
# District heating in Odense - Denmark

*October 2022*

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FJERNVARME FYN

# Topics

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1. **Introduction to district heating in general**
2. **District heating in Odense/Fjernvarme Fyn**
3. **Heat recovery from Meta data center**

40 minutes

4. **Discussion: New district heating … your cases**

15 minutes

5. **Tour**

30 minutes

# District heating in Denmark - Facts

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- District heating is a heat distribution system
- 66% of domestic houses have District Heating
- 72 % of the heat is based on renewable energy (waste, woodchip, straw, wind, solar, biogas and geothermal)
- 40,000 miles of pipes  (Equator circumference: 25,000 miles)
- Strong regulation - Non-profit

Source: Dansk Fjernvarme

# District heating in Denmark - Benefits

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- Economy of scale
- Flexible energy sources (garbage, biomass, wind, solar, biogas, geothermal, coal, natural gas, oil)
- Use of renewable and waste energy resources

# The three parts of district heating

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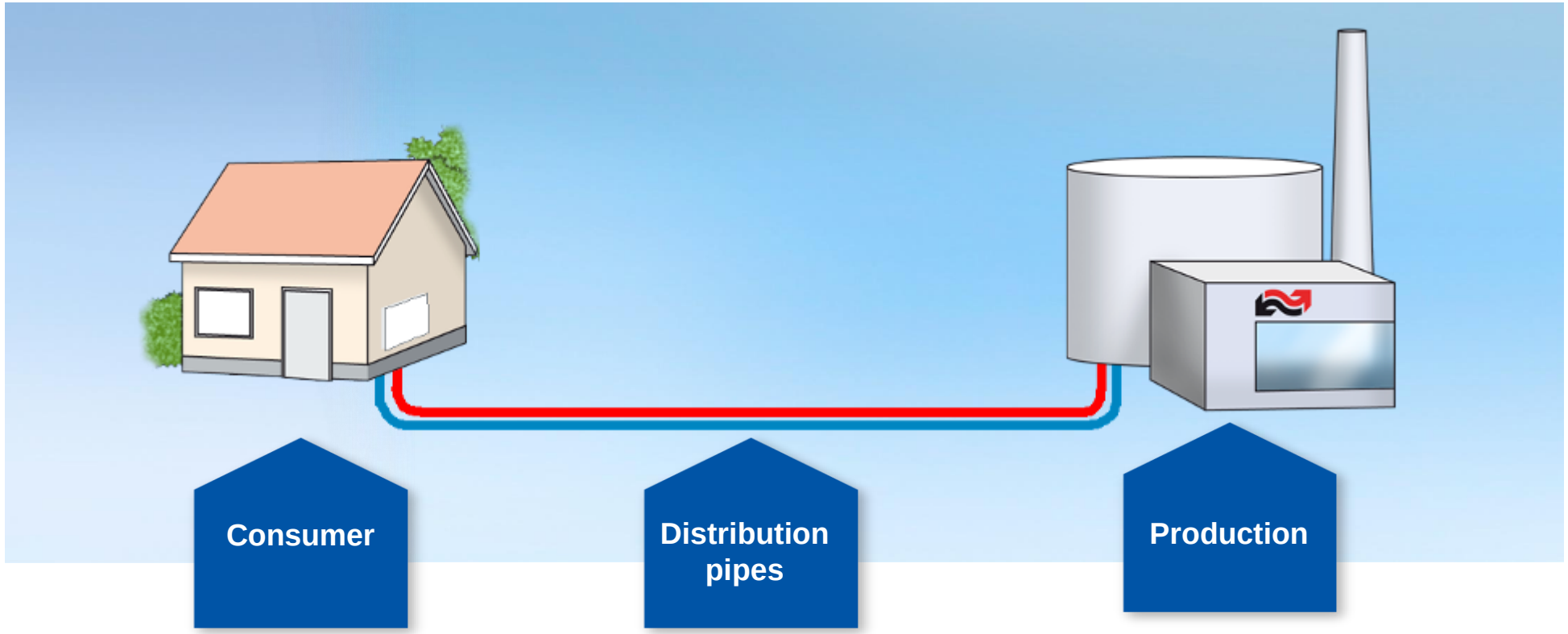
Source: www.fjernvarme.info



