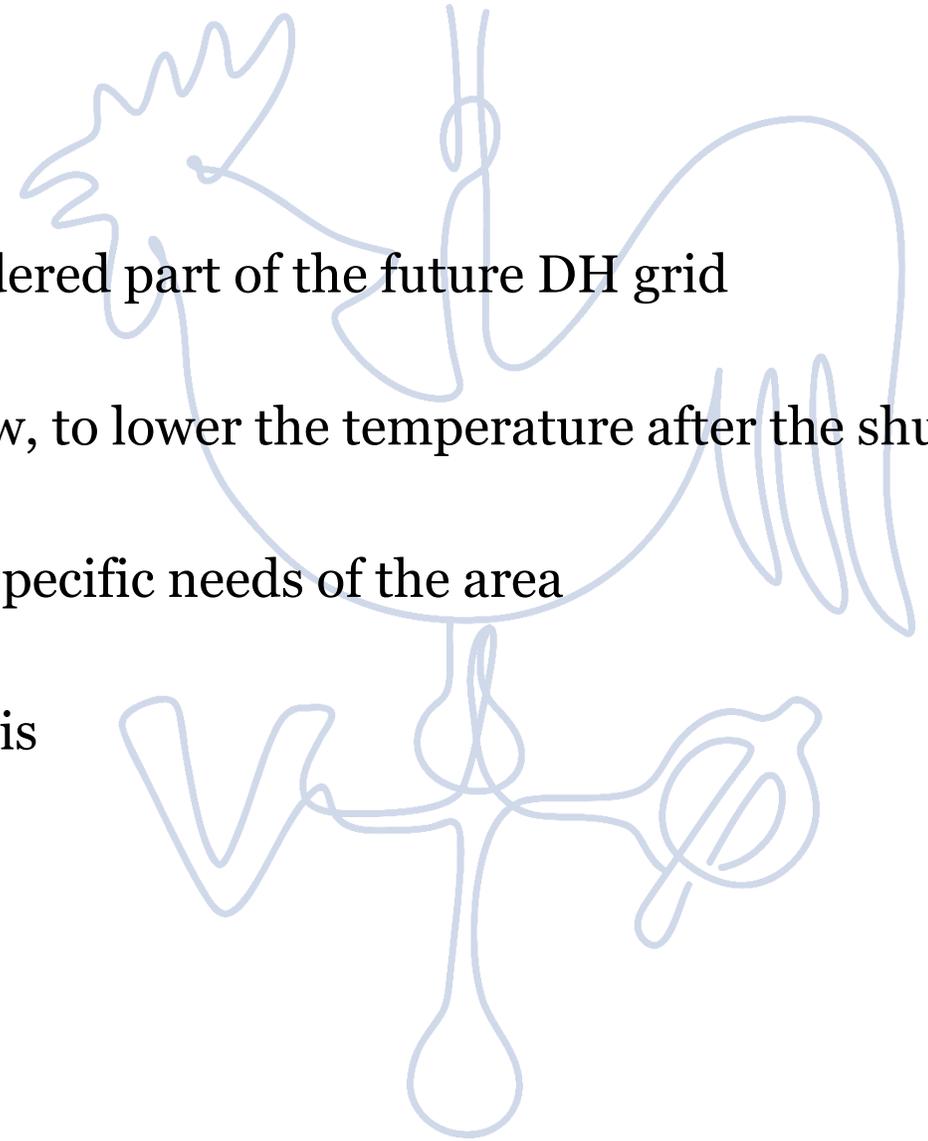
# REWARDHeat – and Porsager

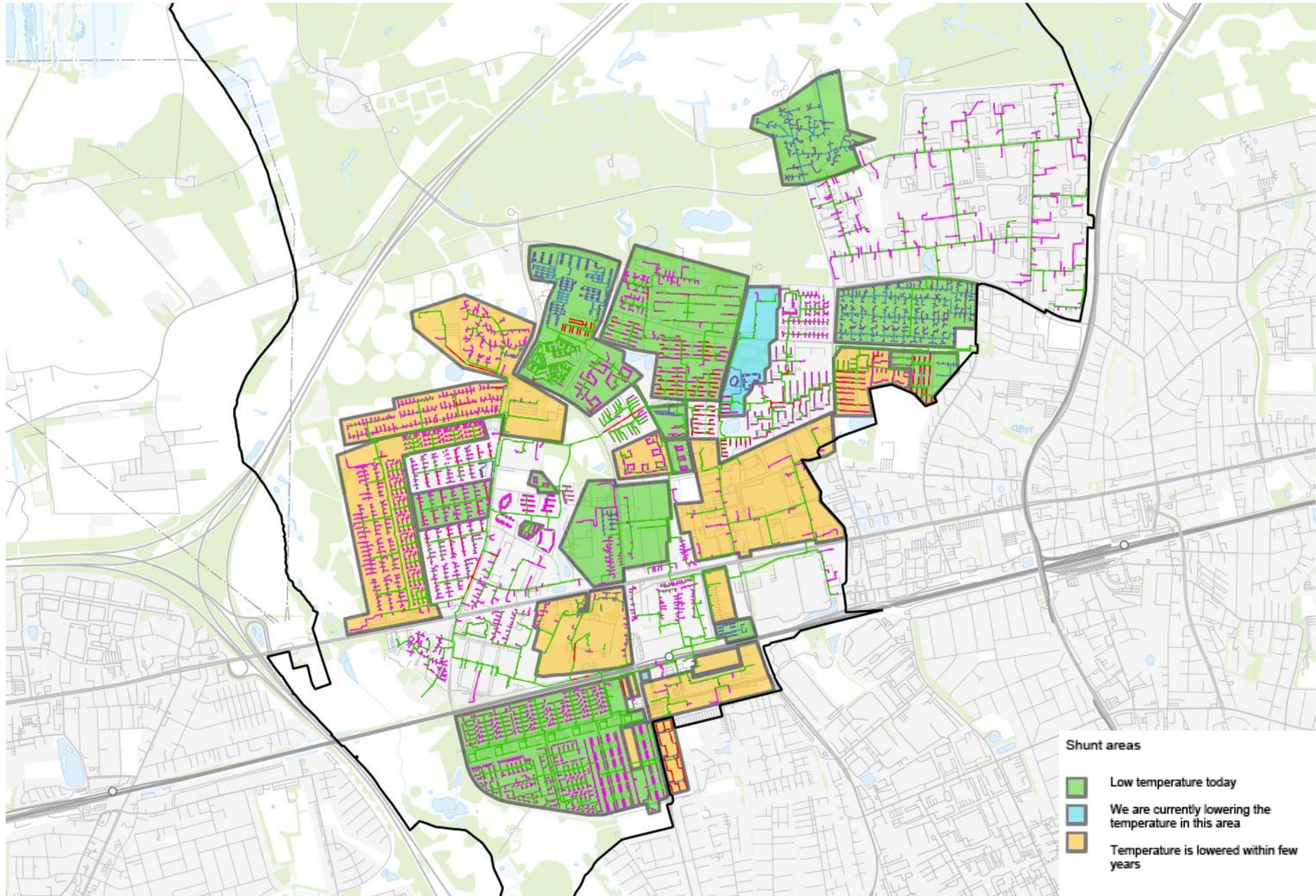
- Horizon 2020 project (grant agreement N. 857811)
  - Demonstration: How to lower the DH temperature in an existing housing area
  - Use of data – for prognosis
  - Development of business models
  - Development of equipment
- Demonstration area of Albertslund: Porsager
  - A street with 104 villas from the 1960's
  - Installation of a Grundfos iGrid shunt
  - Lowering the temperature
  - Development of "skids" for houses with difficulties
- Rewardheat.eu – for more details



