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Climalife Contact

The European magazine for climate control system professionals

Technological Advances in Climate Control Systems

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Editorial

Pierre-Etienne Dehon
Chairman and CEO

Performance, Safety and the Environment: a constant challenge!

Since the Montreal protocol our company is constantly in the midst of change. First for the protection of the ozone layer, which put an end to the use of CFCs, and now with the Kyoto protocol on the greenhouse effect, which focuses on HFCs.

To cope with these developments, we have always set ourselves the goal of being at the forefront of innovation while continuing to offer reliable solutions. This is why we aim to combine technological progress with sustainable development, without neglecting the safety of our operators.

To this end, and to reconcile technical performance, safety and environmental needs, our teams are actively seeking to develop the refrigerants of tomorrow using Performax™ LT and HFOs. The results obtained in refrigeration systems are already proving to be of great interest to the refrigeration and air-conditioning industry.

At the same time, we continue our efforts on other products such as heat transfer fluids. Thanks to our R&D unit specialising in application chemistry, we now offer a range of Greenway plant-based solutions, aimed primarily at use in renewable energy production.

Positioning ourselves at the forefront of innovation does not necessarily mean that we must be the first to market a product. For instance, we refused to market cleaning solutions that contain bromine compounds toxic for reproduction, and in so doing anticipated subsequent regulations that demanded specific labelling.

Every day, we strive to be an innovative partner in energy performance, while remaining reliable and responsible as we seek to fulfil our commitment to provide lasting support to our clients in their development.

Happy reading!

About F-Gaz

In accordance with Article 10 of European Regulation No. 842/2006, which provided for a review of said Regulation before July 2011, the European Commission hired consultants to assess the application and effectiveness of the rules currently in force*.

A report** on the experiences and results of the last 4 years was published in September 2011. It concluded that the restrictions have helped the European Union to meet the commitments made under the Kyoto protocol on climate change for the period 2008-2012.

It also underlined the need to take fresh action to continue to reduce fluorinated greenhouse gas emissions in the EU, by:
1) implementing a European phase-down (the introduction of maximum, gradually declining, limits for the quantity of F-gases placed on the EU market, in terms of CO_2 equivalent);
2) strengthening measures on the containment and handling of fluorinated gases; and
3) prohibiting the use of fluorinated gases for certain applications.

These draft amendments were put to the public in a questionnaire between October and December 2011 (see Climalife Newsletter of 10.11.2011).

Most national associations took this opportunity to express their views and advocated actions that are environmentally-friendly without harming the proper operation of the refrigeration and air-conditioning industry.

Whilst EPEE (European Partnership for Energy and the Environment), supports a 2-stage approach based on a study published recently by the French research institute ERIE and ARMINES:
1) Full implementation and further improvement of the F-Gas Regulation,
2) A balanced and realistic system to cap and progressively reduce HFC consumption.

The amended F-Gas regulation is currently expected early in 2013. Climalife will be sure to keep you informed of all developments on its website: www.climalife.dehon.com

You can also visit the following websites for further information:
http://www.afce.asso.fr
http://www.epeeglobal.org

*Reminder of the rules in force:

- Containment of HFC refrigerants
- Restriction of their use by qualified personnel and qualified companies
- Label equipment that contains them
- Recover them
- Report the quantities in circulation on the market
- Limit their application.

** "Report from the Commission on the application, effects and adequacy of the Regulation on certain fluorinated greenhouse gases:
http://ec.europa.eu/clima/policies/f-gas/docs/report_en.pdf

Refrigerants: HFOs come on the scene in refrigeration and air-conditioning systems

Interview with Dr. Nacer Achaichia, Refrigerants Technical Leader EMEAI, at Honeywell, a worldwide producer of fluorinated products.

Mr. Achaichia, our clients are wondering about the future of refrigerants and how they are used. Today, there are new products on the air-conditioning and refrigeration market, and frequent, often contradictory debates keep them from getting a clear view of what's to come. Between hydrocarbons, so-called natural fluids, HFOs and other substitutes, can you give us a status update and tell us about the solutions of the future?

N.A.: The development of so-called synthetic refrigerants became possible because so-called natural refrigerants were dangerous, ineffective, and expensive to use.

The rebirth of these so-called natural fluids is due to their low GWP. Today, the new generation of HFOs have more than just performance and safety features similar to HFCs, they also have good environmental properties characterized by low GWP. Several conditions must be met in order to choose the right refrigerant.