# Consumer installation

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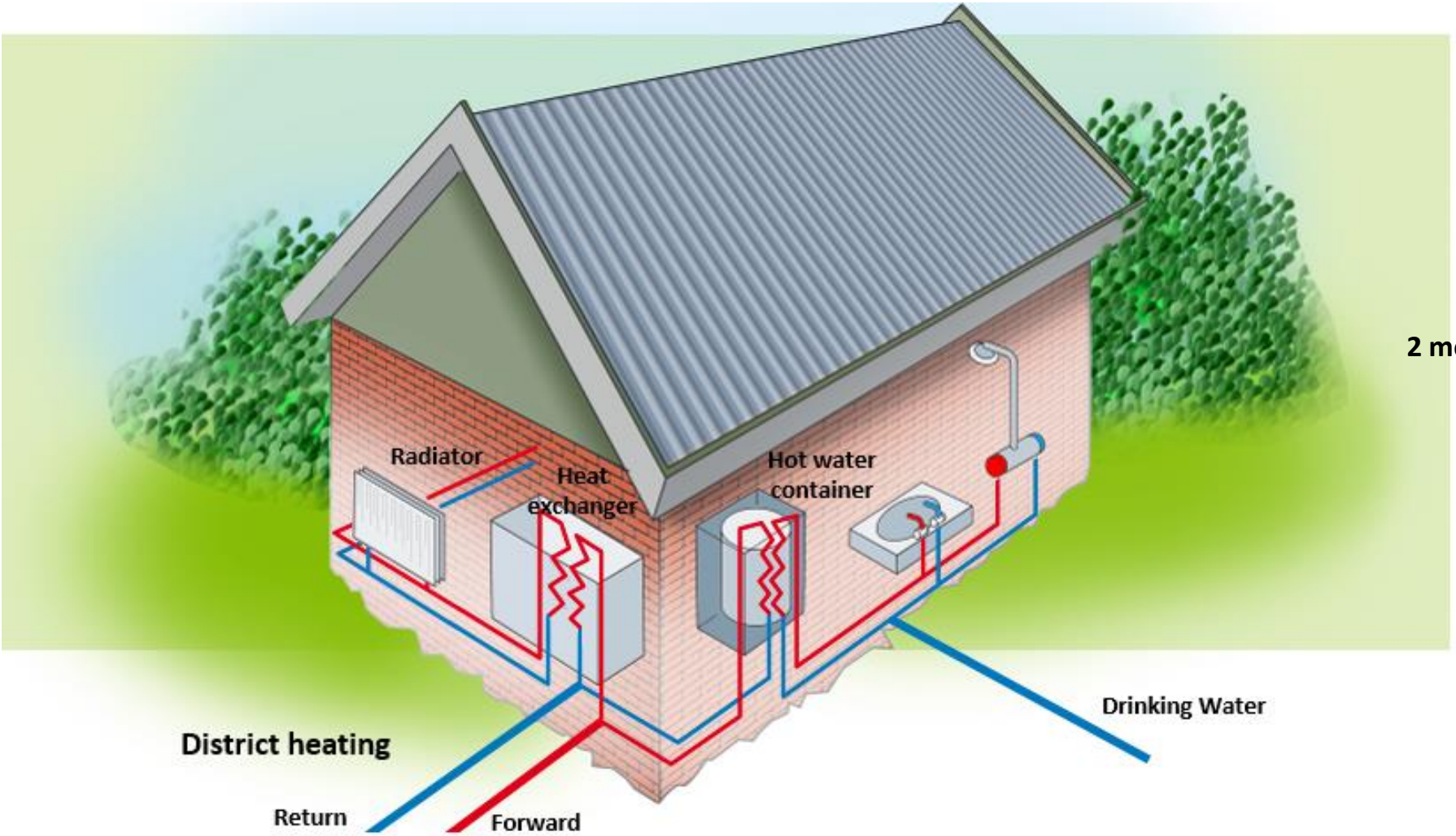
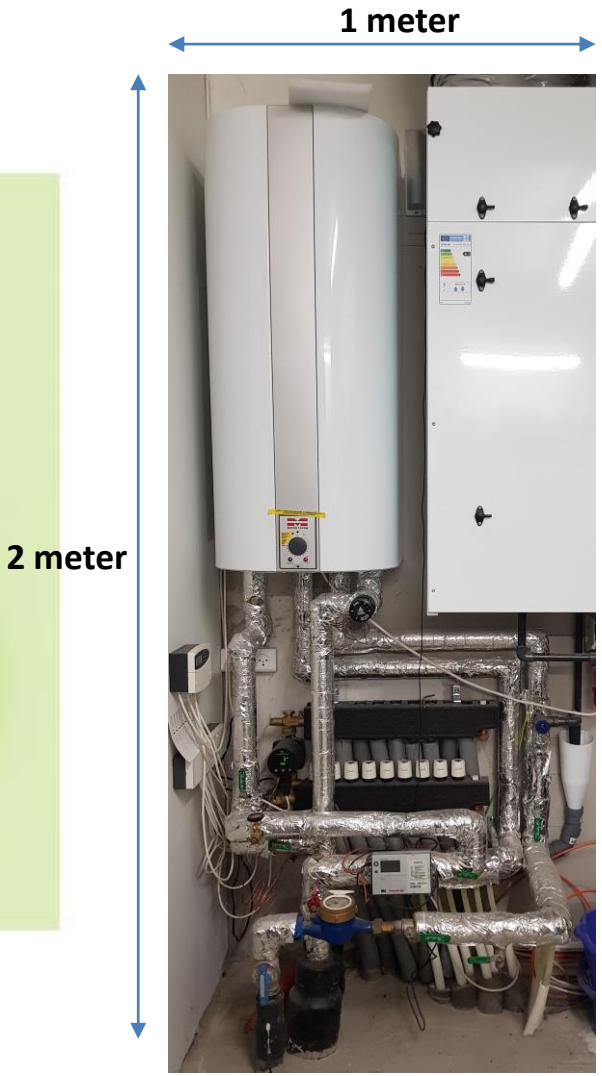
Heat demand:

1. Room heating
2. Hot water



# Distribution pipes

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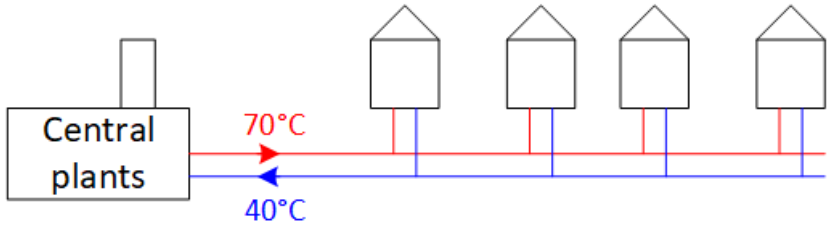
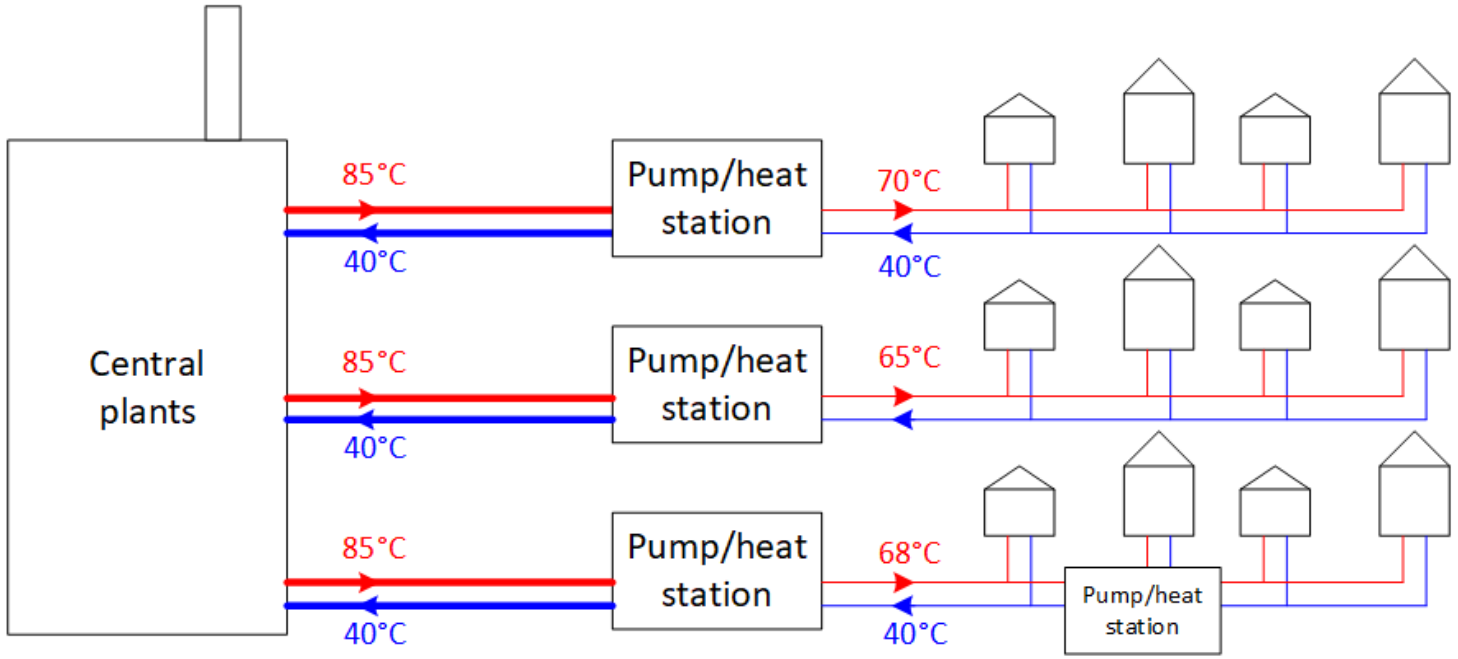
**Small grid**




