

Introduction to District Heating Funen Strategy and Heat Pump Central utilizing Facebook surplus heat



4 December 2019

Kim Winther

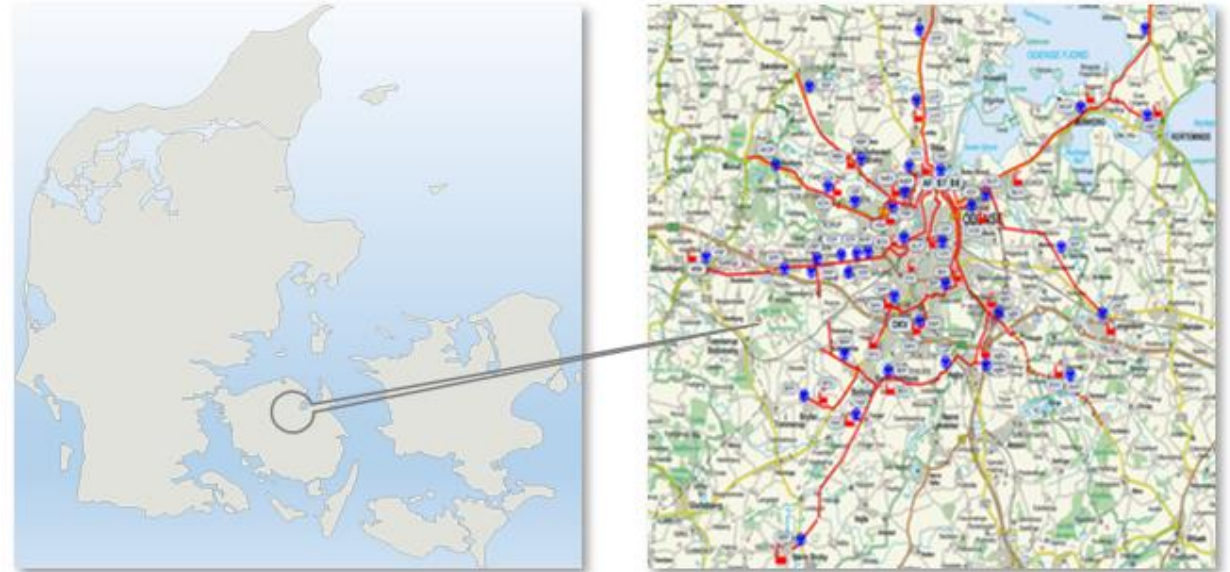
Head of Business Development, Fjernvarme Fyn (kwi@fjernvarmefyn.dk)

Key facts about Fjernvarme Fyn

- Shareholders company owned by the municipalities of Odense and North Funen
- Annual turnover: 200 mio. Euro (Heat, electricity, waste incineration)
- 285 employees
- First heat from CHP in 1929

Targets in 2025 Strategy:

