Success story

Heos Sistema

comparison between Heos Sistema and traditional technologies

One of the main advantages of this solution is energy saving. In order to measure the extent of such savings, the power consumption of two twin supermarkets was monitored: one served by a traditional HFC multiplexed system, the other by Heos, the CAREL waterloop system.

Connected Efficiency

What

- Comparison of refrigeration technologies: Heos (waterloop) vs. traditional (multiplex).
- Two twin supermarkets, opened in the same period.
- Measurements made using mains power meters for one year.
- Mathematical models, created using the collected data, were then applied using the temperature statistics for several European cities.

Why

Heos technology was chosen due to:

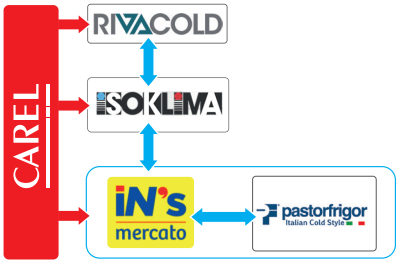
- easy installation and maintenance in old town centres, as a result of reduced system size and low noise pollution;
- the energy efficiency guaranteed by DC inverter compressors;
- the drastic reduction in refrigerant charge compared to traditional systems.

Comparative energy analysis shows savings in annual power consumption of 25%.

The new iN's store that opened in northern Italy in December 2016 expresses the full potential of CAREL's waterloop solution.
Taking advantage of simple installation due to the use of plug-in units, **Heos Sistema** was easily installed in a store in an old town centre.

CAREL's partners on the project were:

- iN's: supermarket chain operating in the discounted sector, 100% Italian-owned and part of Gruppo Pam S.p.A.
- Rivacold: European leader in the supply of refrigeration systems, in this case supplier of the Heos refrigeration units;
- Isoklima: company specialised in industrial air-conditioning and refrigeration which, through its qualified personnel, offers installation, maintenance and assistance for HVAC-R systems;
- Pastorfrigor: company that manufactures refrigerated showcases for supermarket chains.



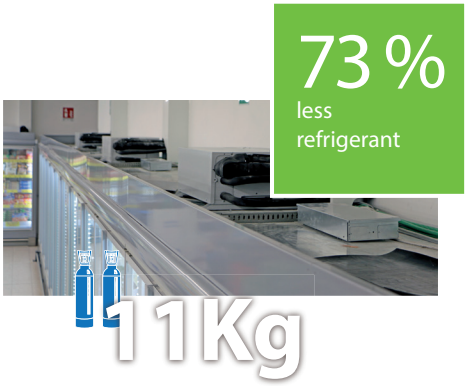
Business Challenge

Traditional

Multiplexed refrigeration system comprising 1 medium temperature compressor rack and 2 low temperature condensing units.
Showcase temperature is controlled by an electronic controller that drives a PWM modulating valve.

Type	Number of units	Capacity	Refrigeration units	Valves
Dairy	4	3.80 kW	Rack with 2 ON/OFF compressors	PWM
Meat	2	3.74 kW		PWM
Fruit and vegetables	1	2.55 kW		PWM
Frozen foods	2	2.45 kW	Condensing units	PWM

