

Integral system

Martin Meister, Coop, 14.09.2022



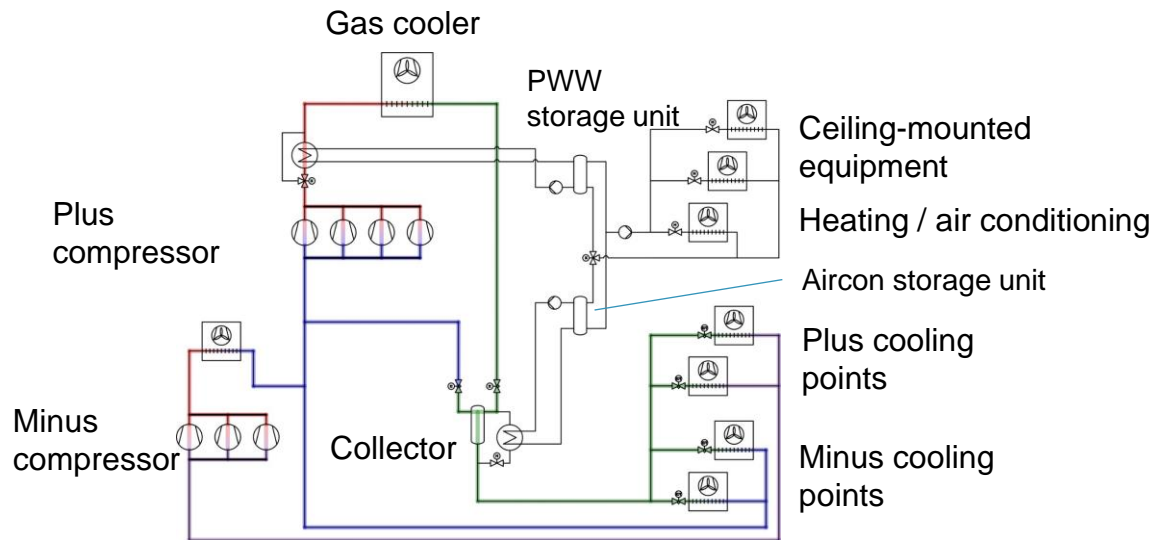
Introduction



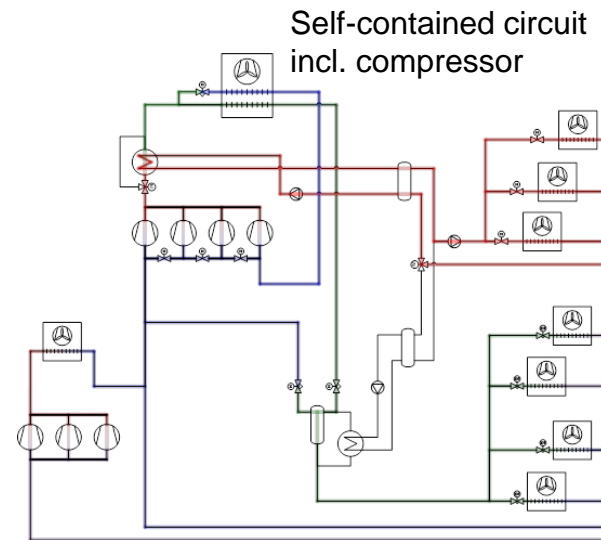
- The integral system is a heat pump integrated into the cooling system.
- Generally speaking, our sales outlets are heated using waste heat.
- As regards sales outlets that we rent, we are not able to exercise any control over external heat.
- The integral system can be employed so that sales outlets are free of fossil fuels.