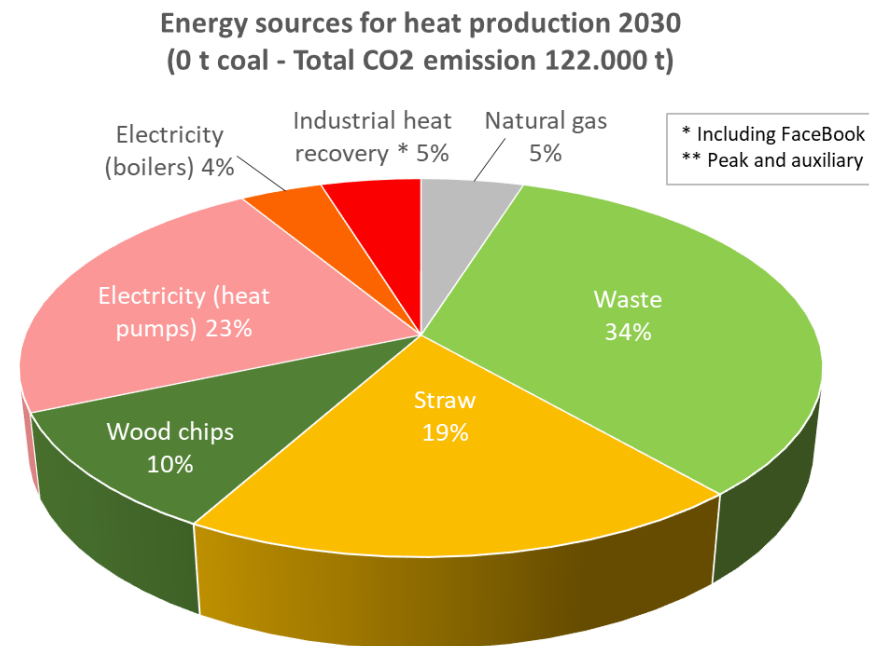
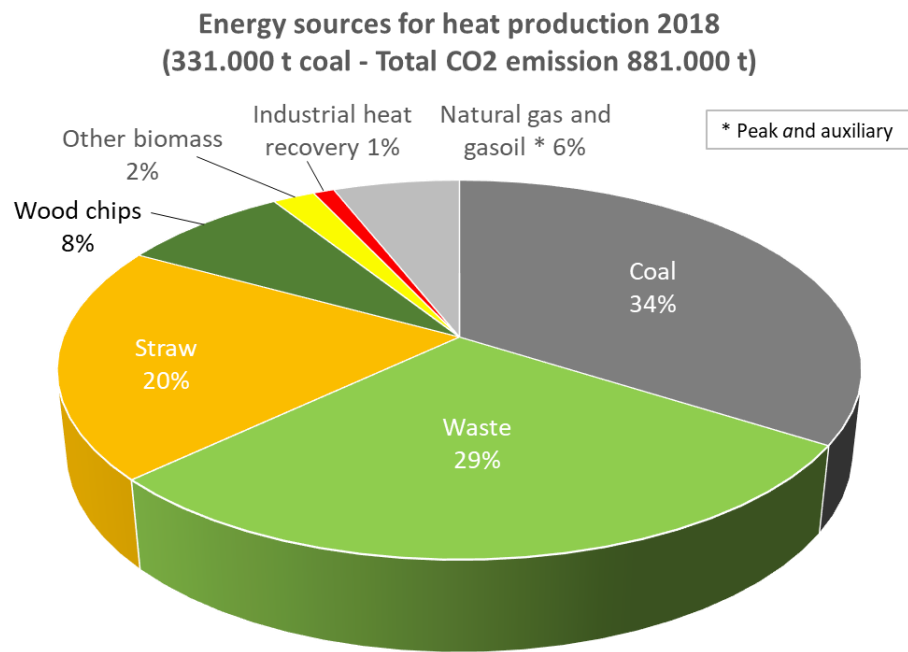
- Top 3 on lowest price*
- Phase out coal by 2025



One of the worlds largest district heating grids:

