

# *First National Census on HFC italian alternative technologies*

*Aerosol, Air Conditioning, Fire Protection, Foams and Refrigeration sectors*



Barbara Gonella, Gabriella Rago, Federica Moricci

## INTERNATIONAL AGREEMENTS



### Emendamento di Kigali

Gruppi di Paesi	Inizio phase -down	Baseline di riferimento
<b>I Gruppo: Paesi industrializzati</b>	<b>2019</b>	<b>Livello di consumo medio triennio 2011-2013 plus 15% di HCFC</b>
<b>II Gruppo: Paesi in via di sviluppo (inclusi Cina, Brasile, Sud Africa)</b>	<b>2024</b>	<b>Livello di consumo medio triennio 2020-2022 plus 65% di HCFC</b>
<b>II Gruppo: Paesi in via di sviluppo Iran, Iraq, Pakistan, India e GCC</b>	<b>2028</b>	<b>Livello di consumo medio triennio 2024-2026 plus 65% di HCFC</b>

**ACCORDO DI COLLABORAZIONE TECNICA CON IL MATTM:  
*Rassegna delle sostanze e tecnologie alternative agli HFC***

**PRIMO CENSIMENTO IN ITALIA**

REFRIGERAZIONE

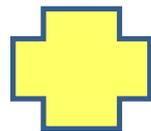
CONDIZIONAMENTO

SCHIUME

AEROSOL

SISTEMI FISSI DI PROTEZIONE  
ANTINCEDIO

- **Punti di forza**
- **Criticità**
- **Alternative agli HFC**
- **Prospettive per il futuro**



**FORMAZIONE**

## COSA SI INTENDE PER MADE IN ITALY

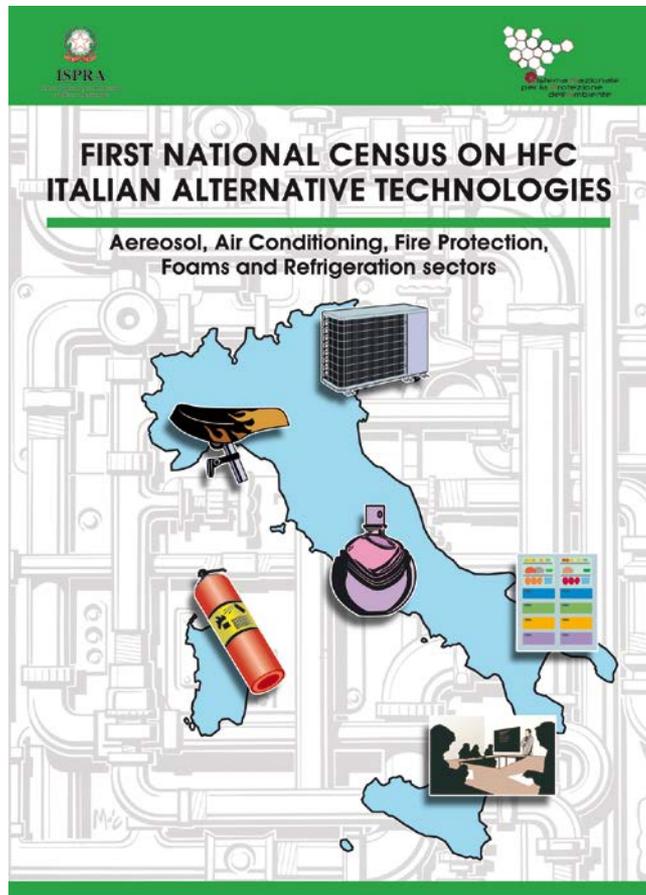
**A CHI SI  
RIVOLGE?**

**AZIENDE PRODUTTRICI DI TECNOLOGIE  
ALTERNATIVE AGLI HFC 100% MADE IN ITALY**

- **PROPRIETA' NAZIONALE**
- **APPARTENERE A UNO DEI SETTORI INDAGATI**
- **TECNOLOGIE INNOVATIVE CON EFFETTO SERRA NULLO O BASSO**