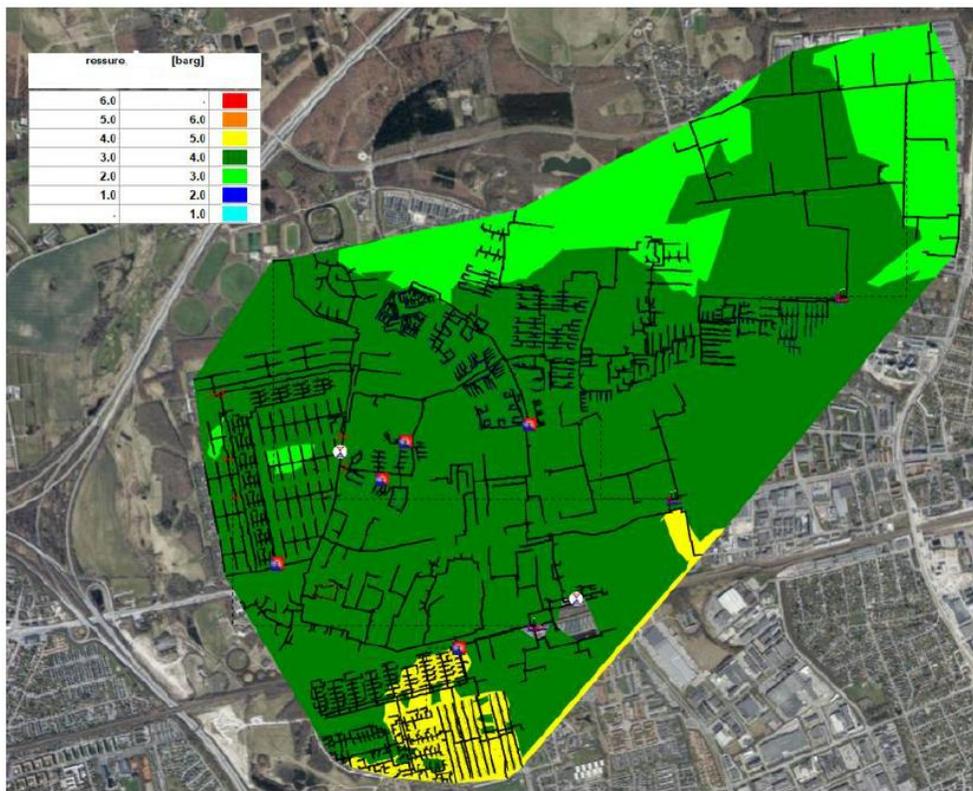
# Shunt strategy

- The previously temporary shunts, are now considered part of the future DH grid
- The shunts mixes return flow with the supply flow, to lower the temperature after the shunt
- Temperature and pressure can be finetuned the specific needs of the area
- Learning by doing instead of very detailed analysis

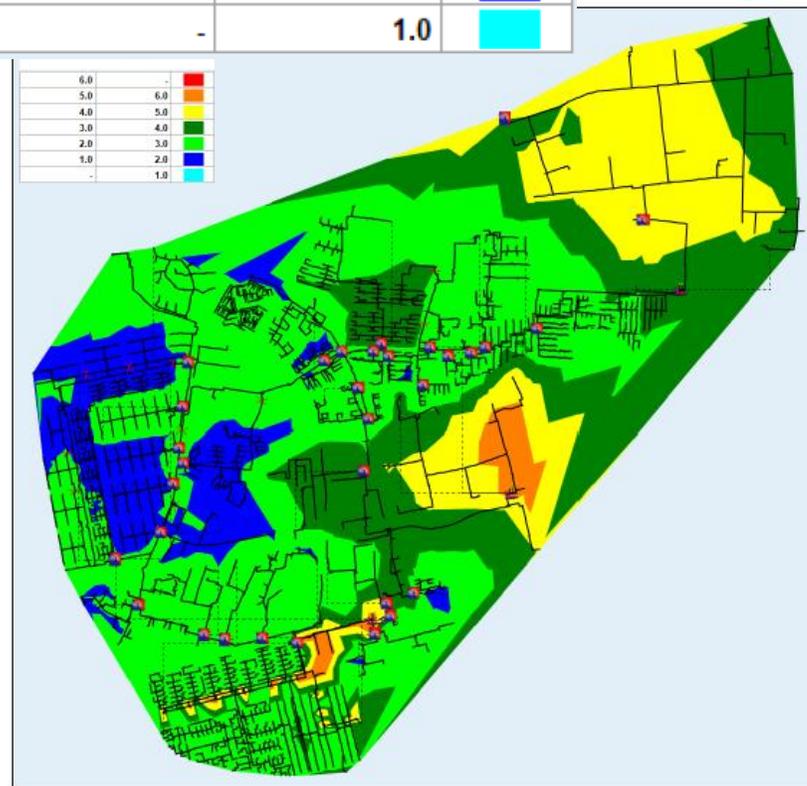




# Lower forward pressure



Pressure, Supply [barg]		
6.0	-	Red
5.0	6.0	Orange
4.0	5.0	Yellow
3.0	4.0	Dark Green
2.0	3.0	Light Green
1.0	2.0	Blue
-	1.0	Cyan



# Benefits with shunts and temperature zones

- Distributed pumps lowers the overall pressure in the grid
  - Increased capacity in the grid
  - No need to upgrade the current 6 bar network
- Lowering forward temperatures locally
  - Lower average forward temperature
  - The large pipes are better insulated, and less branched
- Possibilities for optimised forward temperature and pressure for each area
  - Flexibility
  - Easing the transition



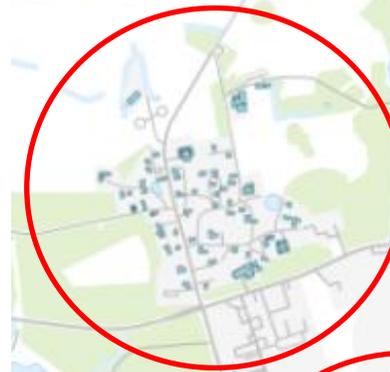
# From Gas to Low Temperature District Heating

- 310 houses from 1960-1970
- 100 houses (some +100 years old)
- They are all on Low Temperature District Heating now
- All with new heating units (most rented from the utility)



