User acceptance of new solutions - households in Østerby area and Xplorion building

COOL DH conference 18-19 May, 2022

Kerstin Sernhed, Lund University

"The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 767799-COOL DH- H2020-EE-2016-2017/H2020-EE-2017-RIA-IA"

COOL DH
COOL DISTRICT HEATING

Xplorion – Sweden (Lund, Brunnshög)

- Car-free, smoke-free, demand-controlled ventilation
- Electric car and several electric bicycles and transport bicycles are included in the rent via the loan pool
- Photovoltaics and battery
- Low energy house
- Open plan solutions

- Low temperature district heating
- DH substations in each apartment.

"The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n° 767799-COOL DH- H2020-EE-2016-2017/H2020-EE-2017-RIA-IA"

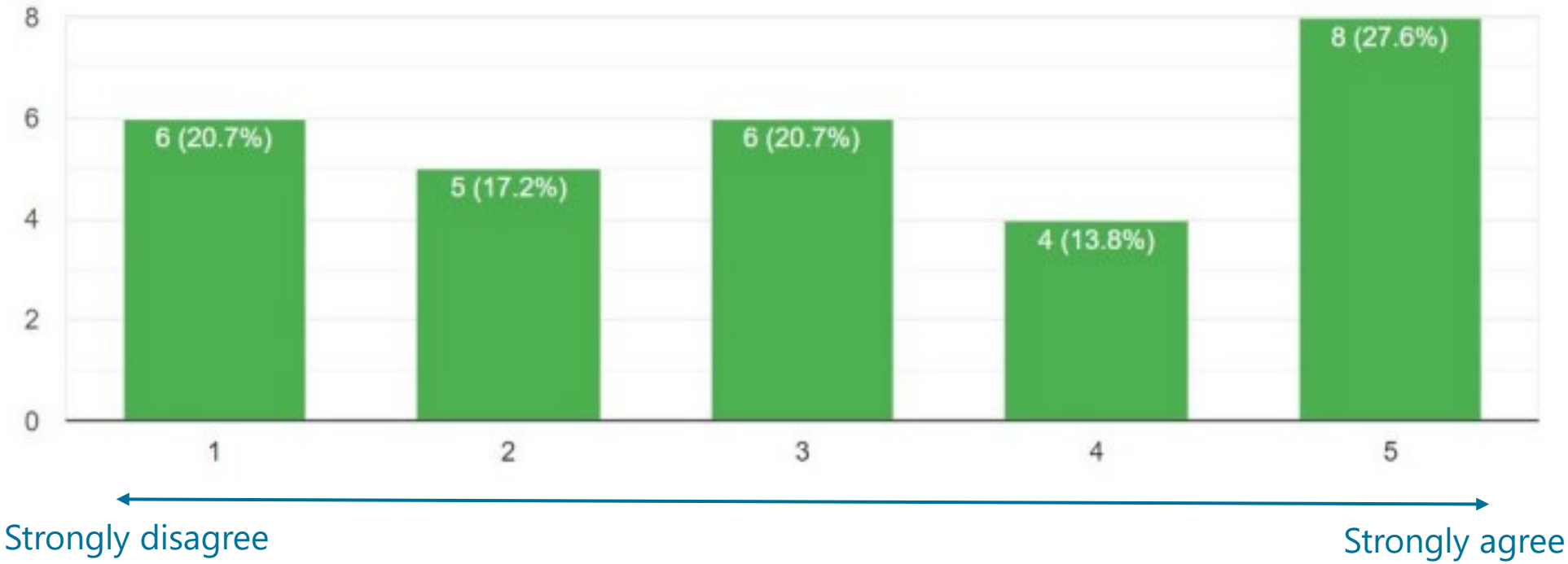
COOL DH
COOL DISTRICT HEATING

What is different for the customers?

- Each apartment is equipped with a DH substation
- Tenants have access to display and thermostats
- Individual metering and charging

COOL DH
COOL DISTRICT HEATING

Do you have knowledge about what a low temperature district heating system is?



