

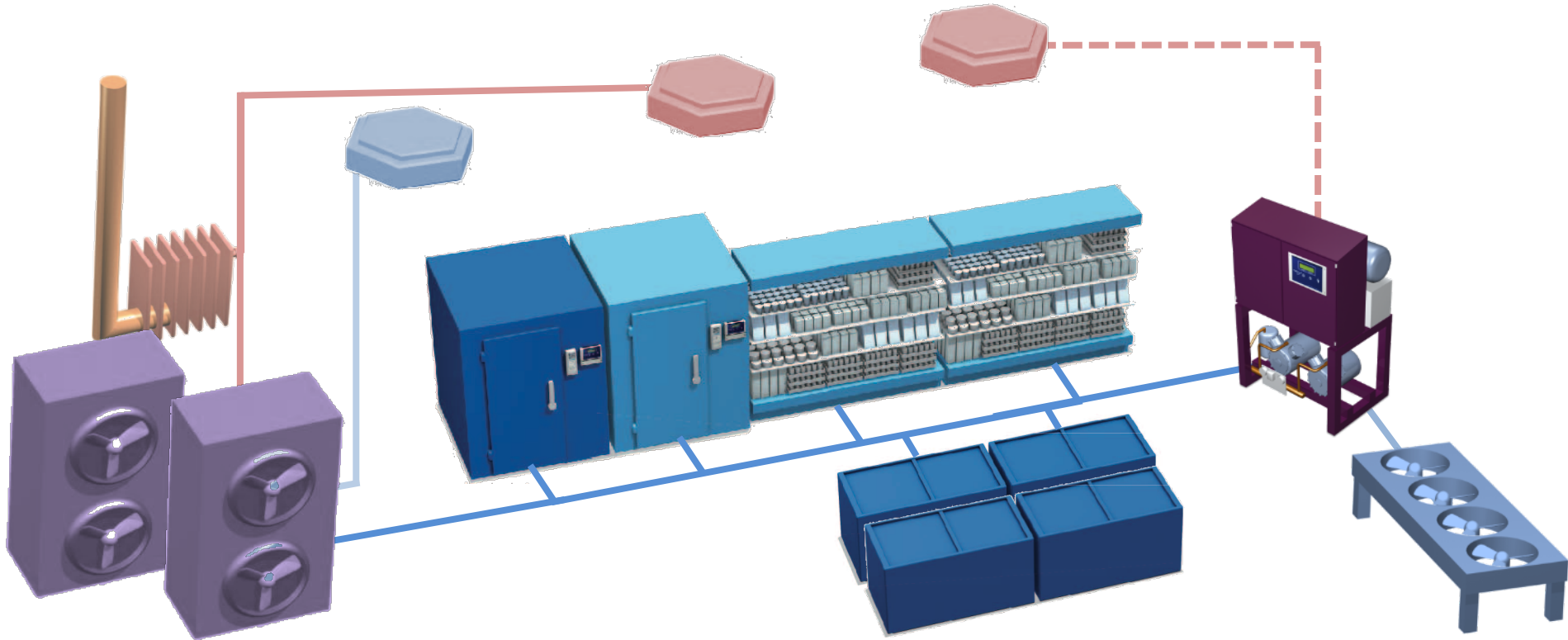


ATMO
sphere

ROXSTAR *cube Integral*

Integrated systems.

Temperature handling technology in Supermarkets.



Pros. Cons.

Advantages of integrated systems

- Heating, AC and Refrigeration from one source
 - Easy thermal management
 - Coordinated control strategy
- One-stop coordination
 - One contractor – one contact person
 - Minimized interface losses
 - Optimized installation workflow

Disadvantages of integrated systems (overall)

- Negative interaction effects
- High contractor's know how level necessary
- Higher refrigerant charge (single cycle)

Disadvantages of *conventional* integrated systems

- F-gas refrigerant (R410A) with high GWP (2088)
- Exact refrigerant charge necessary
- Noise problems due to outdoor installation (residential areas)

Integrated systems. Next generation.



Building
Management

Comfort tempering:

- Air con up to 40 kW
- Heating up to 50 kW

Air conditioning

Heating



Cooling capacities:



- MT up to 75 kW
- LT up to 12,5 kW

LT refrigeration

MT refrigeration

Differences.

