

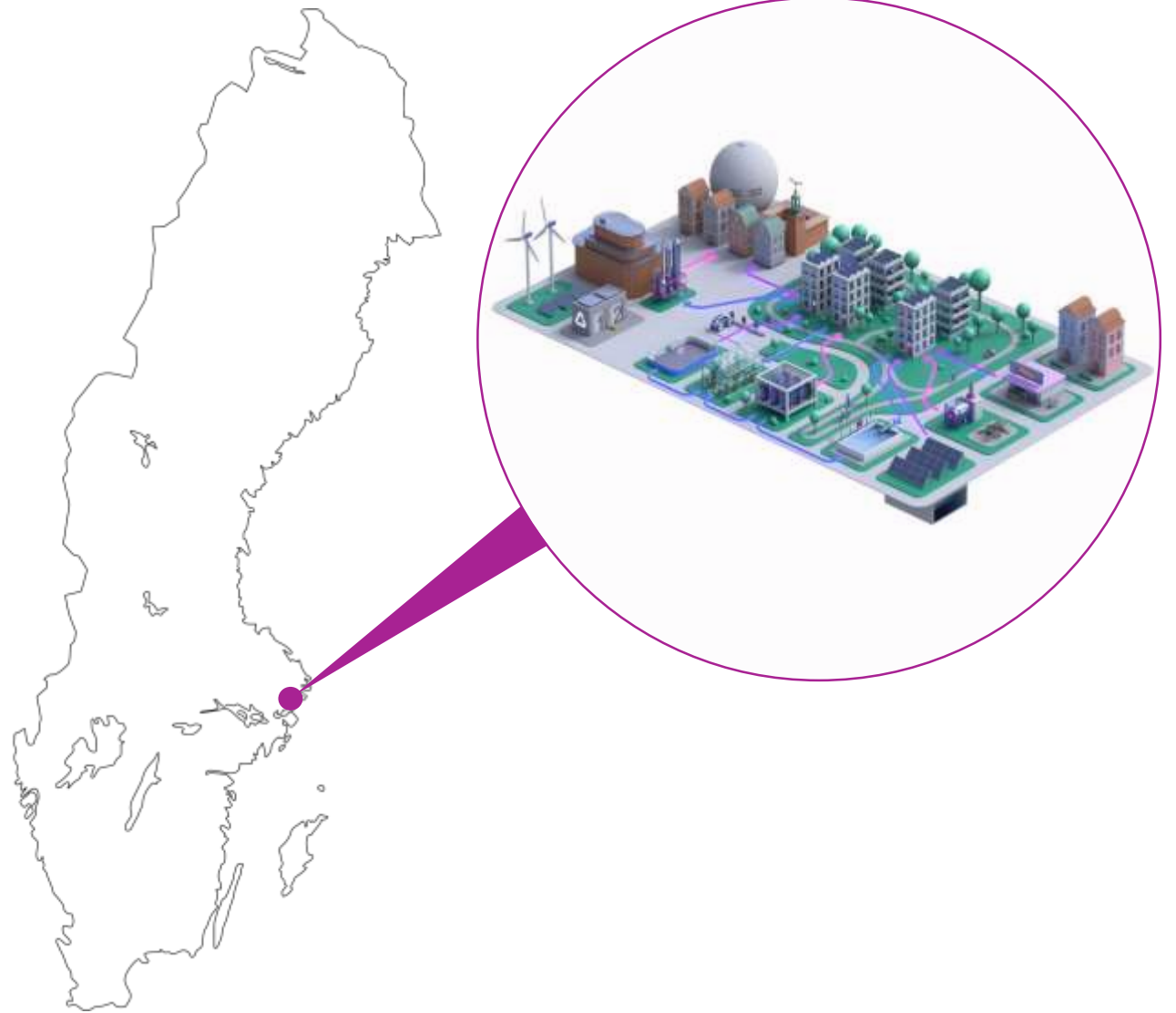
Unleash the market economy for successful heat reuse

Erik Rylander, Head of Open District Heating



Stockholm Exergi

- 10 TWh heat and electricity
- €700 m turn-over
- Reduced fossil fuel. Today 99 per cent of the production from recovery, reuse or renewable sources
- Next step: Remove Co2
- Target: Climate positive value chain by 2025