Comparison

- Refrigeration system



- Integral system



Systems examined - space requirement

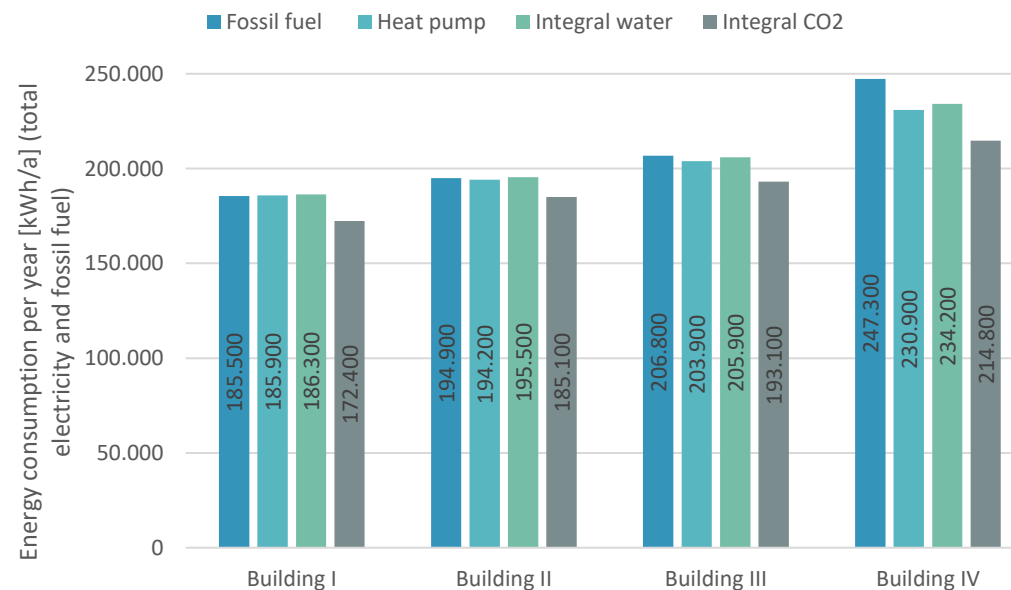


- The Integral Water and Integral CO2 systems take up significantly less space

	External / roof-mounted installation		Machinery / plant room						
Fossil fuel	Condenser / Heat exchanger	Gas cooler Refrigeration	Refrigeration unit	Fossil fuel	Air conditioning	Pumps	Electrical switch	Optional storage	Optional storage
Heat pump	Condenser / Heat exchanger	Gas cooler Refrigeration	Refrigeration unit	Rev. heat pump	Free space	Pumps	Electrical switch	Optional storage	Optional storage
Integral water	Condenser / Heat exchanger	Free space	Refrigeration unit (integral water)	Free space		Pumps	Electrical switch	Optional storage	Optional storage
Integral CO2	Condenser / Heat exchanger Air conditioning unit	Free space	Refrigeration unit (integral CO2)	Free space			Electrical switch cabinet	Free space	

