

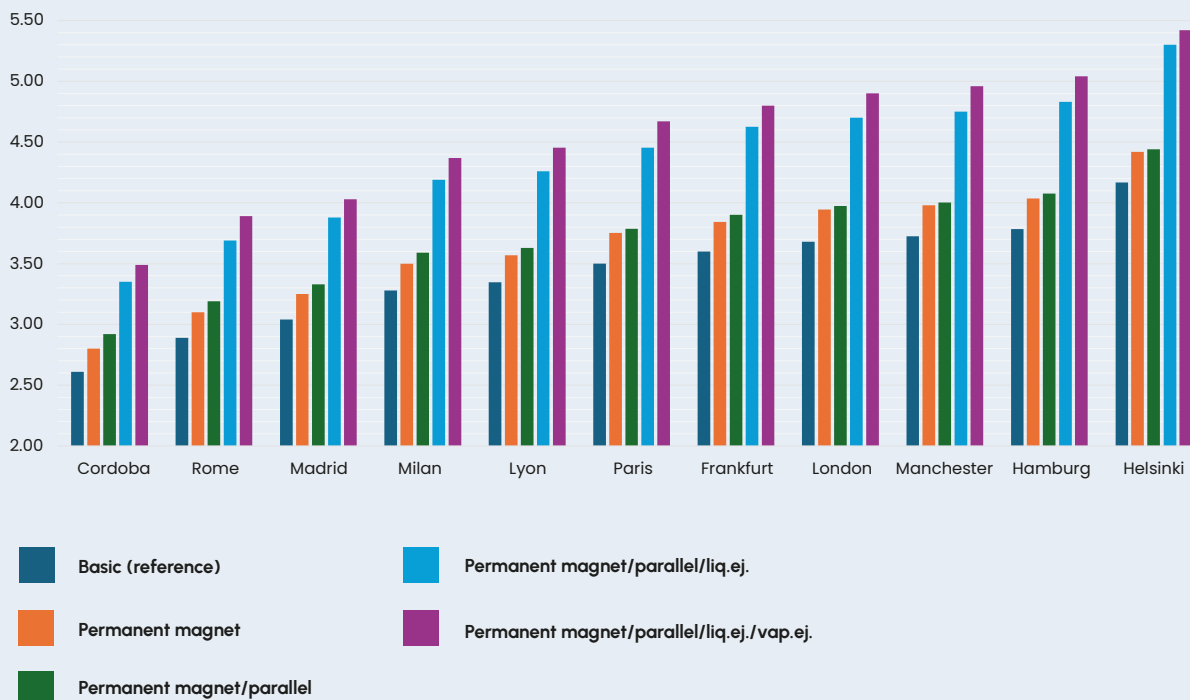
CO₂'s Role in sustainable *cooling*



enex technologies
cooling and heating naturally

Efficiency of CO₂ *transcritical*

Transcritical CO₂ refrigeration systems show strong efficiency across a wide range of European climates. The Seasonal Energy Performance Ratio (SEPR) rises in colder regions, and advanced system architectures—such as parallel compression, liquid ejectors, and vapor ejectors—consistently deliver higher efficiency compared to basic configurations. At the same time, the data demonstrates that CO₂ technology performs reliably and efficiently even in warmer climates.



Life cycle cost



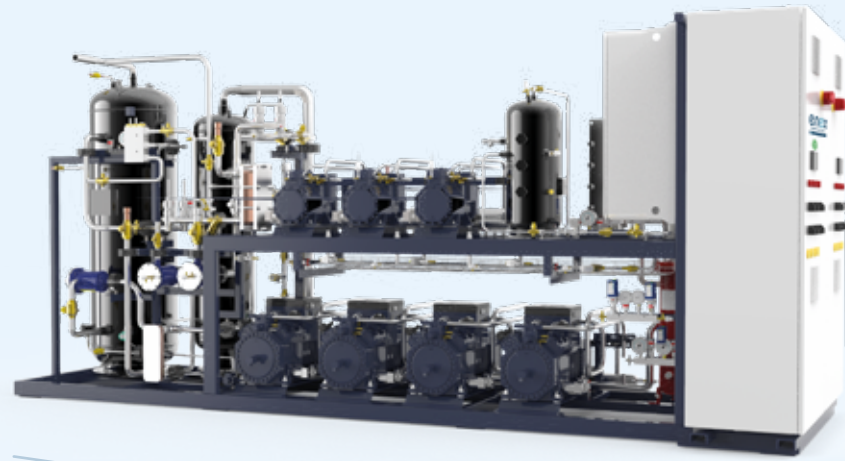


Thanks to **modern components and optimized system designs**, high energy performance is maintained in southern regions as well, confirming that **CO₂ refrigeration remains a competitive, energy-saving solution throughout Europe**—both in colder and in significantly hotter conditions.

Why choose **ENEX**?