Open District Heating™ - The Basics



Erbjudande

Dagens priser

Nyheter & Media

Om oss

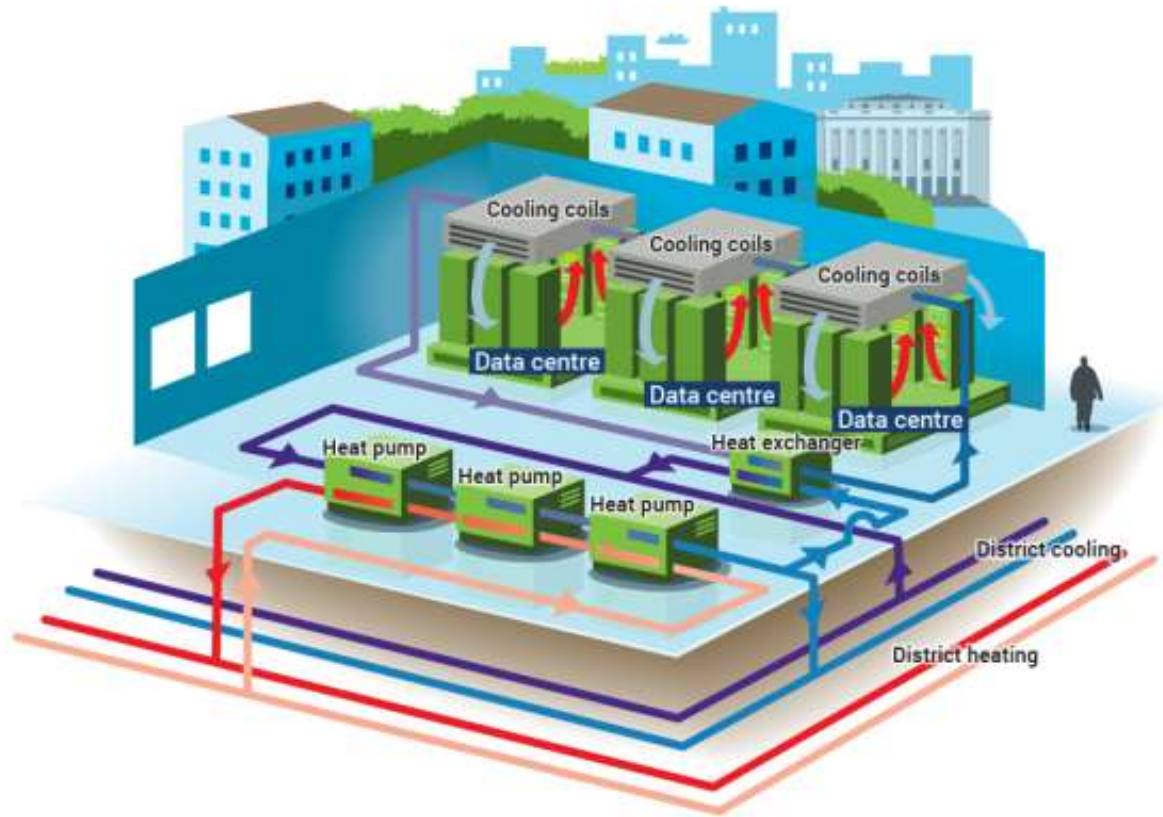
A Market for Recovered Energy

- Stockholm Exergi has created a marketplace for recovered heat and production capacity
- We offer long-term transparent contracts and open prices for trade in excess heat and cooling
- Large as well as small companies and businesses can join the scheme

Avropen meddelade fr.o.m 2021-11-23, kl 14:35		♦ Avrop Värme Söder		● Spotvärme Prima		■ Spotvärme
24 Nov kl:	Prognostiserad utomhustemp. °C	Energipris kr/MWh	Leveranskrav °C	Energipris kr/MWh	Leveranskrav °C	Energipris kr/MWh
00-01	3,50	150,00	68,00	248,00	68,00	252,69
01-02	3,50	150,00	68,00	248,00	68,00	252,69
02-03	3,50	150,00	68,00	248,00	68,00	252,69
03-04	3,50	150,00	68,00	248,00	68,00	252,69
04-05	2,50	150,00	68,00	248,00	68,00	252,69
05-06	2,50	150,00	68,00	248,00	68,00	252,69
06-07	2,50	150,00	68,00	248,00	68,00	252,69
07-08	2,50	150,00	68,00	248,00	68,00	252,69
08-09	2,50	150,00	68,00	248,00	68,00	252,69
09-10	2,50	150,00	68,00	248,00	68,00	252,69