There is no single solution for all applications, which is why there is a large range of refrigerants to meet every need. There may be room for natural fluids, such as when using hydrocarbons in home refrigeration, where the refrigerant's load is low and permitted by safety standards.

CO_2, for example, has good qualities for low-temperature applications, and we see it used in low-temperature commercial refrigeration, especially in Nordic countries. To overcome the technical limitations of CO_2 at high ambient temperatures, CO_2/HFC hybrid systems have been developed. This solution will also exist in the future with CO_2/HFO systems to reduce the carbon footprint. For the vast majority of applications, HFO fluids will be the choice of tomorrow. At present, we already have HFO mixtures to replace most existing fluids.

More specifically, what are the main characteristics of hydrofluoroolefins (HFOs)? Why do you recommend this alternative?

N.A.: HFOs (Hydrofluoroolefins) are a class of unsaturated molecules that contain at least one carbon-carbon double bond. These molecules are highly reactive in the atmosphere, and consequently have a relatively short lifespan. This short lifespan partially contributes to the low GWP of these new fluids.
HFOs have excellent environmental properties, which could have a favourable long-term impact on climate change and abide by current and future legislation owing to their low GWP and energy efficiency.
Most HFOs have service conditions similar to those of HFCs. This means that best practices developed over the years by engineers are not lost, and existing equipment can still be used with little or no modifications.

Are these new molecules toxic?

N.A.: Honeywell takes safety very seriously. These new molecules are subjected to extensive toxicity tests. The purpose of the toxicity tests is to evaluate a compound's potential hazards and determine acceptable exposure levels that will not have unfavourable, lasting, or irreversible effects on human beings and the environment.

There are industry standards that cover safety, such as ISO 5149 and the EN 378 standard. Refrigerants are divided into two toxicity classes. Class A for low-toxicity refrigerants and class B for higher toxicity. The two main molecules HFO 1234yf and HFO 1234ze are both class A, and mixtures containing these molecules will also be class A.

Honeywell's Solstice™ Low GWP Refrigerants

Solstice™ HFO's			
Current Product	**Non Flammable**	**Mildly Flammable (ASHRAE A2L)**	**Examples of Applications**
HFC-134a GWP = 1430		Solstice yf GWP = 4	MAC, Vending, Refrigerators
		Solstice ze GWP = 6	Chillers, CO2 Cascades Refrigerators
R-123 GWP = 77	Solstice zd GWP <5		Centrifugal Chillers

Solstice™ HFO's for Low and Medium Pressure Applications

Many questions have been raised about the flammability of these new products. What can you tell us about this?

N.A.: Since ammonia ignites between 100 and 300 mJ, and the minimum ignition energy of hydrocarbons is less than 1mJ, these products are classified as flammable.

For the first two HFO molecules available, the flammability characteristics have been measured. It has been found that HFO-1234ze (E) is entirely non-flammable at ambient temperatures below 30°C.

The minimum ignition energy of HFO-1234yf is between 5000 and 10000 mJ, which is much higher than for R-32, which ignites between 30 and 100 mJ. As a result, the safety classification of refrigerants in accordance with the ASHRAE 34 standard and the ISO 817 standard has been modified to take into account the low flammability of the new fluids. A new class 2L was therefore created, for fluids with low flammability and a rate of burn below 10cm/s.

This is true of HFO 1234yf, which with a very unstable flame burning at 1.5 cm/s was approved by the automobile industry to replace R-134a

Will installers need to change existing systems to use these new molecules?

N.A.: Unlike CO_2, HFOs have been developed to match the current characteristics of HFC refrigerants. We have identified alternatives for each HFC fluid. They can be used in existing equipment with little or no modification.

Will investment be high to convert HFC installations over to HFO fluids?

N.A.: As I said, these new fluids were designed to be used in existing installations with little or no modification. This implies a minimal investment cost.

In concrete terms, what molecules are currently available, and for which refrigeration and air-conditioning applications?

N.A.: Currently, three new pure fluids and several mixtures made from these molecules are available. Solstice™ yf, with its characteristics similar to those of R-134a, can be used in current R-134a applications, taking into account its A2L classification. At the moment it is mainly used in automobile air-conditioning. Solstice™ ze is another HFO to replace R-134a, with lower instant capacity but better efficiency. Many chillers have adopted this new HFO Solstice™ ze. Even the Turbocor compressor has been approved to work with this fluid.

