

“Heat Pumps and Heat Recovery from Engie Refrigeration”

M Consult 26.03.2026



EINGESCHRÄNKT



INTERN



GEHEIM



Agenda

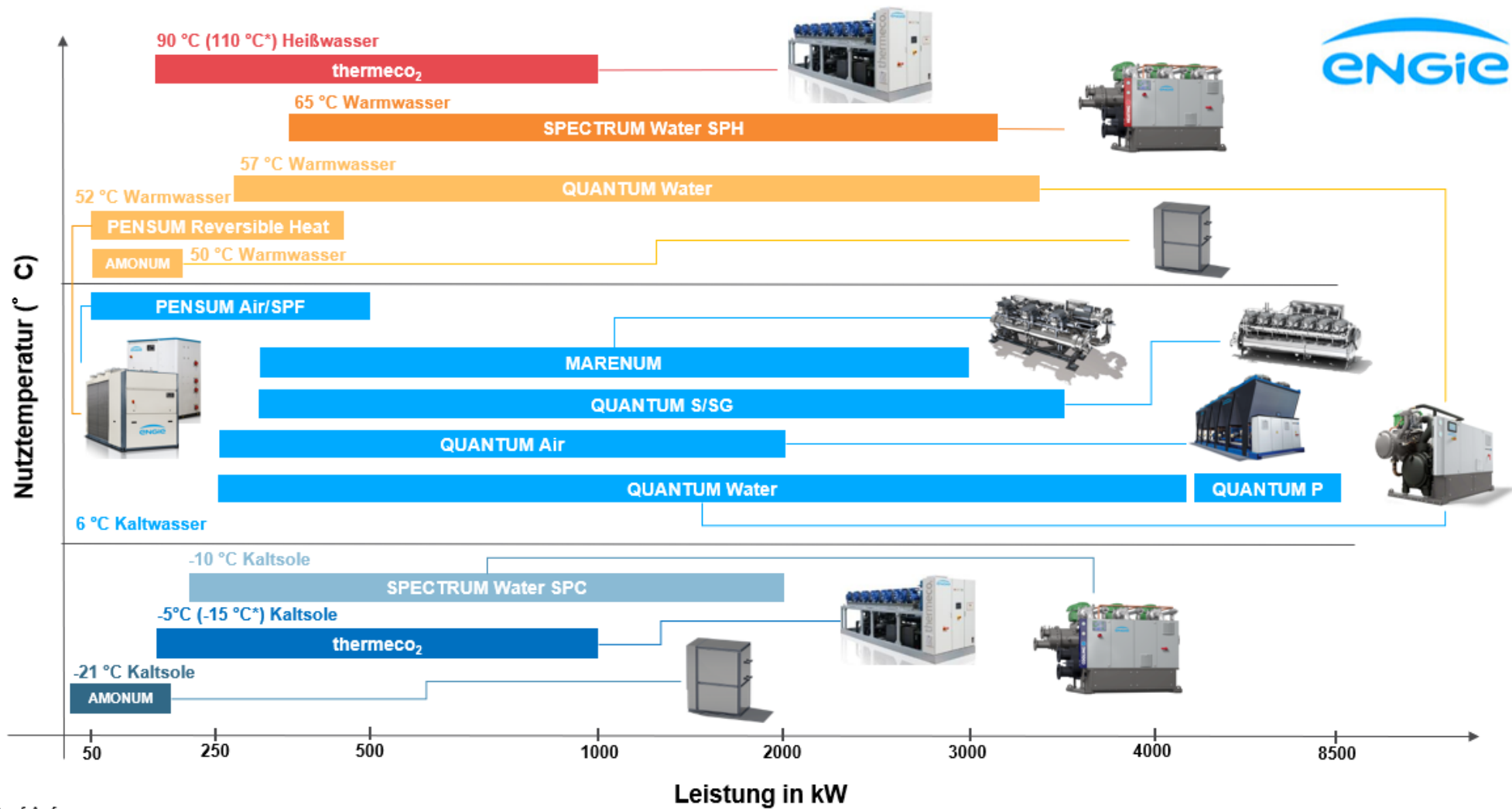
- 01** Portfolio and limits of use
- 02** Heat recovery
- 03** Application examples and ideas
- 04** References



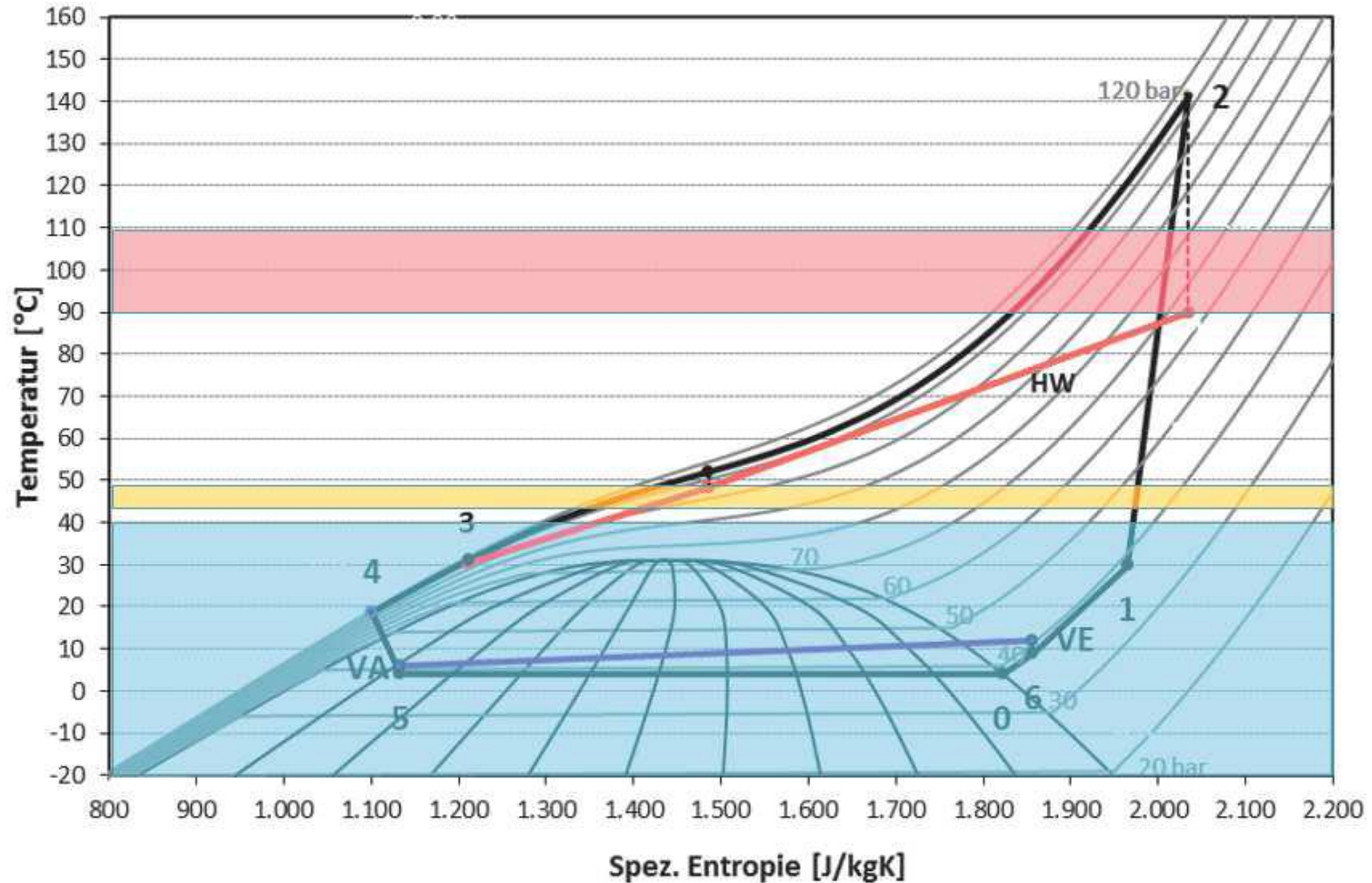
01

Portfolio and limits of use

Portfolio



Operating conditions for R744 (CO₂)