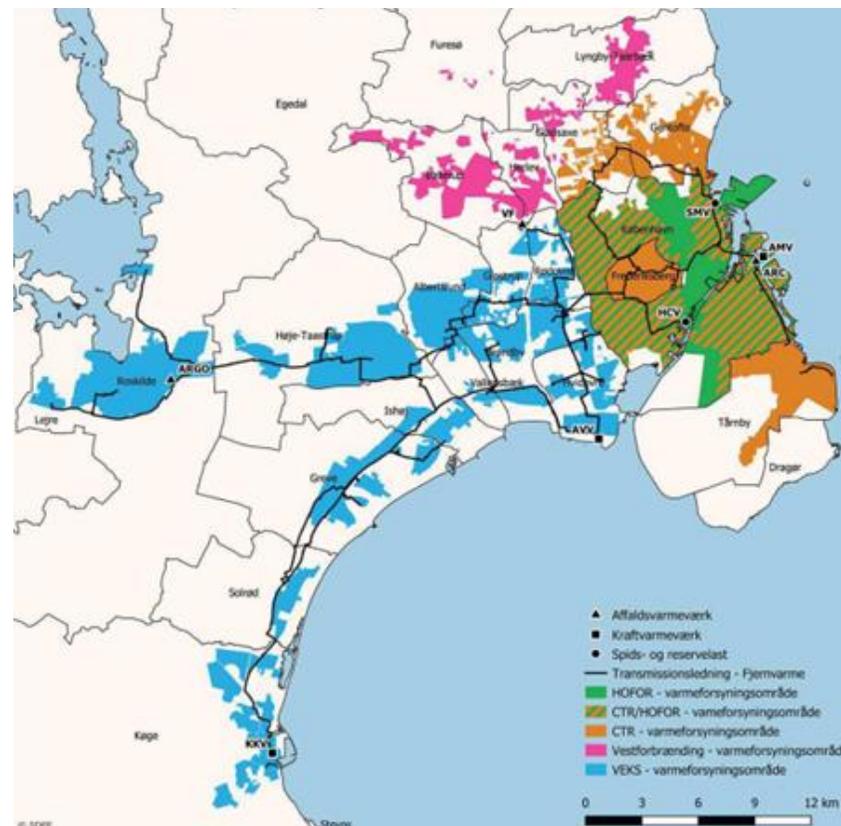
## Heating - Natural Gas

Boligtype [-]	Udvidelsespotentialle, antal [-]
<b>Enfamiliehuse</b>	
Gas	354
Olie	22
Varmepumpe	10
Elpaneler	14
Fast brændsel	4
<b>SUM Enfamiliehuse</b>	<b>404</b>
<b>Rækkehuse</b>	
Gas	8
Olie	1
Varmepumpe	2
Elpaneler	0
Fast brændsel	0
<b>SUM Rækkehuse</b>	<b>11</b>
<b>Etageboliger</b>	
Gas	4
Olie	0
Varmepumpe	0
Elpaneler	1
Fast brændsel	0
<b>SUM Etageboliger</b>	<b>5</b>
<b>Institutioner og erhverv</b>	
Gas	14
Olie	0
Varmepumpe	0
Elpaneler	3
Fast brændsel	0
<b>SUM Institutioner og erhverv</b>	<b>17</b>
<b>SUM total</b>	<b>437</b>



# It's time for a new strategy

- What should be in focus?
  - Electrification
  - Use of data – internally – and sharing data
  - Storage
  - Central and decentral production – and optimization!
  - Citizen/End user involvement
  - ...



# What experiences can be passed on?

- Make some long term goals and work to fulfill them
- Involve as many as possible – better solutions fewer mistakes
  - Networking
  - Citizen involvement
  - Participate in cooperation projects
  - Invite master students
- Try it out
  - Demo cases make the future ”tangible”
  - You learn from both succes and mistakes
  - ...