COOL DH
COOL DISTRICT HEATING

Feedback on expectations

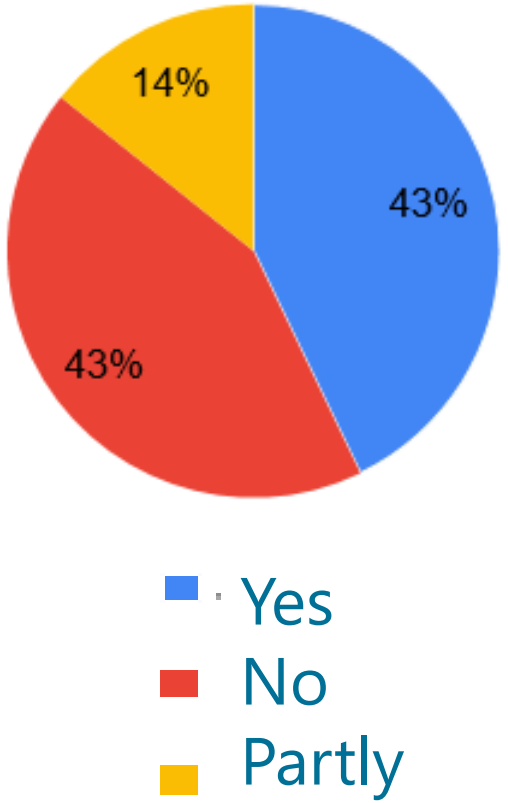
Positive:

- The mobility solutions with car pole and cargo bike offered at Xplorion are appreciated
- The environmentally smart area in Brunnshög was as expected.

Negative:

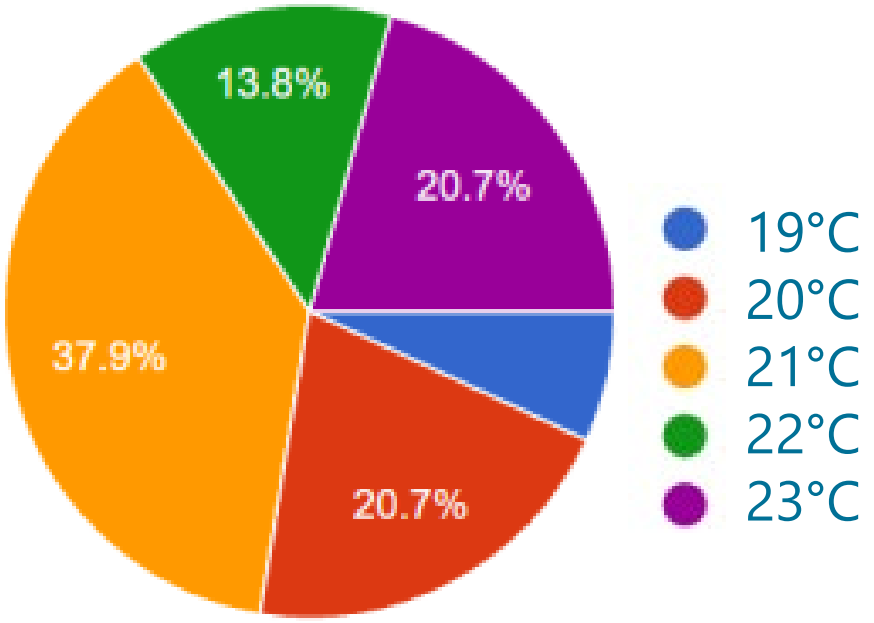
- Problems with thermal comfort in the building
- The cost for heat in the apartments was higher than expected

Did the accommodation meet your expectations?