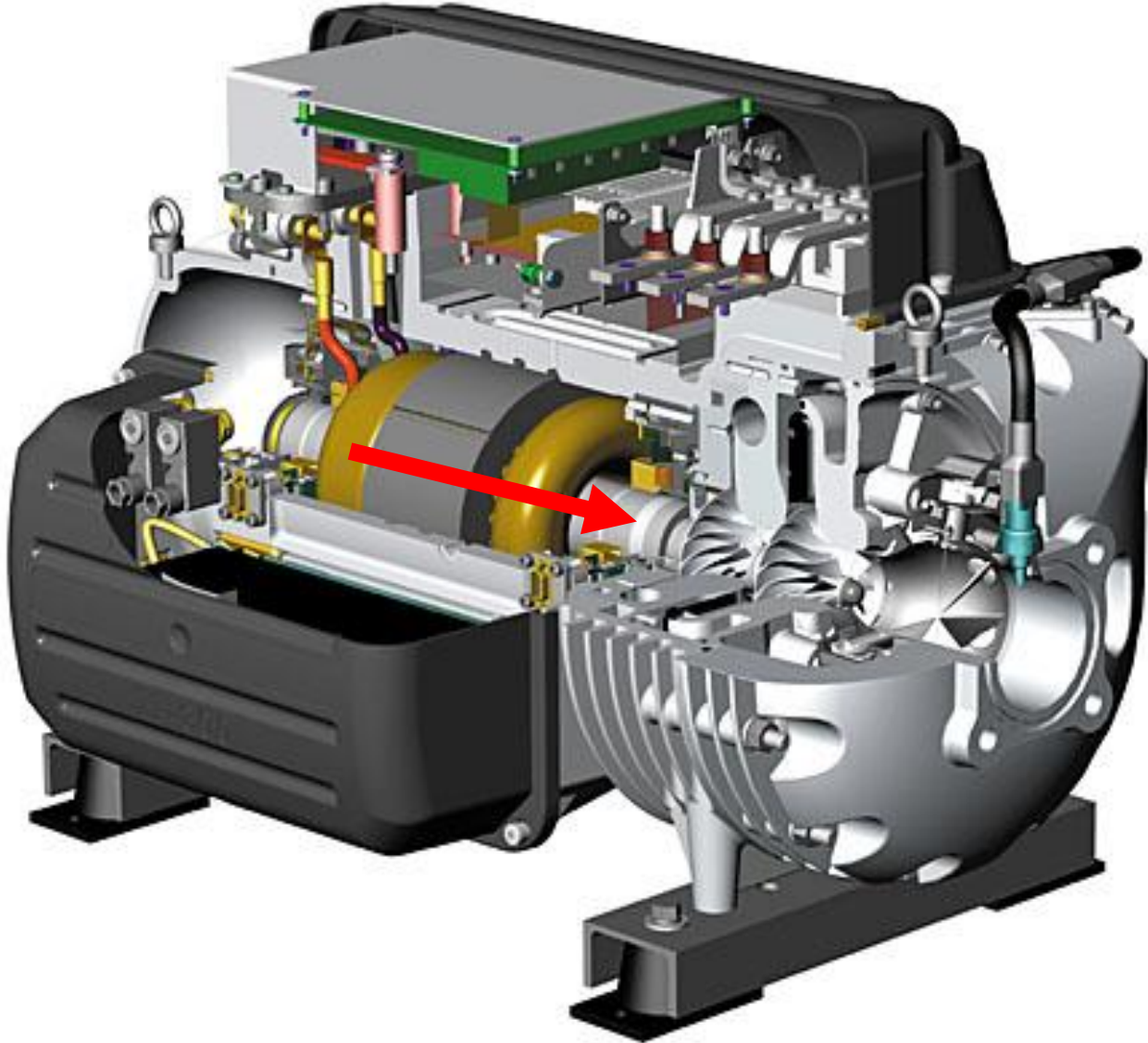


Quantum & Spectrum

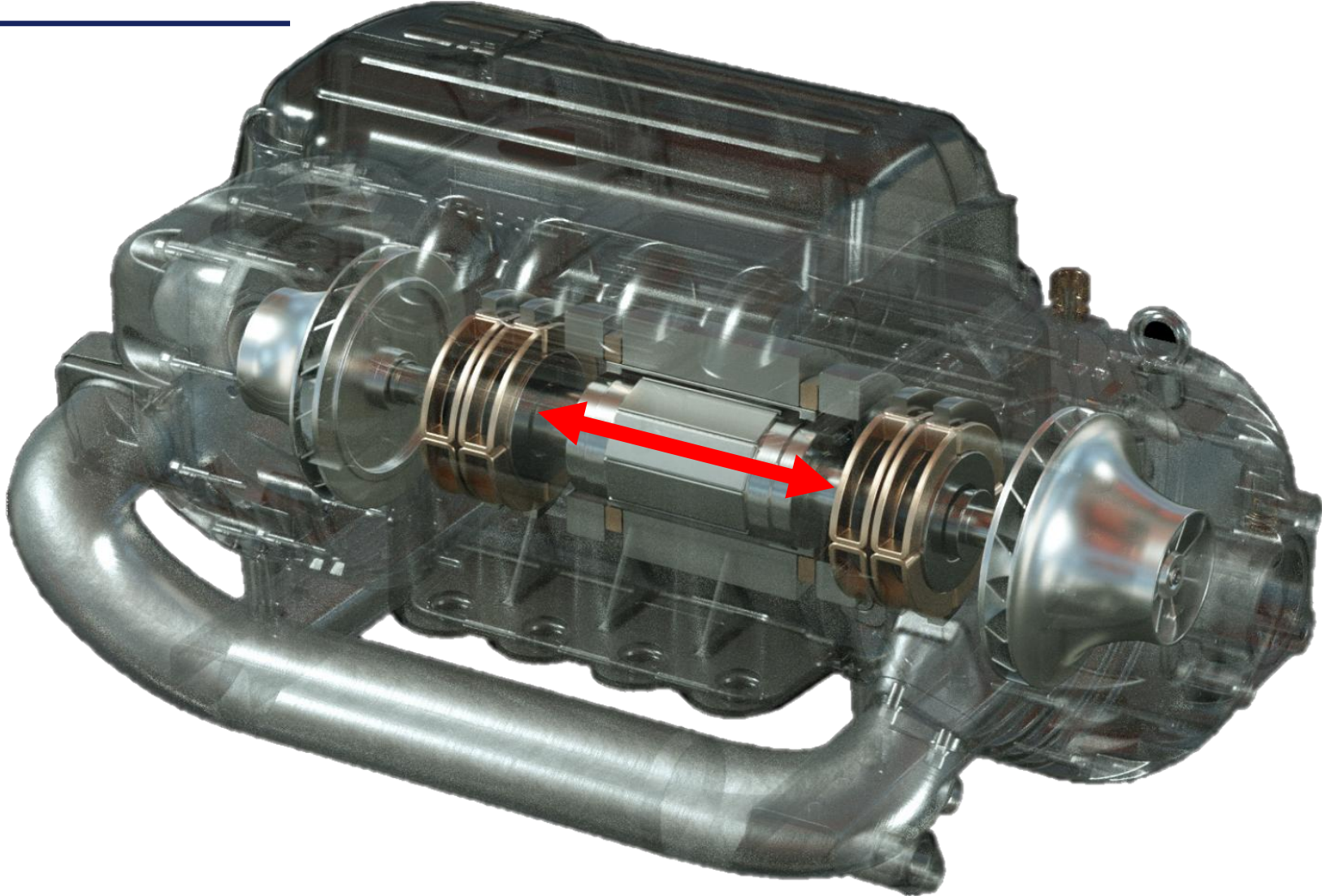


- ★ Magnetic bearings (oil-free system)
- ★ Starting current < 5A
- ★ On-board frequency converter (FU)
- ★ Closed refrigerant circuit

