

 t-store

CAREL

Success story

Mega Image: a sustainable future with Total-Store

14% energy saving across 973 stores

CAREL partnered with Technoelectric to provide Mega Image, part of the Ahold Delhaize group, with a turnkey solution for remotely monitoring and taking optimisation actions on all the points of consumption of the connected sites, both for new stores and retrofit projects. In an analysis conducted on a sample of stores, the improvement in energy efficiency resulted in an emission reduction of 6.39 kilo tons of CO₂e and economic savings of 5.3 million euros on an annualised basis.





Where

973 Mega Image and Shop&Go stores in Romania

What

Total-Store solution for transitioning to natural refrigerants with a remote, centralised and fully integrated monitoring system to manage and optimise consumption of the entire store network.

Why

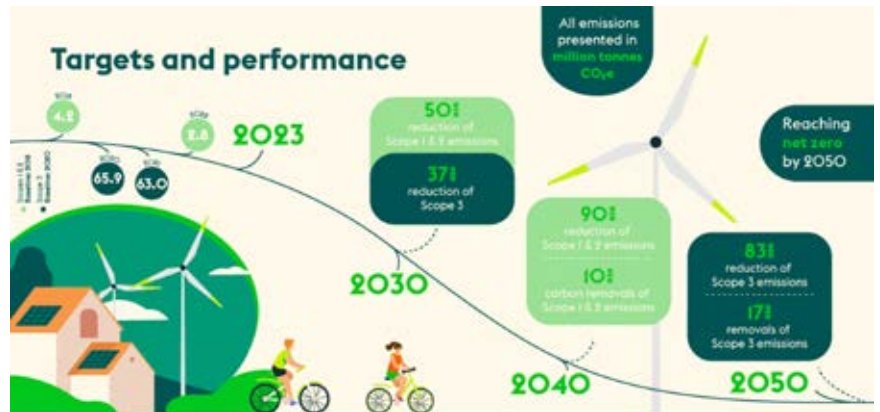
Mega Image was looking for a reliable partner to reach its objectives of reducing its CO2 footprint, cutting OPEX, improving food quality and monitoring energy/water costs

Climate plan: a clear net-zero pathway

In December 2023, Ahold Delhaize, one of the world's largest food retail groups, released its updated **Climate Plan**, which reiterates its previously set **net-zero commitments** by defining science-based emission reduction targets and identifying the levers to activate for each scope.

The first goal of the Climate Plan is to reduce emissions from the local brands' operations, focusing primarily on **transition to low-GWP and natural refrigerants, increased energy efficiency**, renewable energy and transition from fossil fuels in heating and transportation.

For its own operations (scope 1 & 2), Ahold Delhaize is committed to becoming **net-zero by 2040**, with an interim target of a 50% reduction by 2030.



The project

Mega Image currently operates around a **thousand stores** in Romania under the **Mega Image** and **Shop&Go** brand.

Consistently with the Group's strategic objectives of reducing GHG emissions and cutting OPEX, Mega Image identified CAREL and Technoelectric as the ideal partners to transition to natural refrigerants and implement an energy-saving centralised "Smart Metering" solution for the **remote monitoring and optimisation** of its stores, also **integrating all the already existing control technology** in order to protect previous investments.

The integration project was successfully extended to **all the existing and new sites** in the area and included both the **Mega Image** stores (supermarket/hypermarket format with 30-150 cabinets) and the **Shop&Go** stores (convenience store format with up to 8 cabinets).



Founded in 1994, Technoelectric is a Romanian systems integrator company for complex projects through the execution of creative, innovative, and efficient applications in the refrigeration and electrical fields.

Technoelectric has grown to be a multifaceted organisation providing a wide range of services: from automation solutions for refrigeration and electrical domains to professional teams for systems installation, monitoring, and maintenance.

Since 2011 Technoelectric has been CAREL representative for controllers and monitoring systems for refrigeration installations in the area.