- Among the **longest experience** in transcritical CO₂ (20+ years)
- Proven **outstanding quality and reliability** (2000+ units in the field in 30+ countries)
- State of the art production line with **3 pressure test bunkers** (PS x 1.1)
- Attention to **every construction detail**
- Inventor of **liquid ejector**
- **Industrialized but still flexible**

Construction details



Stainless steel piping

Robust **AISI 304** piping with **large thickness** capable of withstanding the most extreme vibrations in transport and operation. All welds executed by highly skilled welders trained in the Enex Academy.

Large liquid receiver

Generously sized liquid receiver **able to store the system charge** in case of maintenance.

Welded steel frame

Robust fully welded steel frame built with closed profile beams, providing **the most stable support to compressors, vessels and piping**. High design flexibility to meet dimensional constraints. Possibility to split the unit in multiple modules for transport and installation

3-layer insulation

All cold vessels protected by 3 layers: **grease tape, aluminium foil and closed cell insulation sheet**, for maximum resistance against corrosion over the entire product life.

Oil reservoir

Dedicated oil receiver at intermediate pressure for **foaming prevention in compressors** and minimum oil carry over into the system.

Non-miscible PAG oil

Higher viscosity in the compressor sump leading to less wear and longer life. **Smart oil management with drain points** in all critical sections of the system.

Suction accumulator with 3 level sensors

Maximum safety against liquid return in case of semiflooded operation with liquid ejector.

Service valves

All main components isolated by service valves to **minimize downtime in case of maintenance**.

Compressor on rubber mounts

No compressor oscillations transferred to frame to minimize structural noise and vibration.

Backup mechanical expansion valves

Mechanical automatic **high pressure and flash gas valves**, in parallel with the electronic stepper valves, provide full backup in case of failure.

Advantages

Carbon dioxide, CO₂, is a naturally occurring substance. It is not harmful to the atmospheric ozone layer and, although it is a "greenhouse gas," it has a very low Global Warming Potential (GWP).

By definition, the GWP of CO₂ is 1. CO₂ is a molecule produced by combustion, and the issue with CO₂ lies more in the enormous quantity continuously produced worldwide. In refrigeration applications, however, CO₂ is not produced but rather reused from what has already been emitted. With this distinction, **the CO₂ used in refrigeration has a net-zero GWP**.

Carbon dioxide was used in refrigeration up until around 1930, but was abandoned following the invention of synthetic refrigerants, which were later found to be harmful to the environment. **CO₂ has excellent thermophysical properties and is also well suited for use in heat pumps**.



Low environmental impact

CO₂ has a GWP of 1, meaning it is used as the reference point for defining Global Warming Potential. Some synthetic refrigerants have a significantly higher GWP—on the order of 1000 or more—which means that 1 kg of one of these fluids released into the atmosphere has an impact equivalent to that of 1000 kg of CO₂.



Versatility of use

Thanks to its thermophysical properties and the fact that it is **neither toxic nor flammable**, CO₂ is a versatile refrigerant that can be used in many sectors—for example, in food refrigeration, industrial refrigeration, and heat pumps. Its low critical temperature, often considered a limitation, can be overcome through the use of specially designed transcritical or supercritical cycles.



Non-flammable and non-toxic

CO₂ is **non-toxic at low concentrations** and is naturally present in ambient air at a concentration of around 500 ppm. Moreover, it is **non-flammable**, which is a key advantage in terms of safety as well as efficiency. Its non-flammability allows for direct circulation, resulting in lower energy losses compared to systems using secondary fluid loops.



Energy Savings

In addition to the energy advantage offered by the possibility of direct circulation, which is not feasible with toxic and/or flammable refrigerants, **appropriate modifications to the refrigeration cycle can increase overall efficiency to levels higher** than those achieved with conventional refrigeration systems. Such modifications include, for example, flash vapor recompression and the use of an ejector, which are now well-studied variants. The ejector was introduced in refrigeration, **thanks to new schemes patented by Enex, starting from 2011**.

Products Series

enex technologies
cooling and heating naturally

Tago



Drava



Senna



Senna P



Senna Xtra Smart



Neva



Elba



Blast Freezer Rack



Yukon B



Yukon C



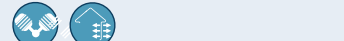
Yukon R



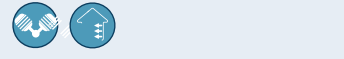
Yukon D



Kube



CO₂ Subcritical



Airheat



Geoheat



Performance Range



MT 10 kW - 40 kW

LT Up to 8 kW

MT 16 kW - 65 kW

LT 12 kW - 23 kW

MT

LT

MT

LT

MT

LT

MT

LT

MT

LT

LEGEND



Remote gas cooler



Water cooled



Small footprint



Inverter technology



Low noise



Connectivity



High hot water temperature



Plug & Play



Indoor/outdoor installation



Outdoor installation



Indoor installation



Liquid ejector



Semihermetic reciprocating compressors



Flooded evaporator



Vapor ejector



Plate exchangers





enexttechnologies.com
info@enexttechnologies.com

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