**Large grid**



# Distribution pipes – main pipes

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Pipes ready to be dug down in open field


Pipes ready to be dug down on the side of the road

Pipes dug down in the street

Internet fiber, water, gas , …

# Distribution pipes - Pipes going into the house

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Pipe hole at the consumer

Intersection point

Intersection point cover

# Heat production - CHP

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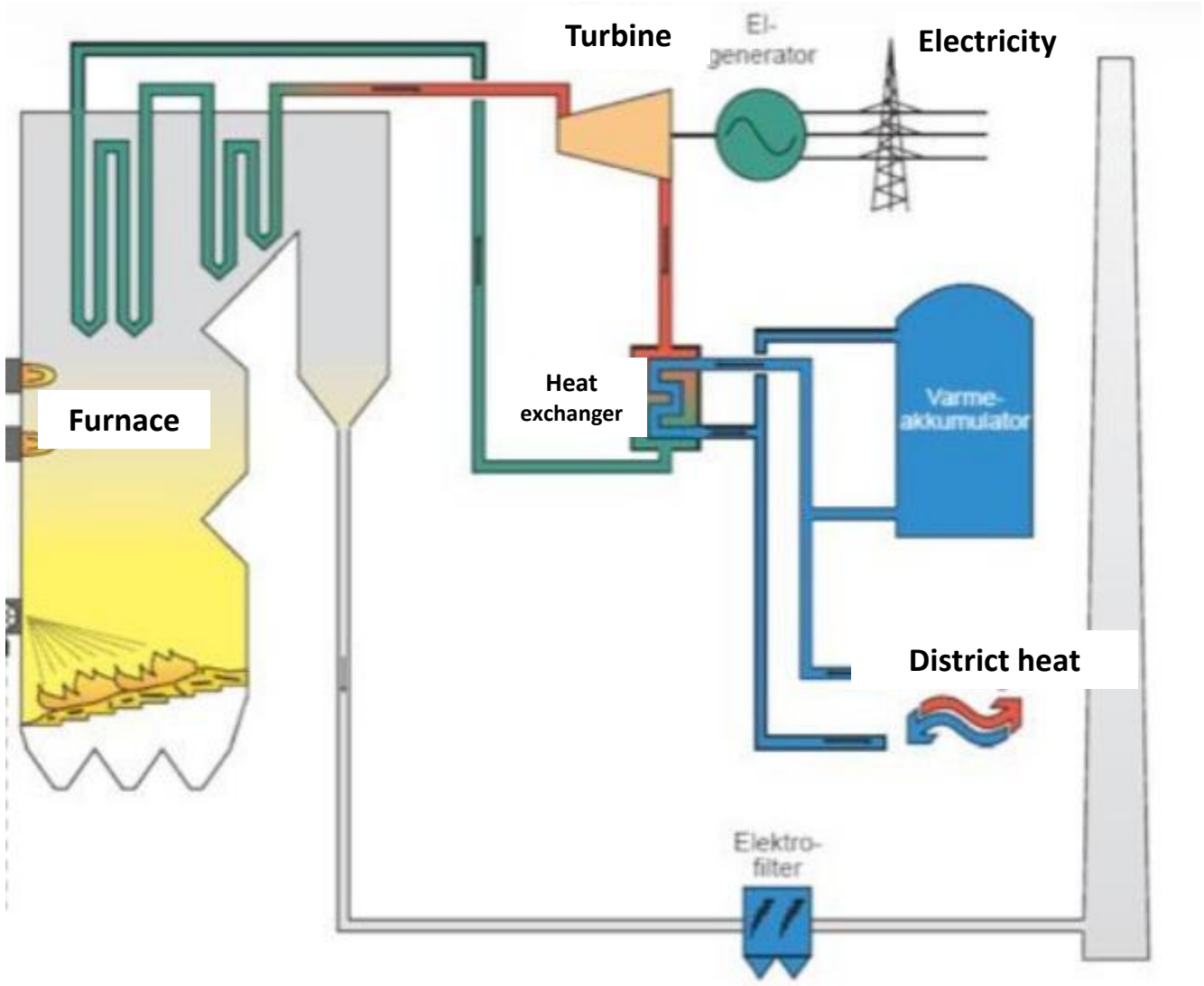
Coal, gas, biomass or waste



