



NatRefs cited in Italy's first survey of HFC-alternative technologies

Italian contributions to the natural refrigerant industry include Epta's FTE CO₂ system and a strong expertise in R290 plug-in units.



In response to the Kigali Amendment to the Montreal Protocol, the Italian government has carried out its first national survey on environmentally friendly alternatives to HFCs in a number of industries, with CO₂ and R290 systems cited as major options.

The aim was to promote "made in Italy" technologies to the world, and to assist developing nations make the shift from HCFC's and HFCs to natural refrigerants, enabling them to comply with the Kigali requirements by using Italian made products and solutions.

The survey report – "[First National Census on HFC Italian Alternative Technologies](#)" – is the result of a collaboration between the Italian Ministry of Environment, Land and Sea (IMELS) and the Institute for Environmental Protection and Research (ISPRA), together with regional agencies for the protection of the environment.

It spans six sectors - refrigeration, air-conditioning, foams, fixed fire protection systems, aerosols and training. Most of the participating companies (11) are in the refrigeration sector. In the air conditioning and foam sectors, one company each responded; in fire protection, two companies; and in aerosols, none.

Contributions to refrigeration

The survey found that Italy has 17 companies offering technologies using HFC alternatives in the commercial refrigeration sector. The list includes big players on the European market for stand-alone units (Carel, Arneg, Epta, Dorin and LU-VE) and for central systems (Arneg, Carel, Dorin, Epta, LU-VE, DGM, ENEX, EUROKLIMAT, NOVA FRIGOR and SIAD).

The report states that the main Italian contribution to the development of new refrigeration technologies lies within appliance design and the manufacturing of natural solutions, including hydrocarbons and CO₂. It concludes that this expertise probably stems from the country's long tradition as a machine manufacturer and exporter.

One area singled out is the use of propane (R290) for plug-in units, both for single and multi circuit solutions. Several Italian companies, including Arneg and Epta, have long standing expertise, offering solutions with "best in class" energy efficiency and low charge.

The report also mentions Epta's [Full Transcritical Efficiency \(FTE\)](#) systems as an example of a patented Italian development that increases the efficiency of transcritical CO₂ systems, and opens up their use in warmer climates. This new option is made possible by decreasing the discharge temperature from FTE medium-temperature compressors by flooding the evaporators. The FTE solution "has allowed the use of the transcritical CO₂ booster at all latitudes of Europe, allowing high energy efficiency at any temperature and use for all store sizes," the report says.

The FTE systems also has installation and maintenance costs that are up to 30% lower than traditional systems, and an energy consumption that is 10% lower.

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Propane chillers

Italy has a long tradition of using hydrocarbons in small self-contained air-conditioning units, with De'Longhi being the first to produce a portable "Pinguino" propane AC unit in 1985. EUROKLIMAT was cited in the air-conditioning sector for its propane water chillers.

Italian legislation on the use of flammable refrigerants in buildings does not address the use of A2Ls, defined as having low flammability. This presents a challenge for the sector when it comes to identifying suitable HFC alternatives in larger air-conditioning equipment, says the report. The HVAC sector has requested that international standards of flammability be implemented in Italy to improve this situation.

The report also details how production of air-conditioning equipment in Italy doesn't happen on a massive standardized scale. Manufacturers tend to specialize in small-scale production of customized solutions, with the production of heat pumps a driving element in the industry. Generally, the country produces end-user solutions, while buying its compressors abroad. Italian manufacturers of heat pumps and chillers include Carrier, Clivet, Aermec and Euroklimat.

The report also notes that Italian companies' commitment to research and development of new technologies "emerges as an outcome of the survey."



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– ISPRA report