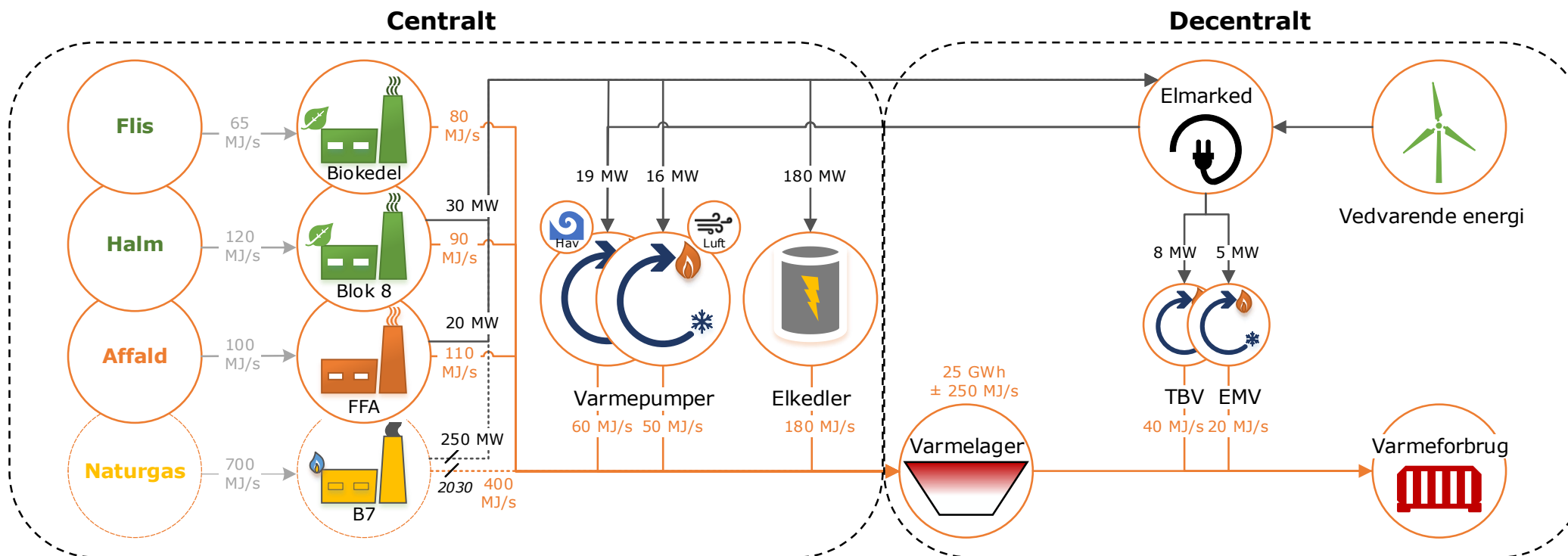
- 65.000 connections/ meters
- 120 km transmission lines (80-90 °C)
- 2200 km distribution lines (70-75 °C)

Heat production in 2018 and 2030



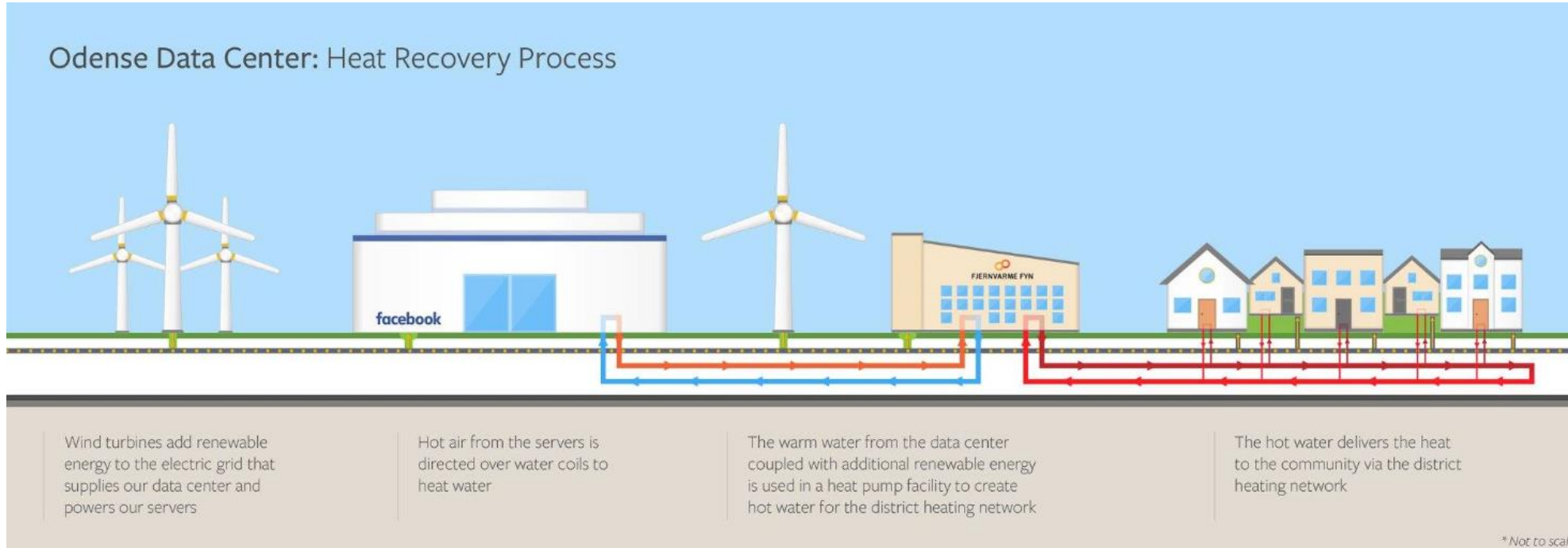
- Coal to be phased out by 2025 – already down to ~220.000 t in 2019
- Electrical heat pumps will be a large part of future production mix
- Heat pumps will utilize surplus heat from Facebook, sewage sludge and ambient sources (air and sea)