## GUIDA ALLA LETTURA



- **INTRODUZIONE**
- **PANORAMICA DEL SETTORE**
- **METODOLOGIA SEGUITA**
- **RIFERIMENTO AL REGOLAMENTO F-GAS**
- **DESCRIZIONE DELLE APPARECCHIATURE**
- **ALTERNATIVE AGLI HFC MADE IN ITALY**



# GUIDA ALLA LETTURA

## AEROSOL 1

### 1 AEROSOL

#### 1.1 Introduction

The aerosol sector is made by small and medium companies that work in filling activities for third parties, and nutritional companies with consumer products and production of aerosol cans, accessories and raw materials. An important part of the sector is made by consumer goods (cosmetics, household products, paints, technical products and do-it-yourself products, food and pharmaceutical products), which has been able to renew itself over time, facing and overcoming complex and difficult challenges for the realization of products increasingly innovative and compatible with the environment.

Raw materials, propellant gases, packaging and accessories, machines and systems, and in particular finished aerosol products, are all included in the aerosol sector represented by Federchimica from AIA (Italian Aerosol Association) (FEDERCHIMICA, Confindustria 2016). Federchimica is the abbreviated name of the Italian Federation of the Chemical Industry. At the present time 1.420 companies, with a total of 65.000 employees, are part of Federchimica. They are grouped into 17 Associations, and among these AIA and ASSOCIATIONS that are respectively involved in the realization of the aerosol product and technological aspects.

#### 1.2 Overview of the sector

In the aerosol sector, two Associations are the reference: AIA - (ITALIAN AEROSOL ASSOCIATION) and ASSOCIATIONS. The first represents all the companies that contribute to the realization of the aerosol product, from the realization of the manufactured article to the filling of the substances destined to be supplied. The following production areas, are involved:

- manufacturers of machines for aerosol supply chain;
- manufacturers of aluminum or tripartite containers
- manufacturers of accessories such as valves and caps;
- fillers, on their own and on behalf of third parties;
- independent suppliers;
- importers and distributors of aerosol dispenses on the market/Italy.

50 companies are part of AIA representing around 70% of the Italian production of the sector.

During 2017 an independent study on aerosol products was conducted to have an updated representation of the economic dimensions of the sector. According to the statistics it has been estimated that 548 million spray cans were filled in Italy in 2017 45% were products for personal use the share is higher compared to the two-year period 2015-2016. Fragrances, pharmaceuticals, cosmetics and food products account for 10% (increasing value compared to the two-year period 2015-2016). Pharmaceuticals, pharmaceuticals and foodstuffs show an increasing weight compared to the figure of the beginning of the decade, while products for cars, industrial products and the remaining aerosols are stable or slightly down.

Inside the same environment of products for personal use, developments come continuously of

## FOAMS 4

### 4 FOAMS

#### 4.1 Introduction

Foam means a dispersion of a gaseous medium in a liquid or solid medium or in a gel. Foam products are manufactured with chemical blowing agents that expand the plastic matrix before it solidifies. The type and amount of blowing agent used, as well as the processing conditions applied, determine the final density of the foam that is generated (UNEP 2015).

Foam products are present in everyday life, in fact they are used for insulation (in building, appliances and wall cavities) or to manufacture a variety of foam products. Foam manufacturing was the second largest consumption sector worldwide for HCFCs (used as blowing agents) consumption. The main applications of HCFC blowing agents is in rigid polyurethane (PIU) foam used in sandwich panels, pipe and appliance insulation, in spray foams and in extruded polystyrene (XPS) foam.

At global level a wide range of alternatives to HCFCs have become available, including hydrocarbon technology, modified water based formulations, isopentane, carbon dioxide, methyl formate, methyl HFCs, and high-GWP HFCs. The selection of the most appropriate alternative technology requires consideration of many factors including the long term competitiveness, safety, cost, training, and availability.