# Heat production – Heat pump

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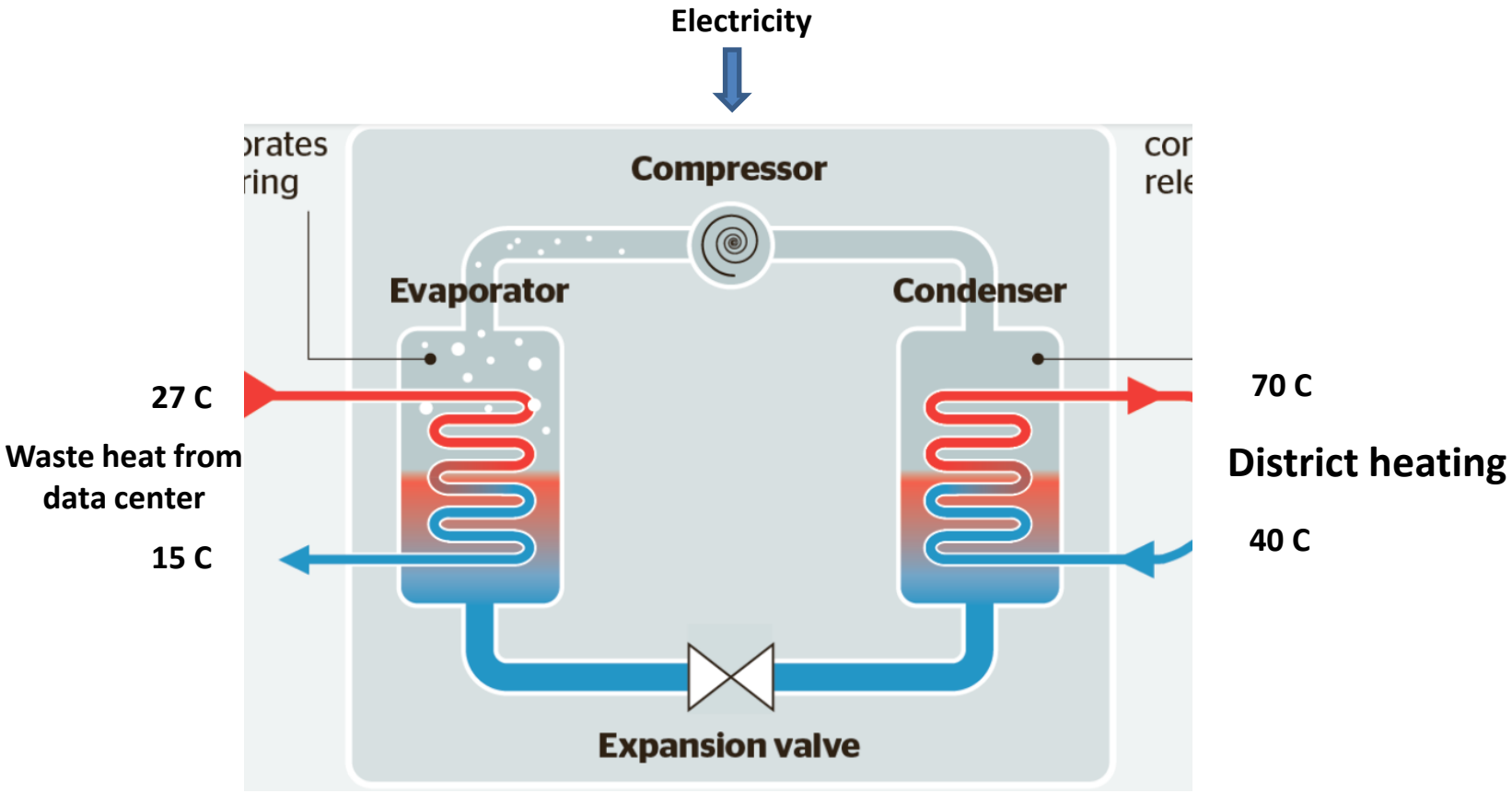

# Heat production

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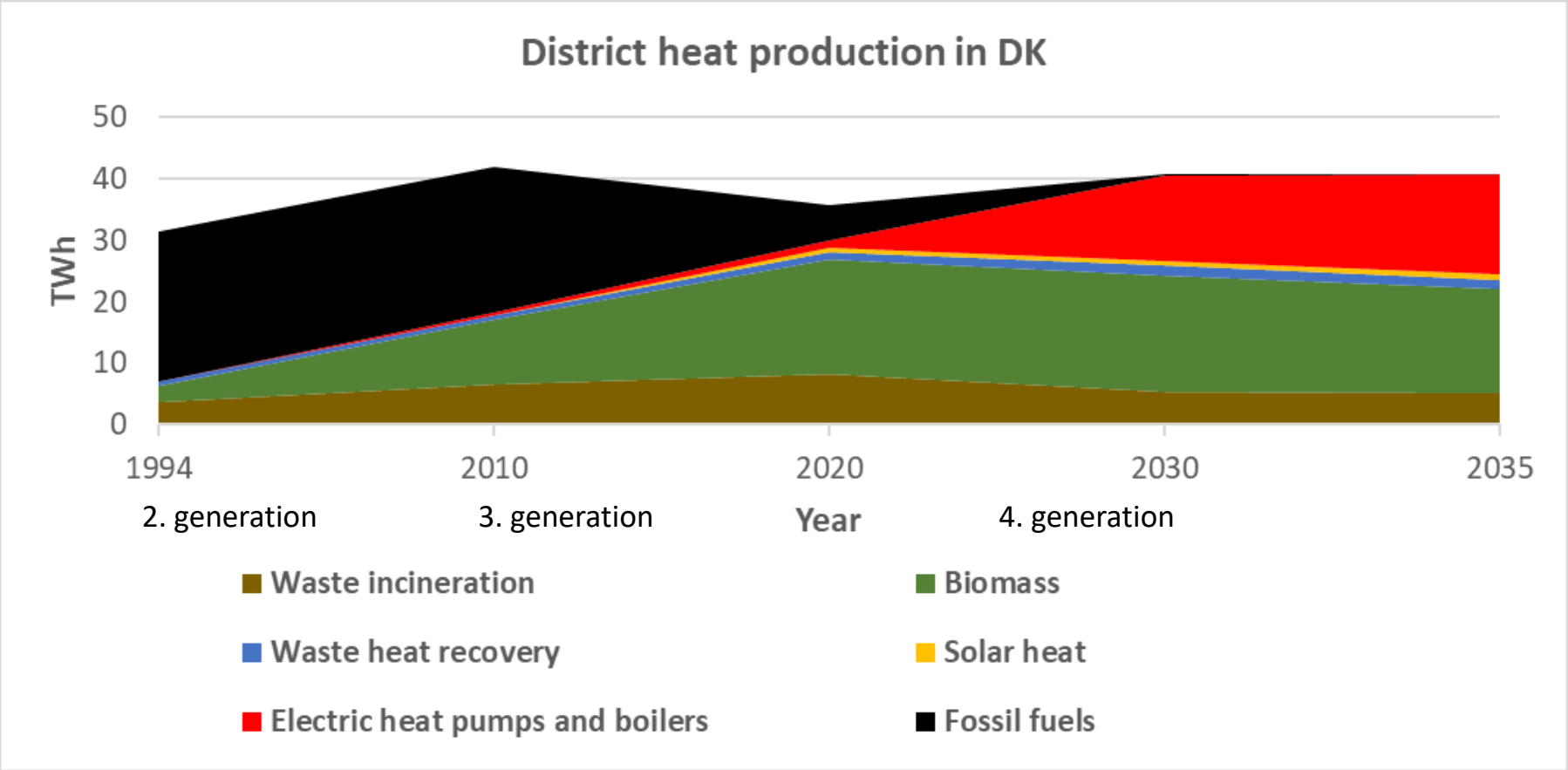
1. generation: mainly oil
2. generation:  fossil source
3. gen.: biomass source
4. gen.: waste heat and electricity source