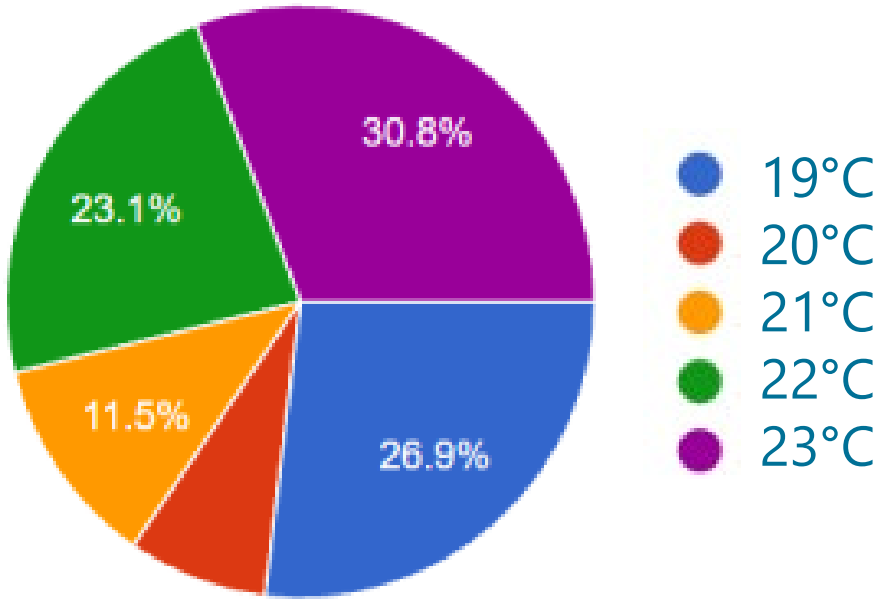


COOL DH
COOL DISTRICT HEATING

Indoor climate comfort



Preferred indoor temperature



Temperature set on the display

COOL DH
COOL DISTRICT HEATING

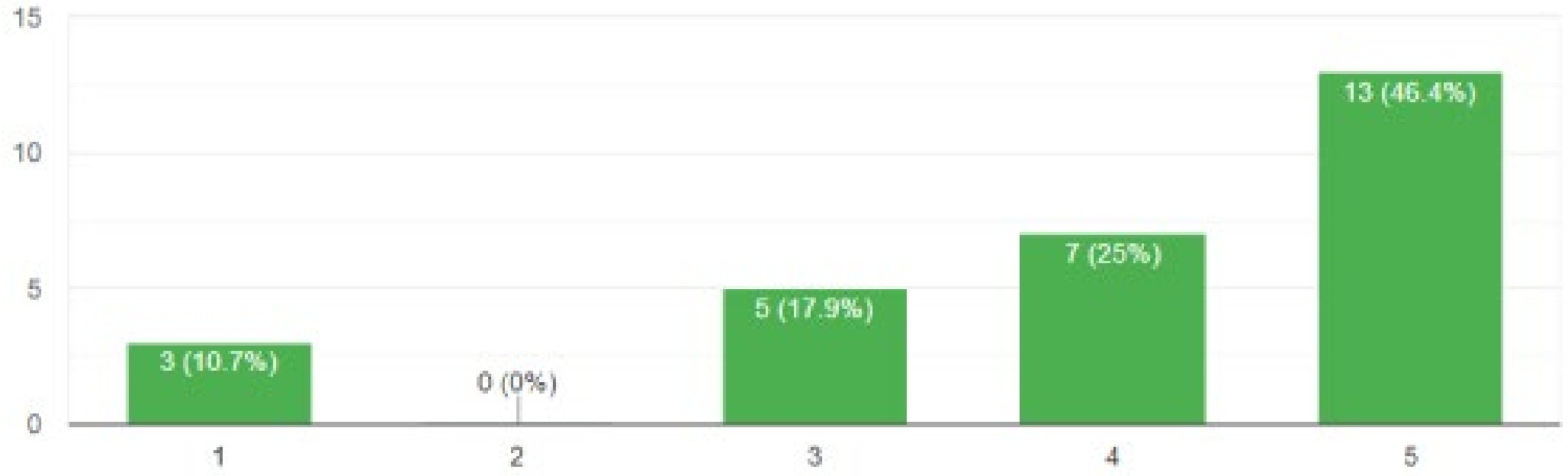
Domestic hot water comfort

- 80% are satisfied
- Comments:
  - In some apartments it takes long time to get hot water
  - Rare occasions, there has been no hot water
  - Water pressure is perceived to be poor in some apartments

COOL DH
COOL DISTRICT HEATING

Individual metering and charging of heat and hot water:

How do you experience the fact that “you pay for what you use”?

