



The Italian Union of Green Heat and Cold (Unione del caldo e del freddo green) is an informal ad hoc group that was founded 1 year ago and counts some of the largest industrial players of natural refrigerants across the whole value chain. Its goal is to contribute to the development of the right legislative framework to develop more sustainable refrigeration and conditioning.

The purpose of this document is to clarify some of the doubts that have been circulating in the decision-making arena and have appeared on mass media as fake news.

PREAMBLE

On 5 April 2022, the European Commission presented a legislative proposal to update the F-GAS Regulation.

The proposal aims to bring the 2014 F-Gas Regulation in line with the European Green Deal and the European Climate Act, as well as the most recent international commitments under the Montreal Protocol.

In particular, it is proposed to increase the ambition of the quota system in order to accelerate the hydrofluorocarbons (HFCs) phase-down of: quotas are now revised starting in 2024, leading to a 98% reduction of HFCs placed on the market in 2050.

But let's take a step back: **what is the F-GAS Regulation, when did it come into force, what does it imply and how have the refrigeration, air conditioning and heating sectors been impacted?**

The **European Regulation 517/2014** on fluorinated greenhouse gases came into force in June 2014 and it is applicable from 1 January 2015.

It is one of the concrete action of the environmental policy the European Union decided to adopt to **limit the production and use and in general prevent the emissions from fluorinated greenhouse gases, regulating their recovery and destruction and defining criteria for the labelling and disposal of products and equipment containing this type of gases.** It also deals with the **training and certification of personnel and companies involved in the greenhouse gases (F-gases) treatment.**

Over the years, the use of F-Gases in the refrigeration and air-conditioning sectors has contributed to some of the major environmental problems, including:

- 'ozone hole' in the Earth's stratosphere (with CFC gases);
- global warming of the earth's atmosphere (with HCFC and HFC gases);
- potential pollution impact on soil and groundwater (with HFO gases).

The history of refrigerants tells us that each generation of synthetic gases has been gradually phased out due to their proven harmful effects on the environment.



The numerous advantages over HFCs and HFOs make natural refrigerants a real guarantee for a more sustainable future.

This is why the UNIONE DEL CALDO E DEL FREDDO GREEN (**UCFG – Green Heat & Cold Union**) was founded, a group of major Italian companies that believes in this industry sustainable development and promotes technologies using natural refrigerants that have no environmental impact on our Planet.

1) What does “natural refrigerants” really mean?

Natural refrigerants are substances that are already abundantly and naturally present in the atmosphere and therefore pose no potential risk to the environment: their use in refrigeration, air conditioning and heating in no way threatens the environmental balance.

On the contrary, the synthetic fluorinated gases CFC/HCFC/HFO (also known as 'chemicals' or “patented”) are man-made and are for years responsible for considerable environmental damage (ozone depletion, greenhouse effect and possible PFAS pollution¹).

Some of the natural refrigerants that have been reliably and efficiently used (and for decades now) in the refrigeration and heating sectors are: CO₂, R290 (propane) and R600a (isobutane) and NH₃ (ammonia).

Natural refrigerants clearly differ from synthetic ones in their GWP, which measures their impact on global warming:

	NH₃ (R717)	CO₂ (R744)	R290	R600a	R32	R448A	R134a	R404a
Type of refrigerant	Natural	Natural	Natural	Natural	Synthetic gas	Synthetic gas	Synthetic gas	Synthetic gas
Family			HC	HC	HFC	HFC/HFO	HFC	HFC
GWP* (a 100 years)	0	1	3	3	675	1386	1430	3922

* Global Warming Potential (GWP for short) expresses the contribution to the greenhouse effect of a greenhouse gas relative to the effect of CO₂, whose reference potential is 1. Each GWP value is calculated for a specific time interval (typically 20, 100 or 500 years).

¹ PFAS are compounds found all over the world, used to make textiles, paper, and coatings for food containers grease- and water-resistant, but also in the production of photographic films, fire-fighting foams, and household cleaners. However, their chemical properties and characteristics have negative consequences for the environment, and due to their persistence and mobility, these compounds have been detected in significant concentrations in ecosystems and living organisms.



2) Are there technical/practical limitations to using of natural refrigerants?

NO, when handled properly, there are none: natural refrigerants are used in any refrigeration, heating and air-conditioning system and installation safely and always with very high of energy efficiency levels and extremely advantageous operating costs.

The products using natural refrigerants are ready because they are manufactured according to well-established technical norms and product standards and, at the same time, are constantly evolving to meet the need of a faster phase-out of environmentally harmful synthetic gases.

3) Are they efficient in terms of technical and energy performance?