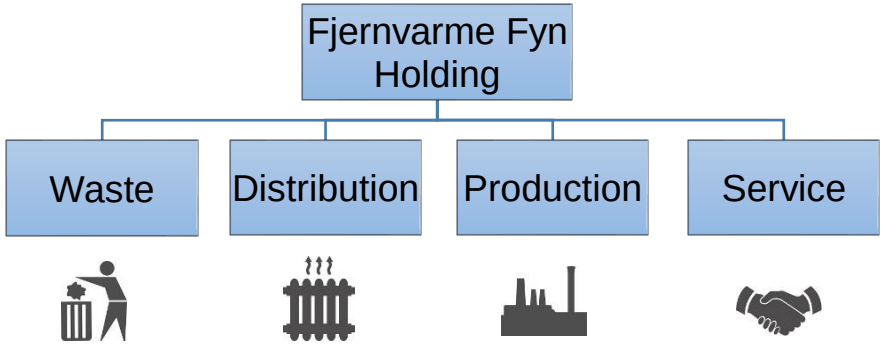



Source: Energistyrelsen basis fremskrivning

# Fjernvarme Fyn - Facts

- Fjernvarme Fyn is a shareholders company owned by the municipalities of Odense and North Funen
- Annual turnover: 2-300 mio. € (Heat, electricity, waste incineration)
- ~300 employees
- First heat from CHP in 1929

**Our legal structure includes entire value chain**




***Targets:***

***Top 3 on lowest price***
*by*
*Competitive development and cooperation along with automation and digitalization*

***Phase out coal by Q1-2023***
*by*
*Stepwise installation of new technologies with synergies to existing units and a high level of electrification*

***Odense Carbon Neutral 2030***
*by*
*Carbon capture from fossil and biogen sources at Fjernvarme Fyn*

Source: Fjernvarme Fyn



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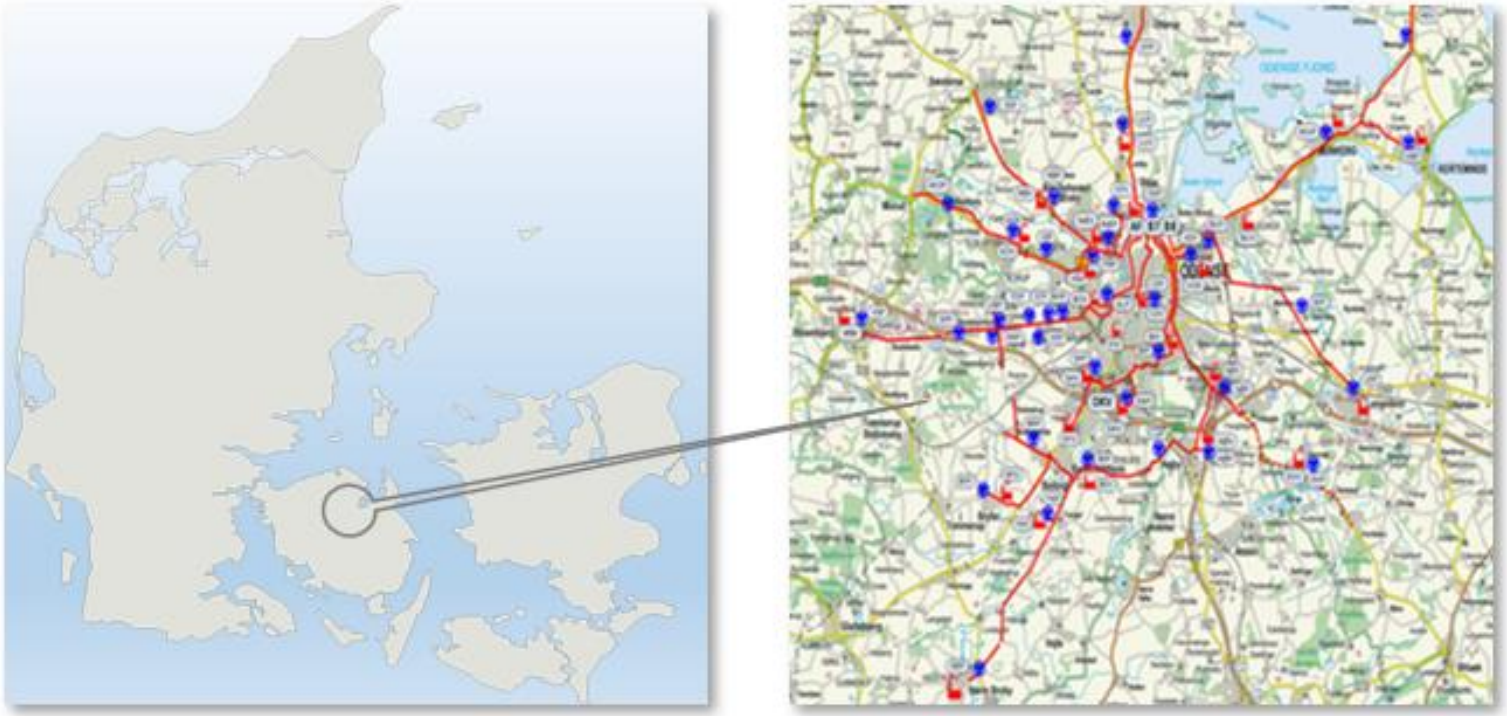
# Fjernvarme Fyn - One of the worlds largest district heating grids