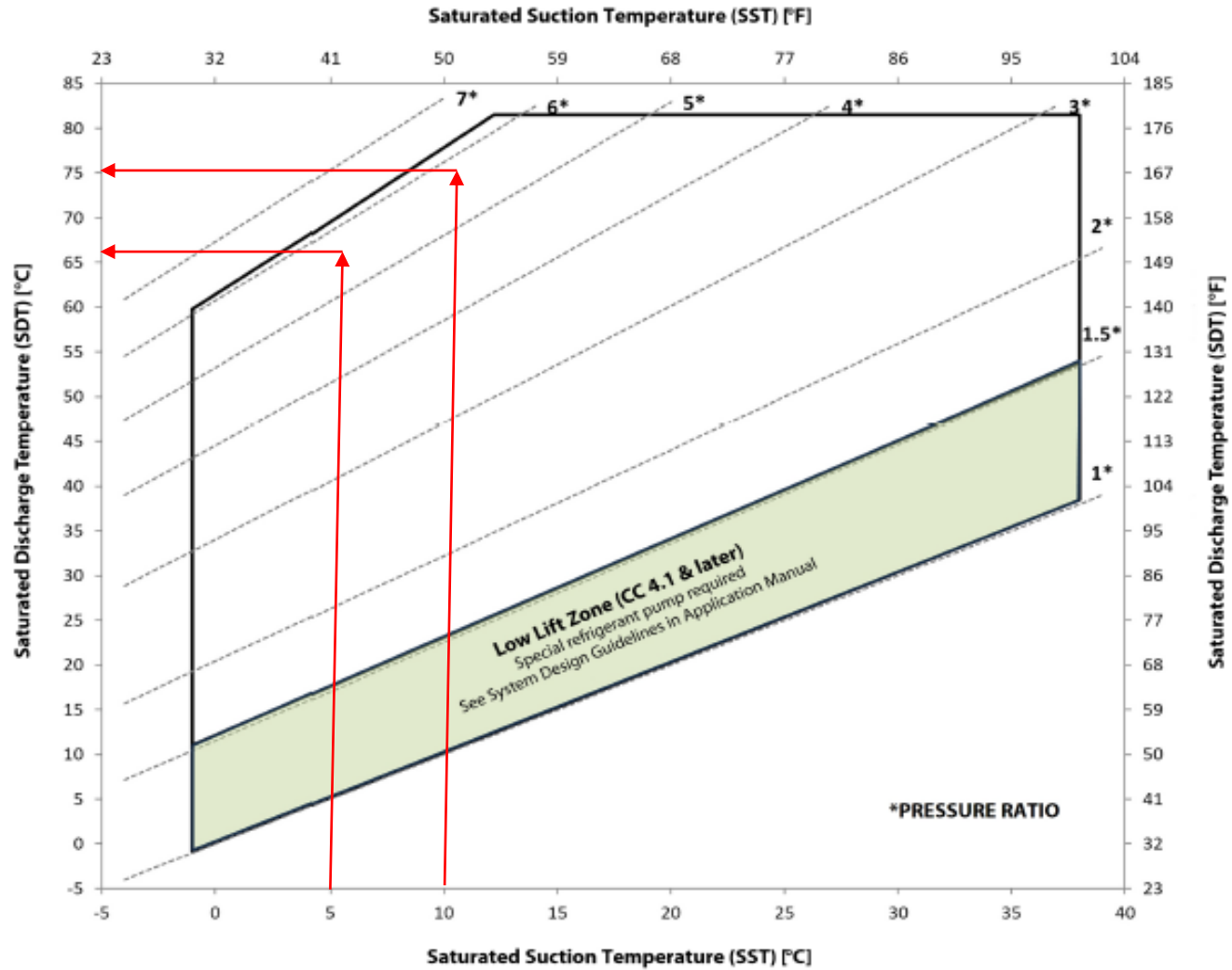
TGS Compressor



TGH Compressor



Operating Envelope

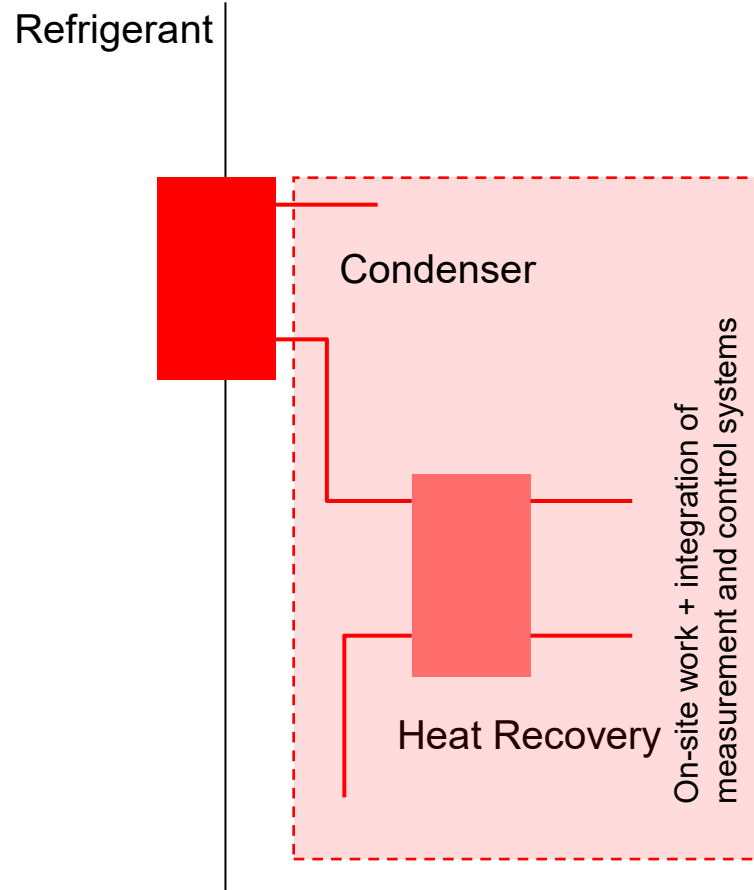




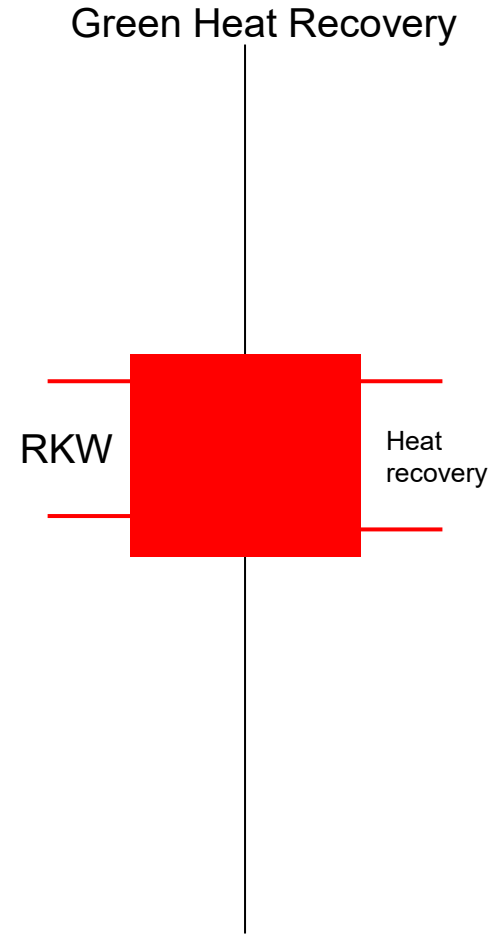
02

Heat Recovery