When will HFOs be available on the market for other applications?

N.A.: Solstice™ yf and Solstice™ ze are available. Solstice™ yf is available in limited quantities for the automobile industry, unlike Solstice™ ze which is available without restrictions. The various HFO-based mixtures are in development, but are already available for partners who wish to conduct tests. We are now in the process of evaluating these mixtures with multiple OEMs, both for refrigeration and air-conditioning applications. These mixtures will be available in 2013.

Finally, what feedback has been received from using these new molecules?

N.A.: The feedback from Solstice™ ze use in chillers has been very positive. This is because measurements have shown a better COP compared to R-134a. Multiple compressor technologies have been approved with this fluid. The Turbocor centrifuge from Danfoss is also available for these applications. The trend is clear: future chillers will be loaded with 1234ze.

Honeywell's Solstice™ Low GWP Refrigerant Blends

Solstice™ HFO Blends			
Current Product	***Solstice™ N Series*** Reduced GWP Option Non Flammable (ASHRAE A1)	***Solstice™ L Series*** Lowest GWP Option Mildly Flammable (ASHRAE A2L)	***Examples of Applications***
HFC-134a GWP=1430	N-13 – GWP~600		Chillers, Med-temp Refrigeration
HCFC-22 GWP=1810	N-20 - GWP~1000	L-20 - GWP <350	Stationary A/C, Refrigeration
R-404A GWP=3922	N-40 - GWP~1300	L-40 - GWP~200-300	Low-Temp Refrigeration
R-410A GWP=2088		L-41 - GWP <500	Stationary A/C Application

Solstice™ HFO Blends for Medium & High Pressure Applications

TERTIARY

Domestic hot water production and auxiliary heating for a 180-unit apartment block using Greenway® Solar heat transfer fluid

The Hungarian government has launched various calls for tender for the renovation of residential buildings built with energy-saving industrial technologies. Within this framework, the Hungarian authorities are encouraging the installation of infrastructures to renovate and modernise systems and equipment designed to increase renewable energy use in residential buildings.

A 180-unit apartment block located in the 11th district of Budapest received a government subsidy in 2011 for the external insulation of the building, the replacement of its windows and the conversion of the domestic hot water production system from district heating to solar.

An order for tubular thermal solar collectors was placed with Solar Trade Kft. This company, created in 2005, specialises in the manufacture, design, application and installation of systems utilising renewable energy, as well as consulting services in the field. It is a company committed to the deployment of heating and cooling systems that are economical, environmentally friendly and energy-efficient. Its Director, László Garaguly, found out about Greenway® Solar through Klenk Energetikai Kft, a company based in Békéscsaba that had been very satisfied with this solution in its old and new solar circuits.

Consequently, they contacted the sales representative at Climalife, a supplier of innovative and sustainable solutions for climate control systems.

At temperatures above 150°C, Greenway® Solar degrades 4 times slower than a conventional solution based on Monopropylene Glycol, which enables a dramatic reduction in corrosion and "tarring", while avoiding the risk of the collectors becoming clogged. At 100°C, it expands half as much and its technical properties remain stable. It requires less energy to pump due to its low viscosity.

Because of its numerous advantages, systems that have adopted Greenway® Solar react better to overheating, displaying greater resistance. The systems have a longer life span and are efficient in the long term, yielding a good return on investment.
Convinced by its qualities, the company Solartrade Kft then came out in favour of Greenway® Solar. The Monopropylene Glycol antifreeze previously used in such systems was replaced, as it was observed that the acid concentration of this fluid increased at high stagnation temperatures, with the circuit beginning to "tar".

The second reason for its replacement is the fact that in sunny winter conditions, monopropylene glycol may turn into sludge, which makes it difficult to prime the pump and increases energy consumption. No such changes are observed with Greenway® Solar; the properties of this heat transfer fluid make regulation and adjustment easy. An essential characteristic of the product, linked to the company's commitment to the environment, lies in the fact that Greenway® Solar is a 100%-renewable plant-based substance, which makes it possible to significantly reduce users' carbon footprint. In two hours, the 600 litres of heat transfer fluid were transferred by pump into the evacuated tubular thermal solar collectors (type: TZ 12CPC).
These collectors, with a total surface area of 123 m^2, were installed on the roof of the 10-storey building. Buffer tanks with capacities of 1 and 2 m^3 were installed in the basement. There are three 2 m^3 tanks for hot water and one 1m^3 tank for drinking water. The system is regulated so that temperatures never exceed 95°C in the tanks and 50°C in the up pipes.