Some of the available alternatives to HCFCs are also options still available to replace HCFCs in the foams sector (hydrocarbons, hydrofluorolefins and water together with hot in kind solutions (inert fibers such as rockwool, glasswool as far as thermal insulation is concerned).

#### 4.2 Overview of the sector

About 100 companies operating in the foam sector in Italy are represented by the following four sectoral associations:

- Aipe (Associazione Italiana polistirene espanso, Italian Association of expanded polystyrene)
- Aipef (Associazione italiana produzione poliuretano flessibile, Italian Association of flexible polyurethane manufacturers)
- Aipep (Associazione Nazionale Poliuretano Espanso Rigido, Rigid Polyurethane expanded foams Association)
- Associazione Italiana Produttori Materie Plastiche (Italian Association of Plastics Materials Manufacturers)
- Associazione imprese di impermeabilizzazione italiane (Italian Waterproofing Companies Association)

Table 4.1: Foams sectoral associations in Italy

FOAMS SECTORAL ASSOCIATIONS	NR. OF COMPANIES
Aipe	40
Aipef	45
Aipep	45
Associazione Italiana Produttori Materie Plastiche	60
Assopne	10

## AIR CONDITIONING 2

### 2 AIR CONDITIONING

#### 2.1 Introduction

In the last few years the air conditioning sector has experienced a strong increase in demand throughout the world, especially in warm climates, including Italy. As a result of this, the sector has recorded a significant increase both in terms of energy consumption and in terms of greenhouse gas emissions, destined to increase also in the coming years. 65% of HFC usage comes from this sector. Increasing urbanization, rising incomes and falling air conditioner prices in many developing economies are some of the factors of this boom. Global temperature increases, accelerated in part by emissions of greenhouse gases, are also expected to have a significant role in the increasing conditioning demand. According to the Environmental Investigation Agency (EIA), an HFC by 2050 an additional 700 million units will be added to the global air conditioner stock. (McLaughlin C, 2016).

The F-Gas regulation (EU 2014) is playing a pivotal role in stimulating innovation and the adoption of HFC-free technologies in the HVAC&R sector, including air conditioning, but unlike sectors that have already transitioned or are transitioning towards natural refrigerants, such as the refrigeration, this sector doesn't boast the same number of natural refrigerant based systems and the transition to natural refrigerants is facing some barriers and difficulties.

The air conditioning sector includes equipment used for cooling, heating, ventilation, humidification or dehumidification of a given environment, depending on the characteristics of the external climate and the conditions of the internal temperature. In the sector there are some different kind of equipments, with different sizes and refrigerant charges and different possibilities in terms of alternatives to HFCs:

- Small Self Contained Air-Conditioning units
- Split air conditioning
- Water chiller
- Heat pumps

The Italian leadership in the air conditioning sector is recognized in all the world, and in the last years heat pumps are the driving motor for all the sector. According to the statistics announced by the association Assoclima, in the following pages, the air conditioning sector is increasing for its activity in the world technologies, where there aren't regulatory restrictions on the use of natural refrigerants.

#### 2.2 Overview of the sector

Although the European F-gas Regulation sets up prohibitions for the next few years for air conditioning sector, and even in the country there are other kind of restrictions (concerns about the use of refrigerant fluids for buildings, the risk assessment of flammable substances, HFC 125), it is ready to expect the alternatives to HFC in all the rest of the world.