Yes. Companies, particularly the Italian ones and across the whole of EU have been producing them for decades equipment using natural refrigerants and continue to invest in the research and development of these technologies, significantly improving their performance and energy efficiency to the point of making them technically and economically advantageous compared to similar equipment with synthetic gases, as demonstrated in the numerous case studies presented at conferences and industry panels.

4) How is CO₂ (R744) used?

CO₂, a byproduct of many energy transformations and industrial processes, is commonly used for centralized refrigeration systems in medium and large shops and supermarkets where high seasonal efficiency is required.

In Europe, there are over 57,000 installations (shops) running on CO₂, with an annual growth rate of 40% (source Atmosphere, 2022).

Since more than a decade, CO₂ has been the most widely used solution for this type of new installation for the following reasons:

- It is a **natural refrigerant**;
- Its **GWP is 1**, so the use of CO₂ as a refrigerant is crucial to achieve the European environmental goals (phase down of F-gases, Montreal Protocol, Paris Agreement, European climate law);
- It has an **ODP** (Ozone Layer Depletion Potential) of **0**;
- **It is safe, non-flammable and in normal concentrations non-toxic**;
- Compared to synthetic gases, **CO₂ is a pure fluid and has a high intrinsic heat transfer capacity, which contributes to its excellent energy efficiency**;
- **Its cost is low and stable** compared to synthetic HFC/HFO gases (especially the patented ones).



A favorable and clear regulatory framework is therefore necessary to encourage the spread of these technologies and support companies that have been investing for years in a more sustainable future, maintaining the employment levels in this key sector for the European industry.

5) What can hydrocarbons (R290, R600, R600a) be used for?

Hydrocarbons are natural refrigerants that are ideal for self-contained refrigeration, heating and air conditioning equipment according to the safety standards of the ISO/EN 60335 family.

In refrigeration they are used in the so-called plug-ins: the R290 is used in grocery stores/supermarkets (display cabinets, fridges) and in the Ho.Re.Ca sector, for refrigerated cabinets and freezers, ice-makers, beverage dispensers and, in general, in confectionery, catering and many types of refrigerated professional equipment.

In the home-appliance (basically in all domestic fridges all over Europe) the R600a (isobutane) it is commonly used).

The main advantages of hydrocarbon refrigerants are the same as CO₂, in particular:

- **near-to-zero GWP;**
- **pure substance, with very high levels of performance and efficiency;**
- **constantly low and stable cost, thanks to its abundant availability.**

To date, there are more than 5 million refrigerators and beverage coolers in Europe using propane (R290) and hundreds of millions of domestic refrigerators and freezers using on isobutane (R600a). Globally, more than 100 million R600a refrigerators are produced annually with very high safety standards.

Hydrocarbons are also used for the human comfort in buildings, as operating fluids in Heat Pumps (HPs).

6) Are hydrocarbons dangerous?

NO, they are not dangerous per se.

Like many commonly used substances, they are flammable under certain conditions, which is why **their use in the refrigeration, air conditioning and heating equipment is strictly regulated by international safety rules.**

Examples of common domestic use of hydrocarbons (in total safety) are: the gas boiler, the gas cooker, the refrigerator, the gas barbecue, etc.

Even for maintenance/service work, there are established solutions and good practices that, thanks to the use of simple tools, allow operators to intervene in total safety, even during public opening hours.



7) What are Heat Pumps, and where are they used?

Heat Pumps are devices that exploit the characteristics of a refrigerant fluid to heat and cool an environment without the direct use of fossil fuels: they are therefore essential to achieve the objectives of the electrification of heating with high performance and efficiency.

In particular, high-temperature **heat pumps are ideal for the replacement of existing boilers in buildings** where heating is provided by radiators: reaching water temperatures above 80°C, they guarantee very high levels of performance and can be used in all existing buildings even without renovation work.

8) Why are Heat Pumps with natural refrigerants more efficient?

Today, all over Europe, **heat pumps working with natural refrigerants operate proven performance equal or better performance than those using F-gases.**

Remarkably these heat pump can in some cases achieve much higher temperatures in heating (beyond 80°C) than synthetic gases.

Thanks to this feature, heat pumps using hydrocarbon refrigerants are also installed in new or refurbished buildings, including in the case when a complete refurbishment of the heating system is not possible, such as in buildings in old town centers or apartment blocks (plug-in installations instead of boilers).

They are therefore the only real possibility to achieve the European climate targets and, in particular, the REPower EU targets.

The limited gas charge and state-of-the-art technology adopted in the hermetic circuits of heat pumps make them superior in terms of home safety, compared to traditional gas boiler heating systems. **The use of natural refrigerant heat pumps also improves the energy performance of buildings, significantly lowering utility bills.**

The air-conditioning and the air-to-air heat pump industry is also rapidly switching to natural refrigerants for their greater efficiency, with many examples of R290 units being installed in Italy as well.