The service pressure is 2 bar. The equipment can produce 10 to 12,000 litres of hot water per day. The building was approved on December 2011 and since then, energy-saving and efficiency measurements have been taken regularly. The system has produced 62 MWh of energy in approximately 5 months, to the great satisfaction of residents.

COMMERCIAL COOLING

Performax™ LT / CO_2: first supermarket in France

The Intermarché supermarket in Trégueux is taking a big step forward by choosing a new cascade refrigeration system that combines energy efficiency and sustainability.

Now more than ever, Performax™ LT is the right refrigerant to meet the needs of large and medium size stores whose managers are looking to save energy. Mr. Piermé, the manager of the Intermarché store in Trégeux, agrees: “Every month we pay close attention to our energy consumption and do all we can to lower its substantial impact on our budget.”

Located near to St Brieuc in the department of Côtes-d’Armor, France, the 2,225 m² Intermarché decided to increase its sales floor by more than 30% (to 3000 m²). Central Froid was consulted to replace the old cooling equipment that ran on R-22, R-408A, and R-404A.

The company’s geographic proximity and the recommendations regarding new technologies made by Mickael Rouxel, Director of Central Froid since 1 August 2008, attracted attention, and so work began in late 2011.

The solution is centred on a Performax™ LT / CO_2 cascade installation for the environmental benefit of refrigerants and the energy savings of R-407F.

As the supermarket was not going to be closed during the expansion, technical solutions were needed to ensure constant refrigeration.

The operation therefore proceeded in several phases over 4 months, with 4 to 7 technicians working to ensure the smooth-functioning of operations.

The refrigeration installer recommended that a CO_2 / R-404A system came first, in order to be able to continue working with the existing linear compressors that used R-404A, and to add the new refrigeration equipment planned as part of the expansion.

From left to right: Sébastien Corre, refrigeration technician – Mickael Rouxel, Central Froid Director – Mr Piermé, store manager – Pierre-Emmanuel Danet,Climalife technical support manager

An optimized refrigeration system

Designed following a detailed study of needs, the system is made up of two central HK Refrigeration units, each equipped with variable speed drives in order to limit energy consumption and short-cycle starts, and to manage the compressors’ operation in order to best meet the needs of the various cold units. The Danfoss electronic expansion system is equipped with AKCC 550 and AKCC 750 controllers.

The CO_2 low-temperature central unit is made up of three Bitzer 2EHC-3K-40S compressors which supply four linear compressors and two -25°C frozen chambers. The medium-temperature central unit, loaded with 500 kg of Performax™ LT supplied by the distributor Rolesco (Rennes office), includes four Bitzer compressors (3 x 6H25-2Y / 1 x 6H35-2Y) and a floating HP, and generates cooling for 14 work rooms, the air-conditioned premises, and 18 linear compressors. In the condensation section, a EXL 14A 50S SR plate heat exchanger with power of 150kW is installed to retrieve heat for the supermarket air heaters.

Until April 2012, when construction was complete, the installation ran on R-404A.

Afterwards, R-404A / Performax™ LT retrofit was carried out at night, and completed in 8 hours. The installation was fully drained, the R-404A was retrieved in accordance with regulatory requirements, and then the Performax™ LT was injected by the installation’s liquid line. In order to avoid emptying the display cases, the installer recommended using dry ice. This measure also made it possible to avoid temperature increases and a resultant risk of CO_2, leaks, due to the very high pressure of the fluid.

Overheating adjustments were performed. Direct cooperation between Mr. Rouxel and the companies Honeywell, Danfoss, and Climalife proved necessary in order to configure the electronic control system initially designed for R-404A to work with R-407F. This case study enabled the control system’s manufacturer, Danfoss, to integrate this new refrigerant into their equipment. The same was true for Siemens, which was contacted for its Polycool expansion valve, which is installed on the CO_2 evaporative condenser.