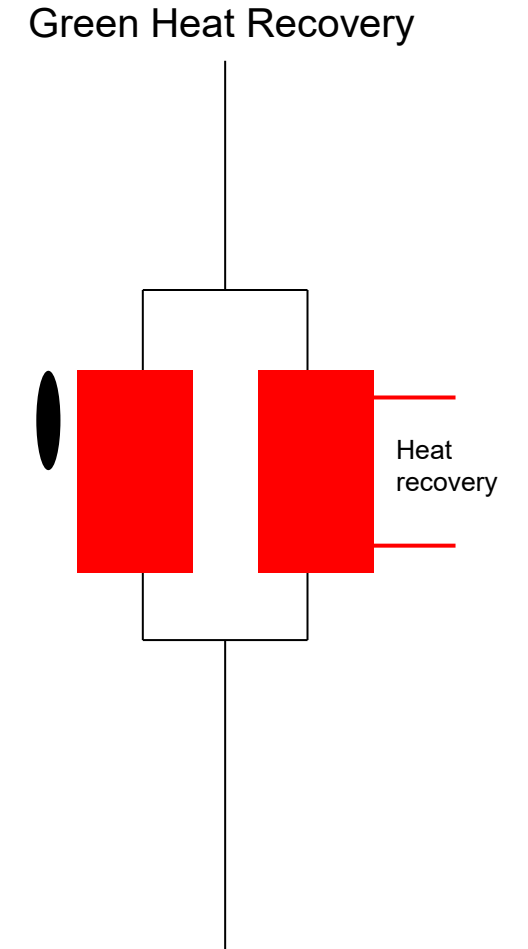
The new approach to heat recovery



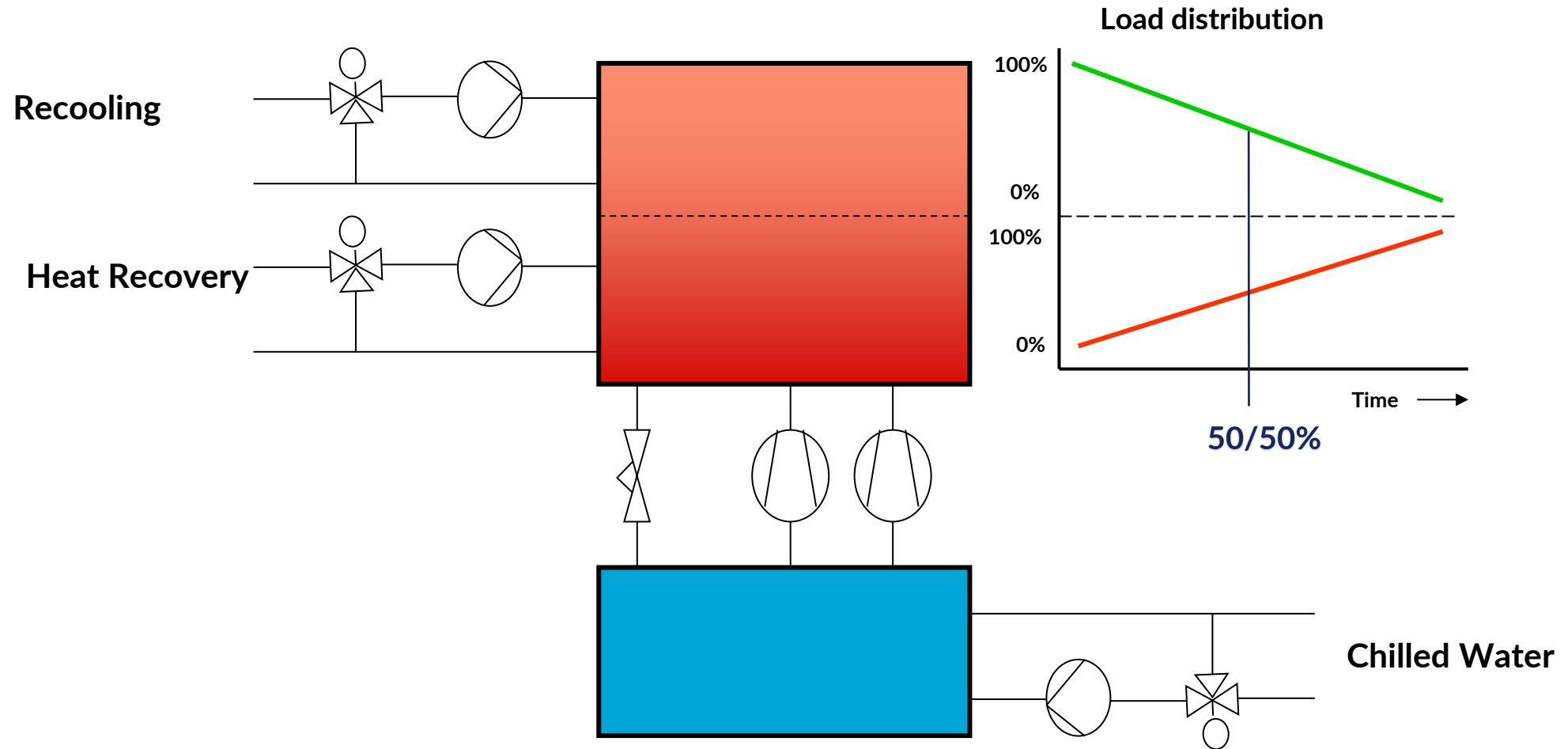
4 Kelvin heat transfer



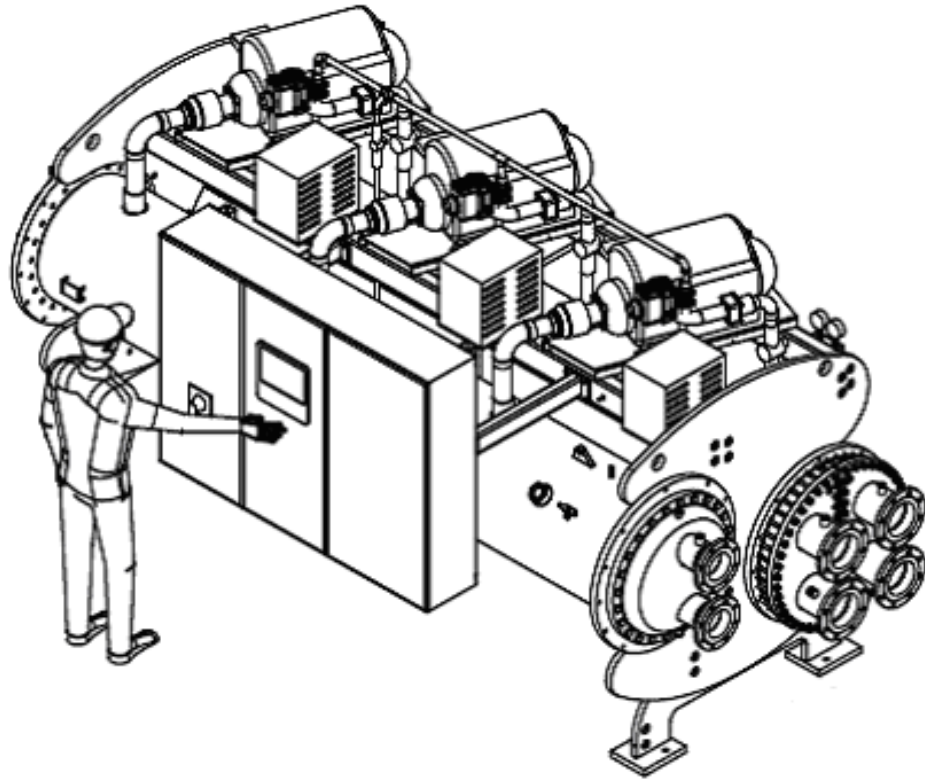
2 Kelvin heat transfer



