

Success Story



where

"Jiffy Maejo" C-store
• Chiangmai, Thailand

what

Hecu sistema real energy consumption comparison with ON-OFF system

why

- Extremely energy efficient
- Fully connected
- Optimal food preservation

when

November 2015



Real energy consumption comparison with Hecu sistema in Thailand

27.5% energy saving compared to the previous traditional installation

C-store chain Jiffy has decided to revamp more than 80 stores in Thailand using Hecu sistema.

Hecu sistema is present in Thailand thanks to cooperation between:

- Thermedez, both a condensing unit and cabinet OEM and contractor,
- SCI, BLDC compressor supplier,
- CAREL, electronic controller, DC inverter and electronic expansion valve supplier.

Thermedez is a leading company in the local refrigeration market. It has decided to equip its condensing units with BLDC technology in order to provide end users the highest level of energy efficiency.

Remote connectivity is exploited to improve service levels, always ensuring the best operating conditions and avoiding energy waste and system downtime.

Here below is a description of Hecu sistema and a detailed analysis of energy consumption over 4 weeks using the traditional ON-OFF system, and 4 weeks using Hecu sistema, highlighting:

- 27.5% monthly savings, equivalent to €62.50 per month based on local energy cost;
- return on investment (ROI) of less than 18 months.

Description of the system

Condensing unit

Application	Technology	Compressor model	Refrigerant type
MT	BLDC	ADB66FAAMTS	R404A

The condensing unit is equipped with an **SCI BLDC scroll compressor ADB66FAAMTS** for R404A refrigerant. This compressor has a wide speed range, from 20 rps to 120rps. Capacity modulation means system request can be precisely met, avoiding energy waste and frequent ON-OFF cycles.

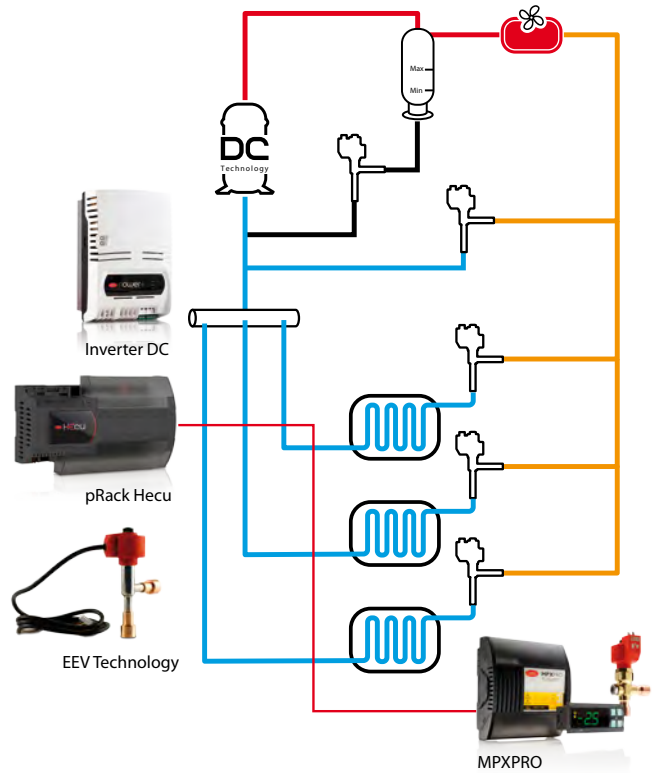
The compressor is driven by the **CAREL DC power+ inverter and pRack Hecu controller**.

The CAREL inverter and controller use advanced features to manage the compressor envelope and ensure safe operation.

The controller is also connected to the MPXPRO controller installed on each refrigerated cabinet, in order to implement the floating suction function and optimise the set point in order to save energy.

Two CAREL EEV electronic expansion valves are installed, for calibrated injection of oil and liquid in the suction line. These features are managed directly by Hecu, and increase reliability of the overall system, ensuring the best energy performance in all operating conditions. pRack Hecu calculates the opening of the valve in real time, so as to calibrate oil flow based on compressor speed, and liquid flow based on discharge temperature.

Circuit diagram



Hecu sistema condensing unit made by Thermedez



Jiffy Maejo convenience store (Chang Mai)

Walk-in coolers

Evaporator	Type	Cooling capacity	Valve model
#1	Walk-in cooler	3.5 kW	CAREL EEV
#2	Walk-in cooler	3.5 kW	CAREL EEV
#3	Walk-in cooler	3.5 kW	CAREL EEV

The walk-in room features three evaporators. Each evaporator is equipped with a **CAREL MPXPRO controller** and **CAREL EEV electronic expansion valve**.

The MPXPRO implements the smooth line function, modulating the superheat set point and avoiding ON-OFF control cycles. The temperature is thus flatter, and the significant reduction in ON-OFF cycles also affects compressor behaviour: speed is adapted accordingly, however the compressor hardly ever switches OFF. The final result is a very high quality in the product preservation.