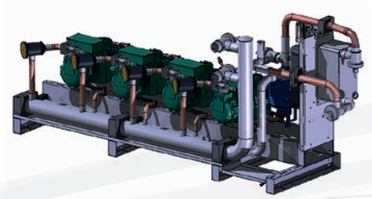


Diagram of the HK Refrigeration medium-temperature central unit running on Performax™ LT

Company: Sarl Central Froid
Business: Commercial cooling, air conditioning, and commissioning or repairing heat pumps
Location:
St Brieuc, France
Date of creation: 1982
Employees: 12 people

COMMERCIAL COOLING

Characteristics of the Performax™ LT / CO_2 installation

		Low-temperature central unit HK eCO_2Gen 40/3	Medium-temperature central unit HK MOPSH 213 4P	
	Unit	CO_2	Performax™ LT	R-404A
Evaporating pressure	Bar gauge	10.5	2.9	3.6
Evaporating temperature	°C	-36	-8	-8
Condensing pressure	Bar	29.2	20.5	19.5
Condensing temperature	°C	-5	45	45
Cooling capacity (SC=10K / SR=3K)	kW	37.8	-	234.7
Compressor power	kW	11.1	-	110
Compressor type/product code		Bitzer 2EHC-3K-40S	Bitzer (3 x 6H25-2Y / 1 x 6H35-2Y)	
Number of compressors		3	4	
Refrigerant load	kg	90	500	-
Type of oil		BSE60K	BSE32	

10% energy savings compared to R-404A

On-site operating readings were taken on 16 August, 2012. Three months after service began, the results speak for themselves.

With more cooling units (12 m more medium-temperature display case linear compressors, 10 m freezer linear compressors, three air-conditioned laboratories added: pastry, fish and a cheese counter), and a 30% expansion of the store, Performax™ LT has reduced the electrical bill for cooling, as it does not cause power consumption to increase.

The absorbed current as measured with the Performax™ LT is 10% less on average than with the R-404A. In practical terms, these energy savings match the theoretical estimated values.

Overall satisfaction

Already convinced of the Performax™ LT’s performance from previous installations, Mickaël Rouxel was pleased with the results achieved using this new system. “This refrigerant is a reliable product that shows promise for the future. Since April 2011, we have been using it regularly and have had no negative feedback for the systems in service. No leaks have been found and there is no need to change the seals on the solenoid valves.” This installer feels it is his duty to remind his end customers every day of the benefit of putting lower-GWP fluids to use in order to preserve the environment and offer more energy-efficient solutions. “I’m 31, and after my years working in Switzerland, I know that we need to take care of the environment and make it an important part of our lives.”

Medium-temperature central unit
T evap = -10,3°C
T cond = 37,1°C
Machine : 71%
Condensor : 83%

Low-temperature central unit
T evap = -32,8°C
T cond = -7,1°C
Machine : 71%
Condensor : 0%

Absorbed current measured

on the medium-temperature central unit’s compressors

	T° Outside	Date of readings	Compressor N°2	Compressor N°3	Compressor N°4
Central unit R-404A	+ 19°C	April 2012	I1= 35.9 I2= 36 I3= 36.2	I1= 35.8 I2= 36 I3= 36	I1= 36 I2= 35.9 I3= 36.1
Central unit Performax™ LT	+ 18,5°C	Retrofit	I1= 32.8 I2= 33 I3= 32.9	I1=33.3 I2= 33.1 I3= 33	I1= 33 I2= 32.7 I3= 33
Central unit Performax™ LT	+ 22,8°C	16 August, 2012	I1= 33.2 I2= 32.8 I3= 33.2	I1= 33 I2= 32.6 I3= 32.4	Compressor off – not in service

Note: Compressor n°1 does not appear in this table, as the reading is insignificant. This compressor constantly operates with a power regulator

Environmental Impacts of Heat Transfer Fluids

Comparative analysis of the Greenway® / MPG solutions' life cycles

The Climalife approach

Climalife has produced and distributed heat transfer liquids for more than 30 years. It bases its development on innovation, quality, and environmental preservation. A range of heat transfer fluids made from biodegradable and plant-based ingredients were developed as part of this strategy: Greenway®.

To confirm the environmental benefits of the Greenway® product line and enhance them, a comparative Life Cycle Analysis (LCA)* was carried out by the firm SGS**.

It enabled an assessment of the difference in terms of environmental impact between:

- The Greenway® -30°C Bio-PDO-based heat transfer fluid formula (Propanediol 1.3).
- The MPG (Monopropylene glycol from fossil resources) -30°C heat transfer fluid formula.