Generally, as regards the equipment in the sector of air conditioning, Italy mainly produces machines while purchase commissions from abroad. The production of equipment in Italy is more

## REFRIGERATION 5

### 5 REFRIGERATION

#### 5.1 Introduction

Because of the large amounts of HFCs used, refrigeration was the first sector affected by the provisions of the F-gas Regulation and the replacement of high GWP refrigerants with others having lower GWP has already been going on for several years. According to the Core Sectorial Fact Sheets on HFCs and Low GWP Alternatives (INEP, 2015), within the Refrigeration sector the following categories are included:

- Domestic Refrigeration (i.e. appliances used for the storage of chilled and frozen food and commercial Refrigeration (i.e. the wide variety of equipments of small "plug-in" vending machines, display cabinets and food service coolers through to large supermarket refrigeration systems - Fact Sheet 4)
- Industrial Refrigeration (i.e. include refrigeration systems used in manufacturing and process industries, for the processing and storage of food and beverages and the manufacturing of petrochemicals, chemicals and pharmaceuticals - Fact Sheet 5)

The categories are generally identified on the grounds of type and size of the equipments, temperature requirements.

Domestic refrigeration includes the household appliances commonly used for food storage and preservation. Most domestic refrigeration appliances are factory produced electrically driven hermetically sealed systems using a vapor compression refrigeration cycle (INEP, 2015).

It is worth noting that in Italy the use of hydrocarbons (isobutane, HC-600a) in the manufacture of domestic refrigerators instead of fluorinated refrigerants has started well before the entry into force of the F-gas Regulations (Figure 5.1). In Europe 56% of domestic refrigerators sold in 2000 had HC-600a as refrigerant and 42% had HFC-134a. In Italy there was an increase on the Italian market of HFC-134a from 1994 to 1998 as a consequence of the replacement of HCFCs with HFCs, since 2015 due to the effects of the European F-gas regulation since 1996 the amount of HFC-134a both for manufacturers of domestic refrigerators and in the domestic refrigerators placed on the market has been decreasing up to 2015, since then and due to the entry into force of the European F-gas Regulation no HFC-134a has been used for new domestic refrigeration.

The installed fleet of refrigerators and freezers has increased over time from around 25 million pieces in 1990 to 29 million in 2006 to over 30 million in 2011. In the last refrigeration cycle (INEP, 2017), Confindustria declares an installed park just below 33 million pieces, 75% of which (about 25 million pieces) consisting of refrigerators and freezers. According to INEP, the amount of the sector of domestic refrigeration is the isobutane (HC-600a), a hydrocarbon with very low GWP (G) and highly flammable. The use of hydrocarbons is chemically sealed and factory-produced systems, allowed this refrigerant to spread safely.

## FIRE PROTECTION 3

### 3 FIRE PROTECTION

#### 3.1 Introduction

The Fire Protection sector produces systems used to prevent or extinguish a fire including fire extinguishers (IEU, 2014). Fire Protection systems are equipments in operation or temporarily out of service, consisting of interconnected components located in a specific space. In general, during the operation phase these equipments are stationary. Fire extinguishers are portable devices that can be moved manually or by motor means (CE, 2009). These equipments may contain fluorinated gases as extinguishing agents. The extinguishing substances are natural or artificial products, in the liquid, gaseous or solid state capable of extinguishing a fire. The actions to prevent or extinguish a fire are:

- Cooling: subtraction of heat to the combustion until a temperature lower than that needed to maintain of the combustion
- Separation: physical separation of combustible material from the comburent or removal of fuel from the combustion area
- Suffocation: reduction of the oxygen percentage below the minimum that can sustain a combustion;
- Chemical inhibition: stopping of chemical reactions occurring during combustion.

Extinguishing substances can act by combining more than one of these actions together, increasing extinguishing efficiency. The main substances used for extinguishing fires are:

- water;
- foams;
- powders;
- carbon dioxide
- halogenated hydrocarbons or halons.

The Italian technologies in the fire protection sector is recognized in all the world. As reported in the following pages, exports of Italian technologies in the fire protection sector are increasing. For research and investments there is an increase (+8%) and an expectation of increase in 2018 (+1.5%). The fire protection technologies actually on the market are considerable and mature.