Stores connected to the RED Optimise cloud portal as of July 2024



Global energy savings through t-Store system



Annual economic savings observed on 576 stores



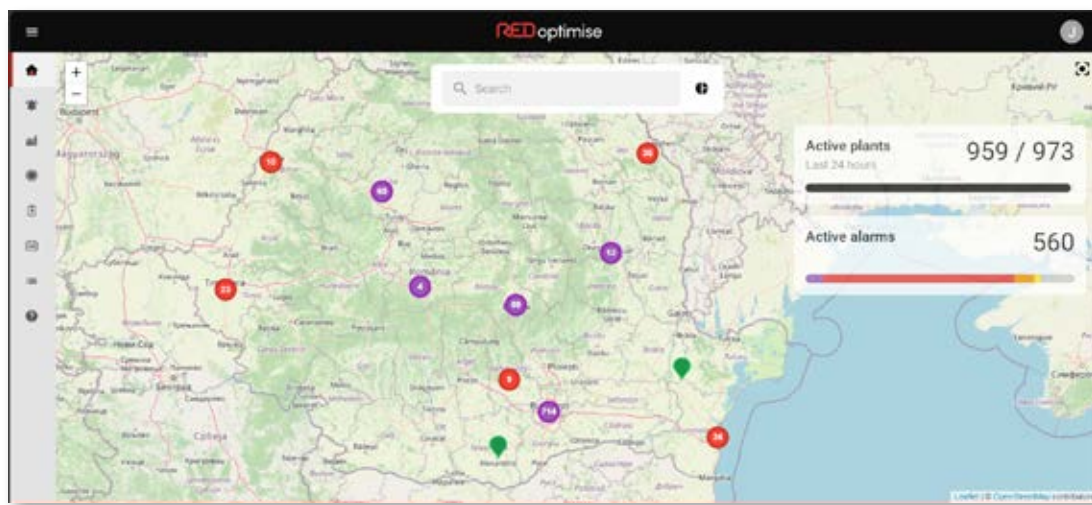
Total-Store solution for new stores and retrofit projects

The complete **equipment-to-cloud solution** proposed by CAREL and Technoelectric is arranged in a **tier structure**, from field controllers and metering devices to RED optimise, the multi-site cloud centralisation portal that makes it possible to **manage and quickly access data of all the stores**.

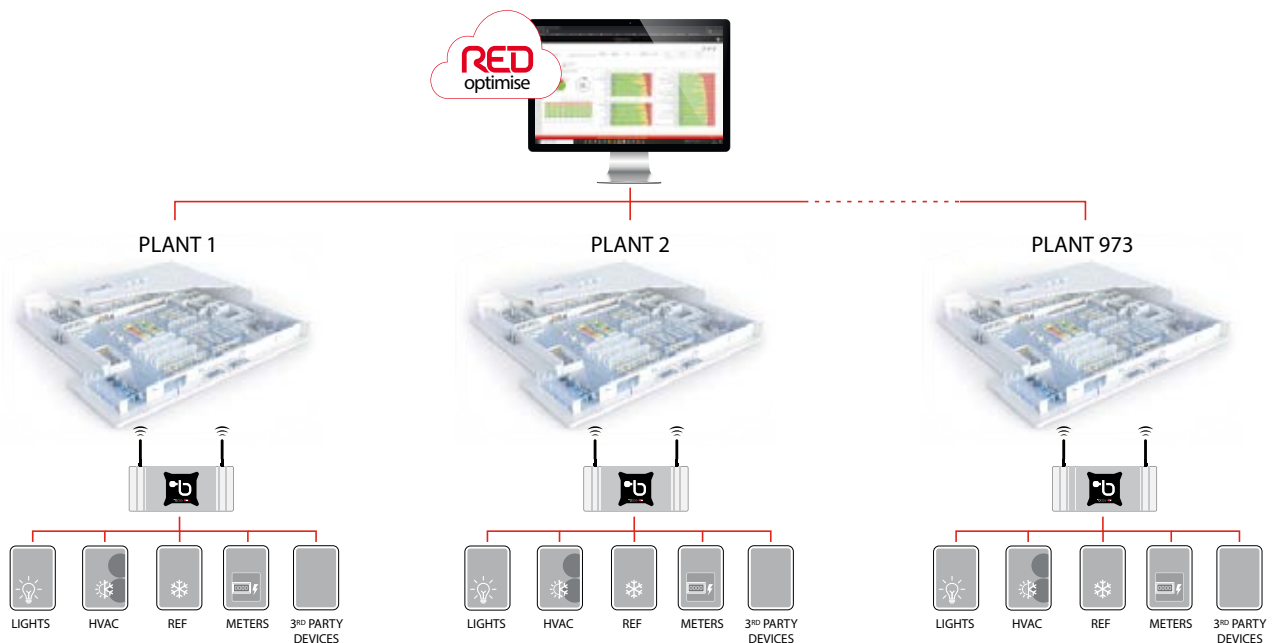
“To better reflect the savings achieved with the system, we compared electricity consumption in 2018 (before implementation) with consumption in 2022 (after implementation)” explained Mega Image’s technical team.

“In an analysis carried out on 576 stores, the improvement in energy efficiency resulted in an emission reduction of 6.39 kilo tons of CO₂e (the same amount of emissions generated by 6500 people flying from London to New York!) and economic savings of 5.3 million euros on an annualised basis”.*

**Source: myclimate*



Thanks to Technoelectric’s software development skills and CAREL’s offering of parametric and programmable controllers, it was possible to implement a **unique control system** for **all the functional areas of the stores** (refrigeration, HVAC, lighting, metering, reporting and other auxiliary functions), also **integrating third party devices**.