What is a Life Cycle Analysis (LCA)?

The LCA is a method (standards 14040 and 14044) used to assess a product's environmental impact over the course of its life cycle: from the extraction of raw materials to end-of-life processing. The consumption of resources and the emission of substances into water, air, and soil during the product's life cycle are quantified and converted into environmental impact potentials.

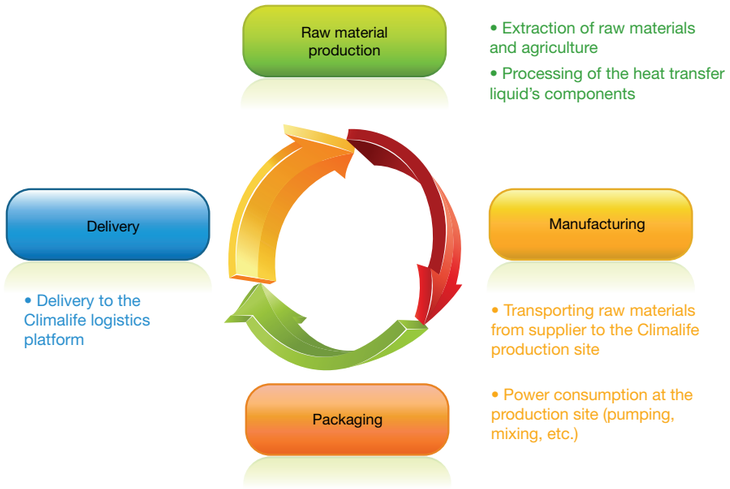
Chosen LCA scope:

Cradle to gate: This scope focuses on the phases of the life cycle over which we, Climalife, as Greenway®'s producer, have the most influence. These include studying environmental impacts from the extraction of raw materials to delivering the product after it has been manufactured.

* OECD method 302B
**Study conducted by the firm SGS
Standards and methodological documents:
ISO 14040: Environmental management – Life cycle assessment – Principle and framework
ISO 14044: Environmental management – Life cycle assessment – Requirements and guidelines.

The phases of the heat transfer liquids' life cycle

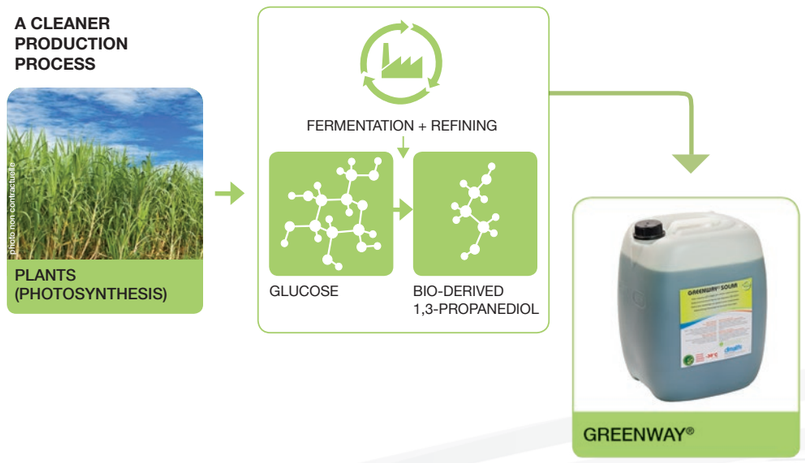
(cradle to gate scope)



- Primary packaging (canister) and tertiary packaging (reused wood pallet)
- The full package and cycles is included: raw materials, production, transportation, and end-of-life

Simplified diagram of Greenway® production

(cradle to gate scope)



LCA Results

The detailed analysis shows that the impact of production largely comes from the production of raw materials. Greenway® -30°C has a lower impact than MPG -30°C for 5 indicators. Notably, its impact on ozone layer depletion is found to be almost zero, and Bio PDO is found to have less influence on climate change.

Overall, Greenway® -30°C is better than MPG -30°C from an environmental perspective, in addition to its technical benefits, particularly for solar or geothermal applications.