Koncept for fremtidig varme



- Et økonomisk/ teknisk robust koncept med en bred portefølje
- Energilagring sikrer høj udnyttelse af VE fra vind og sol
- Centrale anlæg i synergi med decentrale anlæg (TBV og EMV)
- På lang sigt (+2025) mulighed for at indpasse nye teknologier, bl.a. CO₂-opsamling, overskudsvarme f.eks. fra brændstoffabrik, anlæg til energiuudnyttelse fra vanskelige brændsler som f.eks. shredder m.v.

Facts about the 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
- 100.000 MWh surplus heat ~ 6900 households
- 2017: Investment decision
- 2019/2020: Operation

Situation map of heat pumps and data center in Tietgenbyen, Odense SØ

Heat Pumps
Tietgenbyens Varme Central (TBV)

Odense Data Center
Facebook

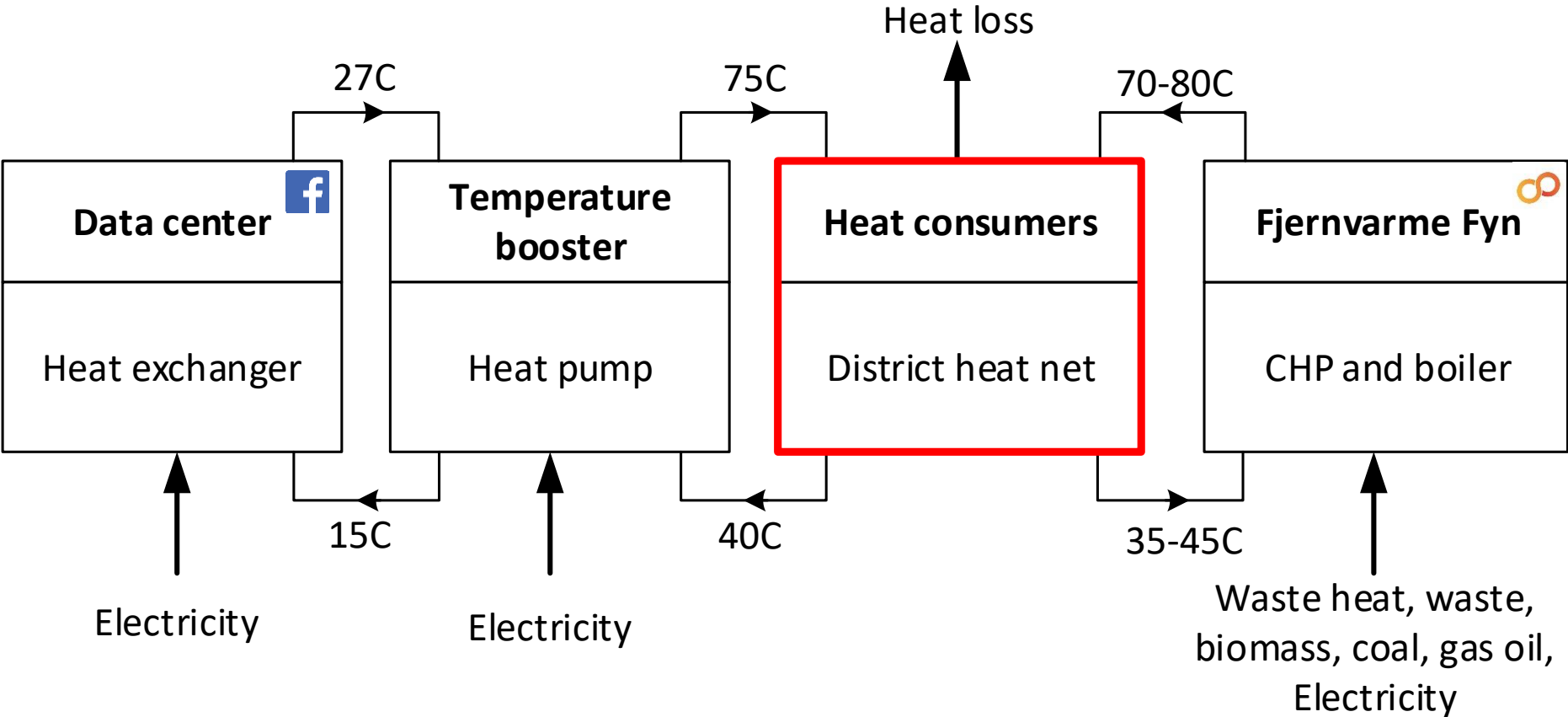
- Characteristics of DK system:**
- High security of supply
 - High RES
 - Stable data