- 70,000 consumers/meters
- 120 km transmission lines (80-90 °C)
- 2200 km distribution lines (70-75 °C)
- Typical price for a 130 m2 house: 1,500 $/year



Source: Fjernvarme Fyn



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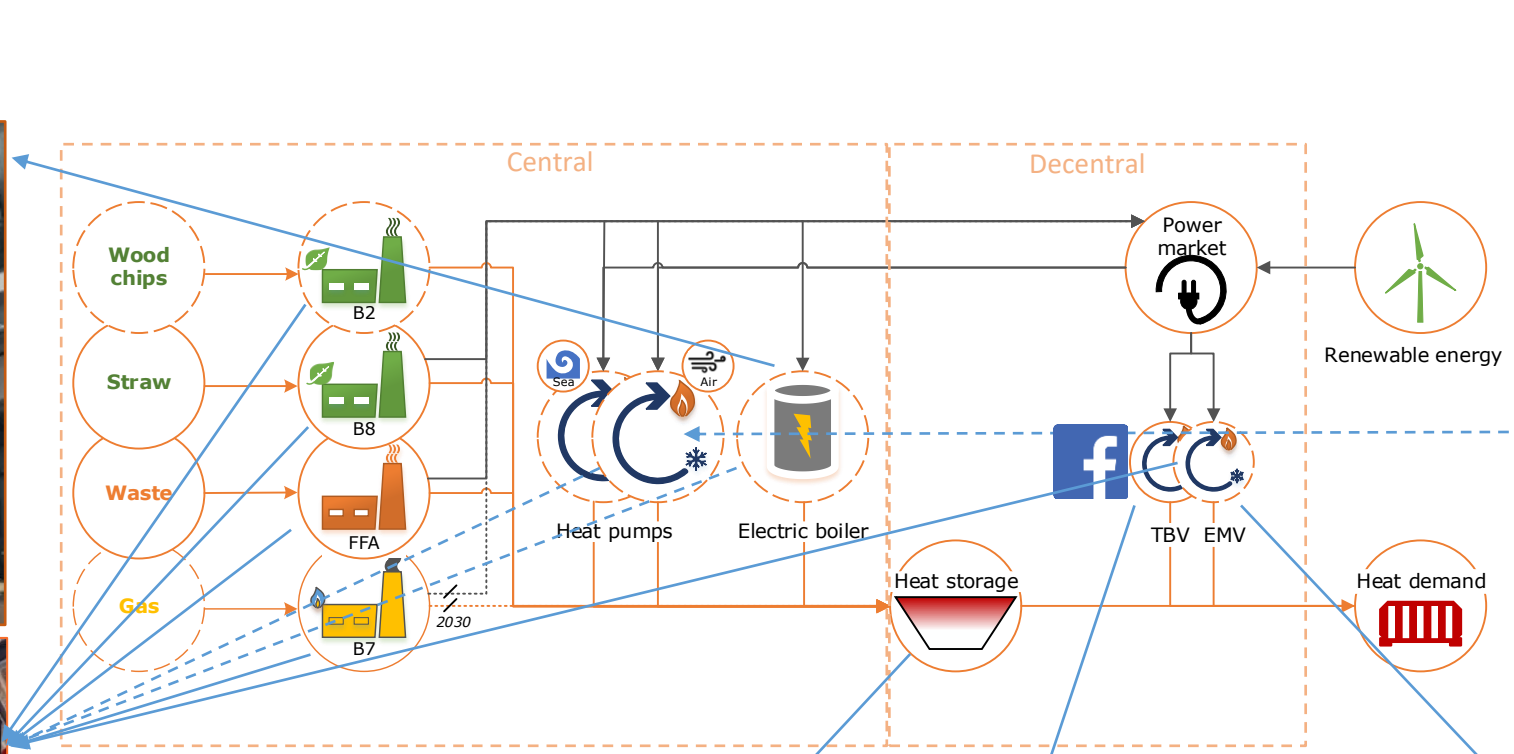
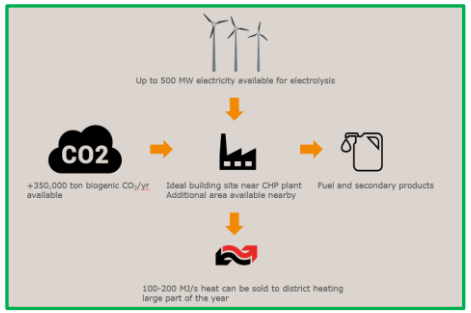
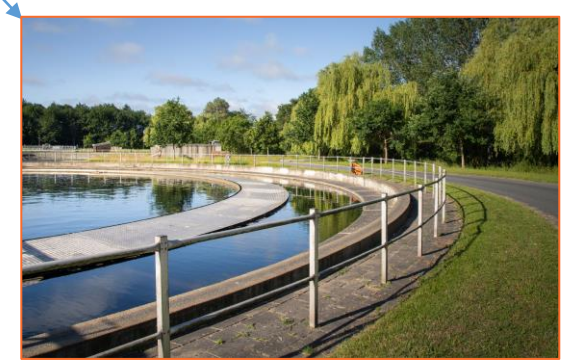
# FVF district heating in the near future will be green and flexible




$CO_2$-fangst (CCS)




Power-to-X (PtX)