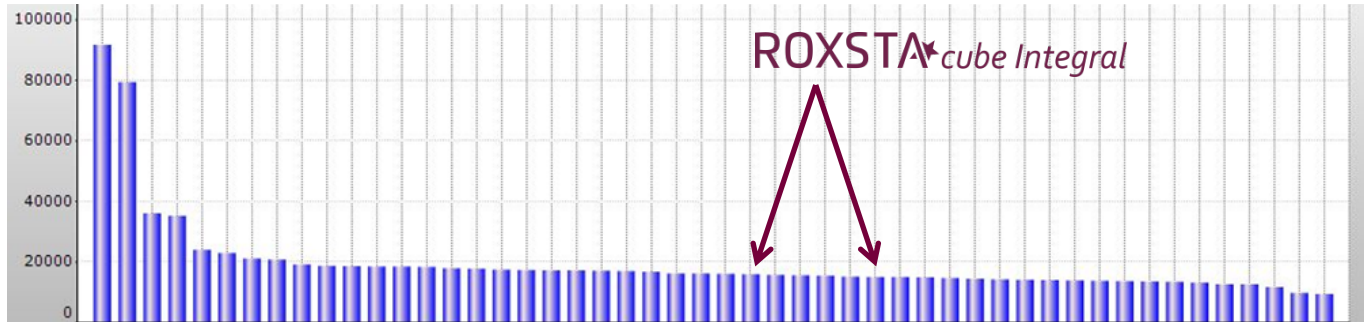
Comparison to conventional integrated systems with R410A.

- Natural refrigerant (R744).
- Installation outdoor and indoor (noise critical installation) possible with a separate gascooler.
- Short and easy cycle.
 - DX at the evaporators
 - Secondary (water) loop for air conditioning and heating
 - Automatized hydraulic balancing of the water loop (AC / Heating) – A technology of  **GTM**
Gebäudetechnik Management
- Clear design – Easy to handle (installation, start-up, maintenance)
- Holistic control system platform (FRIGOLINK® - BMS, integral unit and cold points) by  **WURM**
SYSTEME
 - General data exchange (improves efficiency, monitoring, operational safety)
- „Freshness First“-strategy (Priority to fresh goods temperature)

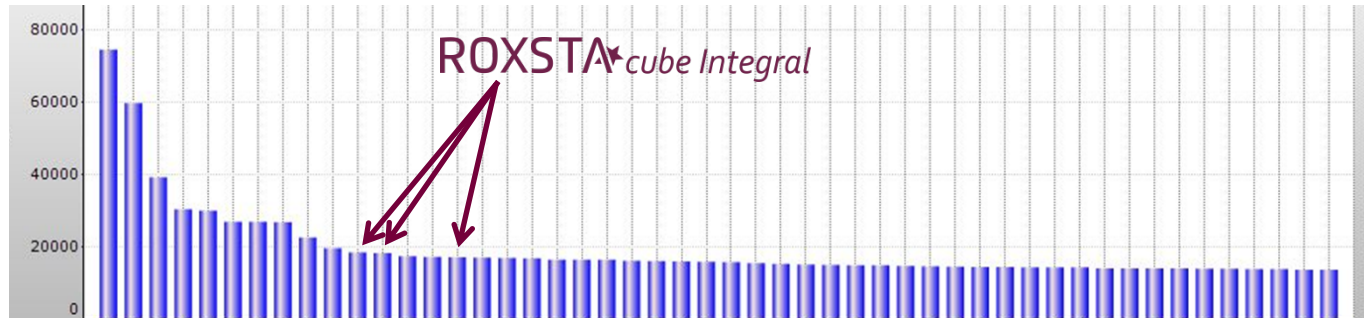
Results.

Comparison to conventional integrated systems with R₄10A

- Energy consumption (January – refrigeration + heating)



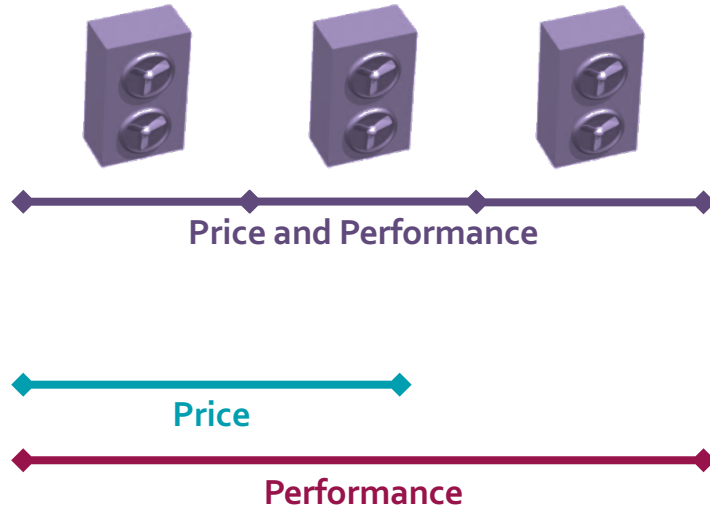
- Energy consumption (August – refrigeration + air conditioning)



Results.

Comparison to conventional integrated systems with R4.10A

- Price performance



Forecast.

Considerable improvements concerning efficiency are in sight

EVALIFT (EVAporation LIFTing)

- A technology for a higher evaporation level by shifting the superheat out of the evaporator (semi-flooding).
- Efficient – more than liquid ejector
 - Independent on pressure difference and load → all-season operation
 - Also useable in LT application
- Easy
 - Simple solution
 - Users know how is existing
- Safe
 - Higher system stability
 - Improved oil balancing



Thank you very much!



Please feel free to contact us.



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