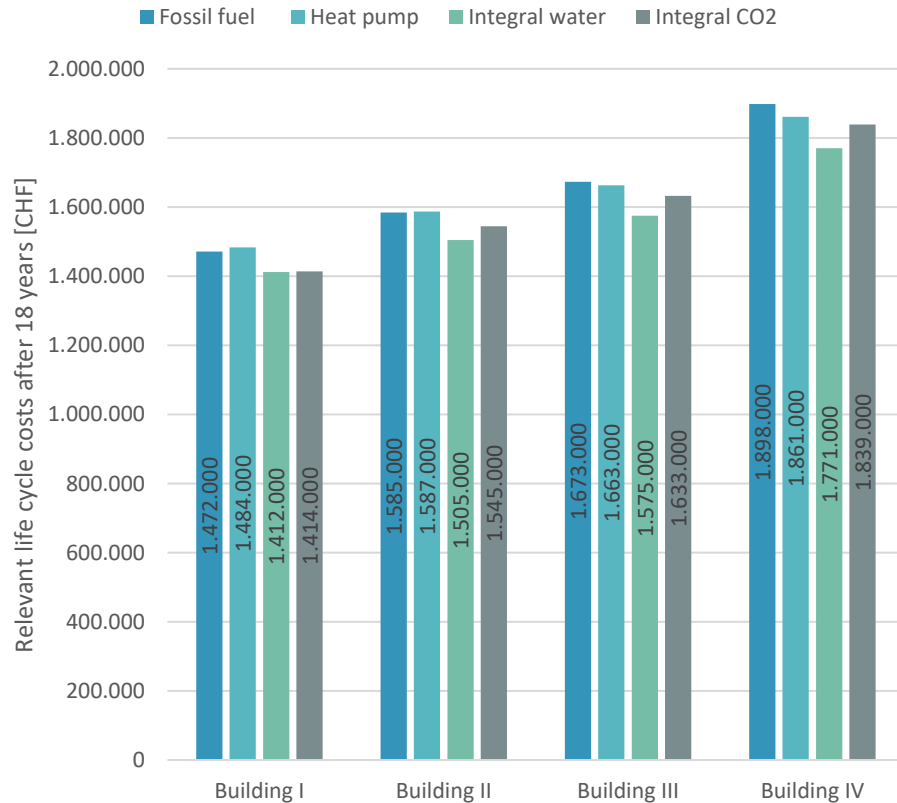
Energy consumption per building

- Waste heat largely equates to the heat required

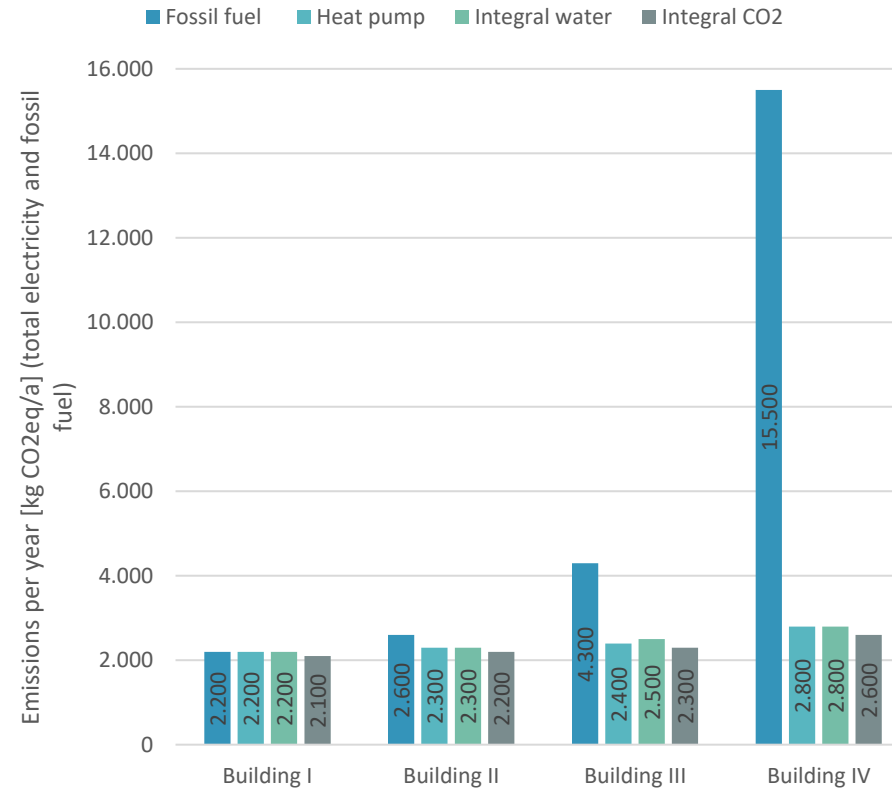


Nominal performance and effective energy	Building I	Building II	Building III	Building IV
Heat requirement, heating Ta: -8°C	63 kW	88 kW	113 kW	168 kW
Heating energy per year (effective energy)	126,000 kWht	152,000 kWht	178,000 kWht	240,000 kWht
Cooling requirement, air conditioning Ta: +34°C	8 kW	22 kW	36 kW	68 kW
Air conditioning energy per year (effective energy)	6,000 kWht	19,000 kWht	32,000 kWht	67,000 kWht

Analysis



Energy cost:
 Electricity: 0.15 CHF/kWh
 Fossil fuel, heating oil: 0.10 CHF/kWh



Emission factor:
 Electricity: 0.012 kg CO2eq/kWh
 Fossil fuel, heating oil: 0.424 kg CO2eq/kWh

Emissions from the integral system are up to 82% lower.

Depending on the building category, the life cycle costs of Integral Water are 4% to 7% lower.



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