



Enex Technologies Integral Unit Transgourmet Poland. Photo Credit: Enex Technologies.

## Enex Integrated CO<sub>2</sub> Rack and Heat Pump Cuts Polish Hypermarket's Annual Emissions by 70 Tons

**With a charge of roughly 500kg of CO<sub>2</sub>, the system provides store refrigeration, heating, cooling and sanitary hot water.**

Jae O. Haroldsen May 13, 2024 Commercial Refrigeration, Europe



An integrated CO<sub>2</sub> (R744) rack and heat pump system manufactured by Italian OEM [Enex Technologies](#) has cut the CO<sub>2</sub>e emissions of a remodeled Transgourmet Polska hypermarket in Warsaw, Poland, by about 70 metric tons annually compared to the previous system, which used R404A.

Swedish-based Frigo-Consulting and [Epta](#) Central North Europe, part of the Epta Group, partnered with Enex on the project.

"This CO<sub>2</sub> installation with heat recovery, as well as other store functions, are part of our mission to reduce emissions harmful to the climate and protect valuable resources," said Bartosz Jankowiak, Technical Department Director at Transgourmet Polska.

According to Enex, the reduction in CO<sub>2</sub>e emissions mostly comes from the use of CO<sub>2</sub> refrigerant, with leaks of synthetic refrigerants accounting for higher equivalent emissions. In addition to moving to a natural refrigerant, the company also acknowledges energy efficiency also plays a role in the reduction.

Besides refrigeration, the integrated system, with a charge of roughly 500kg (1,100lbs) of CO<sub>2</sub>, provides store heating, cooling and domestic hot water.

"It is sufficient to say that using a natural refrigerant for such a plant size, with a charge of about 500 kg, the 'content' in the circuit is reduced by 1,000 equivalent tons of substances producing greenhouse effect," said Enex.

The system design includes two identical units, with each providing the following capacities:

- 200kW (56.9TR) of medium-temperature (MT) refrigeration at -3°C (26.6°F) evaporation temperature
- 32kW (9.1TR) of low-temperature (LT) refrigeration at -28°C (-18.4°F) evaporation temperature
- 150kW (42.7TR) of air-conditioning at water flow temperatures ranging from 10–16°C (50–60.8°F)
- 360kW (102.4TR) of heating with water flow temperatures up to 42°C (107.6°F)
- 100kW (28.4TR) of hot water for sanitation purposes at flow temperatures up to 72°C (161.6°F)

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## Energy savings

Enex indicates that the installed system reduces overall energy use by roughly 30% compared to the predicted consumption rates. "Combining the 'warm side' and the 'cold side' of a refrigeration system is attractive because, energy-wise, such systems can be overall very efficient," the manufacturer said.

The average winter highs in Warsaw are close to 1.7°C (35°F). Enex reports that the CO<sub>2</sub> system meets all of the store's heating needs for climate control and sanitation with no additional energy.

According to the manufacturer, the system's energy savings compared to standard solutions come from heat recovery and other measures, including:

- recompression of the flash vapor
- an innovative air-conditioning system
- ejectors to recover expansion energy
- Enex's [patented liquid ejector](#) for overfeeding evaporators
- modulating 3-way ball valves in front of the heat exchangers

"We are more than satisfied with [the] truly efficient and energy-saving integrated installation, with no oil return problems or anything else," said Krzysztof Blauciak, Project Manager for Frigo-Consulting in Poland.

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## Gaining experience

Since its founding in 2004, Enex has pioneered transcritical CO<sub>2</sub> refrigeration, with its founder, Sergio Giroto, [installing the first CO<sub>2</sub> system](#) in an Italian supermarket in 2001.

Enex noted that the success of the integrated system in the Polish hypermarket flows from the refinement of several similar but smaller installations. The company started developing combined systems for heating and refrigeration in 2018.

As part of its participation in the [EU-funded MultiPACK project](#), Enex found integrating CO<sub>2</sub> heat pump systems provides space heating, cooling and domestic hot water for hotels at COP values of up to 6.

Last year, a new [luxury Swiss hotel](#) opened with an Enex transcritical CO<sub>2</sub> booster system, providing refrigeration for 26 MT rooms, 11 MT cabinets and 5 LT rooms across seven restaurants and bars. Heat recovery from the system provides space heating and hot water for the hotel.

“Our mission is to support the global energy transition through climate-tech solutions while making our customers successful,” said Luis Crespro, President of HVAC and Commercial Refrigeration Business Units at Enex Technologies. “We are committed to continuing our efforts to be pioneers in natural refrigeration technology for HVAC&R.”

Besides CO<sub>2</sub> systems, Enex offers ammonia (R717), propane (R290) and water (R718)-based HVAC&R solutions. Last month, the company [appointed](#) François Audo, most recently a Vice President and Managing Director at Carrier, as its new CEO.

**Update:** This article was updated on May 15 with new information from Enex about the synthetic refrigerant used in the Transgourmet Polska hypermarket in Warsaw.

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