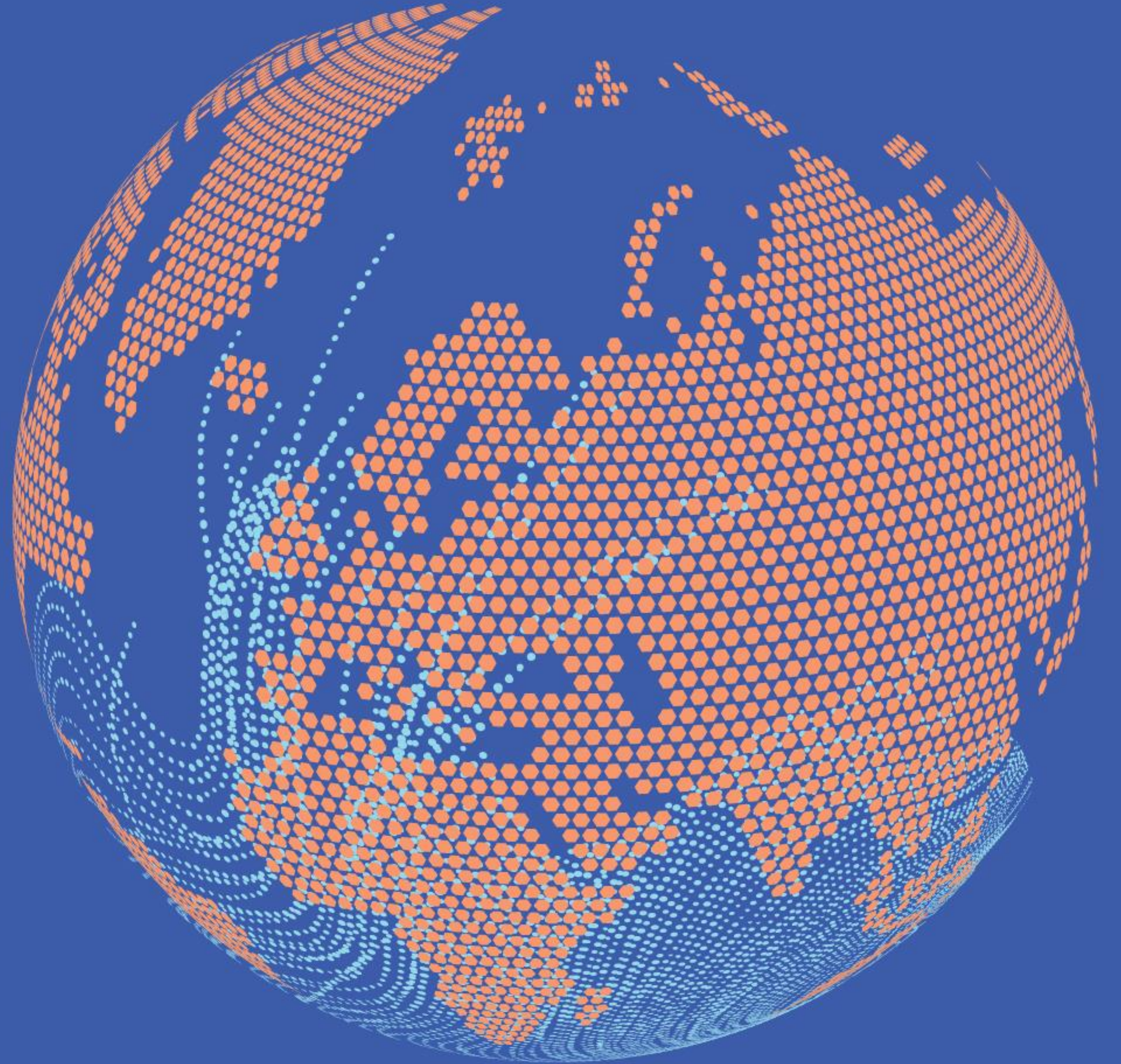




Business Case for
Natural Refrigerants



28-29 SEPT. 2021
ONLINE



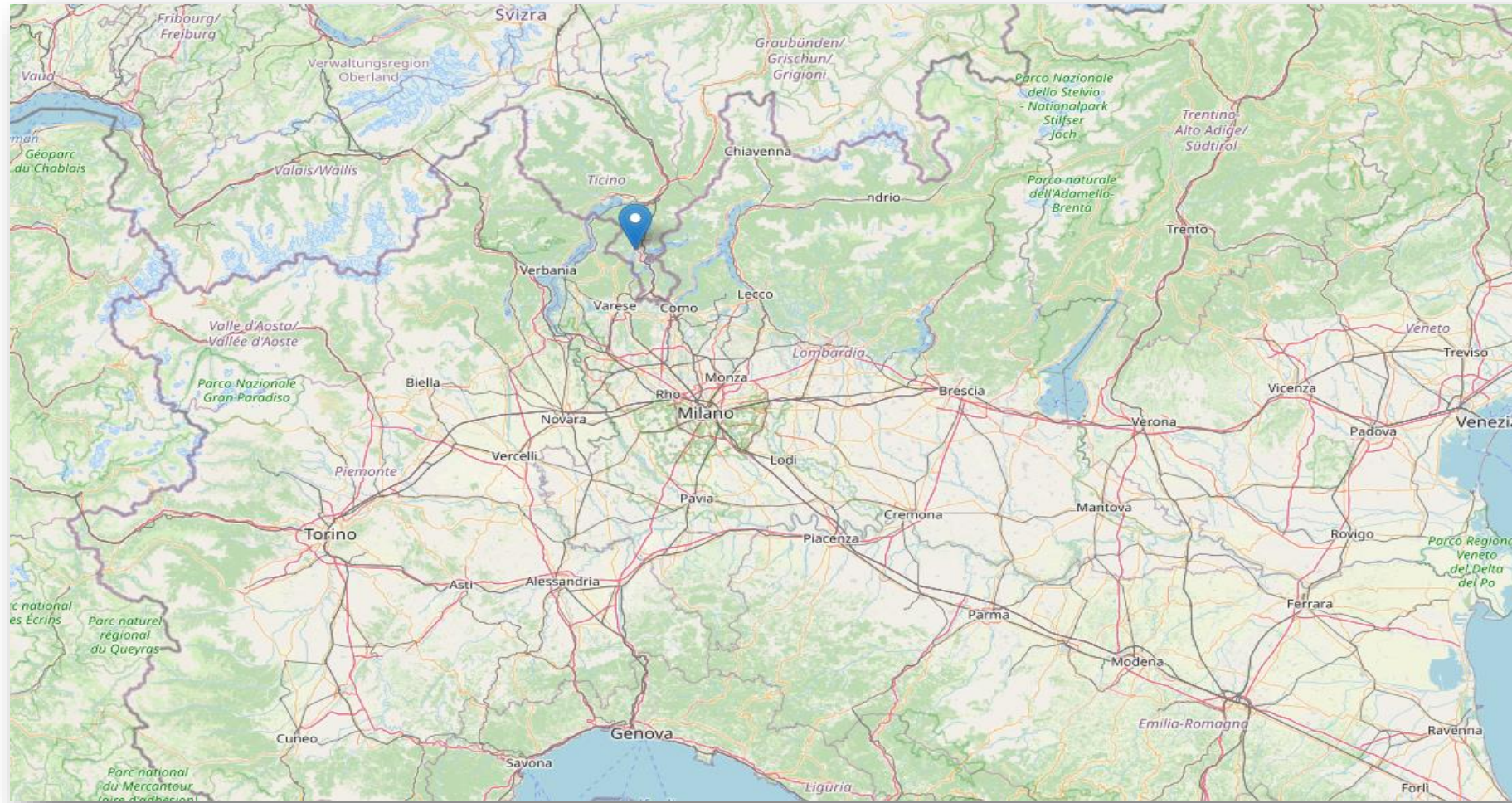
**Swiss shopping mall implements 600 kW
*CO*₂ reversible heat pump/chiller**



MIGROS TICINO

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Background information



- The plant is located in **Agno**, close to the airport in Lugano, Switzerland
- The project started in 2020, with the design of the units and main additional devices

- The installation on site was done in March-April 2021
- Commissioning has been completed in June 2021