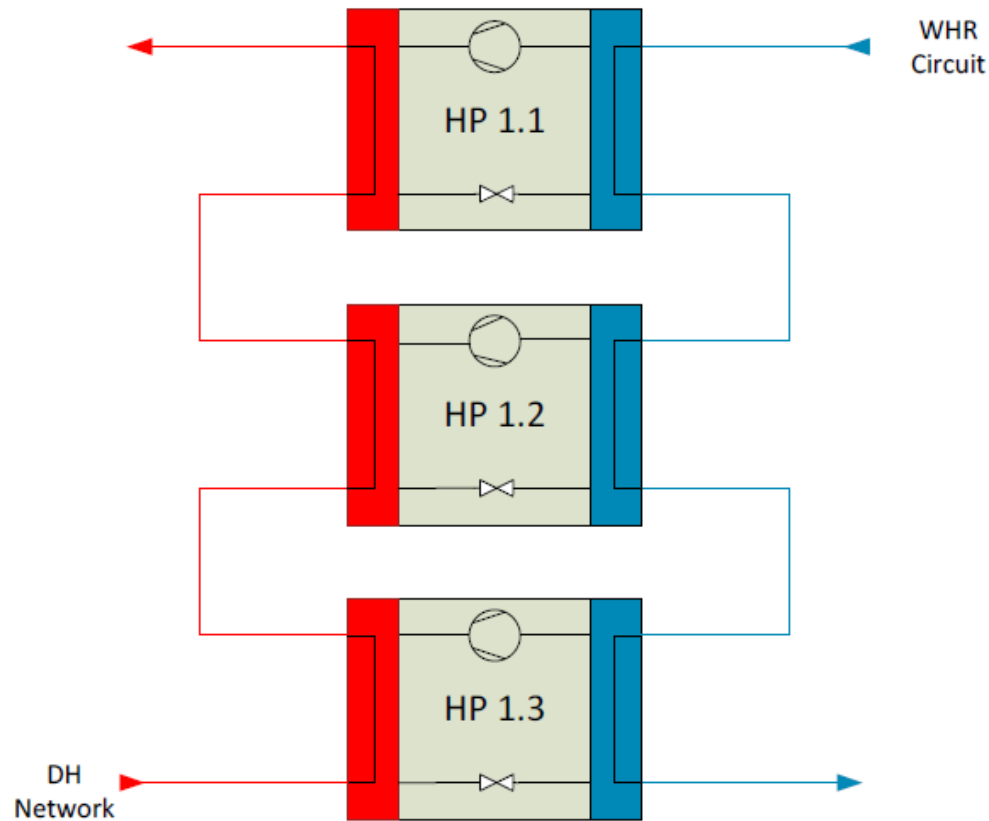
Low temperature district heating grid

Fraugde power station

Integration between Facebook and Fjernvarme Fyn



HEAT PUMP DESIGN



- 25 MW heating capacity
- COP_{heat} for heat pumps = 4.8 – 5.2
- 9 ammonia heat pumps in series of 3
- Single-stage economized screw compressor systems
- Manufactured and tested at the factory
- Compressor capacity control
- 275 kg ammonia per heat pump

TBV heat pump central



Heat pumps



Visitor center



Heat pump and manifold