TBV: Tietgenbyens Varme Central (heat pumps near facebook)
EMV: Ejby Mølle Varme Central (heat pumps utilizing sewage sluge
Source: Fjernvarme Fyn



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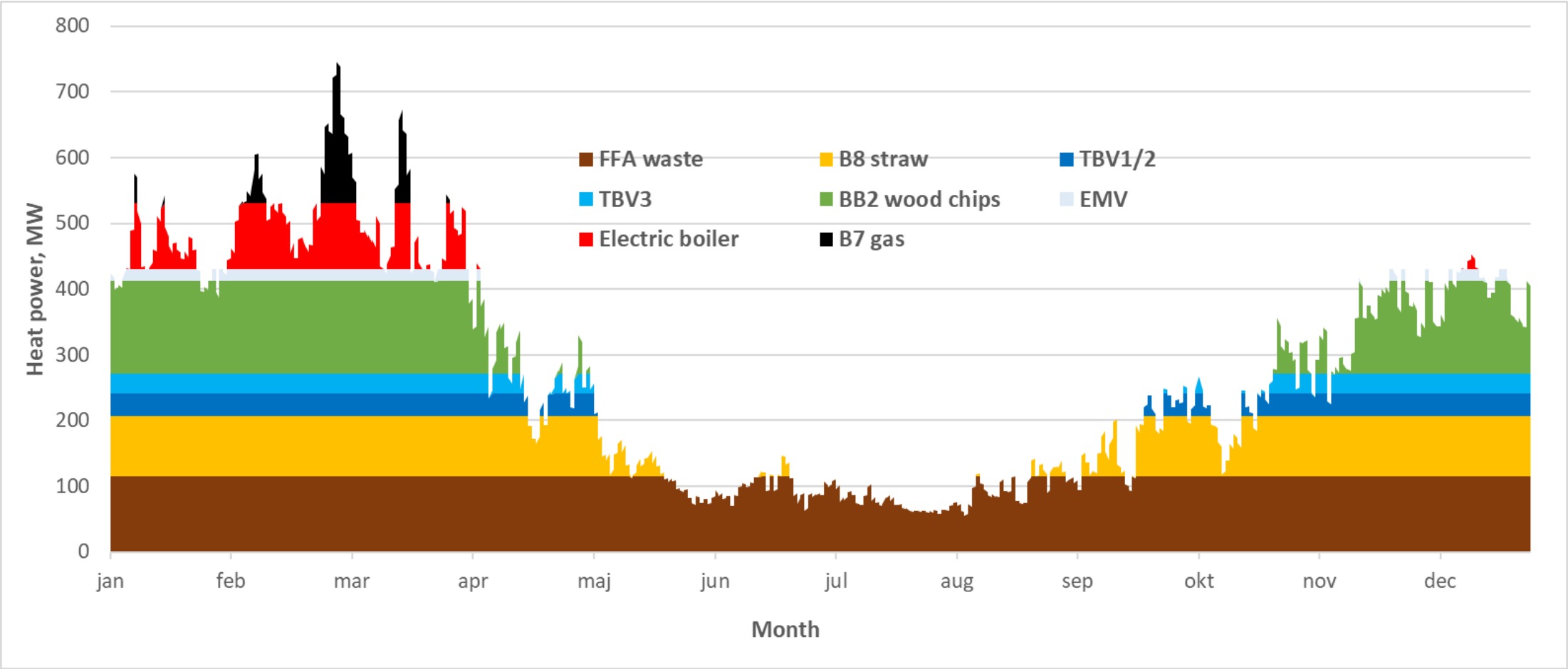
# FVF energy system in 2025



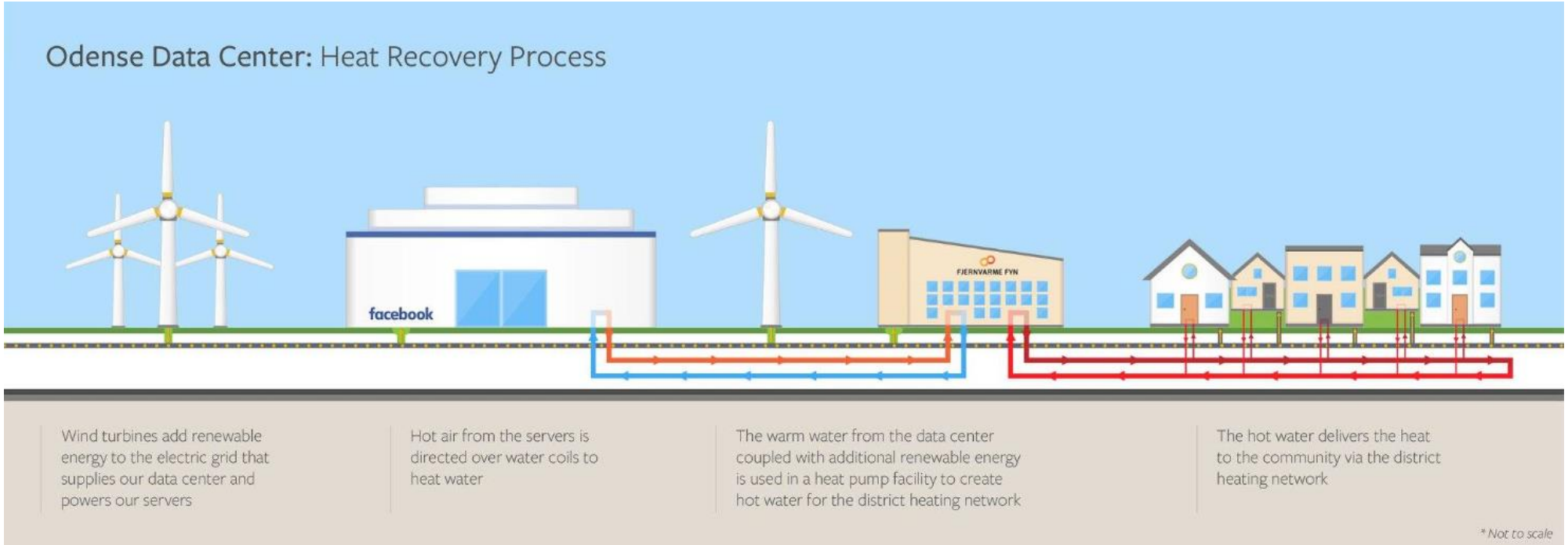

TBV heat pump central


Facebook servers


Visitor center


Heat pump and manifold

# Facts about the Facebook heat recovery project




**Facts:**

- Data center owned and operated by Facebook
- Heat pump plant owned and operated by Fjernvarme Fyn
- Both facilities supplied by renewable energy
- 160.000 MWh surplus heat ~ 11.000 households
- 2017: Investment decision
- 2020-2021: Commissioning of TBV1 and TBV2