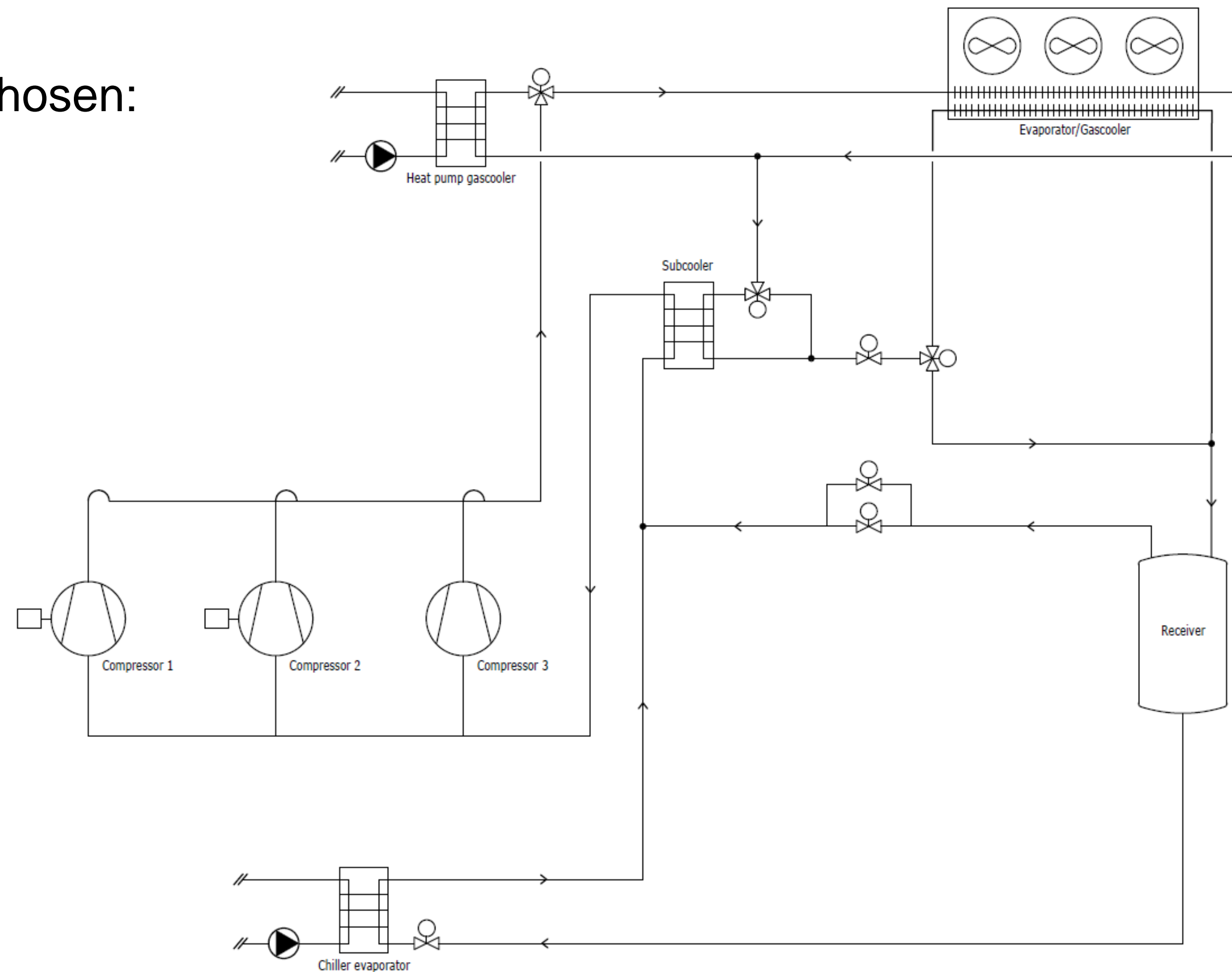
Goals of the project

- Replacement of 2 pcs. old burners for heating (capacity: 650 kW, **oil**)
- Replacement of old **HFC** cooling system (capacity: 434 kW, **R407C** with water cooling tower)
- Installation of unique system able to satisfy all the energy requirements
- Decrease the **GWP** of the installation
- Guarantee best thermohygrometric conditions in warm and cold seasons
- Improve efficiency and decrease energy consumption
- Making **Migros Agno** the first shopping mall in this region fed with **R744** reversible heat pump/chiller