A favourable and clear regulatory framework is essential to support the rapid adoption of these technologies, in a sector where Italian companies are world leaders.



9) Is the natural refrigerant heat pump market a niche market?

Until now, heat pumps with natural refrigerants have represented a minority share of European production (while they are very present in Japan, for example), but in the last two years a trend reversal is taking place.

Germany, Europe's largest heat pump market, has recently adopted a new incentive program that increases subsidies for citizens installing natural refrigerant heat pumps by 5 per cent; from 2028 it provides exclusive incentives, with an option to anticipate this to 2027.

In other words, in four years' time, heat pumps with natural refrigerants will gain a predominant market share in the European reference market for this technology.

10) Why is ammonia (R717) used in refrigeration?

Ammonia, whose chemical formula is NH_3 , is a natural refrigerant, the only basic gas in the atmosphere, and for this reason it is the only natural agent that can neutralise acid rain, even forming fertilisers.

Ammonia has always been the first choice for large refrigeration systems and it is no coincidence that the first chillers were designed using ammonia. Its following characteristics, however, make it usable not only in sub-zero refrigeration systems, but also in air conditioning systems and heat pumps:

- **Efficient:** it is the best performing refrigerant under all operating conditions, due to its unique thermodynamic properties resulting in a high heat exchange coefficient. The use of ammonia guarantees considerable savings on electricity compared to any other refrigerant.
- **Sustainable and environmentally friendly:** it is the only refrigerant gas that boasts a GWP (Global Warming Potential) and an ODP (Ozone Depletion Potential) both equal to 0. Ammonia does not harm the environment.
- **Cheap:** it is available in abundance and at a much lower price than synthetic gases and is readily available. Ammonia does not run the risk of phasing out.
- **Flexible:** it can be used in many applications: for industrial refrigeration plants (cold rooms, freezing tunnels, breweries, food processing plants) and commercial, as well as civil plants and heat pumps applications.

11) Is ammonia (R717) toxic and explosive?

Yes, it is considered a toxic gas and its use in Italy is still regulated by the Royal Decree No. 147 of 1927. **Nevertheless, its pungent odour allows its presence to be immediately detected at very low concentrations** (a few ppm, parts per million). There are redundant safeguards in the plants



to manage the use of the refrigerant with low risk, including scrubbers that allow the concentration of refrigerant to be reduced by 95% in the event of a leak.

Ammonia is only explosive under certain atmospheric conditions: in a concentration range of 15% to 28% and an ignition temperature of 630 °C. In refrigeration plants, these conditions are difficult to meet, especially if the plant is located outdoors.

12) Why are HFOs dangerous?

Hydro-Fluoro-Olefins (HFOs) are the latest generation of synthetic gases promoted by the chemical industry for cooling equipment and heat pumps, proposed as a sustainable alternative to Hydro-Fluorocarbons (HFCs).

However, **there are several important studies that show that HFOs would be a threat to the climate, the environment and human health:** they decompose in the atmosphere, creating high levels of trifluoroacetic acid (TFA), a very persistent, non-degradable substance, whose levels have increased tenfold since 1990, that accumulates in glaciers and leaches into the soil and groundwater in the form of acid rain.

This is why **we firmly believe in the need to apply a the Precautionary Principle now and in the future use to these synthetic gases**, at least until their overall effects on the planet and on our health will be fully understood and proven.



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Chi Siamo:



Legambiente

Era il 1980 quando abbiamo iniziato a muovere i primi passi in difesa dell'ambiente. Da allora siamo diventati l'associazione ambientalista più diffusa in Italia, quella che lotta contro l'inquinamento e le ecomafie, nei tribunali e nelle istituzioni, così come nelle città, insieme alle persone che rappresentano il nostro cuore pulsante. Lo facciamo grazie ai Circoli, ai volontari, ai soci che, anche attraverso una semplice iscrizione, hanno scelto di attivarsi per rendere migliore il pianeta che abitiamo.

Abbiamo bisogno di coraggio e consapevolezza perché, se lo facciamo insieme, possiamo cambiare in meglio il futuro delle giovani generazioni.

It was 1980 when we took our first steps in defense of the environment. Since then we have become the most widespread environmental association in Italy, the one that fights against pollution and ecomafias, in the courts and institutions, as well as in the cities, together with the people who represent our beating heart.

We do this thanks to the Circles, volunteers, and members who, even through a simple membership, have chosen to take action to make the planet we inhabit better.

We need courage and awareness because, if we do it together, we can change the future of the younger generations for the better.

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ARNEG

Arneg è leader internazionale nella progettazione, produzione e installazione di refrigerazione commerciale e attrezzature complete per il settore del retail. Casa madre di un gruppo multinazionale, è presente in tutto il mondo grazie a **21 stabilimenti di produzione e 20 sedi internazionali** (1.550.000 m² di terreno e 480.000 m² di aree coperte) con l'impiego di **3.140 collaboratori**. Il gruppo, che nel 2021 ha fatturato **841 milioni di euro**, si contraddistingue nel mercato per la capacità di coniugare alte performance, innovazione ecosostenibile, ottimizzazione del risparmio energetico e design made in Italy.