# Thank you!

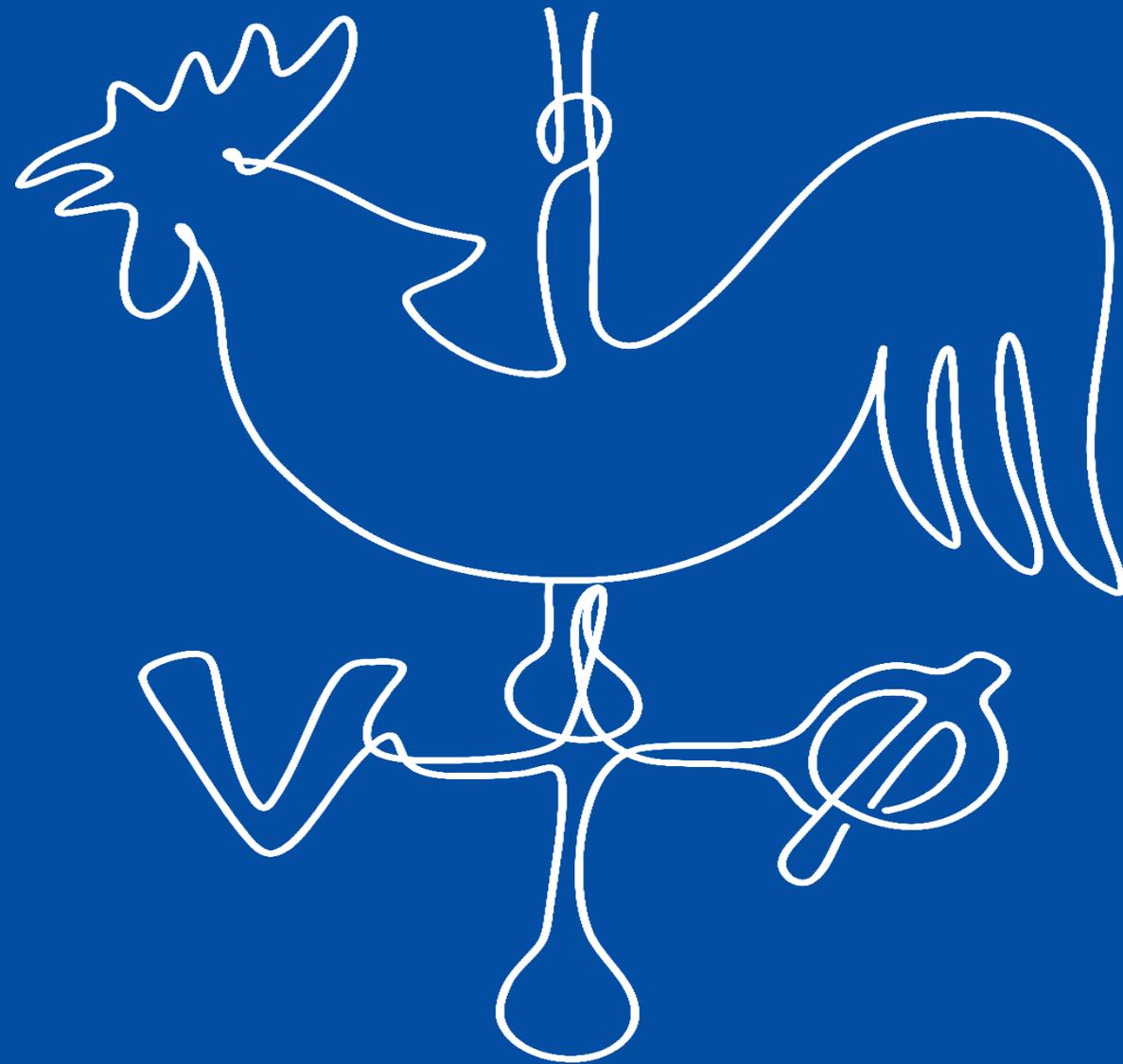
More about our experiences with LTDH:

<https://online.flippingbook.com/view/775246563/14/>



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# Tariffs



# District Heating Tariffs in Denmark

## Fixed tariffs

- Meter
- The consumer's fixed costs are based on their potential impact on the district heating network (most often based on m<sup>2</sup>)

*Minimum 20 %*

## Variable tariffs

- The consumer pays for the energy consumed

## Motivational tariffs

- Are used to encourage consumers to adopt usage patterns

*Maximum 30 %*



# New Tariffs in Albertslund from 2025

The main goal of the tariffs:

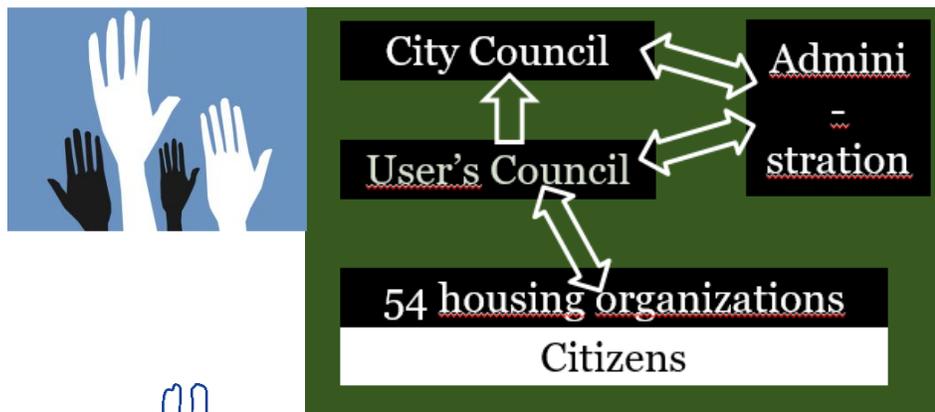
- Be **fair**.
- Be **objective** and **non-discriminatory**.
- Be **cost-based** versus **incentivizing energy savings**.
- Be **simple** and **cost-effective**.
- Be **transparent**.
- Ensure everyone **contributes to the community**.