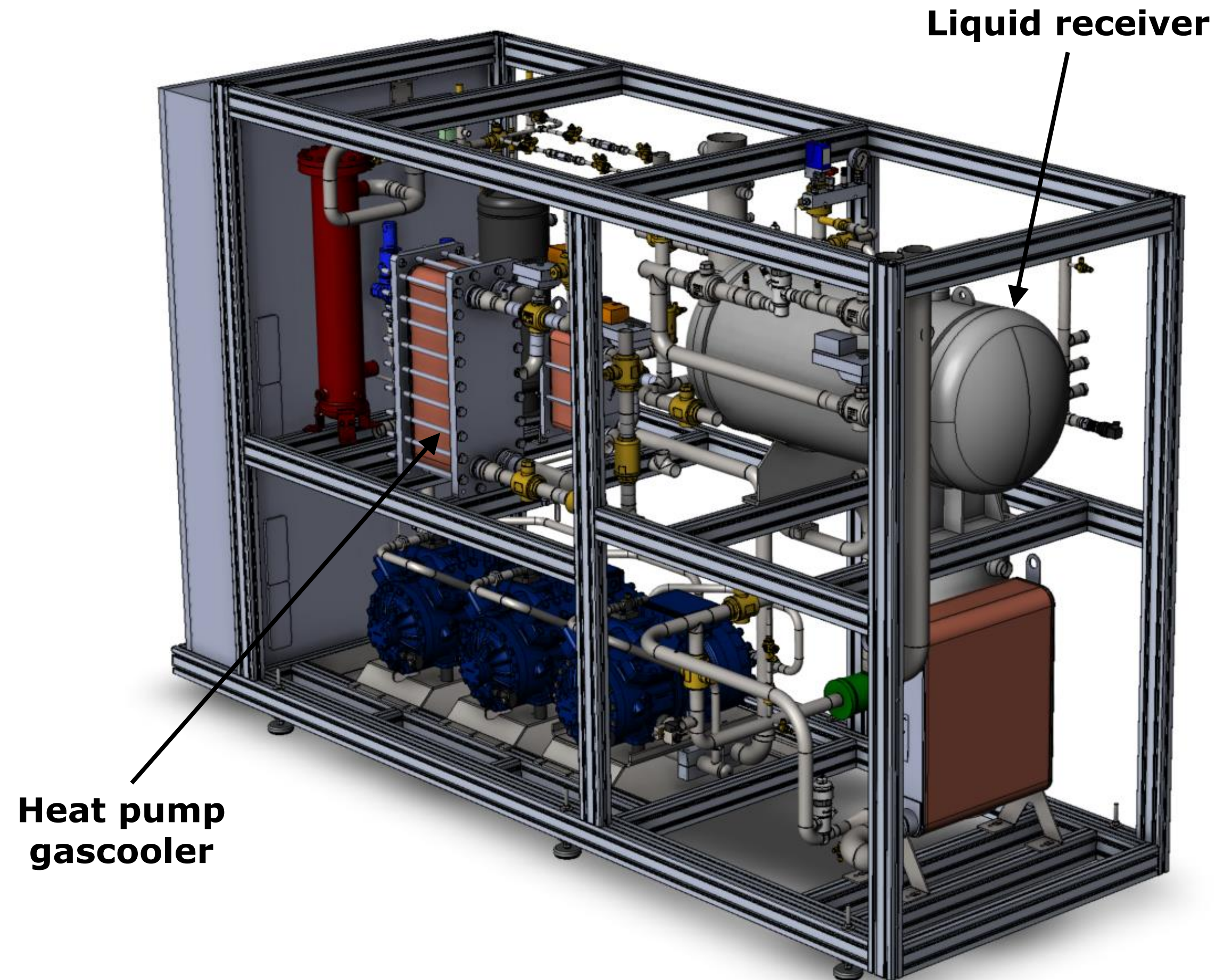
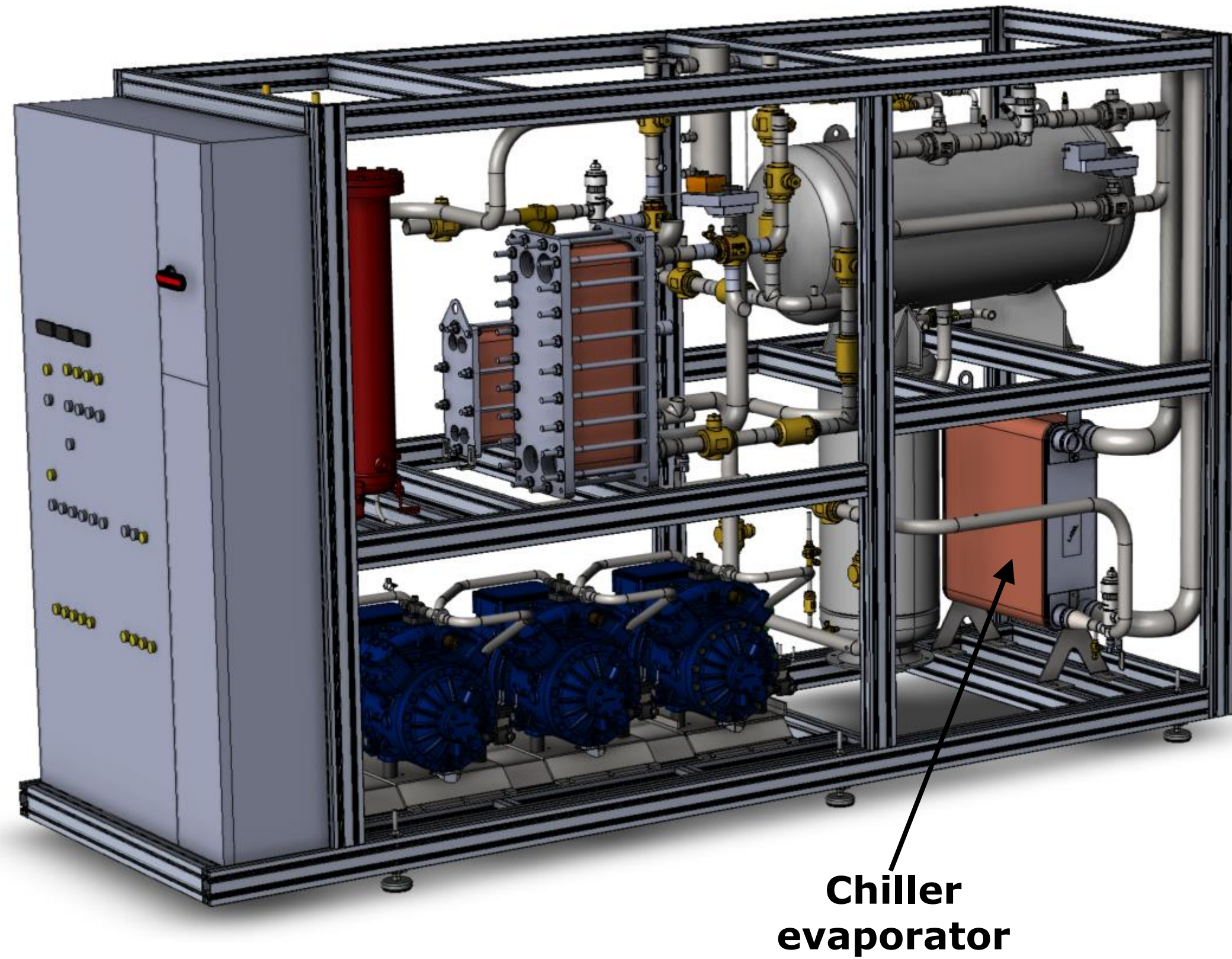