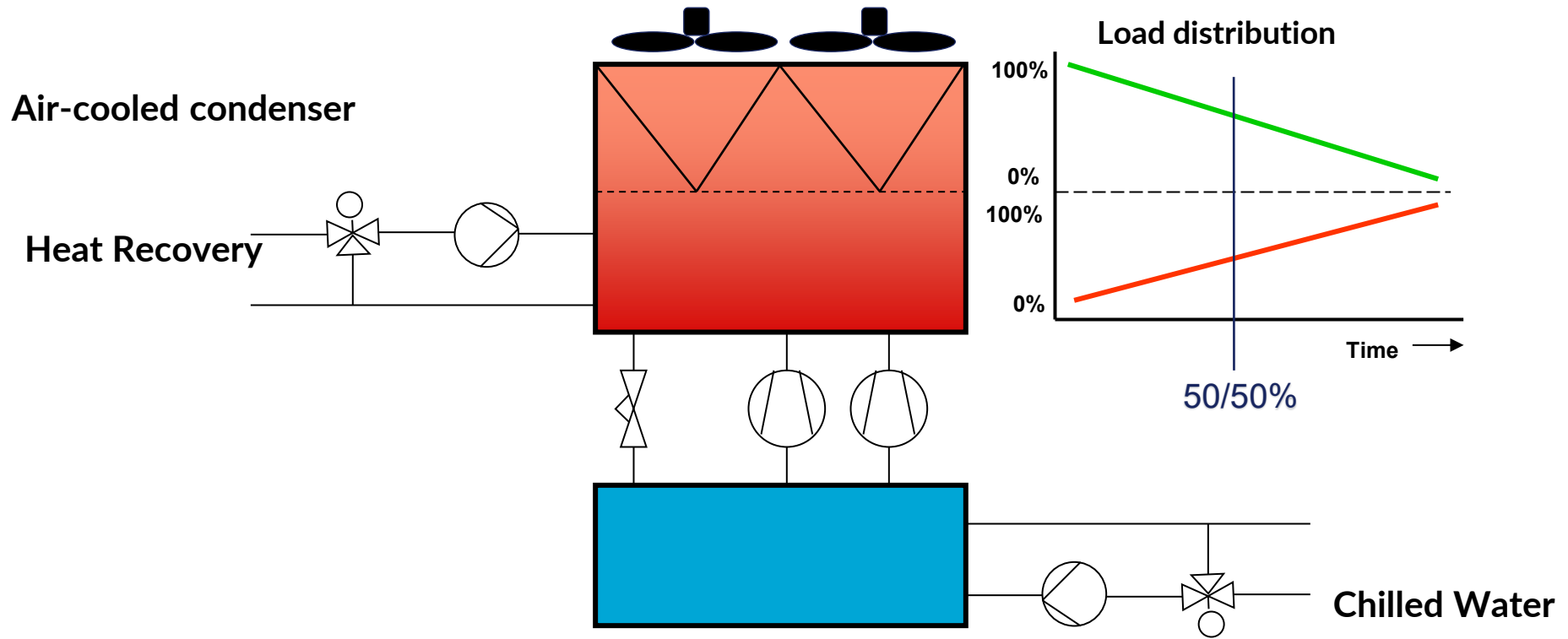
Green Heat Recovery



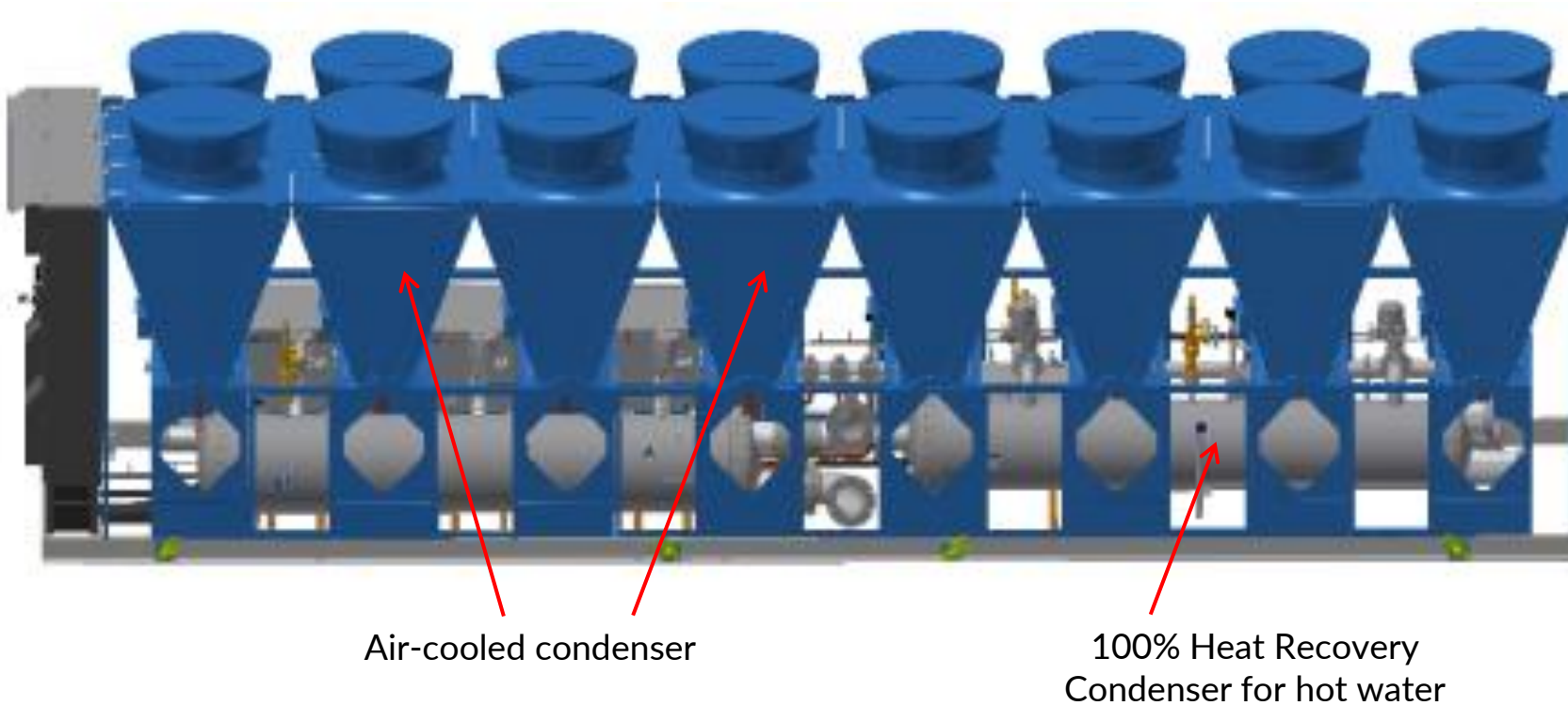
Quantum Water



Quantum Air with 'Green Heat Recovery'



Quantum Air with “Green Heat Recovery”