# Collaborative Development of the New Tariff Structure

Citizen involvement by forming a working group with representatives from the Users' Council

- To ensure diversity and it was important to have representatives from:
  - Various housing areas and types
  - Property management companies
  - Industry
- Multiple workshops held with strong user involvement



## Users' Council

- Representatives from each housing area in town
- The members discuss and can influence the budgets and activities for DH, waste/re-use, water/sewage, outdoor lighting
- The politicians usually follows the recommendations from the Users' Council



# New Tariffs in Albertslund from 2025

## The consumer only pays for their consumption and impact on the district heating system

Fixed part of the price based on the last three years of consumption

- Energy renovations and optimization of the heating system are now reflected in the "fixed tariff"
- Tariffs based on meter data and not assumptions (e.g. m<sup>2</sup>)

Monthly prices

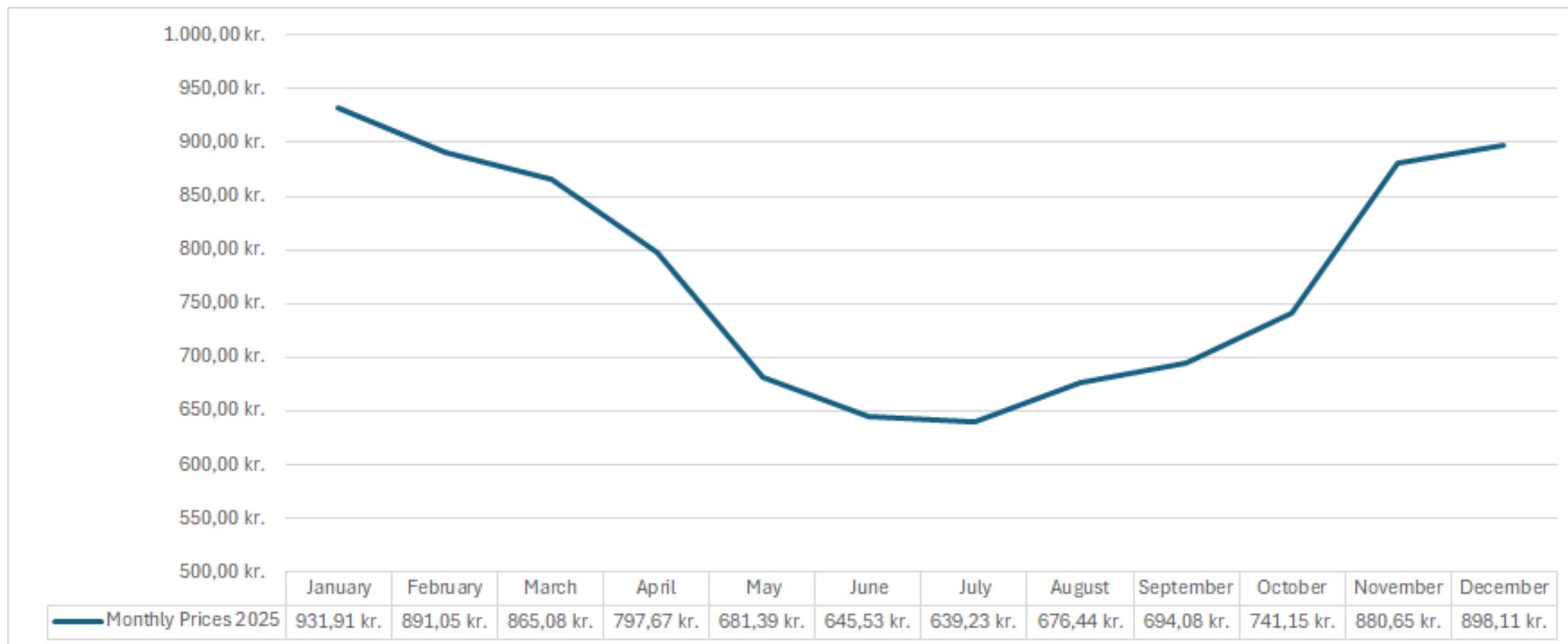
- The price of a MWh depends on the production price – meaning lower prices in the summer, and higher prices in the winter ("true costs")

Motivational Tariffs based on the return temperature

- Less than 35 degrees return temp. results in lower prices
- More than 40 degrees return temp. results in higher prices



# Monthly Prices 2025



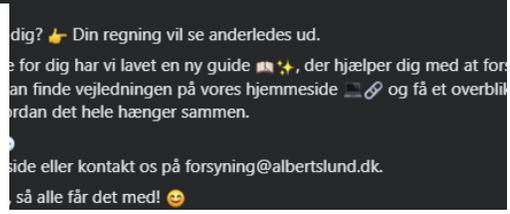
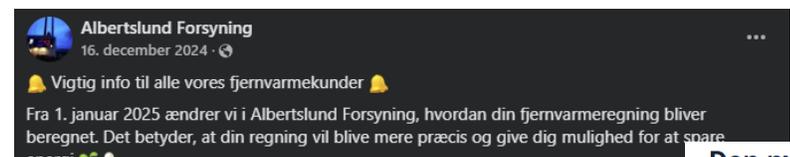
# Communication and citizen involvement is key