BMS control and recording of consumption

For both new stores and retrofit projects, the team developed **custom application software** for the local management of all **BMS control functions** and the **integration** of all the **metering devices** that record energy and water consumption.

The application software, which was replicated in all the sites according to the requirements of the retailer, is designed as a suite of interdependent modules that integrate the direct control and scheduling of:

- Lighting systems and illuminated signs
- HVAC systems
- Energy/water metering systems
- Beverage refrigerators
- Warm technology equipment (oven, rotisserie, fryer)
- Air curtains, generic loads and other auxiliary functions.



Refrigeration equipment monitoring

As regards refrigeration, CAREL and Technoelectric designed two different solutions for new and existing stores.

• Existing stores

In retrofit projects, Mega Image opted for CAREL's **wireless solution** for the **remote monitoring** of **cabinet temperature**, which represents **the most cost-effective way** for existing stores to continuously monitor and automatically record the cabinet temperature in compliance with **HACCP requirements**.

The main benefit of using CAREL wireless sensors is that the system is very **low-impact**, as the retailer is **not required to replace the existing controllers** and there is **no need to create a cabled communication network**.

• New stores

For new store projects, Mega Image took the opportunity to completely **switch to natural refrigerants**, in line with Ahold Delhaize's strategy to progressively **reduce emissions** linked to its own operations. To do this, **CAREL** was selected as the sole **control technology provider** for all the refrigeration equipment (compressor racks, showcases and cold rooms).



Having a **fully integrated CAREL control and supervisory system** for the entire cold chain of its stores brought many additional benefits to the retailer, which, thanks to the presence of a **boss local supervisor**, is now able to **remotely modify and access controller parameters** and **activate energy-saving system functions**.

Remote control and data centralisation

The **brain** of each multisite system is a CAREL “boss” local supervisor, which is responsible for the **integrated monitoring** of all the control systems present in the store, including **third party ones**, and represents the **access gate** to all the connected field devices.

With **RED optimise**, the multisite centralisation portal for retail applications, each store is **geolocated** on a map, thus allowing the retailer to have an initial global view of the entire store network status. With just a few clicks, it is then possible to **quickly access detailed information** about the store of interest.



Mega Image relies on the remote monitoring architecture developed by CAREL and Technoelectric for:

Automatic reporting and store performance evaluation

- Automatic daily **HACCP reports** for all the showcases in each store
- Automatic **energy/water consumption reports** and **regulation performance reports**, customisable through advanced selection filters
- Extensive analysis of the behaviour of the devices to detect anomalies and **restore optimal conditions**, including from remote



Fig. 1.a - Regulations Performances

Subdivision Name (S)	Min F	Max F	2 July 2024																							
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SR 01 (1)	145.8 B	1.5	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOL21 (S)	150.0 B	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOL20 (S)	150.0 B	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOL 21 (1)	145.8 B	1.5	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOL 20 (1)	145.8 B	1.5	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Fig. 1.b - HACCP Report



Fig. 1.c - Consumption Report

Optimisation of service and maintenance activities

- Centralised alarm management for all the connected control devices
- Remote diagnosis to avoid site visits or minimise service times
- Automatic alarm reports with advanced filtering options (duration and type; service company and store technology; priority and description)