*Arneg is an international leader in the design, manufacture and installation of commercial refrigeration and complete equipment for the retail sector. Headquarter of a multinational group, it is present all over the world thanks to **21 manufacturing companies and 20 international offices** (1.550.000 m² of land and 480.000 m² of facilities) with the support of **3.140 employees**. The group, which recorded a turnover of **841 million euro in 2021**, stands out in the market for its ability to combine high performance, eco-sustainable innovation, energy-saving optimisation and made-in-Italy design. We need courage and awareness because, if we do it together, we can change the future of the younger generations for the better.*



CAREL

CAREL è un'azienda italiana leader mondiale nelle soluzioni di **controllo ed umidificazione** per i settori di condizionamento, refrigerazione e riscaldamento. Fondata nel 1973, CAREL ha registrato nel 2021 un **fatturato consolidato di 420,4 milioni di euro**. Il Gruppo comprende **31 filiali, 13 stabilimenti** di produzione in tutto il mondo e partner e distributori in altri **75 paesi**. Inoltre, dal 2018 è **quotata alla borsa di Milano** nel segmento STAR. Nel 2021 Carel ha indirizzato il **49,5% dei propri investimenti ed il 60,4% dei ricavi** verso soluzioni ammissibili e allineate ai criteri di **Tassonomia**, secondo il regolamento EU 2020/852 focalizzato sulla sostenibilità ambientale.

CAREL is a Italian company world leader in control and humidification solutions for the air conditioning, refrigeration and heating sectors.

*Founded in 1973, CAREL recorded **consolidated revenues of 420.4 million euros** in 2021. The Group includes **31 subsidiaries, 13 manufacturing plants** around the world and partners and distributors in another **75 countries**. Furthermore, since 2018 it has been listed on the Milan stock exchange in the STAR segment. In 2021 Carel directed **49.5% of its investments and 60.4% of revenues** towards eligible and aligned solutions with the **Taxonomy** criteria, according to the EU 2020/852 regulation focused on environmental sustainability.*



CRIOCABIN

Criocabin Group, con un fatturato di **43M€/anno**, è specializzata nella produzione di **banchi refrigerati e celle frigorifere Taylor-made** basati su **refrigeranti naturali** per Food Concept nel settore Retail, F&B e Ho.Re.Ca. Tutti i processi, dalla progettazione alla produzione sino ai test finali sono svolti in Italia nei **50000 m2** dei nostri stabilimenti per mantenere la **qualità del marchio Made in Italy** dei **4775 modelli e versioni** prodotti ogni anno. I nostri **330 collaboratori**, estremamente qualificati a cui dedichiamo oltre **12000 ore di formazione/anno**, sono fautori della nostra **etica produttiva e professionale** di **innovazione e sostenibilità** nel pieno rispetto delle norme ambientali.

Criocabin Group, with a turnover of 43M€/year, is specialized in manufacturing Taylor-made refrigerated display counters and cold rooms based on natural refrigerants for Retail Food Concepts, F&B and Ho.re. Ca. The whole process, from designing to the production up to the final tests are carried out in Italy in our 50000 m2 plants to preserve the quality of the Made in Italy brand of the 4775 models and versions produced every year. Our highly qualified 330 co-workers, to whom we dedicate more than 12000 hours of training/year, are advocates of our productive and professional ethics aiming to innovation and sustainability in full compliance with environmental standards.



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INNOVATION

OFFICINE MARIO DORIN

Nata nel 1918, **Officine Mario Dorin** è leader mondiale nel settore della **refrigerazione** ed il **condizionamento**, grazie alla sapiente sinergia tra **qualità, modernità e sostenibilità**. Società fiorentina, sempre in mano alla stessa famiglia, da ben **104 anni**, **Dorin** è leader mondiale nei **compressori per refrigerazione con gas naturali**. **Prima azienda del settore, a livello globale**, ad investire in questa **tecnologia innovativa**, i primi compressori furono realizzati a partire dagli **anni '90**, **Dorin** concentra il suo business nella **ricerca, progettazione, produzione e commercializzazione di compressori per la refrigerazione**, il cui campo di impiego è rappresentato dalla **catena alimentare** e tutte le applicazioni che **richiedono il controllo delle temperature**.