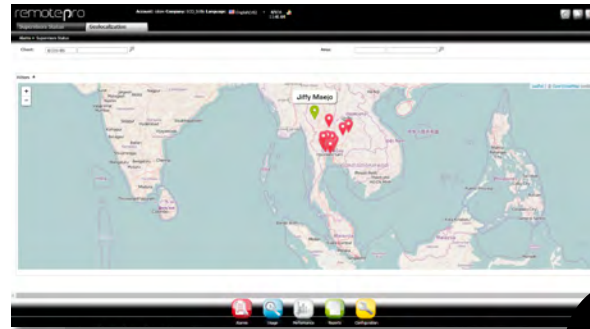
As each MPXPRO is connected to pRack Hecu, all the main information regarding the evaporators is available on the **Hecu PGD user interface** for easier commissioning and maintenance.



CAREL PlantWatchPRO and MPXPRO controllers



Walk-in cooler for beverages



Remotepro

The enterprise software system used to monitor this installation can centralise data from thousands of stores. It provides a built-in dashboard suite to ensure the sustainability of each single store in terms of performance and efficiency, helping customers easily identify where they can take action to optimise the system.

KPI Temperature

Two different temperature and energy consumption reports can be displayed:

- Daily analysis and trend over 24 hours;
- Device operation in percentage terms.



Energy Dashboard

One single system designed to integrate and manage all the data generated by the different areas and different stores:

- Real-time energy consumption via web and comparison charts;
- Monitoring and optimisation for excellent performance.



Comparisons can be made between systems/stores, or the same store over different periods, so as to compare energy consumption statistically.



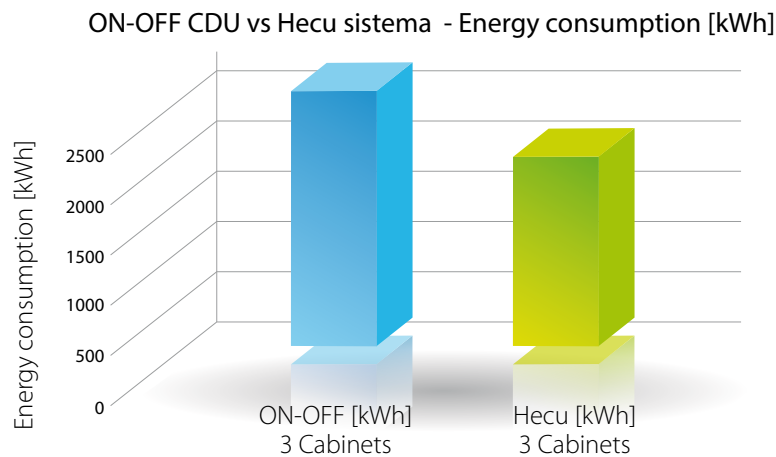
Energy consumption data analysis

Data collection from the previous configuration of the store and when using the upgraded technology with Hecu sistema has allowed in-depth comparison between energy consumption data.

- Four weeks' data collection for each technology;
- Data acquired on: condensing unit energy consumption, indoor and outdoor temperature, indoor and outdoor humidity.

System	Compressor technology	Valve technology	Time period	Number of days	Min. T	Max. T	Average T	Cabinets	Capacity	Energy Consumption
ON-OFF	scroll ON/OFF	TEV	21/02 - 19/03	28	22.2 °C	36.7 °C	27.5 °C	3	10.5 kW	2544 kWh
Hecu sistema	scroll BLDC	EEV	25/03 - 21/04	28	23.2 °C	39.5 °C	31.7 °C	3	10.5 kW	1844 kWh

Worst working conditions for Hecu sistema.

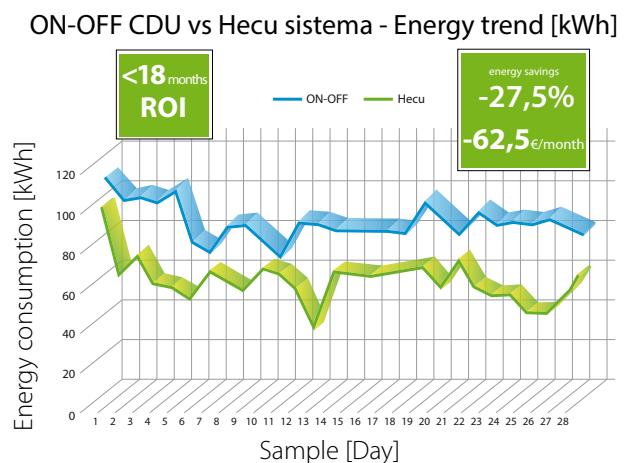


With the addition of another cabinet in the new system configuration, all the energy consumption data has been standardised in order to compare behaviour between two identical stores.

Results:

- 27.5% estimated energy saving between ON-OFF with 3 cabinets and current Hecu sistema (despite a higher outdoor temperature with the new technology), which at an energy cost of €0.089* per kWh means a cost saving of €62.50 per month;
- return on investment (ROI) of less than 18 months.

* Thailand's energy cost updated as of 05/2016.



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