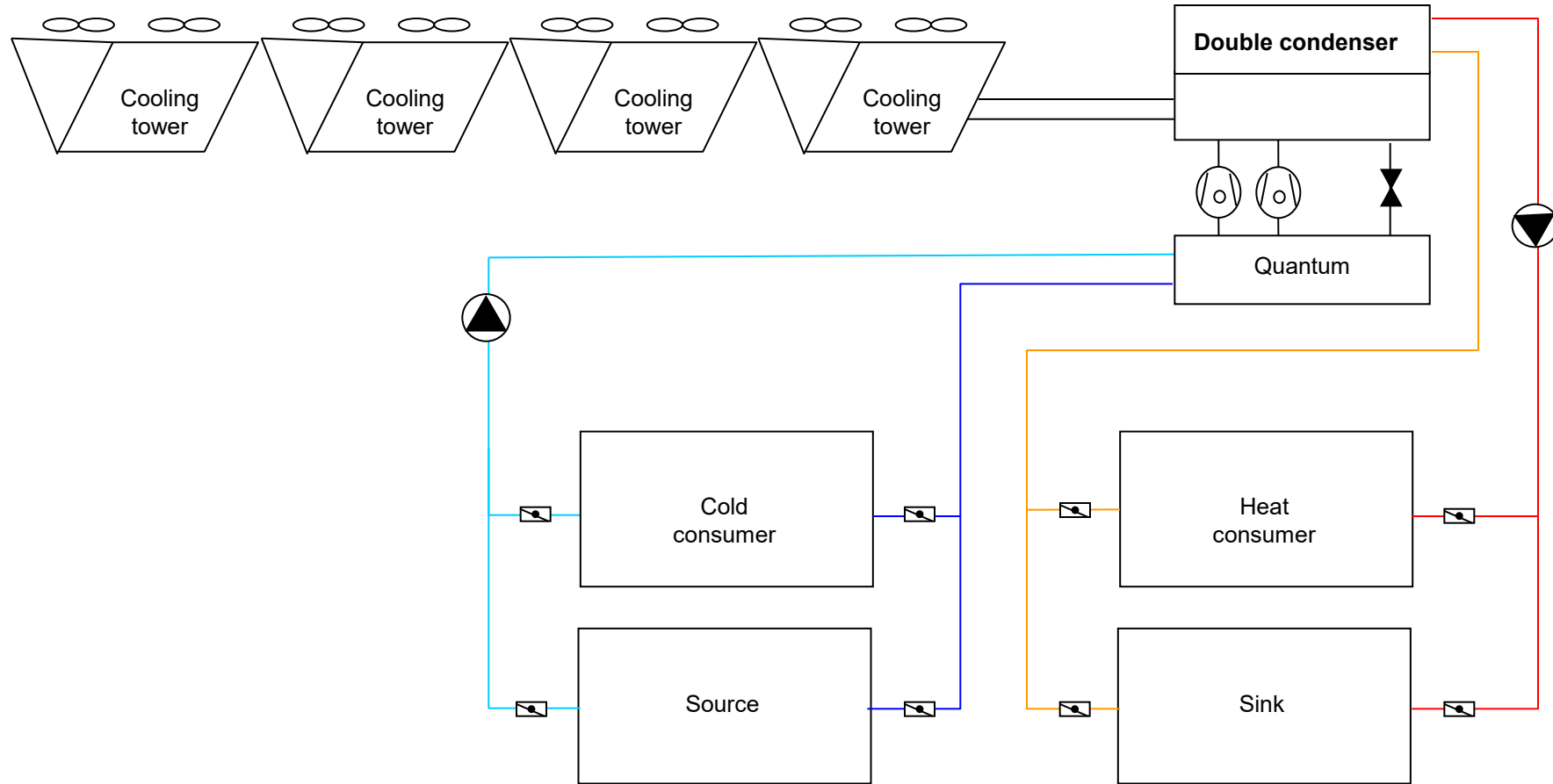




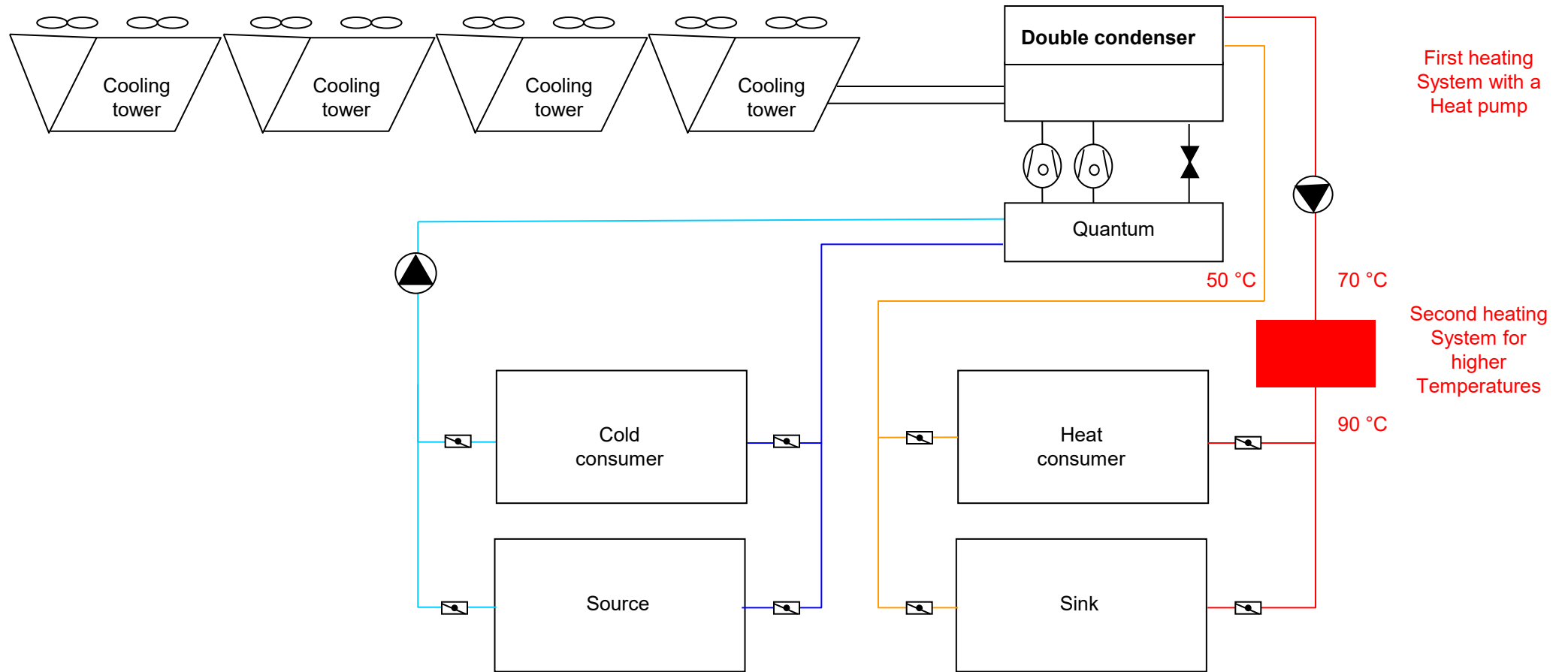
03

Application examples and ideas

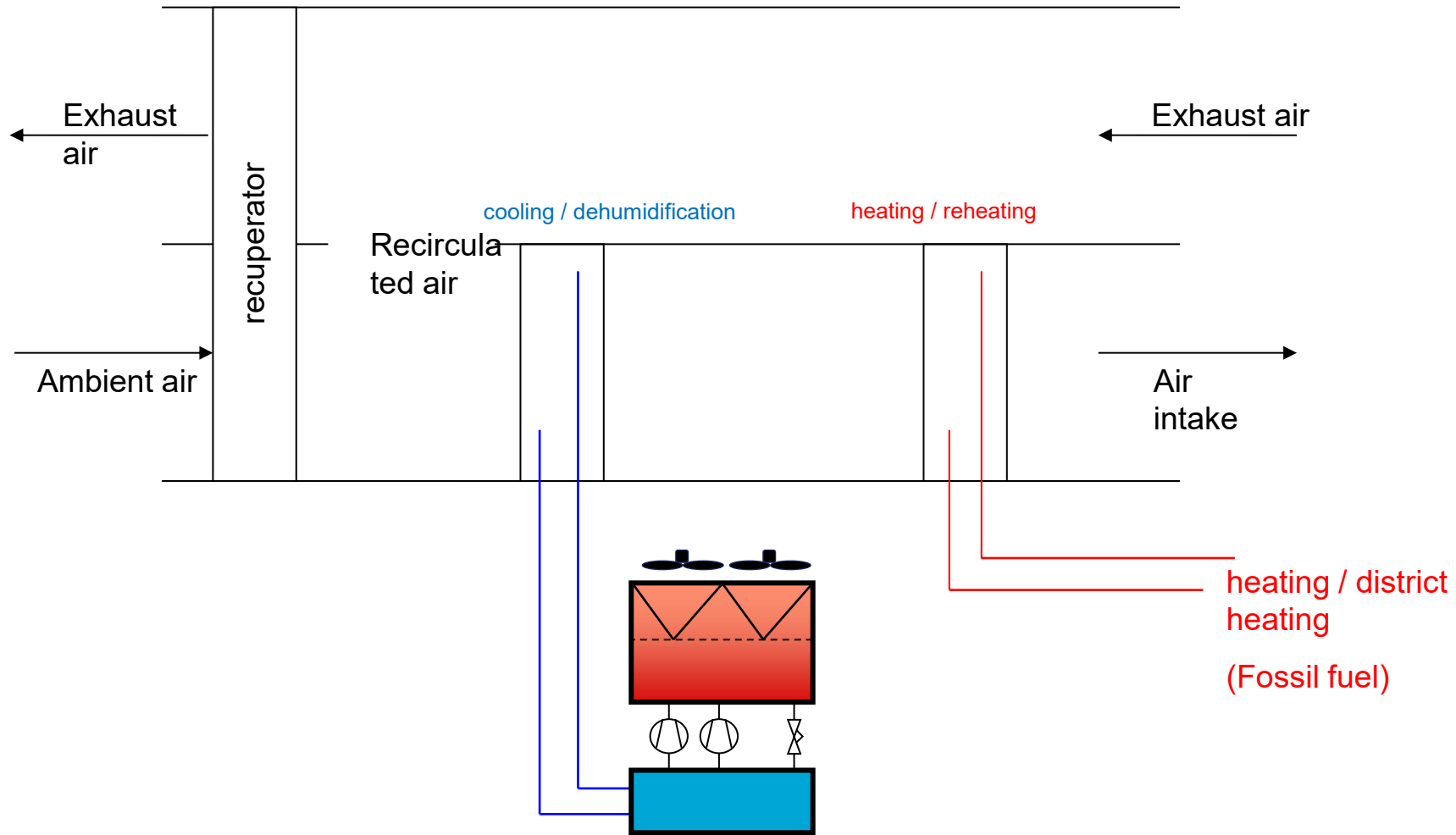