*Founded in 1918, **Officine Mario Dorin** is a world leader in the field of **refrigeration** and **air conditioning**, thanks to the wise synergy between **quality, modernity and sustainability**. Florentine company, always in the hands of the same family, **for 104 years**, **Dorin** is a world leader in **compressors for natural gas refrigeration**. **The first company in the industry, globally**, to invest in this **innovative technology**, the first compressors were built **since the 90s**, **Dorin** concentrates its activity in **research, design, manufacture and commercialization of compressors for refrigeration**, the field of use of which is represented by the **food chain** and all **applications that require temperature control**.*



ELIWELL by Schneider Electric

Eliwell by Schneider Electric ha sede a Belluno, con **250 dipendenti ed un fatturato di 87 milioni di Euro**. La sua è la storia di successo che porta lo sviluppo tecnologico **made-in-Italy nel mondo da oltre 40 anni: dai sistemi di controllo elettronici all'innovazione digitale, al servizio della refrigerazione e del condizionamento**. **Rispetto dell'ambiente, digitalizzazione e risparmio energetico** sono tra i nostri principali obiettivi, che si concretizzano attraverso lo sviluppo di soluzioni tecnologiche innovative per **l'impiego intelligente dei refrigeranti naturali**. **Eliwell dal 2014 è centro di eccellenza del gruppo Schneider Electric, con un fatturato di 25 miliardi di Euro ed oltre 128 mila collaboratori in tutto il mondo**. L'obiettivo di Schneider è consentire a tutti di sfruttare al meglio l'energia e le risorse che abbiamo a disposizione, coniugando progresso e sostenibilità. Questo è ciò che definiamo **Life Is On**.

*Eliwell by Schneider Electric is a company based in Belluno, with **250 employees and a turnover of €87 million**. Eliwell's path is the success story that has been bringing **made-in-Italy technological development to the world for over 40 years: from electronic control systems to digital innovation, serving refrigeration and air conditioning market**. **Respect for the environment, digitalisation and energy saving** are among our main objectives, which are accomplished through the development of innovative technological solutions for **the smart use of natural refrigerants**. **Eliwell has been a centre of excellence of the Schneider since 2014, with a turnover of 25 billion Euros and over 128 thousand employees worldwide**. Schneider Electric's goal is to enable everyone to make the most of the energy and resources we have available, combining progress and sustainability. This is what we call **Life Is On**.*



EMBRACO

Fin dal 1971, Embraco è fornitrice globale di tecnologie di refrigerazione per l'intera catena del freddo residenziale e commerciale, contando su un portfolio ampio, efficiente e competitivo per il domestico, il food service, il food retail, i merchandiser e le applicazioni mediche. Le sue soluzioni si differenziano per l'innovazione, che supera le aspettative più sfidanti dei clienti. Embraco è parte di Nidec Global Appliance, una piattaforma di Nidec Corporation. Con più di 12.000 impiegati su 9 paesi, Nidec Global Appliance produce e commercializza prodotti per applicazioni domestiche e commerciali, incluse le soluzioni di refrigerazione Embraco e i motori Nidec per lavatrici, asciugatrici e lavastoviglie. Il suo obiettivo è offrire un portfolio completo ed innovativo con elevati standard di qualità, affidabilità, competitività ed efficienza energetica. Nidec Global Appliance è una piattaforma all'interno di Nidec Appliances, Commercial and Industrial Motors (ACIM), una business unit di Nidec Corporation.

Since 1971, Embraco has been a global provider of refrigeration technology for the complete residential and commercial cold chain, counting on a broad, efficient and competitive portfolio for household, food service, food retail, merchandisers and medical applications. Its solutions are differentiated by innovation that exceeds customer's most challenging expectations. Embraco is part of Nidec Global Appliance, a platform of Nidec Corporation. With over 12 thousand employees across 9 countries, Nidec Global Appliance manufactures and commercializes products for home and commercial applications, including Embraco refrigeration solutions and Nidec motors for washing machines, dryers and dishwashers. Its focus is to deliver a complete and innovative portfolio with high standards of quality, reliability, competitiveness and energy efficiency. Nidec Global Appliance is a platform within Nidec Appliances, Commercial and Industrial Motors (ACIM), a business unit of Nidec Corporation.



ENEX

Fondata nel 2004, Enex è azienda leader nel settore della refrigerazione con fluidi naturali. Fin dalla fondazione ha progettato e prodotto macchine refrigeranti e a pompa di calore con refrigerante CO2. Attualmente la gamma comprende il prodotto originario, rack per refrigerazione commerciale e industriale, ma anche macchine innovative per settori diversi: pompe di calore ad alta efficienza, chiller ad allagamento per applicazioni industriali, anche in versione reversibile e macchine ibride per produzione combinata di freddo e caldo. Enex è stata protagonista indiscusso dello sviluppo della refrigerazione a CO2, e ha ottenuto numerosi brevetti, ad esempio per l'utilizzo di eiettori per la sovralimentazione di evaporatori e per il recupero dell'energia di espansione, per macchine a espansione secca con economizzatore e per chiller con eietttore. La caratteristica comune delle macchine sviluppate è l'elevata efficienza. Enex è in fase di forte crescita ed è proiettata per un fatturato di 25 Milioni di € nel 2022, e conta 110 dipendenti.