Design of the units

- Among several proposals, our solution was chosen:
2 pcs. **CO_2 reversible heat pump-chillers**
- Indoor installation with splitted gascooler/evaporators outside
- 3 pcs. *Dorin CD3501H* on each *Huurre* unit
- 2 pcs. frequency variator for each machine
- LP design 80 bar
- HP design 120 bar
- *Alfa Laval* plate exchangers for cooling and heating water
- Electrical box on board with *Eliwell by Schneider Electric* controllers

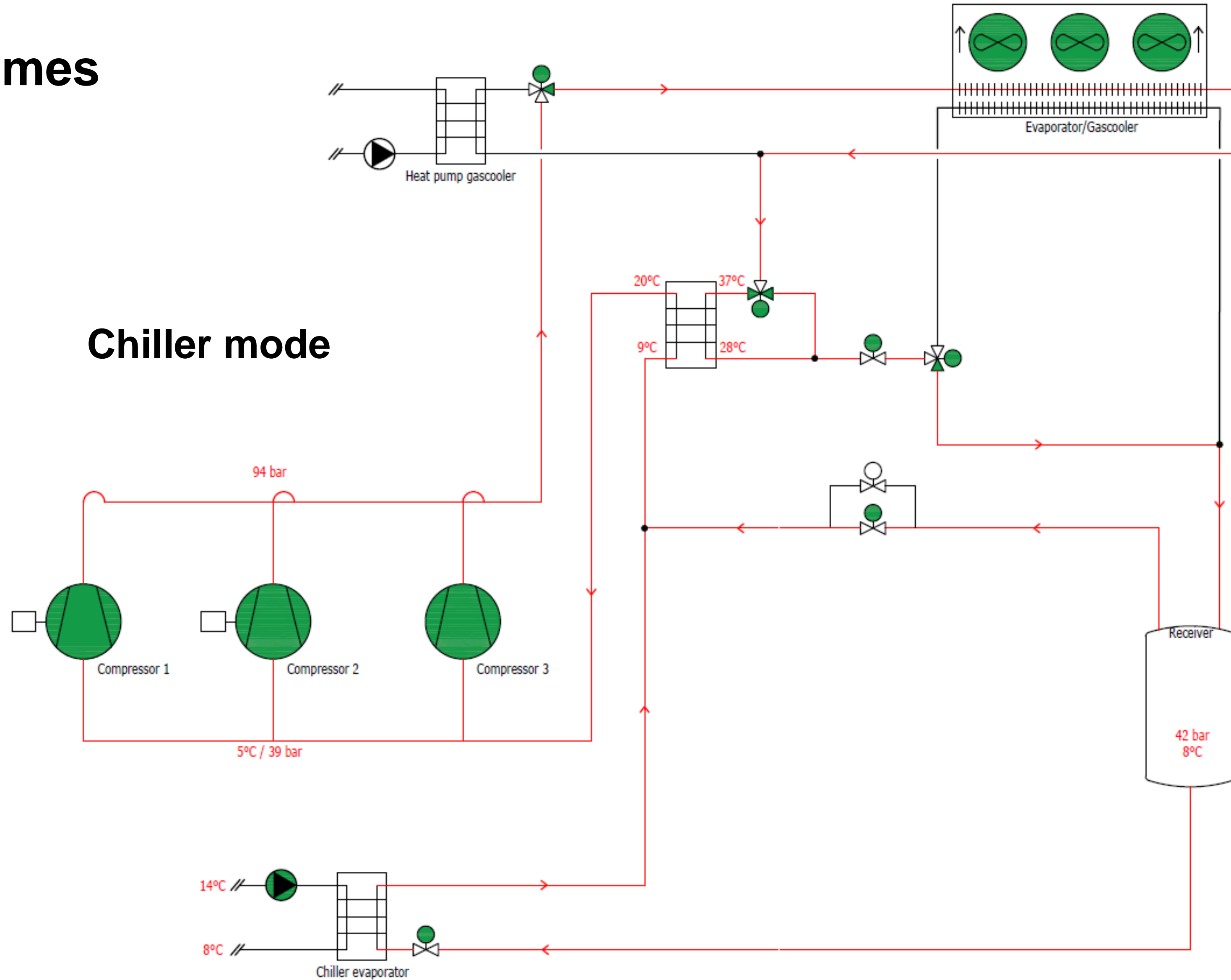


Design of the units



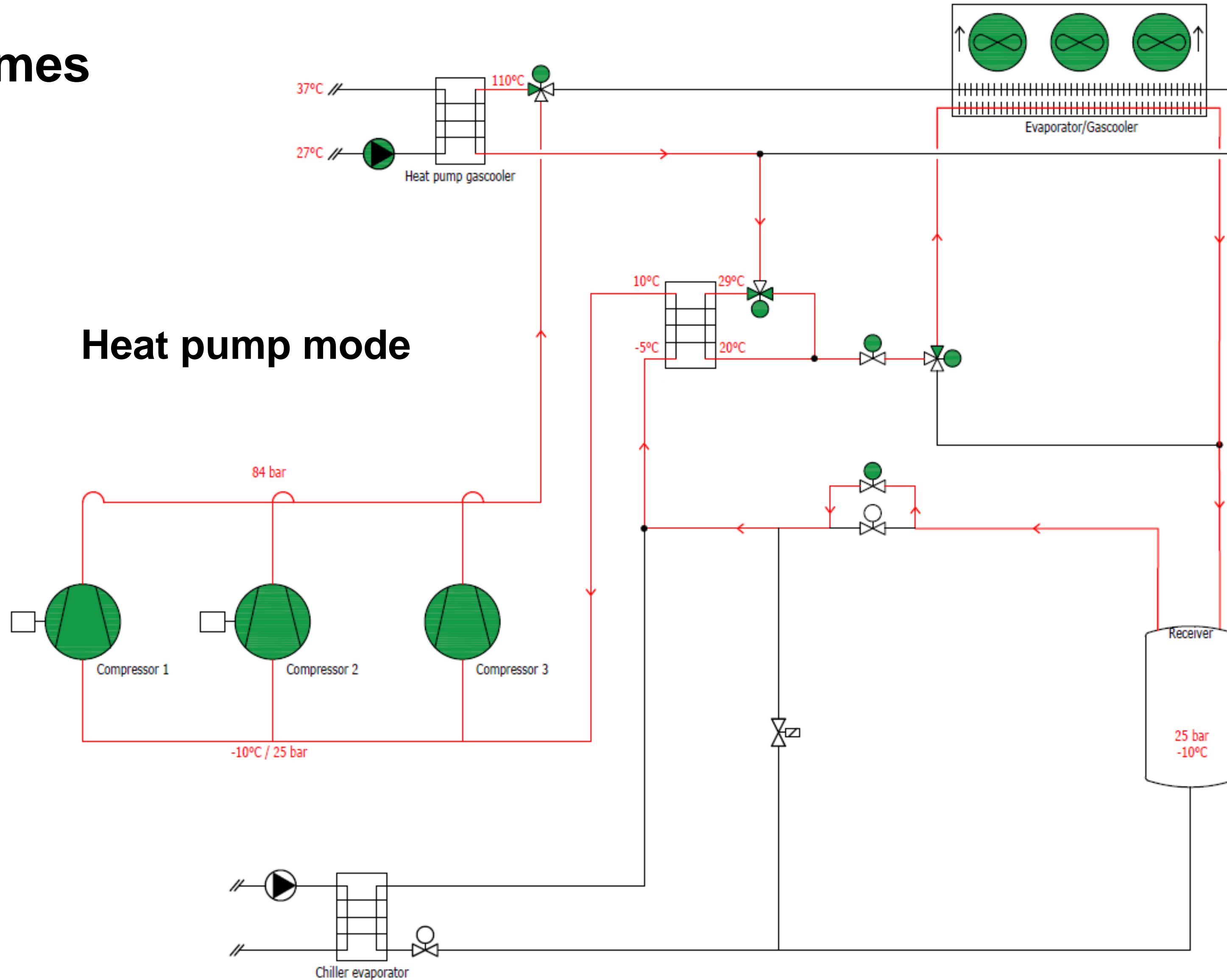
Operation schemes

Chiller mode