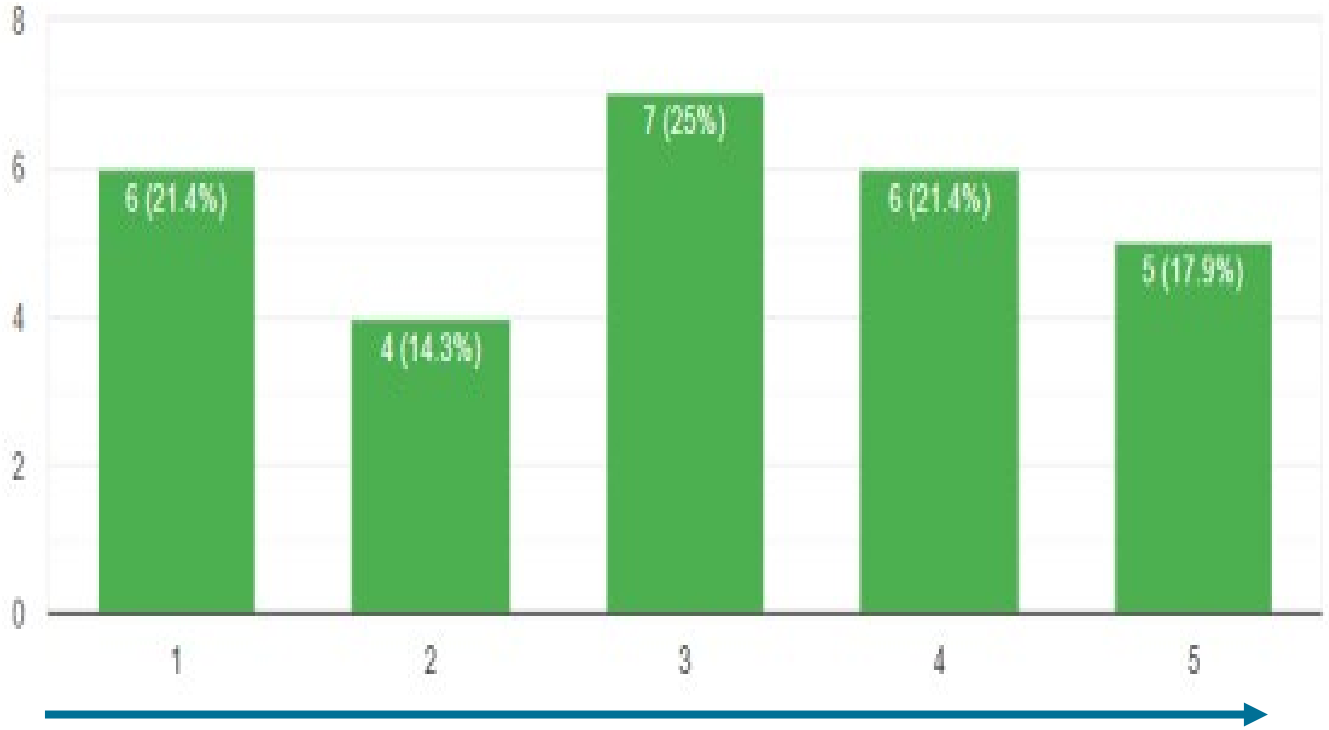


Negative ⟷ Positive

COOL DH
COOL DISTRICT HEATING

Individual metering and charging of heat and hot water:

Does it affect your energy behaviour?