Quantum Air with “Green Heat Recovery”



Quantum Air with "Green Heat Recovery"

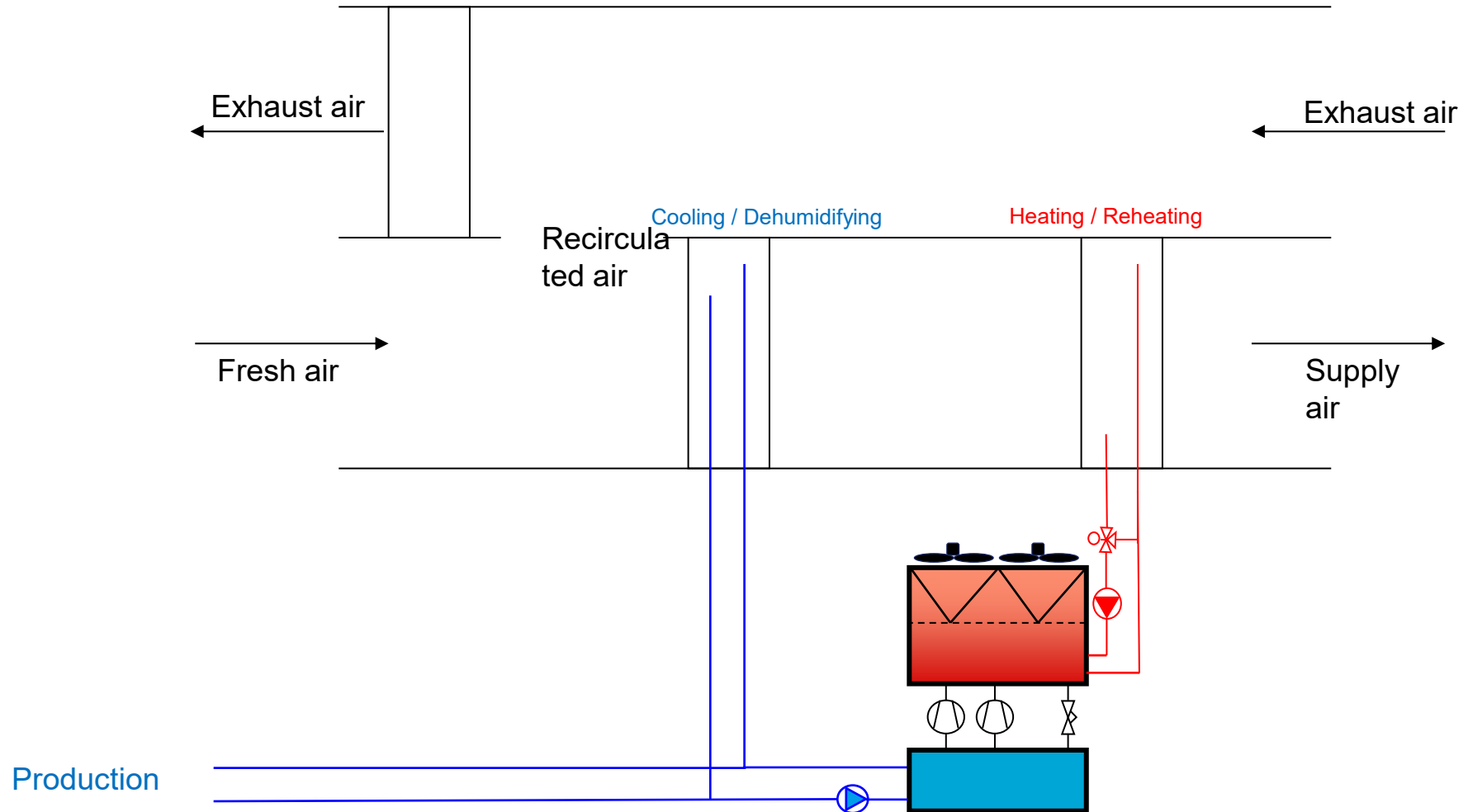


Traditional ventilation system: 'Waste heat + fossil fuel heating'