Founded in 2004, Enex is a leading company in refrigeration with natural fluids. Since its foundation Enex is specialist in refrigeration and heat pump machines with CO2 refrigerant. Currently the range includes the original product, racks for commercial and industrial refrigeration, but also innovative machines for different sectors: high efficiency heat pumps, flooded chillers for industrial applications, also in the reversible version and hybrid machines for combined production of cold and hot. Enex has been the undisputed protagonist of the development of CO2 refrigeration, and has obtained numerous patents, for example for the use of ejectors for the overfeeding of evaporators and for the recovery of expansion energy, for dry expansion machines with economizer and for chiller with ejector. The common feature of the machines developed by Enex is the high efficiency. Enex is undergoing strong growth and is projected to have a turnover of € 25 million in 2022, and has 110 employees.



EPTA

EPTA è un Gruppo multinazionale, di proprietà italiana con sede a Milano, specializzato nella refrigerazione commerciale per i settori Retail, Food&Beverage e Ho.Re.Ca.

Con 11 unità produttive in tutto il mondo (oltre 330.000 mq), una capacità di produzione di 230.000 unità, presente in 100 Paesi con 40 filiali dirette in 5 continenti, 6.300 dipendenti ed un fatturato di 1,2 miliardi di euro nel 2021, EPTA è leader mondiale offre una gamma completa di prodotti e servizi basati sui refrigeranti naturali per la conservazione ed esposizione di prodotti freschi e surgelati.

Epta is a multinational Group, Italian privately owned and headquartered in Milan (Italy), specialised in commercial refrigeration for the Retail, Food&Beverage and Ho.Re.Ca. sectors.

With 11 manufacturing facilities (>330.000 sqm), a production capacity of 230.000 units, present in 100 countries with over 40 direct branches worldwide, 6.300 employees and revenues of 1,2 billions euros in 2021, EPTA is a global market leader and offers a full range of natural refrigerant-based technologies and service solutions for preserving and displaying fresh and frozen products.



EUROKLIMAT

Fondata nel 1963, Euroklimat è stata **una delle prime aziende in Europa nel 2006 ad utilizzare R290 nelle proprie macchine**. Con un fatturato di 20 milioni € e 60 dipendenti, Euroklimat è oggi tra i maggiori produttori mondiali di refrigeratori d'acqua e pompe di calore con **refrigeranti naturali** per il settore commerciale ed industriale. Il mercato di riferimento è principalmente quello centro/nord Europeo, ma non solo, dal momento che sempre più paesi sono impegnati nella lotta alla riduzione delle emissioni di CO2 e nella **elettrificazione dei sistemi di riscaldamento**. La domanda di **pompe di calore** con R290 è in forte crescita ed è oggi affiancata dalle soluzioni con R600a per la produzione di acqua calda ad alta temperatura, ideali per la **sostituzione delle caldaie**.

Founded in 1963, Euroklimat was one of the first companies in Europe in 2006 to use R290 in their machines. With a turnover of € 20 million and 60 employees, Euroklimat is today one of the world's leading manufacturers of water chillers and heat pumps with natural refrigerants for the commercial and industrial sector. The reference market is mainly central / northern Europe, but not only, since more and more countries are engaged in the fight to reduce CO2 emissions and electrification of heating systems. The demand for heat pumps with R290 is growing strongly and is now flanked by solutions with R600a for the production of high temperature hot water, ideal for replacing boilers.



GTS S.p.A.

GTS è un'azienda 100% italiana (45 dipendenti, fatturato 50M€) **leader mondiale nella produzione di gas refrigeranti naturali, idrocarburi** (ODP =0 / GWP<3).

Con i suoi siti produttivi in Italia (2), Belgio, Romania, Brasile, Thailandia supporta i player mondiali dei settori della refrigerazione domestica, commerciale, pompe di calore e air-conditioning.

GTS ha recentemente realizzato un impianto ad Arquà Polesine (Italia) in grado di produrre fino a 26 milioni di Kg di **Isobutano** e **Propano** (sufficienti per l'alimentazione di oltre 50 milioni di pompe di calore), con la disponibilità ad aumentarne la capacità produttiva.

GTS is a 100% Italian company (45 employees, 45M€ turnover) world leader in the production of natural refrigerant gases, hydrocarbons (ODP =0 / GWP<5).

With its production sites in Italy (2), Belgium, Romania, Brazil, Thailand it supports global players in the cooling and heating sectors.