Doesn´t influence behaviour

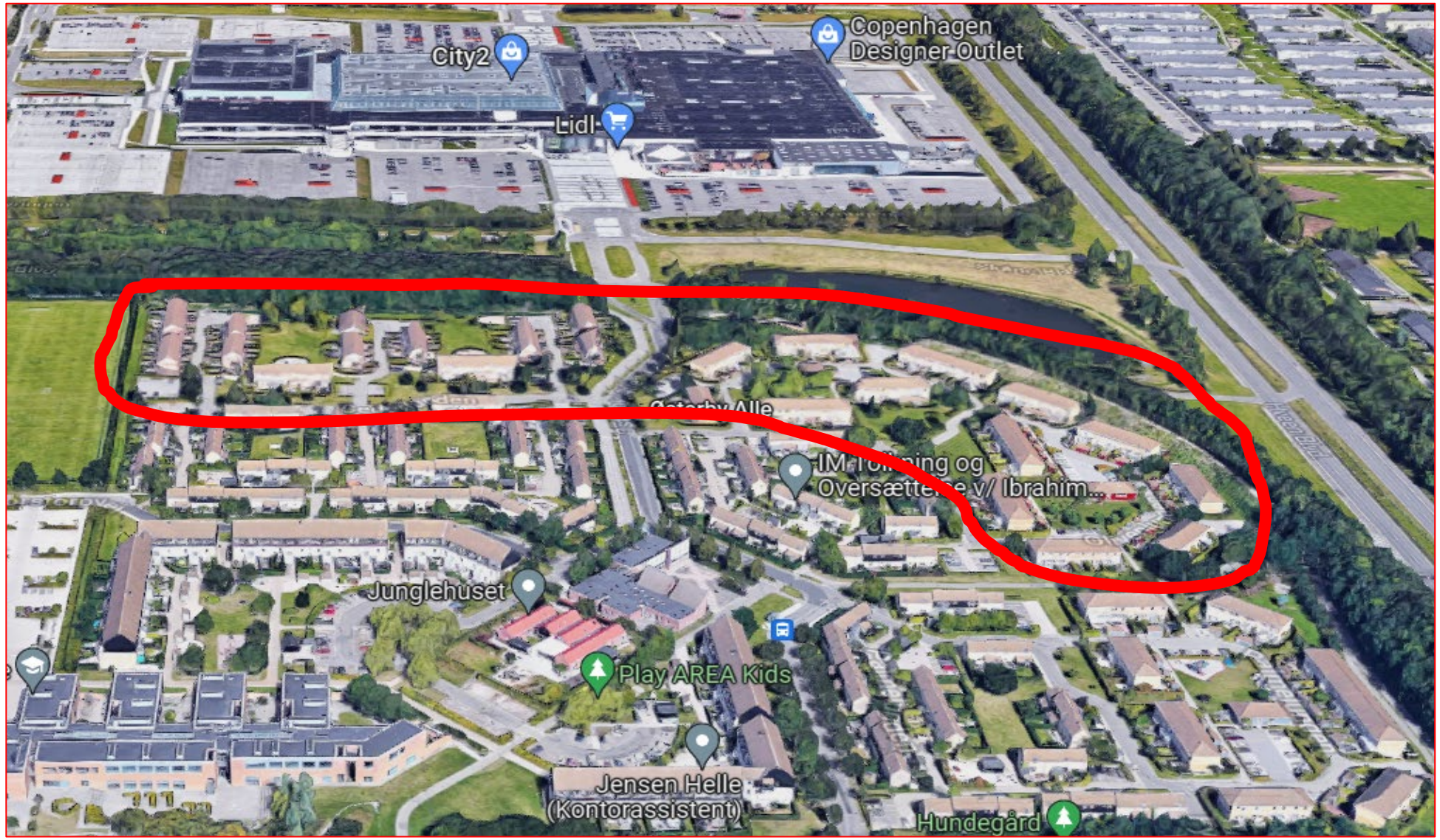
Highly influence behaviour

What do they say they do?

- Shorter showers
- Use a lower temperature on the domestic hot water
- Dishwasher used fully loaded

COOL DH
COOL DISTRICT HEATING

Østerby - Denmark



COOL DH
COOL DISTRICT HEATING

Households in Østerby in HøjeTaastrup

- Houses built in 1985-1986
- Conversion from old DH system to new LTDH system
- Each apartment has its own DH substation