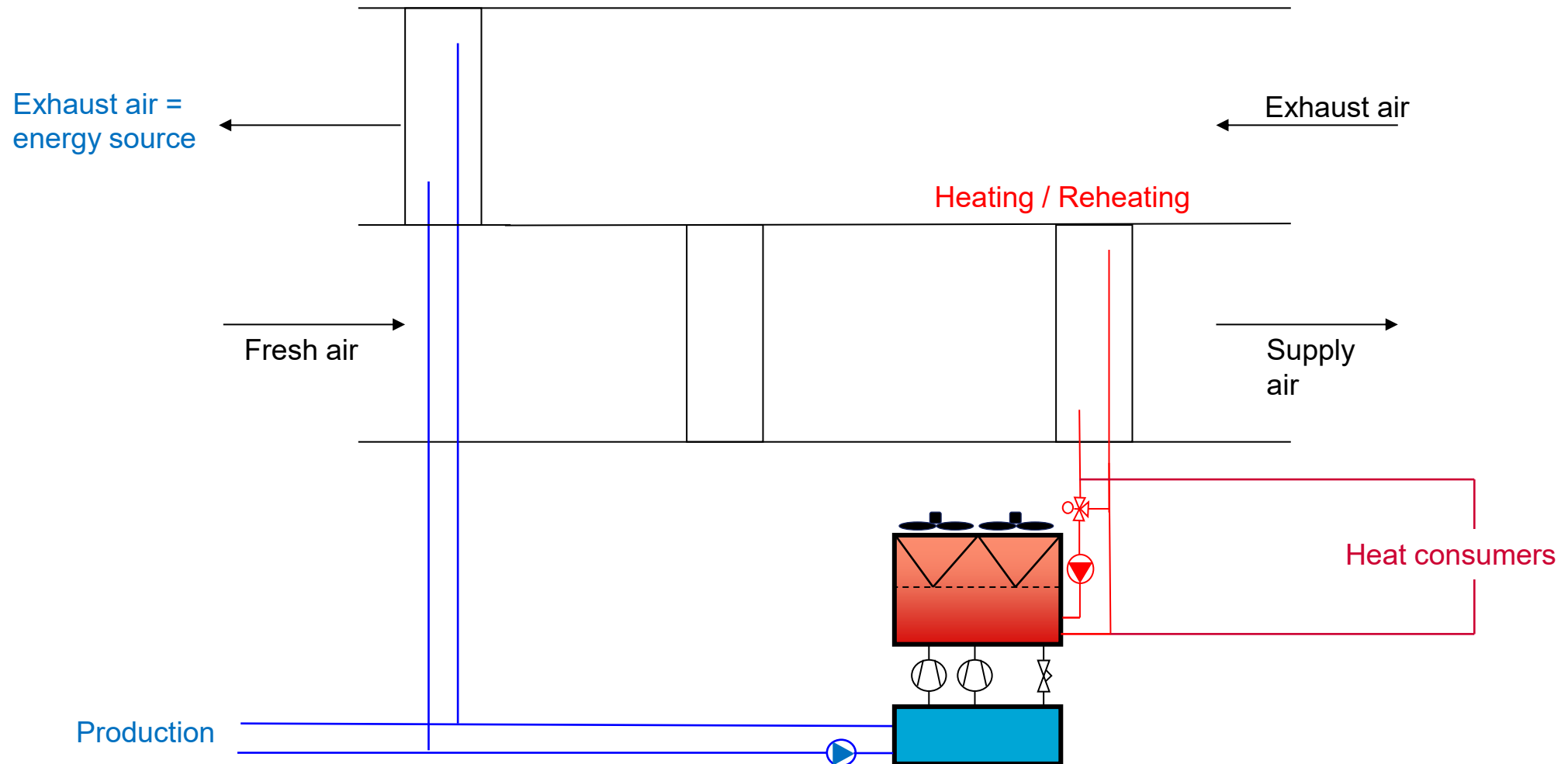


Discharge energy via the return cooler

Ventilation system with heat recovery



Modern and highly efficient ventilation system: 'Exhaust air = source'





04

References



AUTOMOBILE MANUFACTURER & AUTOMOTIVE INDUSTRY

ENGIE Refrigeration supplies geothermal heating system with QUANTUM heat pumps for Daimler AG in Rastatt.

- Heating from waste heat of the production process and from geothermal energy
- Savings of 5 million kWh and 800 t carbon dioxide
- For geothermal energy 11 wells were drilled and 2.6 km of pipelines were laid
- The plant can thermally utilize 800,000 m³ of groundwater per year in a window of 6 to 20 °C

Conclusion:

High efficiency of heat pumps in monovalent operation above 5 (COP) and in bivalent operation above 10 (COP).



CHEMISTRY &

PHARMACEUTICAL INDUSTRY

The client is a leading global specialty chemicals company based in Singapore and focuses primarily on health, nutrition, resource efficiency and globalization..

Project description :

- 5 x QUANTUM chiller P550 with a total cooling capacity of 25 MW
- The first QUANTUM chillers with 10 compressors each
- The condensers are equipped with extremely high quality titanium tubes, as the recooling units use seawater

Advantages:

The high energy efficiency and the fact that the compressors do not emit any heat to the environment due to an integrated cooling system were the customer's main decision criteria.



MANUFACTURING

INDUSTRY


This innovation campus in Grenoble is one of the world's leading micro- and nanotechnology innovation centers.

Project description :

- 1 x QUANTUM chiller P440-E8G and 1 x QUANTUM chiller X135-E3E-HH with double condenser for heat recovery
- Total cooling capacity: 4.3 MW
- Set point: 4 °C
- QUANTUM P: EER = 5.35 (100%) up to 10.84 (part load)

Advantages:

Proven, reliable design with maximum energy efficiency were the decision criteria compared to conventional oil turbo chillers.

A close-up photograph of an AMD Ryzen processor mounted on a motherboard. The processor is white with 'AMD RYZEN' printed on it. The motherboard is dark with various components and text visible, including '3450 Gaming K4' and 'AMD CROSSFIRE TECHNOLOGY'.

MANUFACTURING INDUSTRY

Heat pumps as a substitute for fossil fuels for a manufacturing company in Regensburg

Project description:

- Three QUANTUM W2020 heat pumps with a total heat output of more than 6 MW.
- The three heat pumps replace fossil fuel heating systems and are also responsible for hot water production
- A factory acceptance test was carried out on one of the three QUANTUM Water before delivery
- The order also includes the commissioning and connection to the building management system of all three heat pumps.

Advantages:

The customer was able to convince himself of the compliance with EMC requirements (electro-magnetic compatibility) at the FAT.



DISTRICT HEATING

SPECTRUM Water makes Quartier in France future-proof and environmentally friendly.

- SPECTRUM SPH-W1080 with refrigerant R-1234ze for a quarter near Bordeaux airport
- 40,000 m² total building area (hotel, offices, etc.) in a completely green environment
- Highest environmental requirements (BREEAM)
- Monovalent feed into the heating network for building heating (winter) and building cooling (summer, combined with 2 x 1 MW QUANTUM Air)
- Heat source: geothermal energy. Regeneration of the geothermal system by using the waste heat when the heat pump is running in chiller mode.
 - 1,020 kW heat output at 14/6 °C | 45/55 °C (COP: 4.11)
 - 740 kW cooling capacity at 14/7 °C | 28/38 °C (EER: 4.38)
 - 450 kW cooling capacity at 14/7 °C | 14/20 °C (EER: 8.78) (REG)
 - SCOP (55 °C): 6.11 SEER (7 °C): 8.26



DISTRICT COOLING

District cooling for the Paris Opera and surrounding area.

Project description :

- Total cooling capacity: 25 MW
- Set point: 2 °C (no glycol)
- EER: 4.2 (100 %) up to 9.4 (part load)
- COOLCARE for remote access to the chillers
- For transport, the control cabinet and container were disassembled and reassembled on site

Advantages:

The QUANTUM P's compact and customized design, high energy efficiency and superior operational reliability were the most important decision criteria for the customer

ENERGY GENERATION

First geothermal district heating and cooling by seawater in France. Heating and cooling are supplied to end users in Marseille.

- 2 x QUANTUM chiller P455-E7I-78
- Total cooling capacity: 8 MW
- In the second construction phase, a total cooling capacity of 16 MW is planned
- Set point: 4 °C
- EER = 5.71 (100 %) up to 13.54 (part load)
- Due to recooling with seawater, a corrosion resistant design was necessary
- Automatic brush cleaning for condenser inner tubes
- COOLCARE for remote monitoring and maintenance
- For transport, the control cabinet had to be disassembled and reassembled only on site

Advantages:

The high energy efficiency and simplified maintenance were the most important decision criteria for the customer



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