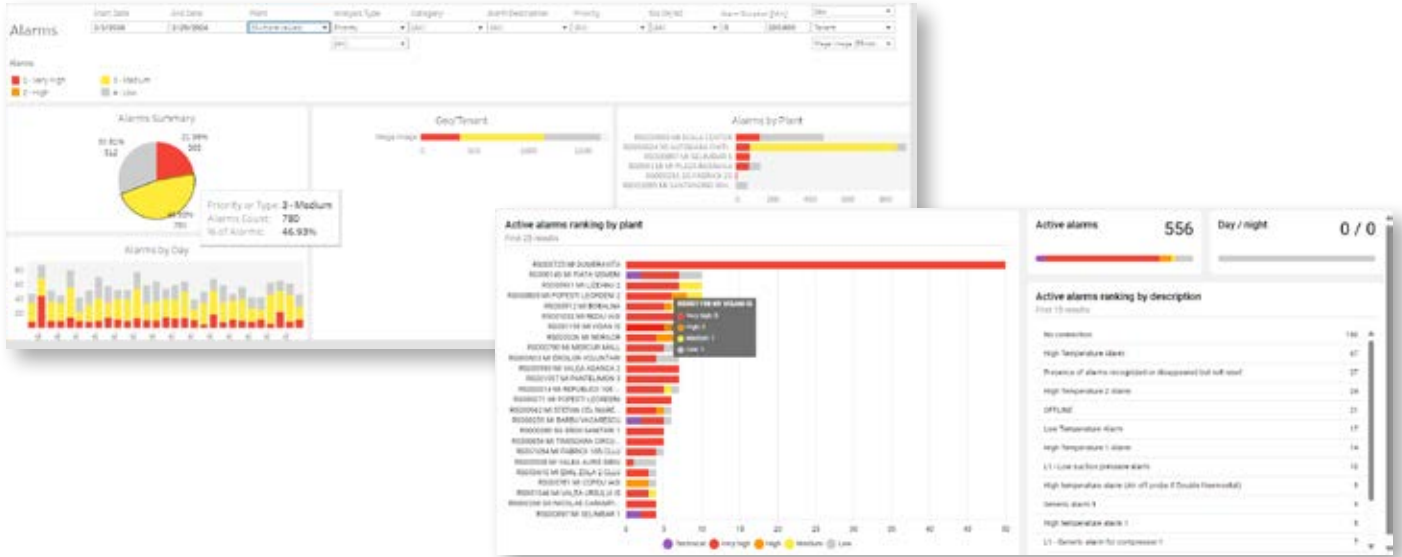


Fig. 1.d - Dashboard for the monitoring and prioritisation of the alarms

Energy efficiency actions

- Comparative performance analysis between different stores to identify optimisation opportunities
- Assessment of the effects of optimisation actions
- Identify and replicate cost reduction actions across the store network



Fig. 1.e - Dashboard for the comparative analysis of monthly consumption

A scalable solution for retailers

The partnership established over many years between CAREL and Technoelectric was the key to the project's success. With Technoelectric acting as general contractor, it was possible to **support the retailer locally throughout all stages of the project**, from understanding its needs to hardware integration, site connection to the cloud, map customisation and dashboard setup.

Over about three years, **around 1000 stores were successfully connected to the cloud**.

The fast deployment of the project was also due to the ability of CAREL and Technoelectric to directly supply **plug & play standardised electrical panels** with all the electronics already on board.



Fig. 1.a - Electrical panels with CAREL electronics



Site Performance Optimisation

A further step towards the full optimisation of the entire store network is represented by the **optimisation service** that CAREL and Technoelectric are continuously providing to Mega Image.

In order to **enhance and maintain the performance of the refrigeration, lighting and HVAC systems** on each site, Carel leverages its thermodynamic competences and its extensive expertise in HVAC/R applications to help retailers **unlock the full potential of their systems** and **minimise OPEX**, with **concrete and measurable optimisation actions**.

In accordance with Mega Image, CAREL and Technoelectric are working on one group of stores at a time, in a continuous roll-out. After an initial performance assessment of the store, **the team identifies the areas of improvement and defines the required actions for optimisation**. Most of these optimisation actions, which are always submitted to the retailer for approval, are **handled remotely via the RED digital portal**, while others are carried out locally by the trusted service company.



Thanks to the presence of CAREL controllers and supervisors in combination with the RED digital platform, it is possible to **transform data into technical insights** for continuous improvement, in terms of:

- **Energy saving** by optimising the operating conditions of the equipment and eradicating waste
- **Food waste reduction** by extending product shelf life through improved regulation performance of the cabinets
- **Alarms reduction** through targeted actions on the system operation to optimise issues management and protect components

"Increasing energy efficiency is a key element in the strategy to reduce the impact of our business on the environment", commented the Technical Team for Mega Image. "We are now able to monitor the temperatures in all the controlled spaces and obtain automatic reports that comply with HACCP requirements. Moreover, we automated the control of some important electrical loads in our stores and we can intervene remotely to solve some field issues".

"In addition to optimising service and maintenance activities, the centralisation of information from the field through RED optimise gives us access to high-value reports for the entire organisation".

Conclusions

The project in collaboration with Technoelectric once again demonstrates how CAREL represents the ideal **partner for retailers** to achieve their strategic targets of **lowering OPEX, streamlining service and maintenance activities and transitioning to natural refrigerants**.

In this context, CAREL's combined product and service offering is perfectly suited to support retailers in aligning with the European regulatory framework, which finds EPBD as the main tool to drive the decarbonization strategy for buildings.

The energy savings resulting from the implementation of the Total-Store solution have reached approximately 14% across all the stores, exceeding the expectations set by the project team.

CAREL invests considerable resources in developing a **sound network of skilled partners** able to develop best-in-class solutions and provide a first line of **local support** to retailers throughout **all the stages of the project and beyond**, as shown by the Total-Store experience with Mega Image in Romania.

CAREL and Technoelectric started from Mega Image's needs and, through a **consultative approach**, were able to define and implement the **best technical solution** to meet the retailer's expectations **for both new stores and retrofit projects**.

The highlight of the **Total-Store** solution relies on **integration, centralisation and continuous optimisation**. CAREL's supervisory infrastructure features the presence of all industry-standard communication protocols, thus allowing the **integration of third-party devices**. This makes it possible for retailers to completely **centralise the control and monitoring** of **all the functional areas** of the stores and the store network.

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