*GTS has recently realized a plant located in Arquà Polesine (Italy) able to produce up to 26 million kg of natural refrigerant gas **Isobutane** and **Propane** (enough to power more than 50 million heat pumps), with an interest in investing further to increase its capacity in Italy and in its other 4 production sites worldwide.*



LUVE-GROUP

LU-VE Group è uno dei maggiori costruttori mondiali nel settore degli scambiatori di calore ad aria (quotato alla Borsa di Milano). Opera in diversi segmenti di mercato: refrigerazione (commerciale e industriale); raffreddamento di processo per applicazioni industriali e "power generation"; condizionamento dell'aria (civile, industriale e di precisione); porte e sistemi di chiusura in vetro per banchi e vetrine refrigerate; specchi IoT per applicazioni speciali (digital signage, cabine ascensore, camere hotel, ecc.). LU-VE Group (HQ a Uboldo, Varese) è una realtà internazionale con 19 stabilimenti produttivi in 9 diversi Paesi: Italia, Cina, Finlandia, India, Polonia, Rep. Ceca, Svezia, Russia e USA, con un network di società commerciali e uffici di rappresentanza in Europa, Asia, Medio Oriente e Nord America. Del gruppo fa parte anche una software house destinata all'ITC, allo sviluppo dei software di calcolo dei prodotti e alla digitalizzazione. Il Gruppo è forte di circa 4.500 collaboratori qualificati (di cui oltre 1.200 in Italia); 906.000 mq di superficie (di cui oltre 262.000 coperti); 3.605 mq di laboratori di Ricerca & Sviluppo; 83% della produzione esportata in 100 paesi. Fatturato oltre €490 milioni.

LU-VE Group is one of the major manufacturers in the world in the air heat exchanger field (listed on the Milan Stock Exchange). It operates in various segments of the market: refrigeration (commercial and industrial); process cooling for industrial applications and power generation; air conditioning (civil, industrial and close control); glass doors and closing systems for refrigerated counters and cabinets; IoT mirrors for special applications (digital signage, lift cars, hotel rooms, etc.). The LU-VE Group is an international company (with HQ in Uboldo, Varese, Italy) consisting of 19 manufacturing facilities in 9 different countries: Italy, China, Czech Rep., Finland, India, Poland, Russia, Sweden & USA, with a network of sales companies and representative offices in Europe, Nord America, Asia and the Middle East. The Group also includes a software house dedicated to ICT (Information and Communications Technology), the development of product calculation software and digitalization. The strength of the Group lies in its employees: some 4,500 qualified people (over 1,200 in Italy); total surface 906,000 sq. m (over 262,000 covered); 3,605 sq. m Research and Development laboratories; 83% of products exported to 100 countries. Turnover over €490 million.



SCM FRIGO

SCM FRIGO SPA è una azienda con sede in Italia e di proprietà del gruppo multinazionale svedese Beijer Ref AB. Leader nella costruzione di gruppi frigoriferi per il settore della refrigerazione commerciale e industriale, a partire dal 2004 ha sviluppato gamme di prodotto operanti con fluidi naturali, diventando leader mondiale nella produzione di unità frigorifere a CO2. Oggi è una realtà che conta 230 dipendenti e un fatturato di 53 milioni di Euro nel 2021.

SCM FRIGO SPA is a company based in Italy and owned by the Swedish multinational group Beijer Ref AB. Leader in the construction of refrigeration units for the commercial and industrial refrigeration sector, since 2004 it has developed product ranges operating with natural fluids, becoming a world leader in the production of CO2 refrigeration units. Today it is a reality that has 230 employees and a turnover of 53 million euros in 2021.



TEON

TEON è una azienda italiana che sviluppa, produce e commercializza soluzioni innovative per il riscaldamento (e raffrescamento) «rinnovabile» di edifici. Nata da un progetto pluriennale di ricerca applicata (Area Science Park), detiene brevetti insigniti del premio «Smart Future Minds Award» nel 2011. TEON ha sviluppato e brevettato pompe di calore innovative ad alta temperatura e ad alta efficienza che utilizzano refrigeranti naturali, con l'obiettivo di elettrificare i consumi termici nei settori civile, terziario e industriale offrendo un nuovo modo di produrre calore da una fonte rinnovabile. **L'esclusiva tecnologia Water Blaze massimizza il recupero di potenza termica dalla sorgente naturale** da cedere all'impianto di riscaldamento a temperature compatibili con i tradizionali radiatori e in grado di superare gli 80°C. Grazie alla tecnologia Water Blaze è così possibile riscaldare qualunque abitazione, edificio, struttura commerciale a zero emissioni in loco, dimezzando la bolletta energetica con enormi vantaggi ambientali, economici perseguendo l'autonomia energetica del Paese.