- Involving the users' council provides a direct link to local citizens
- Citizen involvement fosters a stronger sense of belonging, making implementation smoother
- Facilitates informal communication across various channels
- This along more formal communication across various channels (Facebook, Letters, Website, Cooperation with the local SDG Center)

## Vejledning til din aconto-regning

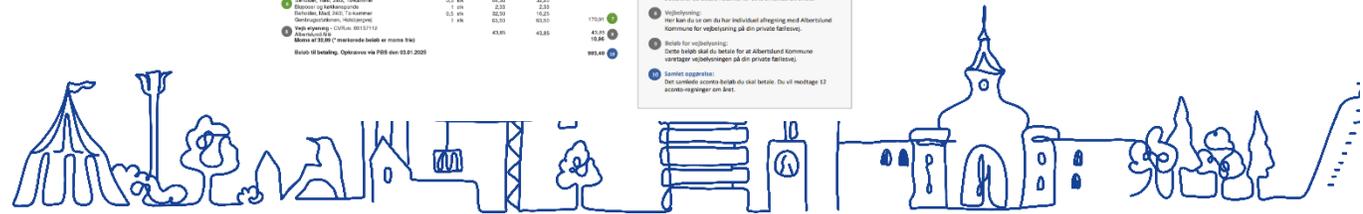
Anders Andersen  
Albertslund Års 1  
2024 Albertslund

	Følg	Pro	Beak	Bekål (alt)
<b>1. aconto for forbrugsafgifter</b>				
<b>Opgræse incl. moms og energigiffter</b>				
Varme: CDR, 6037112	0,384.540	993,00	496,15	
Varmekøbt	0,010.947	168,00	421,9	
Moms af 19,48% (mestende betalt af moms tag)			88,64	178,84
<b>Reparationer: CDR, 6037112</b>				
Fællesomkostninger	120,00	50,50	50,50	
Drivkraft: Elvar, CDR, 6037112	0,10.000	40,00	40,00	
Drivkraft: Elvar, CDR, 6037112	0,10.000	40,00	40,00	
Drivkraft: Elvar, CDR, 6037112	1.000	40,00	40,00	
<b>Moms af 19,48% (mestende betalt af moms tag)</b>				15,84
<b>Samlet opgørelse:</b>				993,49