We pay approx. €150.000 per year for 1 MW delivered heat

Open District Heating™ - The Basics



A Simple Solution

- Cool your facility with a heat pump or directly towards the district heating return line
- Sell excess heat to the district heating network
- (Option) Sell surplus cooling capacity to the district cooling network
- Long term and transparent contracts, 10 + 5 years
- The supplier invests in the heat pump
- Stockholm Exergi invests in the connection to the distribution system

Open district heating today

- Launched in 2014
- 27 suppliers (16 data centers)
- Approx. 120 GWh/y
- 1,5% of Exergi's customer demand
- Contracts signed to reach >5%
- Long term target 10% of customer demand

Heat recovery through Open District Heating has contributed to Stockholm Exergi's closing of the last coal plant in Stockholm 2020



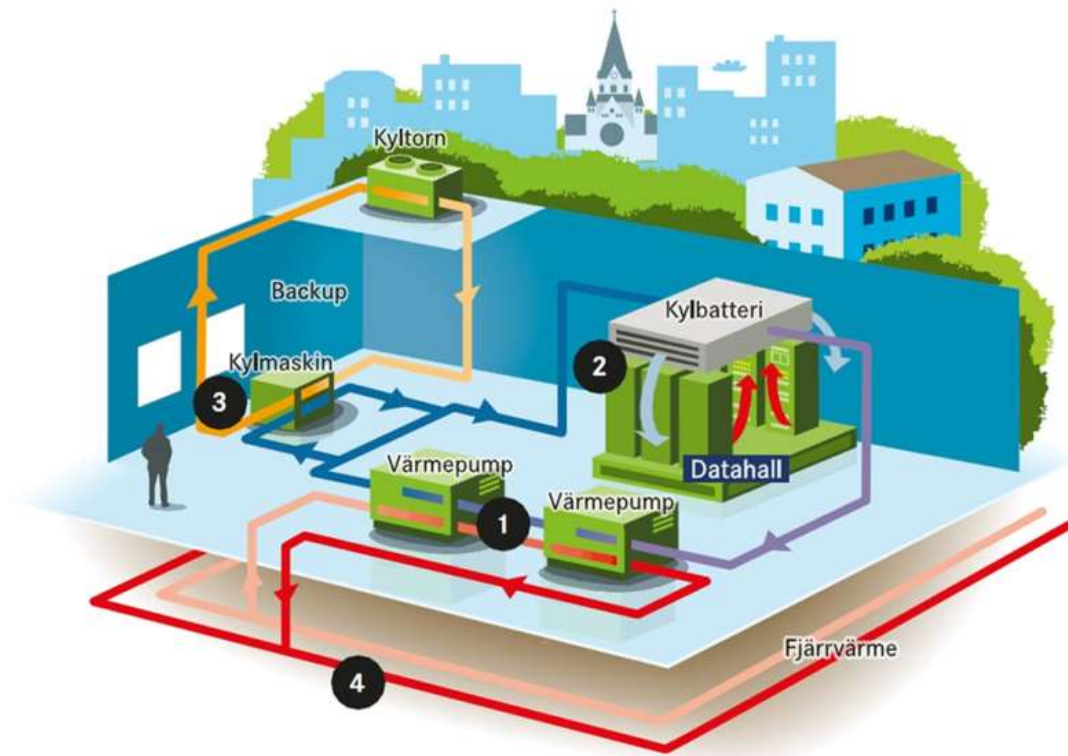
District heating in Stockholm – the enabler of heat reuse

A system built out since the 50's

- Efficient and sustainable heating of residential areas and offices
- Water based heat transport
- Approx. 3 000 km under ground piping
- +10 000 buildings connected (95% in central Stockholm)
- 12 TWh/y heat supply