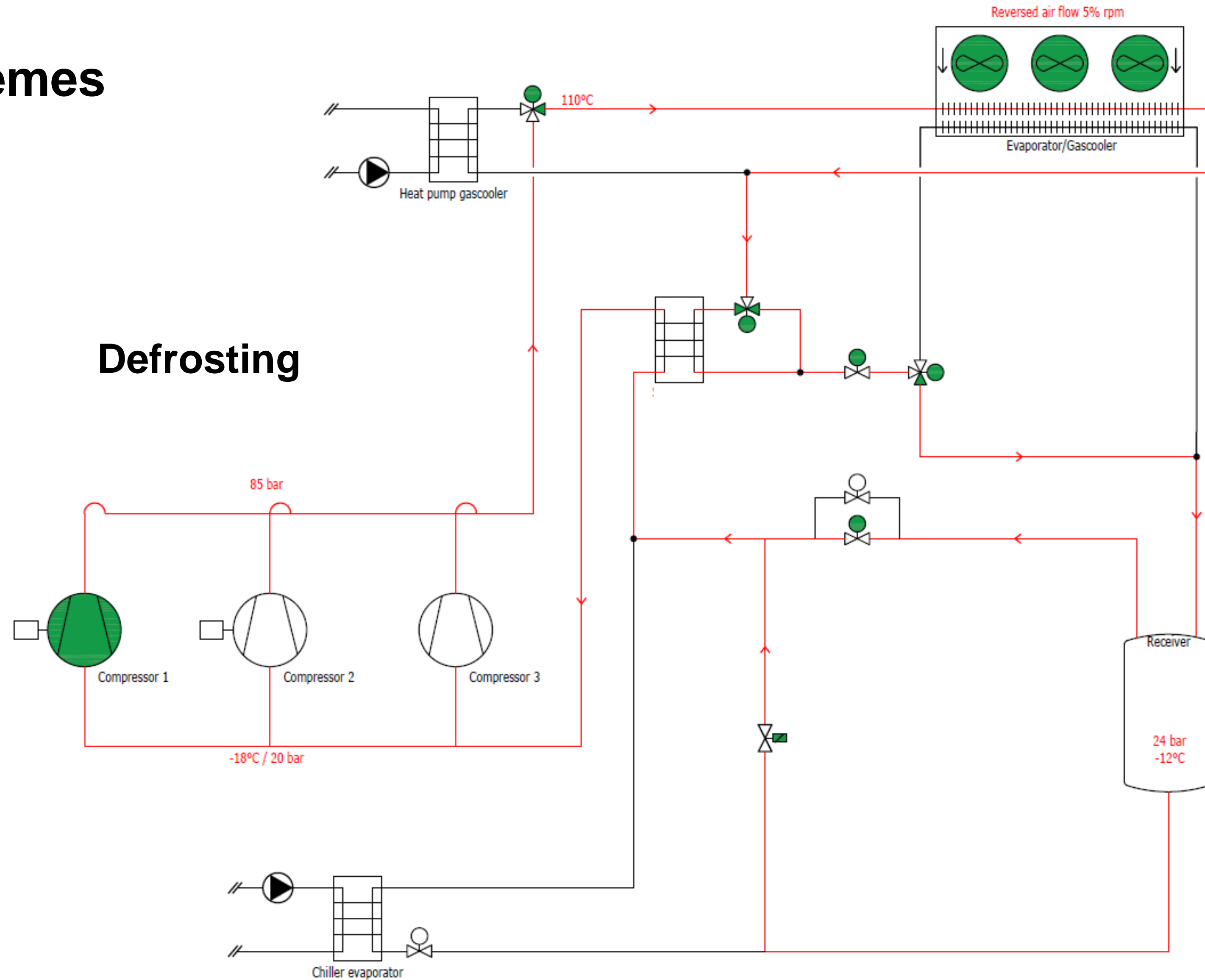


Operation schemes

Heat pump mode



Operation schemes

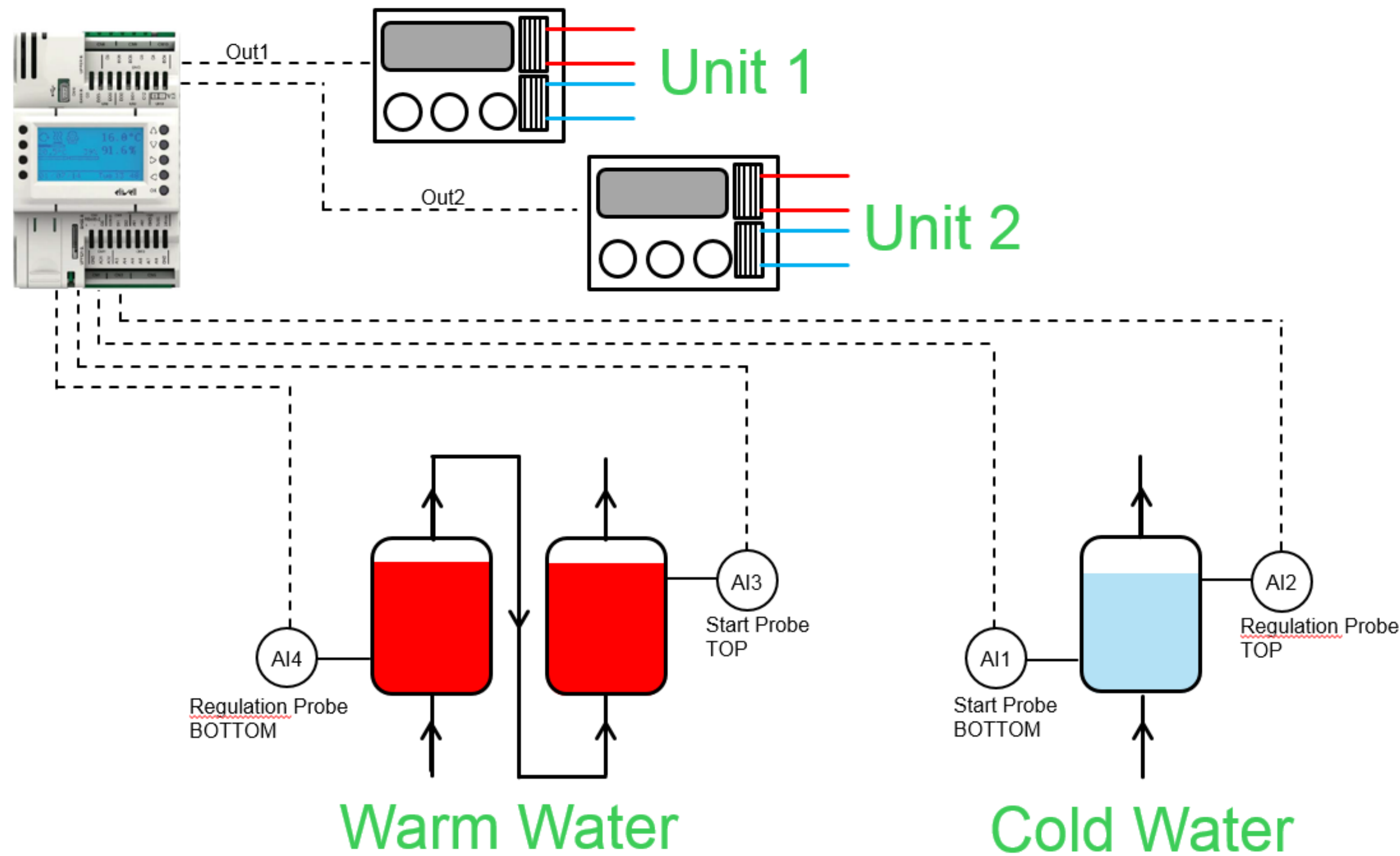


Main features of each unit



	Capacity [kW]	Text [°C]	ΔT_{water} [°C]	LP design [bar]	HP design [bar]	Frequency variator [n.]	External device
Chiller	250	+35	+14 → +8	80	120	2 (25 ÷ 70 Hz)	Gascooler
Heat pump	300	-7	+27 → +37	80	120	2 (25 ÷ 70 Hz)	Evaporator

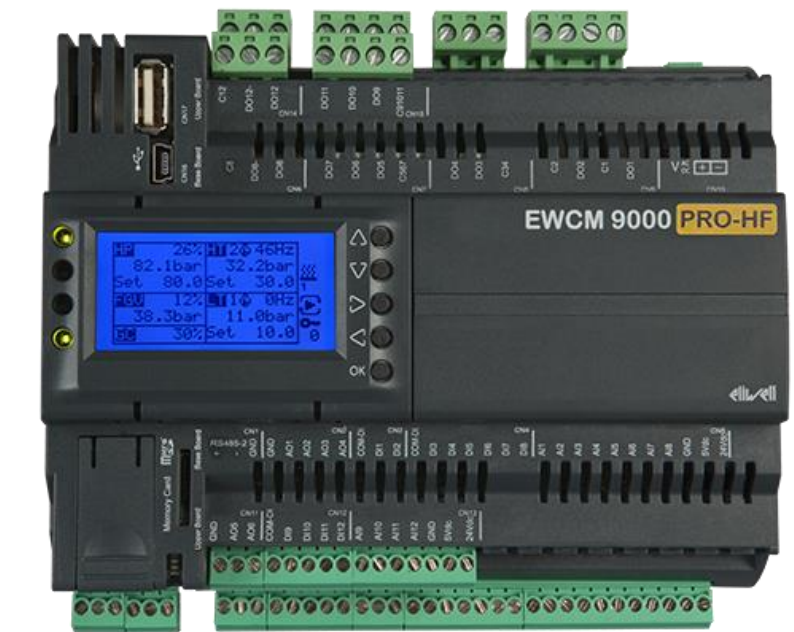
Management of the plant



Eliwell by Schneider Electric

EWCM 9000 PRO-HF

AVD Programmable



For managing and coordinating both single units and the whole system

External devices



Totally customized *LU-VE*
gascooler/evaporators with separated coils

Feedbacks and savings

- 1) New **R744** system performance better than old machines: more comfortable and accurate thermohygrometric conditions in the mall and in the supermarket (for example no more condensation on the cabinet doors, thanks to lower humidity in the air and lower temperature of cooled water)
- 2) Energy consumption measured during the first running months: **10 ÷ 15%** lower than past years
- 3) Heating recovery able to make **post-heating** in the ventilation system
- 4) Partitioning and redundancy with whom the units are able to follow the energy demand curve of the building very accurately
- 5) No failure or breakdown (**remote surveillance and management**)
- 6) Units able to remain stopped without danger thanks to **high pressure design**
- 7) Unique and reliable plant for heating and cooling: lower maintenance costs
- 8) Migros Agno is now 100% **HFC free** and the building doesn't produce greenhouse or pollutants gases



In partnership with



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**Thank you
for listening.**