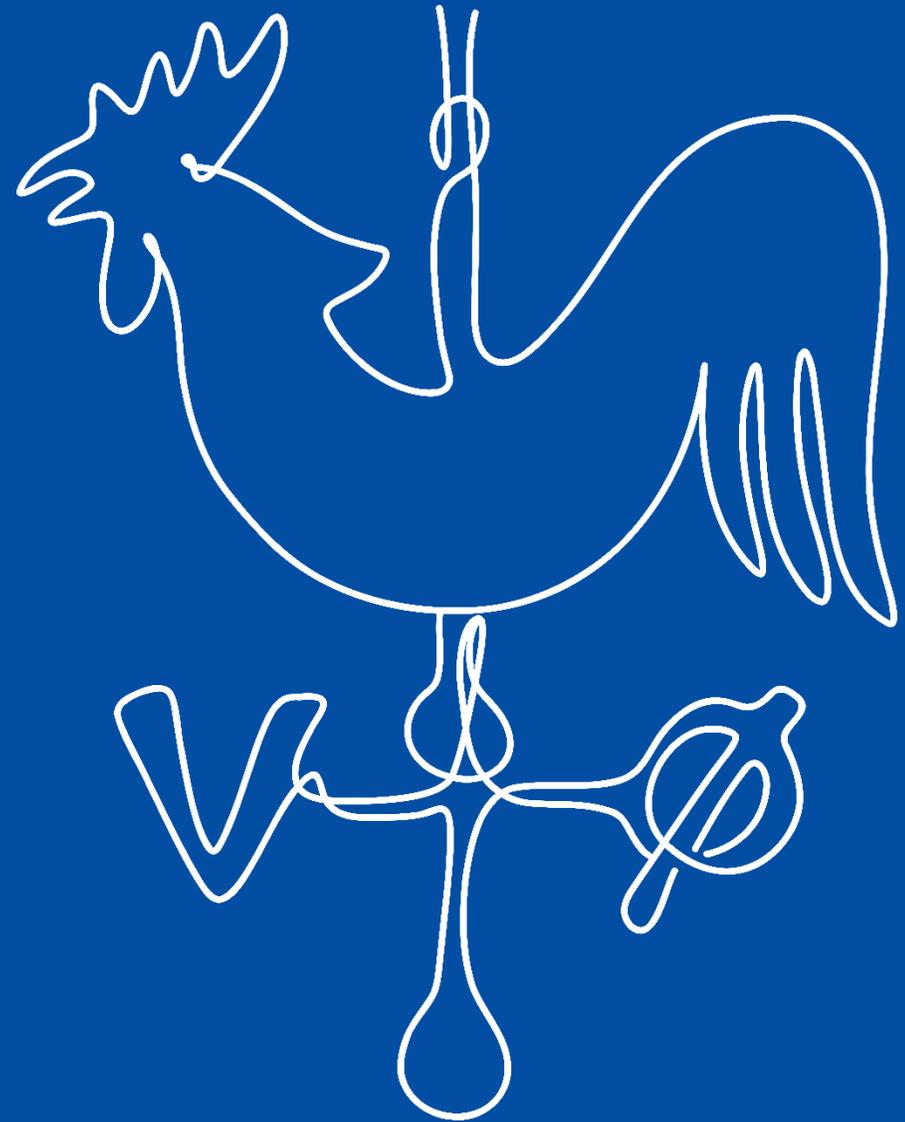


### Den nye fjernvarmetakst består af fire hovedkomponenter:

- MWh-takst
- Afkølingstakst
- kW-takst
- Målerstakst

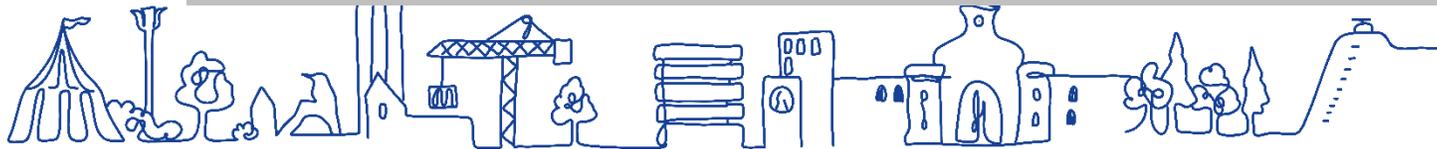
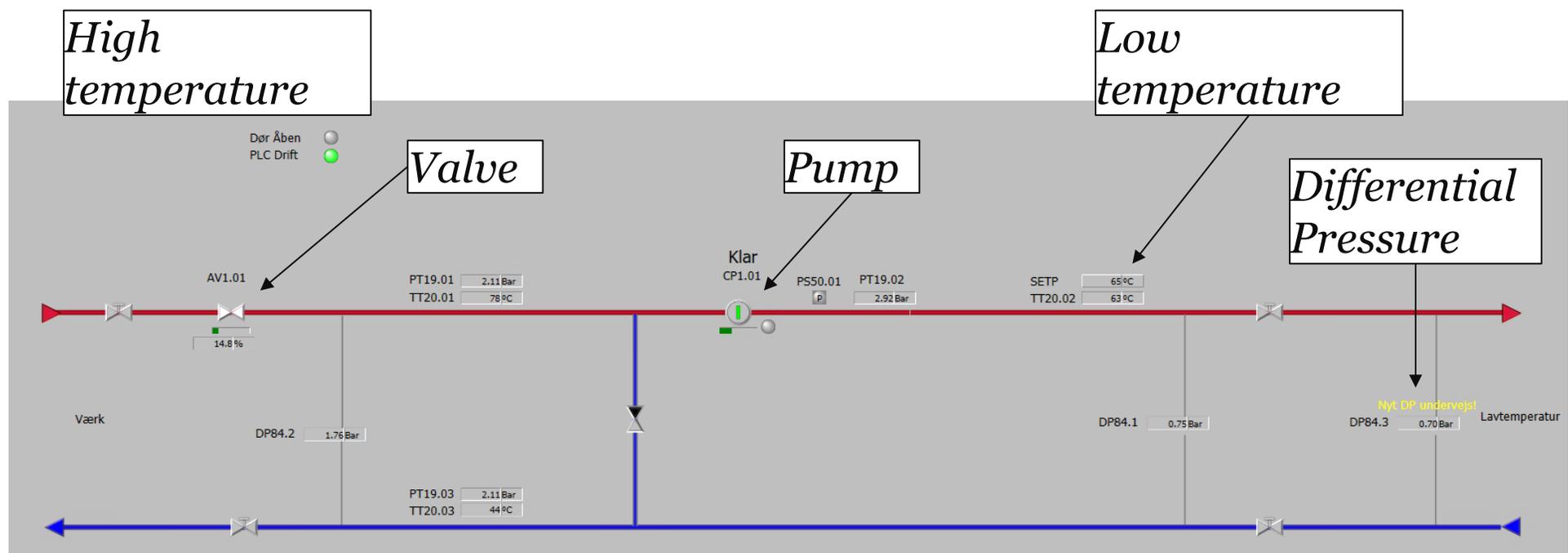


# Shunt design



# Shunt working principle

- Current generation is with a pump for pressure control, and a valve for temperature control
- Different from the iGrid solution



# Latest shunt design