Impact indicator	Unit	Cradle-to-gate	
		Bio PDO-based heat transfer fluid	MPG-based heat transfer fluid
Depletion of abiotic resources	g Sb eq	9.2	21.5
Acidification	g SO2 eq	13.7	7.9
Eutrophication	g PO4--- eq	2.1	2.4
Climate change	kg CO2 eq	1.5	2.2
Ozone layer depletion	mg CFC-11 eq	0.1	1.4
Photochemical ozone creation	g C2H4	0.8	1.0
Total fossil and nuclear energy consumption	MJ eq	33.7	52.4

Product with a lower impact, with a difference of more than 20%
Hard to tell which product has more impact due to the small difference (less than 20% between them)
Product with a greater impact, with a difference of more than 20%

Description of indicators studied

• Exhaustion of abiotic ressources

Abiotic resources are resources that are not produced by living organisms, such as petroleum, gas, or metals. These resources are not available on Earth in unlimited quantities. All materials are quantified in kg Sb equivalents (antimony).

• Acidification

Acidifying substances have a significant impact on soil, groundwater, organisms, ecosystems, and materials (buildings). Before falling to earth, sulphur dioxide (SO_2) and nitrogen oxides (NOx) in gas form and their derivatives (nitrates and sulphates) contribute to poor public health. The acidification potential is expressed in kg SO_2 equivalents per kg of emissions.

• Eutrophication

Eutrophication takes into account impacts related to the excessive input of macronutrients into the environment in air, water, and soil emissions. The excess nutrients stimulate excessive growth in plants, and particularly algae. This reduces dissolved oxygen and causes organisms in the environment to die. The eutrophication potential is expressed in kg PO4 equivalents per kg of emissions.

• Climate change

Climate change may have many effects on the health of ecosystems and on human health. Climate change is related to greenhouse gas emissions in the air. This is a change in climate attributed directly or indirectly to human activities, and which alters the atmosphere's composition in addition to natural changes that may be taking place. This indicator is expressed in kg CO_2 equivalents.

• Ozone layer depletion

The ozone layer naturally protects life on earth from the effects of the sun's UV-B rays, which are a health hazard. The damage may affect human and animal health, terrestrial and aquatic ecosystems, biochemical cycles, and materials. Ozone layer depletion potential is expressed in kg CFC-11 equivalents per kg of emissions.

• Photochemical ozone creation

The formation of photo-oxidants is the formation of reactive substances (mainly ozone) which may be hazardous to human health and the health of ecosystems, particularly crops. This problem is also known as "summer smog". This indicator is expressed in kg ethylene equivalents.

• Aggregate demand for fossil and nuclear energy

The aggregate demand for energy is the total quantity of primary energy required during the product's life cycle. The energy may come from fossil resources, nuclear, solar, wind, geothermal, biomass, or water power. In this study, the method is adapted to take into account non-renewable energy from fossil resources and nuclear power only. This indicator is expressed in MJ equivalents.

MURCO gas detectors: the solution for stationary leak-detection

For stationary leak-detection, Climalife offers Murco MGD gas detectors. They are easy to install and offer excellent performance levels.

The EU F-Gas Regulation (No. 842-2006) makes the use of gas detectors mandatory for systems containing 300 kg or more of fluorinated greenhouse gases. In some countries, such as France, the installation of Murco MGD gas detectors for systems with a load of 30 kg or more also makes it possible to halve the frequency of the mandatory annual checks to be performed by accredited operators (French Environmental Code R-543-75 to R-543-123).

Murco MGD detects leaks of halogenated fluids used in refrigeration and air-conditioning systems, but also NH_3, CO_2, and hydrocarbons. Calibration kits allow you to perform checks on site.

The range is composed of Murco MGD gas detectors with 1 to 6 sensors and 1 or 2 detection thresholds associated with 1 or 2 alarm levels.

• **The 1-level Murco MGD** allows leak-detection at a maximum threshold that must not be exceeded. However many sensors there are, the 1-level Murco MGD will only detect one gas. The type of sensor must be selected according to the gas to be detected. Optional extras are available, such as Atex boxes.

• **The 2-level Murco MGD** can be used to monitor a maximum threshold and a lower threshold. 2-level Murco MGD detectors (with 2 sensors or more) may be equipped with sensors to detect different gases.

The thresholds can be adjusted from 10 to 10,000 ppm, depending on the gas to be detected and the sensor technology (comply with the safety thresholds).

With Duonett® D7,

preserve heat exchange and the sustainability of central heating installations!