*TEON is an Italian company that develops, produces and markets innovative solutions for "renewable" heating (and cooling) of buildings. Born from a multi-year applied research project (Area Science Park), it holds patents awarded the Smart Future Minds Award in 2011. TEON has developed and patented innovative high-temperature and high-efficiency heat pumps using natural refrigerant, with the aim of electrifying thermal consumption in the civil, tertiary and industrial sectors by offering a new way of producing heat from a renewable source. **The exclusive Water Blaze technology maximizes the recovery of thermal power from the natural source** to be transferred to the heating system at temperatures compatible with traditional radiators and able to exceed 80 ° C. Thanks to Teon's Water Blaze technology, it is possible to heat homes, buildings and commercial structures with zero emissions on site, halving the energy bill with huge environmental and economic advantages pursuing the country's energy autonomy.*



VULKAN

VULKAN

Vulkan Italia è la filiale italiana dell'azienda tedesca multinazionale Vulkan: un fatturato di 250 ML di euro, leader mondiale da più di 130 anni nelle soluzioni per la trasmissione di potenza ed il controllo di rumore e vibrazioni, con la sua divisione Lokring ha sviluppato la tecnologia brevettata di connessione di tubi senza fiamma **LOKRING** per impianti di refrigerazione e condizionamento. La filiale italiana con 40 dipendenti un fatturato di 15 ML di euro, ha la sua sede principale a Novi Ligure, nel distretto piemontese del freddo. Vulkan Italia supporta la transizione e il phase-down dei gas HFC a favore degli HC, naturali, con bassissimo GWP e classificati come A3, infiammabili.

Grazie alla **tecnologia di connessione ermetica e permanente** e le soluzioni customizzate sull'applicazione, **Lokring** continua ad essere a fianco delle aziende che hanno scelto gas refrigeranti sostenibili, rendendo le operazioni di chiusura e connessione del circuito, oltre che il service sui prodotti, più semplici e sicure.

Vulkan Italia is the Italian subsidiary of the multinational German company Vulkan: 250 ML turnover, more than 130 years world leader in power transmission and noise and vibration control solutions, with its Lokring division, Vulkan has developed the patented flamefree tube connection Lokring technology for refrigeration and air conditioning systems.

*Founded in 1987, 40 employees, 15 ML euros turnover, Vulkan Italia is based in Novi Ligure, in the Piedmont's refrigeration district. Vulkan Italia supports the transition and phase-down of HFC gases towards HCs: natural, with very low GWP and classified as A3, flammable. Thanks to its **hermetic and permanent connection technology** and the solutions customized on the application, **Lokring** is striving to support companies that have chosen sustainable refrigerant gases, making the circuit sealing and connection operations, as well as the service on products, simpler and safer.*



ZUDEK

Zudek è un'azienda italiana fondata nel 1990 che ha fin da subito sposato la causa dei refrigeranti naturali. Le sue soluzioni, infatti, tutte fatte su misura in base alla specifica richiesta del cliente, utilizzano soltanto l'ammoniaca. In più di trent'anni di attività, **Zudek non ha mai installato né progettato un impianto con gas sintetici.** Attualmente l'azienda, con sede a Trieste, ha più di **80 dipendenti, avendo duplicato il suo organico aziendale negli ultimi cinque anni.** Oggi Zudek progetta, produce, installa e manutene impianti frigoriferi, installati principalmente per stabilimenti industriali alimentari, logistici, chimici e farmaceutici, in Italia e all'estero, avendo esportato la propria tecnologia in tutti e cinque i continenti del mondo. Nella gamma delle soluzioni Zudek rientrano frigoriferi condensati ad acqua e ad aria, pompe di calore ad alta temperatura (90 °C), assorbitori ad acqua-ammoniaca che producono freddo sottozero recuperando energia da una fonte di calore (trigenerazione) e sistemi di sicurezza per l'abbattimento di ammoniaca. **Tutte le soluzioni presentano le caratteristiche della direttiva dell'Industria 4.0 e sono monitorate e gestite da remoto.**

Zudek is an Italian company founded in 1990 that immediately embraced the cause of natural refrigerants. In fact, its solutions, all tailor-made to the customer's specific requirements, use only ammonia. In more than thirty years of business, **Zudek has never installed or designed a system with synthetic gases.** The company, based in Trieste, has currently more than **80 employees, having doubled its workforce in the last five years.** Today Zudek designs, manufactures, installs and maintains refrigeration plants, installed mainly for food, logistics, chemical and pharmaceutical industrial plants, in Italy and abroad. Its technology was exported to all five continents of the world. Zudek's range of solutions includes water- and air-cooled chiller, high-temperature (90 °C) heat pumps, water-ammonia absorption chillers that produce sub-zero cooling by recovering energy from a waste heat source (trigeneration) and safety systems for ammonia abatement. **All solutions respect the features of the Industry 4.0 directive and are monitored and managed remotely.**