Source: Facebook and Fjernvarme Fyn



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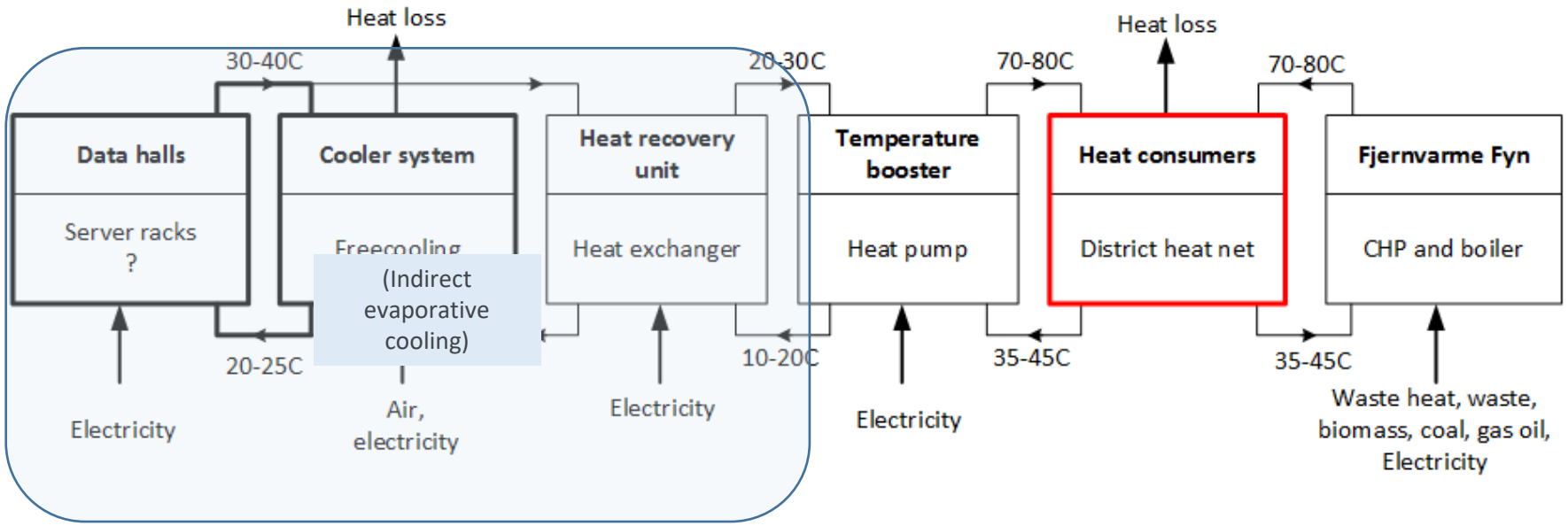
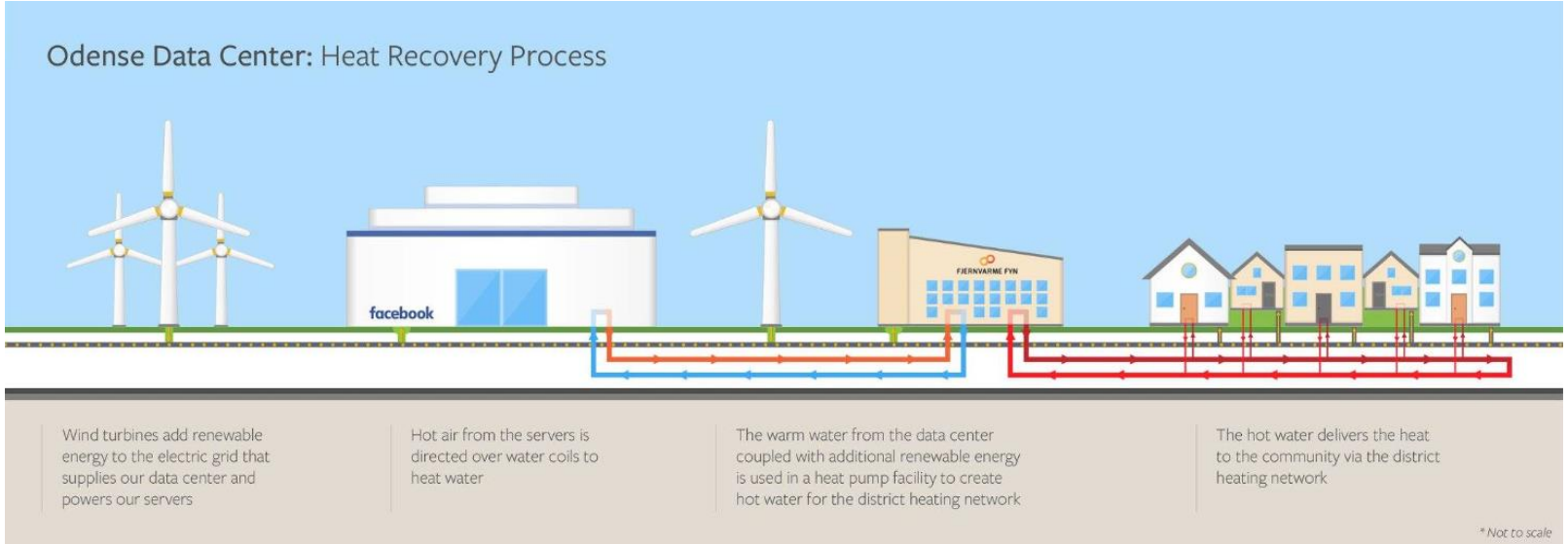
# Heat recovery system




Source: Facebook and Fjernvarme Fyn



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# New district heating - Discussion