COOL DH
COOL DISTRICT HEATING

Installations

COOL DH
COOL DISTRICT HEATING

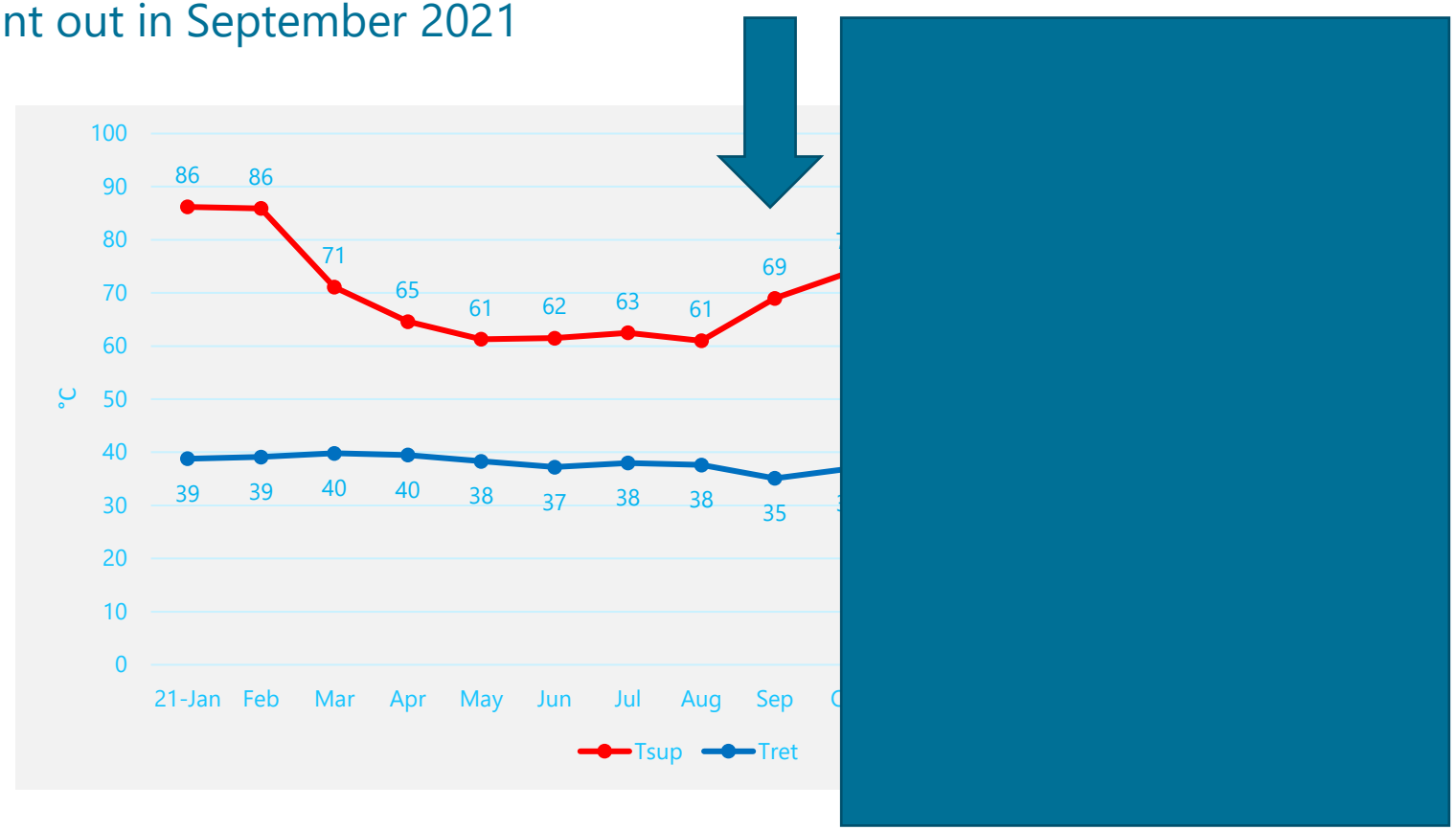
Installations

- Households experience lack of information/ ambiguous information / information comes to late
  - About terms, details, when excavation should start, how long time it will take, when you are coming to our house?
- Recovery work
  - Problems with lawn, hedges and tiles
  - “Excavated soil was replaced with gravel”
- DH station
  - Placement was fine
  - Many households comment on size

COOL DH
COOL DISTRICT HEATING

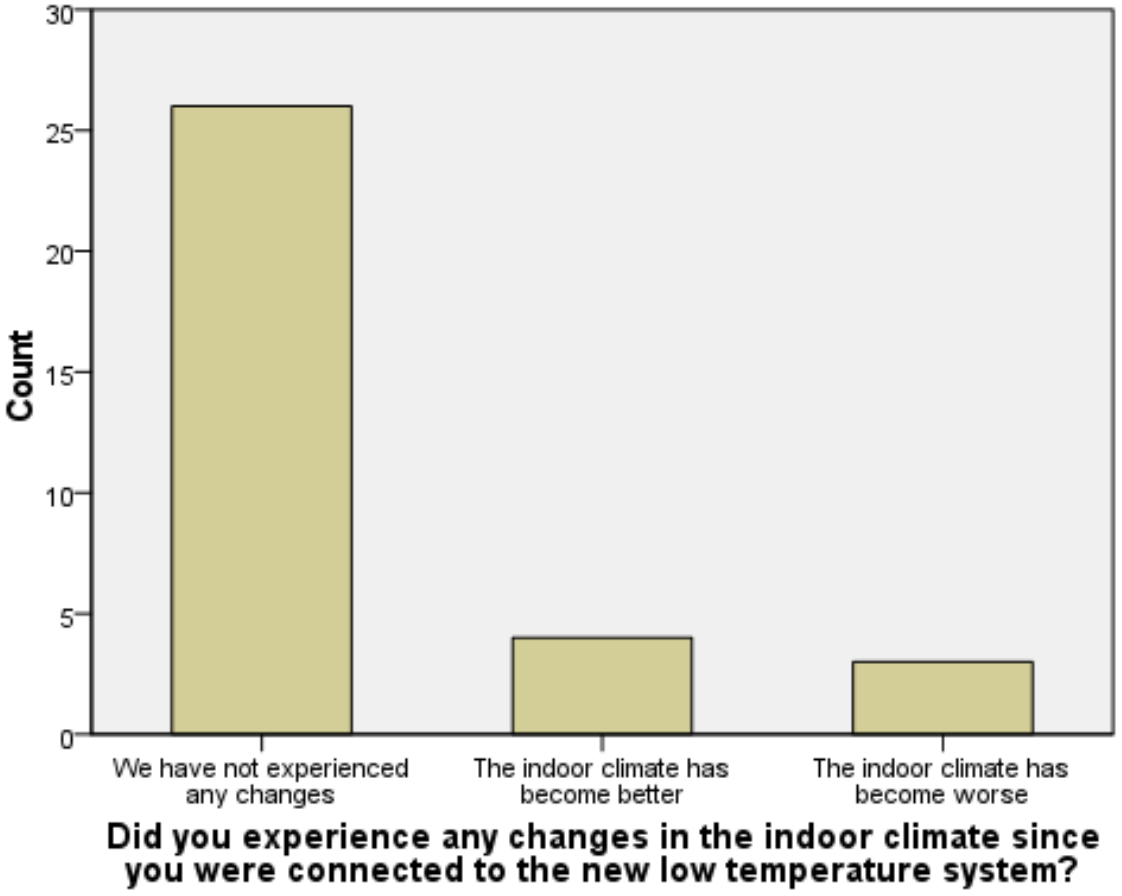
Supply and return temperature in LTDH grid