Our pilots – Bahnhof Pionen



1

2 Carrier 30XWH 802-HT heat pumps connected in series. Cooling capacity 690kW, heating capacity 975kW

2

Data center with cooling coils

3

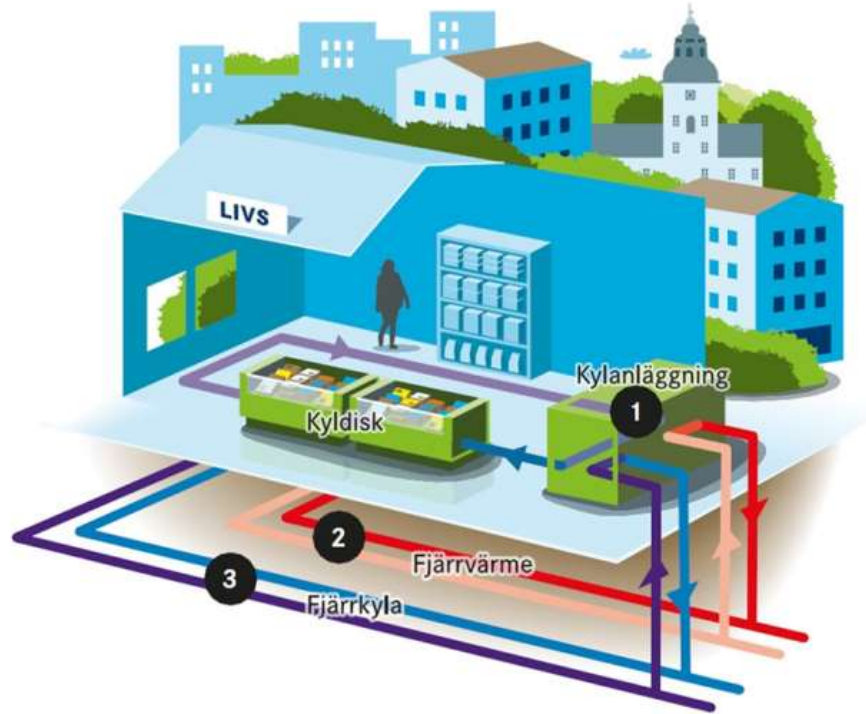
Cooling machine with cooling tower (back up system)