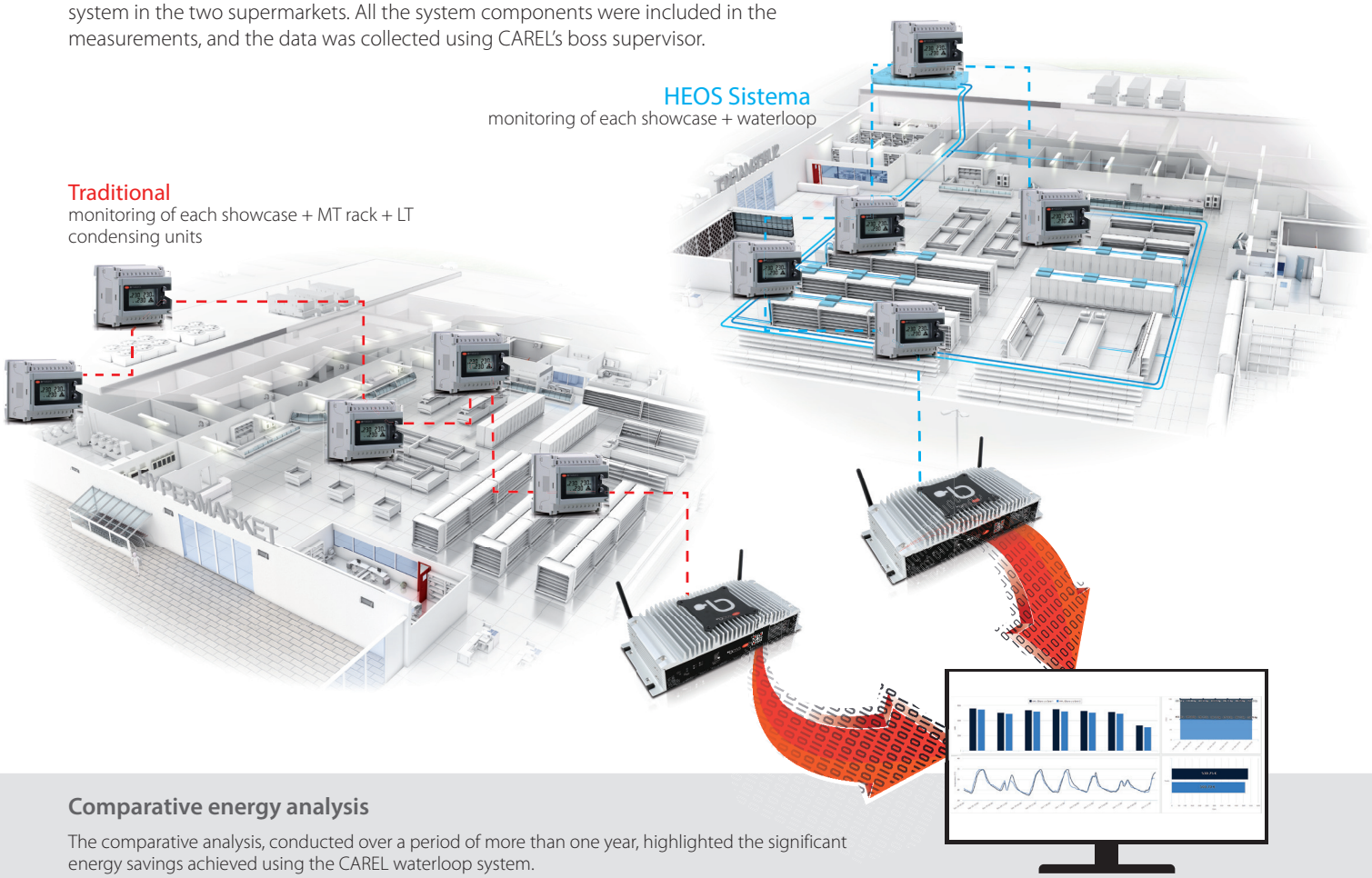
HEOS Sistema



The CAREL Heos refrigeration system uses stand-alone refrigeration units installed on each showcase and cooled by a water loop. The DC inverter compressors guarantee high energy efficiency, in synergy with the CAREL E2V stepper valves.

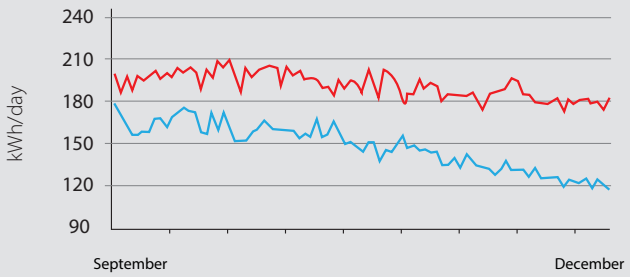
Type	Number of units	Capacity	Refrigeration units	Valves
Dairy	4	3.80 kW	4 x DA220*	EEV
Meat	2 (multi-evap.)	3.74 kW	1 x DA220*	EEV
Fruit & veg	1	2.55 kW	1 x DA91*	EEV
Frozen foods	2	2.45 kW	2 x DA420*	EEV

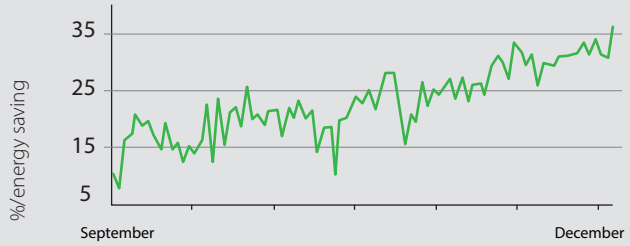
Mains power meters were used to measure the power consumption of the refrigeration system in the two supermarkets. All the system components were included in the measurements, and the data was collected using CAREL's boss supervisor.



Comparative energy analysis

The comparative analysis, conducted over a period of more than one year, highlighted the significant energy savings achieved using the CAREL waterloop system.





Focus on the period September - December

Key
- Traditional
- Heos

25 %
energy savings

Constant monitoring of the two systems allowed the energy savings to be determined: compared to the multiplex system, Heos recorded up to 35% lower power consumption.