Survey sent out in September 2021



COOL DH
COOL DISTRICT HEATING

Indoor climate comfort



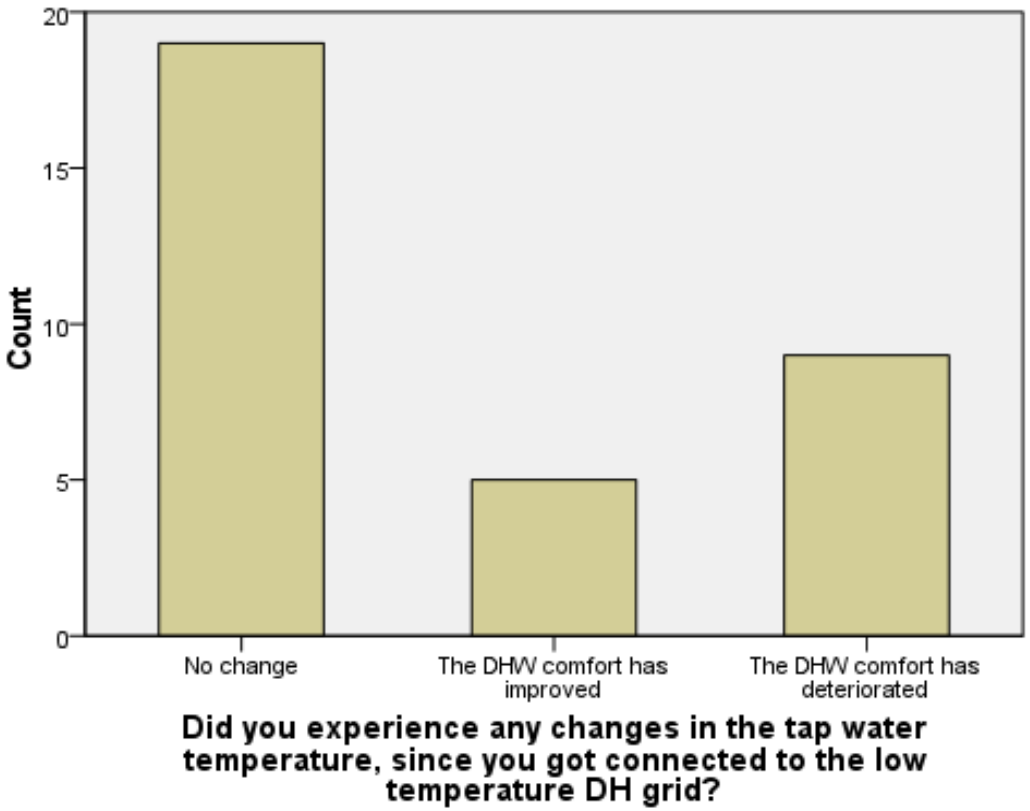
NO CHANGES
"I don't know if it has gotten better or worse. For example, still a lot of condensation on the windows in winter despite a lot of ventilation."

BETTER
"Better heat in the radiators."

WORSE
"Poor heat distribution. No heat on the 1st floor"
"It can not be controlled."
"It is constantly too hot in the house."

COOL DH
COOL DISTRICT HEATING

Domestic hot water comfort



NO CHANGES

"The heat exchanger responds more slowly to hot water than the old one, but only at start-up"

"The shower water on the 1st floor is nice and warm, but the hot water in the kitchen on the ground floor is never really hot."

BETTER

"The temperature is more stable"

WORSE

"It takes a long time before the hot water is hot"

"We can not take a bath with hot water between 16.30-18"

"May lack hot water in the morning"