Descaling is a key operation for preserving heat exchange and the sustainability of central heating installations (3 mm of scale acts as unwanted "insulation" and can cost up to 20% more in primary energy).

Traditionally, however, descaling implies major safety restrictions. Typical treatment products are strong, hazardous acids, which require protection from toxic vapours and contact with skin, and can damage materials (pipes, taps, etc.). They may cause work accidents and legal actions with end customers.

With its Duonett® D7 solution, Climalife offers scale removal treatment for heat exchangers and domestic hot water tanks that is both effective and safe for the operator.

Unlike traditional descalers, Duonett® D7 selectively dissolves scales without damaging metals and synthetic materials:

- Easier to use than conventional acid products.
- Not corrosive or classified as hazardous.
- Does not produce toxic vapour.*
- Requires no special protection equipment.*
- Biodegradable when pure.

Effectiveness helps maintain thermal efficiency:
Duonett® D7 is also highly effective. It dissolves 280 g of scale per litre of product at 20°C. Using a circulation pump, it acts quickly and continuously without halting the operation of the installation and without damaging the piping system's components.

* Refer to the product's fact sheet and check the safety data sheet for more information.

Dates for your diary!

Switzerland

23 Y-Symposium du froid

ASF Association Suisse du Froic Section romande

This symposium for refrigeration professionals, organised by the ASF (Swiss Refrigeration Association, French-speaking section), will be held in Yverdon-les-Bains on 7 November 2012 The day will allow refrigeration market players from French-speaking Switzerland to meet, discuss and discover the latest technical developments.

United Kingdom

On 2 July 2012, the Climalife UK team moved into new offices in Green Court, Kings Weston Lane, Avonmouth.

Managing Director **Allan Harper** has expressed his satisfaction with the move, noting that the new premises provide a good working environment for employees, which will allow a high level of service to be offered to clients.

The Climalife UK team is now ready to welcome customers to its new premises.

The new address is: IDS Refrigeration Limited, Green Court, Kings Weston Lane, Avonmouth, Bristol, BS11 8AZ.

The Netherlands

BIO BUSINESS

Bio Business / Venray - 6, 7 and 8 November 2012. Bio Business is a three-day event open to anyone interested in organic farming and nutrition.

It will showcase farming methods and foodstuffs designed to meet requirements in terms of environmental well-being, nature and the landscape, as well as livestock production. Come and join us at **stand 658**.

DETAF

DETAF / Venray - 4, 5 and 6 December 2012. DETAF is the Trade Fair for Renewable Energy Engineering and Agro Fuels. It provides a European showcase for bio-energy in industry and sustainable industry.
The show will deal with the themes "taking the future into account" and "improving environmental aspects". For the first time. **Climalife will be present** at this event to offer you a sneak preview of our renewable energy solutions.

Germany

CHILLVENTA 2012

The next Chillventa international trade show for the refrigeration, air-conditioning and heat pumps industry will be held from 9 to 11 octobre 2012 in Nuremberg.
New: this year Chillventa starts a day earlier, on the Tuesday, and finishes on the Thursday evening. You can meet the whole Climalife team **in Hall 6 (stand 330)**. Register now for **our lecture on HFOs**, which will be held on Wednesday 10 October from 11:00 to 13:00 in the Kiev room of the convention centre at the Nuremberg Exhibition Centre. **Email:** climalife.de@climalife.dehon.com

France

Salon Energies Froid
The next regional Energies Froid fairs dedicated to thermodynamics will be held:

- in Lille: 14 & 15 November 2012 **Stand E4 – Hall London**

Pre-register now and get your free badge at: http://www.energiesfroid.com

Come and meet your Climalife sales representatives and discover our new products.

Hungary

The Hungarian refrigeration and air-conditioning association will hold its annual conference from 14 to 16 November 2012 at the Karos Spa hotel in Zalakaros.

Climalife will have a stand presenting new energy-efficiency and renewable-energy products.

Russia

Climalife Russia will be exhibiting its overall range at two upcoming trade shows in Moscow:
- **CHILLVENTA ROSSIJA**: 5-7 February 2013, **Stand B 23(12)**
- **CLIMATE WORLD**: 11-14 March 2013, **Stand 8 E18**

International

AHR EXPO

The **Climalife Galco** team look forward to seeing you at the AHR EXPO in Dallas from 28 to 30 January 2013 **(stand N° 261)**.

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