Tradizional

- Invasive installation for the building
- High quantity of refrigerant used
- ON/OFF temperature control
- Considerable space occupied by compressor racks

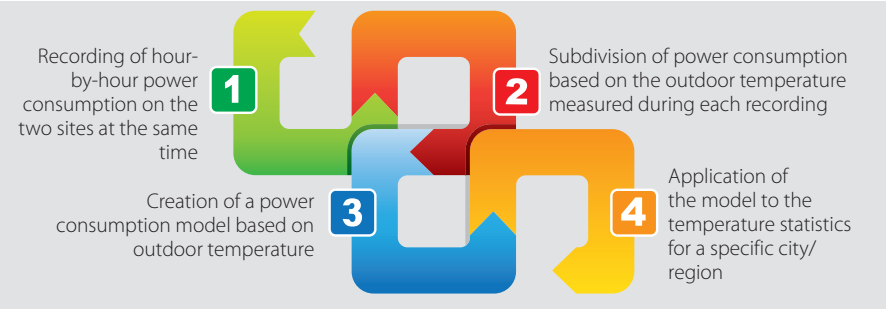
VS

HEOS Sistema

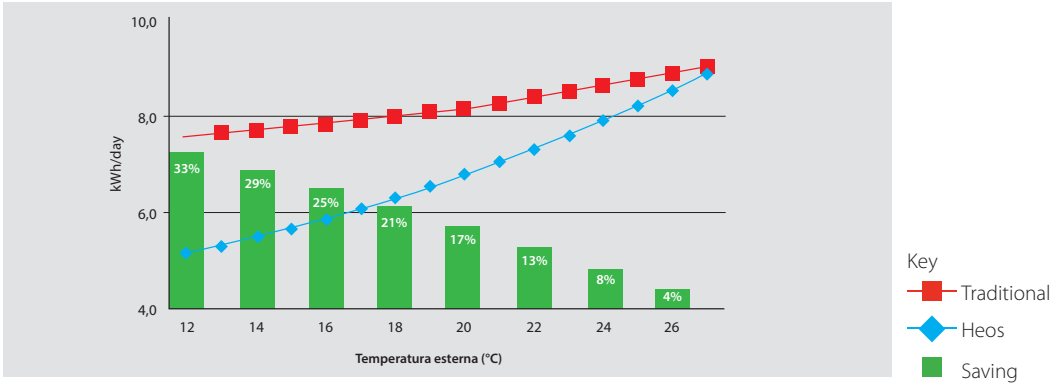
- Fast installation
- Reduced refrigerant charge (-73%)
- Perfect temperature control
- Energy saving (-25%)

From comparison to mathematical model

Starting from the data on power consumption collected in the two installations, a model was created for predicting the energy savings that would be achievable in some of the main European cities. The process for obtaining this result is illustrated below:



Starting from the hourly power consumption recorded using the boss supervisor, a model was developed that links expected power consumption with outdoor temperature. The resulting curves highlight the advantage of the CAREL waterloop system for the most frequent temperatures in our climate zone.
Below are the results in terms of energy savings that are obtained by applying the models calculated, using temperature statistics for some of the major European cities: in warmer climates, the advantage is reduced, yet still remains in favour of the CAREL waterloop system.



Annual saving	London	Munich	Venice	Rome
%	29.7 %	29.4 %	23.5 %	21 %

HEOS Sistema is a complete solution that simplifies operations for the installer right from the very beginning, thanks to quick and easy commissioning. The use of plug & play units reduces maintenance costs by 30%.

30 % lower maintenance costs

Headquarters ITALY

CAREL INDUSTRIES HQs
Via dell'Industria, 11
35020 Brugine - Padova (Italy)
Tel. (+39) 0499 716611
Fax (+39) 0499 716600
carel@carel.com

For more information

ALFACO POLSKA - www.carel.pl
CAREL Asia - www.carel.com
CAREL Australia - www.carel.com.au
CAREL Central & Southern Europe - www.carel.com
CAREL Czech & Slovakia - www.carel.com
CAREL Deutschland - www.carel.de
CAREL China - www.carel-china.com
CAREL France - www.carelfrance.fr
CAREL Korea - www.carel.com
CAREL Ibérica - www.carel.es
CAREL Ireland - www.carel.com
CAREL Italy - www.carel.it
CAREL India - www.carel.in
CAREL Japan - www.carel-japan.com
CAREL Mexicana - www.carel.mx
CAREL Middle East - www.carel.com
CAREL Nordic - www.carel.com
CAREL Russia - www.carelrussia.com
CAREL South Africa - www.carelcontrols.co.za
CAREL Sud America - www.carel.com.br
CAREL Thailand - www.carel.com
CAREL Turkey - www.carel.com.tr
CAREL U.K. - www.careluk.co.uk
CAREL U.S.A. - www.carelusa.com

+4000065EN - 1.1 - 23.10.2018