4

Heat delivered to the district heating network

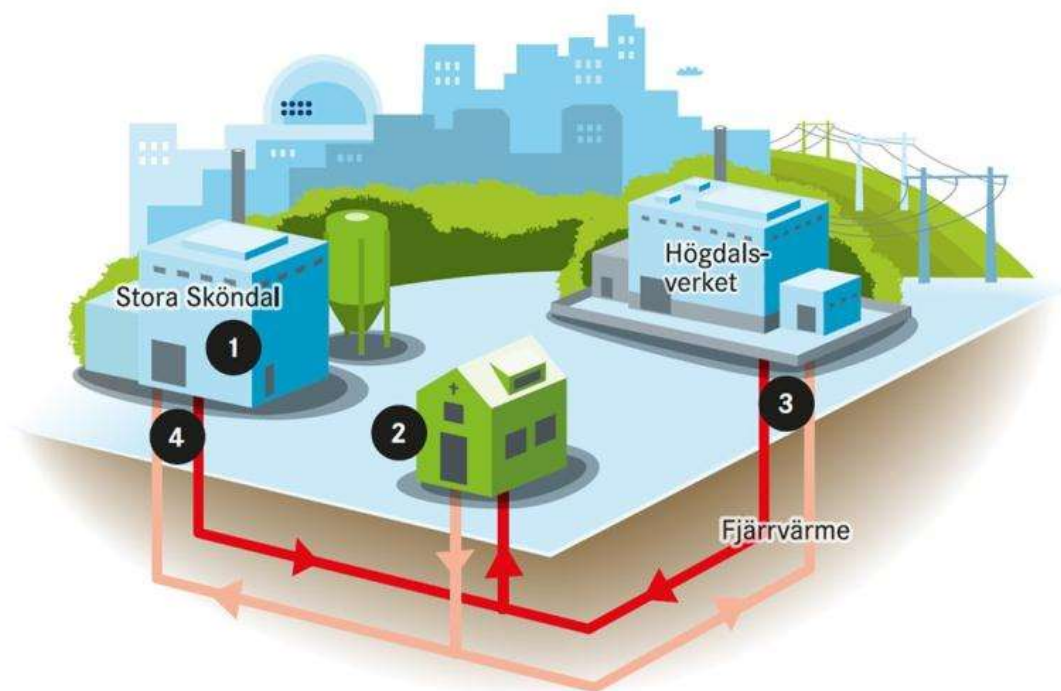


Our pilots – Coop Rådhuset



- 1** CO₂-based cooling system for refrigerated display cabinets and freezers
- 2** High temperature excess heat recovered to the district heating network, approx. 30kW
- 3** Low temperature excess heat recovered to the district cooling network, approx. 30kW

