

## Final Results of Epta's Life-C4R Project Exceed Efficiency Expectations

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Italian OEM Epta has released results from its Life-C4R (Carbon 4 Retail Refrigeration) project, summarizing three years of data from seven European supermarkets testing commercial CO<sub>2</sub> (R744) refrigeration systems.

Final results exceeded expectations, showing a 15–23% decrease in energy consumption over traditional CO<sub>2</sub> systems, Epta said.

Life-C4R, co-funded by the EU, was created to accelerate the implementation of very-high-efficiency CO<sub>2</sub> refrigeration systems as a way of reducing greenhouse gas emissions and cutting energy. The project ran between 2018 and 2021 to collect real-life data from installations in Italy, Romania and Spain. It concluded in July 2021 with a webinar to share the experiences of three of the retailers who took part in the study.

The project's initial technical objective was to create a new generation of CO<sub>2</sub> refrigeration systems, according to a statement by Epta. These systems would allow optimized performance and efficiency for any climatic situation and significant energy savings throughout the world and throughout the year.

"Ultimately, the Life-C4R project allows for the natural refrigeration systems' quality standards to be raised even further," according to Epta. "It promotes an acceleration in sustainability that is required now more than ever, including at the regulatory level."

### Proving (and improving) performance

As part of the project, Epta's FTE 2.0 (Full Transcritical Efficiency) and ETE (Extreme Temperature Efficiency) systems were piloted with the aim of making CO<sub>2</sub> refrigeration systems reliable, safe and even more cost-effective, regardless of the ambient temperature. "The results far exceeded expectations," said Epta.

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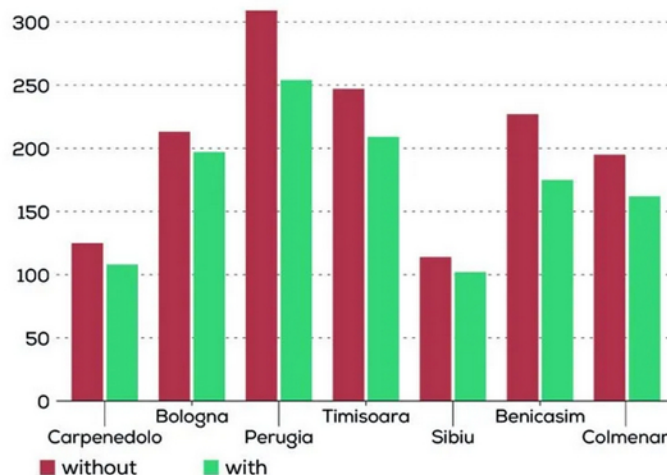
Mechanically, the FTE 2.0 system works with the same components as a standard CO<sub>2</sub> system. Its efficiency derives from utilizing evaporators for medium-temperature users in “flooded” mode. ETE is a CO<sub>2</sub> subcooling system designed to integrate FTE in high- or extreme-temperature conditions, “ensuring ideal performance and consumption even in hot climates and those with temperatures well above 40°C (104°C),” said Epta.

The systems were tested in a variety of different conditions, from store size (1,000 to 6,000m<sup>2</sup>/10,764 to 64,583ft<sup>2</sup>), climatic conditions (mild to extremely hot temperatures) and geographical position (different countries, where habits, knowledge of the systems and skills differ).

### Demonstrating emission reductions

The data produced by the systems during the three years of observation were processed as part of a precise consumption analysis. This demonstrated that the Epta technologies used in the Life-C4R “guarantee an annual decrease in energy consumption of between 15% and 23% (compared to traditional CO<sub>2</sub> systems),” said Epta.

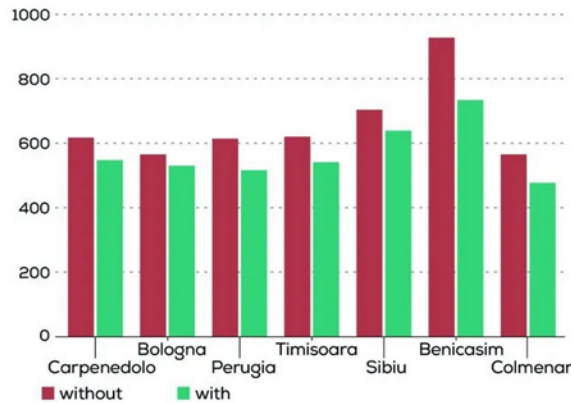
Annual energy consumption (MWh/year) for each store, with Life-C4R technologies and without.  
An energy saving between 15% to 23% is observed



Annual energy consumption (MWh/year) for each store with Epta technologies and without, showing an energy saving between 15% and 23%.

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CO<sub>2</sub>e emissions in the different pilot stores by means of LCCP without and with Life-C4R technologies.  
Total impact assessment (kg CO<sub>2</sub>e per kWh)



CO<sub>2</sub>e LCCP emissions in the pilot stores, with and without Epta technologies. Total impact assessment (kg CO<sub>2</sub>e per kWh).

In addition, Epta provided a Life Cycle Assessment (LCA) of its Life-C4R technologies' GHG emissions, calculated according to Life Cycle Climate Performance (LCCP) standards. This shows that Epta's systems can reduce overall CO<sub>2</sub>e emissions by up to 20%.

"The value of the Life-C4R project for the future is very high," said Francesco Mastrapasqua, Epta's Institutional Affairs Manager. "Not only have we eliminated the technological constraints of CO<sub>2</sub>, but thanks to the numerous outreach activities we have contributed to a cultural change, demonstrating how this refrigerant can be used everywhere in the world and how we can, today more than ever, accelerate towards climate neutrality in our activities."

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Mastrapasqua said that its Life-C4R systems can be used in a "structural retrofit program of existing points of sale." The aim would be "to replace the old generation commercial refrigeration systems with modern technologies, thus aligning this sector with the objectives of European and global climate neutrality."

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The project is applicable beyond Europe, too. Epta's technology has already been installed in countries around the world, even those characterized by high temperatures, such as South America, Australia, the United Arab Emirates and Southeast Asia. In the U.S., Lunds & Byerlys disclosed that it installed an FTE system from Kysor Warren Epta US, the US subsidiary of Epta, in a new store.