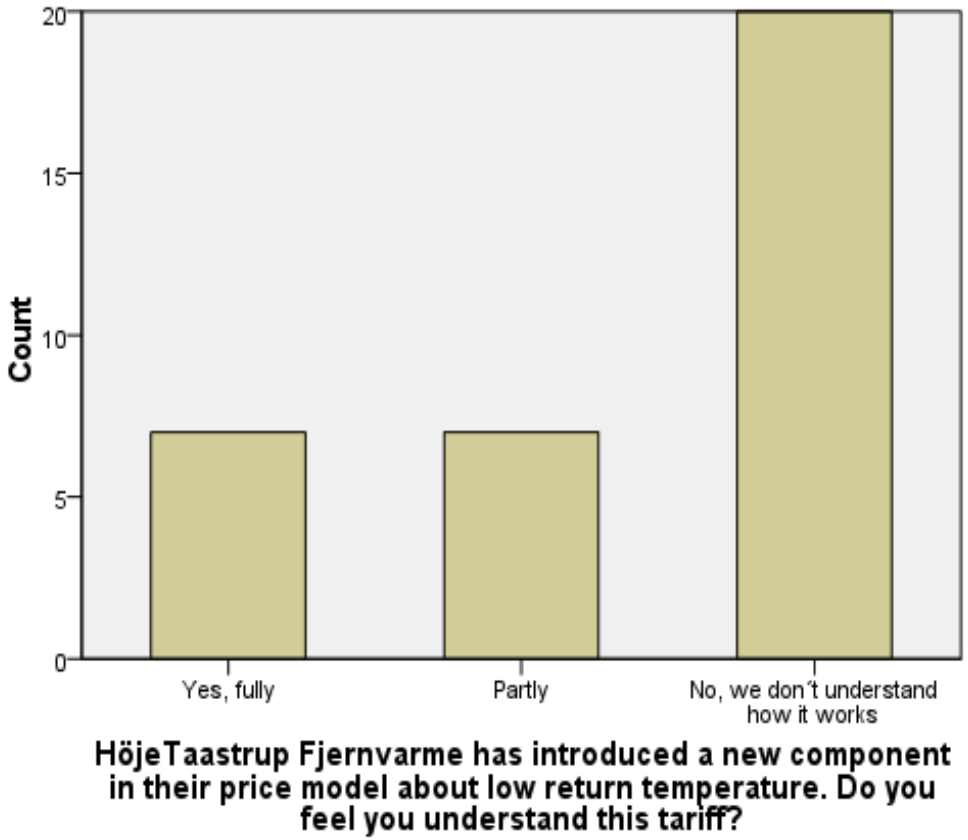
"I have often experienced that I only had cold water."

"The water has become colder"

"There has often been no hot water."

COOL DH
COOL DISTRICT HEATING

New tariff – Return temperature fee



Return temperature tariff

Areal > 0 m2	Price excluding VAT	Price including VAT
Return temperature > 43 °C Additional fee (DK/MWh)	8,00	10,00
Return temperature < 43 °C Refund (DK/MWh)	8:00	10,00

The return temperature is calculated based on the mean value over a year per used MWh

COOL DH
COOL DISTRICT HEATING

New tariff – return temperature fee

1. Most households say they don’t understand the return temperature fee
2. Most households do not understand the motives behind the return temperature fee
3. …but they are accepting the fee anyhow
4. The households don’t know how to get a lower return temperature

COOL DH
COOL DISTRICT HEATING

Why do you think that HøjeTaastrup Fjernvarme has introduced an incitement fee for return temperature?

Motive

COMMENTS

”To make the individual user cool better”.

“For us to take care of the future. Make us more conscious of saving”.

“To reduce consumption”

“I have understood from one of my neighbours that, the lower the return temperature is (and the more heat we use in the house), the less energy the system has to use to cool the return water.”

“So I get my heating system set up correctly so that my heating costs are reduced. It is good for the economy and the environment”

“For better utilization of district heating.”

“I have no idea, to save water?”

”Do not know”

“To make sure you have a good return temperature. But I do not know how to take care of it yourself.”

”To help the climate”

“We could get grants”.

”Crazy climate change hysteria”

COOL DH
COOL DISTRICT HEATING

What do you think about the new price model with the return temperature component?

Like it?

COMMENTS

- “Ok”
- ”Fair”
- ”It is good”
- ”Have probably not read it, otherwise I cannot remember it”.
- ”I'm not familiar with that”
- “Nothing! District heating is obsolete. The future is electric”
- ”It is fine”

COOL DH
COOL DISTRICT HEATING

Do you know how you will get a low return temperature in your system and thereby get lower costs?

How?

COMMENTS

- **“Yes, keep the bottom of the radiator cool”**
- **“Keep heat on all units and not just one”**
- “Do not turn up the heat too high”
- ”Do not change anything on the unit”
- “No. It has, as far as I know, never been communicated from HTK.”
- “I can probably learn about it by reading, but I cannot answer straight ahead”
- “No, but I should probably learn more about it”
- **“No, but we expect the new substation to ensure this.”**
- **“Does not interest me. There has to be heat and that's what we pay expensively for”**
- **“No, why has it just suddenly become my problem. That's HTF's job, right?”**

COOL DH
COOL DISTRICT HEATING

Thank you for listening

- Contact:

Kerstin Sernhed

E-mail: Kerstin.sernhed@energy.lth.se

Telephone: +46 46 222 40 43

COOL DH
COOL DISTRICT HEATING