Our pilots – Stora Sköndal

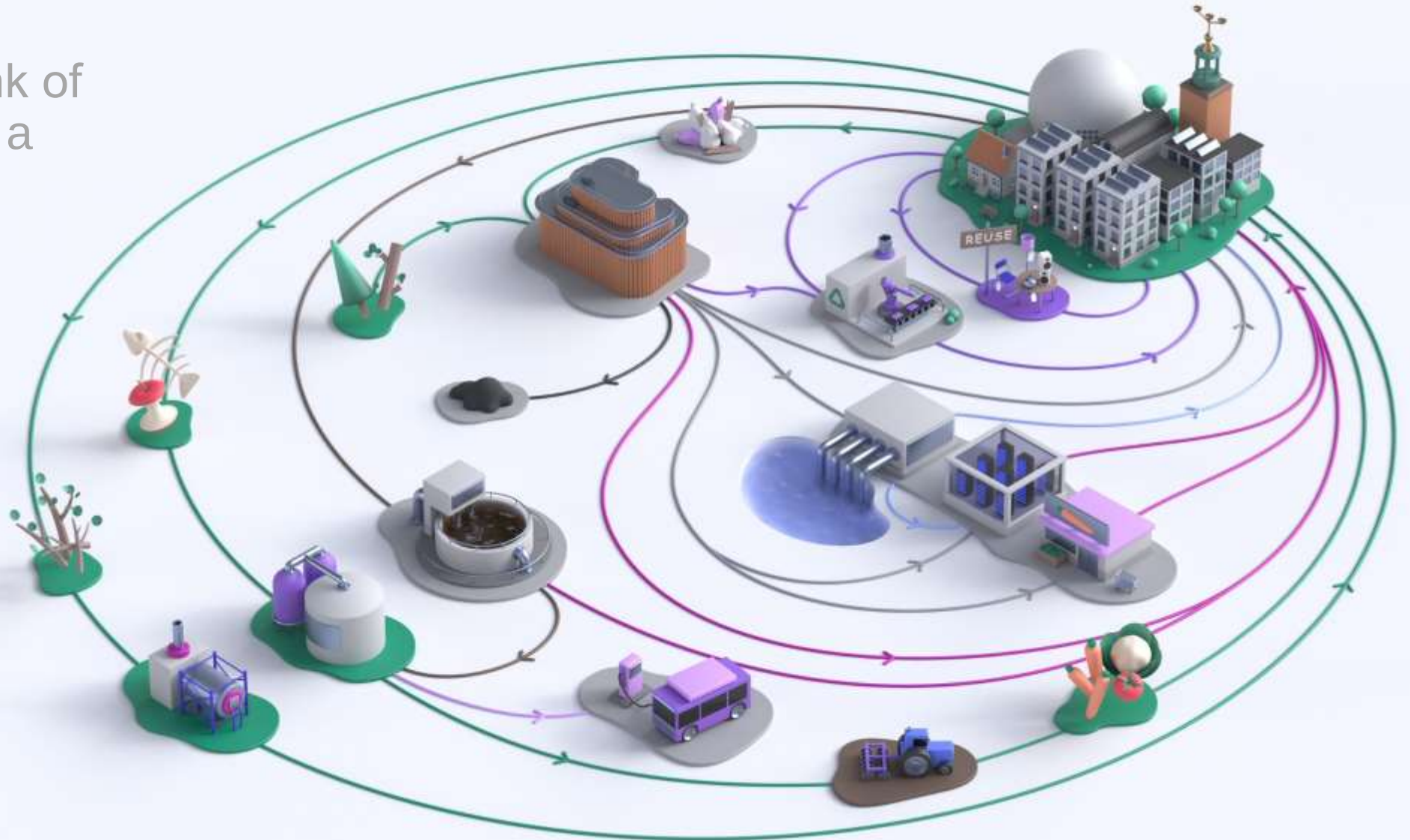


- 1** Stora Sköndal owns two pellet boilers, 2*2,5MW
- 2** The residential area of Stora Sköndal is connected to Exergi's district heating network and Stora Sköndal's internal heating network.
- 3** Exergi sells heat to Stora Sköndal during the warm season
- 4** Stora Sköndal operates their plant during the cold season, and sells surplus heating capacity to Stockholm Exergi



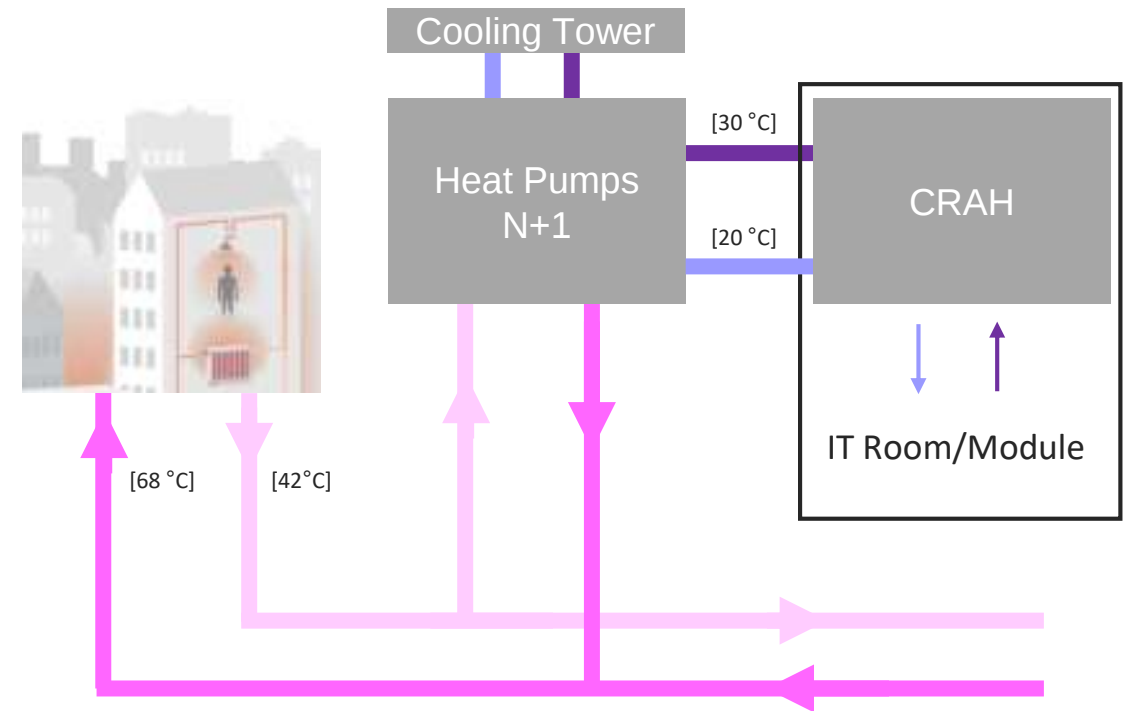
Stockholm – A Circular City

It's time to think of
waste heat as a
resource



Considerations for successful heat recovery

- A huge heat sink
- Capability to transport the energy
- Supplier sites in vicinity of district heating network
 - The larger the heat load the closer to a production site (high-capacity distribution)
- Cooling temperature and delta T
 - Increased densities and Liquid cooling will increase profitability
- District heating temperature
 - Evolution of district heating will increase profitability
- Alternative cost of heat
- Types of alternative heat production
- Access to renewable electricity



Example: data center

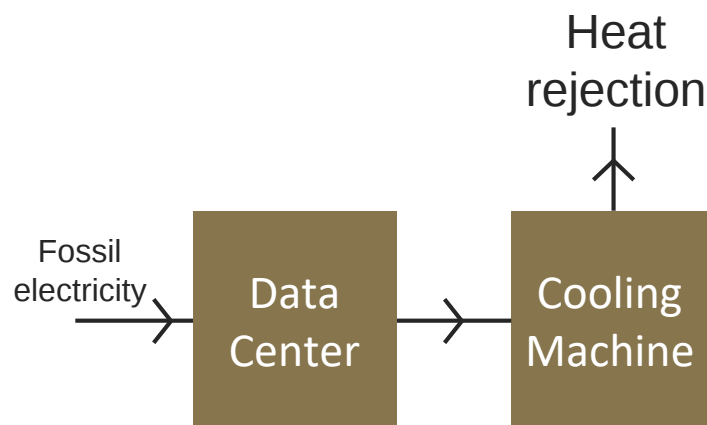


STOCKHOLM DATA PARKS

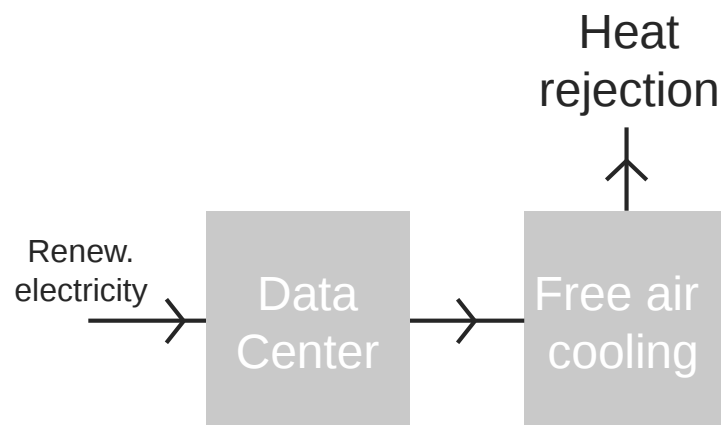
GREEN COMPUTING REDEFINED

Green computing redefined

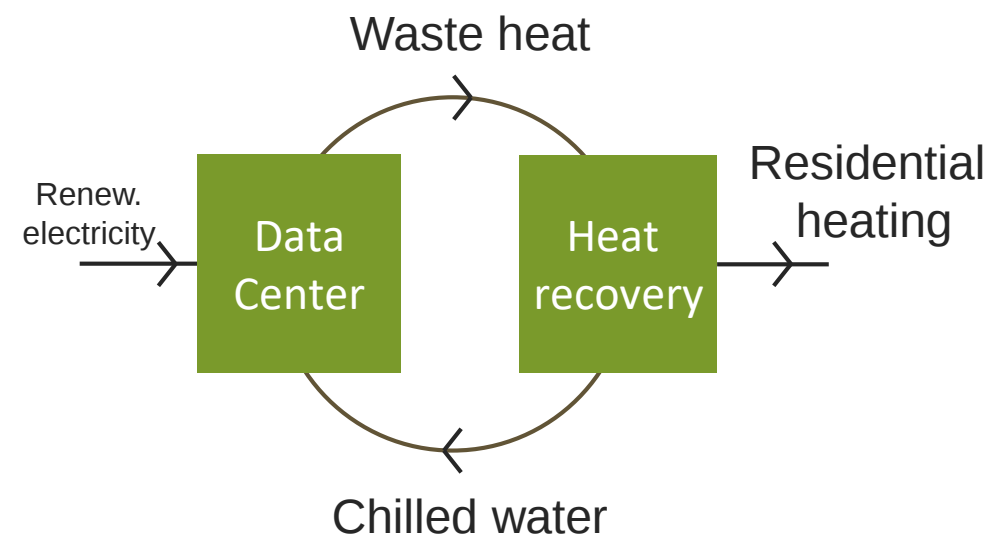
From Brown....



To Grey....



To Green



Stockholm Data Parks



We aim to be able to source 10% of our customer demand from recovered data center heat



Erik Rylander

Head of Stockholm Data Parks

Stockholm Exergi

+46 70 693 51 84

erik.rylander@stockholmexergi.se

erik.rylander@stockholmexergi.se

Don't waste your energy!

stockholmexergi.se

stockholmdataparks.com