#### 3.2 Overview of the sector

MA.I.A. AND UNIFA are the two main Italian associations that represent companies operating in the fire protection sector:

UNIFA (National Association security and fire companies), has the objective to qualify and promote the activity, the technical and regulatory aspects of the production processes and product distribution for services and maintenance. Unifa is federated ANIMA (Confindustria (Federation of Italian Associations of Mechanical and Engineering Industries).

The sector represented by Unifa closes 2010 with substantially stable compared to 2009 both in terms of production values (1,000,000 million €) both in terms of the share of exports (42,000 million €).

## TRAINING 7

### 6 TRAINING

#### 6.1 Introduction

As described in the previous chapters, the alternatives to HFCs available in the long term are, basically, natural refrigerants (carbon dioxide, hydrocarbons and ammonia) and HFOs, but due to present needs and pressures they are not suitable for an instant. The transition to these alternatives involves new issues related to safety, flammability, compatibility and high working pressure.

Furthermore there are problems related to the energy efficiency of the machines, which require maintenance or different types with repercussions on the economic and economic feasibility of the alternatives. For these reasons, even the technical staff handling these substances, and technologies must be adequately trained to ensure they meet the requirements and competences needed to carry out their tasks. As a matter of facts, during the specific working focusing on the alternatives to HFC in Italy, the stakeholders highlighted a significant need for training courses to meet new market demands and able to support the transition process towards other alternative technologies. To overcome these gaps it is necessary to strengthen the system of training courses for teachers and technicians, guaranteeing their uniform distribution on the national territory, a meaningful average on all the main alternative technologies and on the sectors where they can be implemented.

Based on these considerations, information about training activities and capacity building experiences concerning HFCs and the issues resulting from the transition to alternative technologies was collected and is reported in the chapter to complement the overview on alternative technologies to HFCs in Italy.

#### F-gas handling: training and strengthening the world of servicing and repairing

In Italy there are two reference associations for technicians and companies operating in the field of servicing and repairing systems, appliances and equipments containing "gases":

- Assopnefici - Associazione Italiana Pignoni
- ATR - Associazione Tecnici del Riscaldamento

Furthermore, Centro Studi Galileo is an Italian institution with a 40-year long expertise in training and certification of technicians in the field of refrigeration, air conditioning and renewable energy. These institutions often may also cooperate in carrying out training activities, organizing seminars and courses. In the following paragraphs information about Centro Studi Galileo and ATR is provided.

Centro Studi Galileo (CSG) has been organizing training courses, seminars and conferences in the field of refrigeration, air conditioning and renewable energy. It is part of Galileo, the Galileo Institute and the Green Way Group.

Centro Studi Galileo has received the support of the Italian Ministry of the Environment, Ministry of Economic Affairs, Ministry of Energy, Ministry of Health, Ministry of the Interior, Ministry of the Regions for these activities.

CSG collaborates with the United Nations Environment Programme (UNEP), the International Institute of Refrigeration (IIR Paris) and the leading international Association of Refrigeration (AAR). It is also involved in the development of training programs on alternative technologies in the air conditioning and refrigeration industry. During these events, particular importance is given to F-gas reduction, the alternative refrigerants and systems, and their European and international regulations and standards. The institutional conferences have been organized biennially since 1983.

## GUIDA ALLA LETTURA

### REFRIGERATION 5

IDENTITY CARD	
Name: EPTA	
Contact:	 <p><b>EPTA S.p.a.</b> Via Mecenate, 86 - 20138 Milano - Italy T +39 02.55.403.211 – F+3902.55.401.023 P.IVA04160730968 info@eptarefrigeration.com</p>
Where are located:	Asia Europe South America
Company Profile:	Epta, multinational Group specialised in commercial refrigeration, has a very strong and well balanced competitive position worldwide, in terms of geographic distribution and of business area coverage, thanks to its brands: Costan, Bonnet Névé, George Barker, Eurocryor, Misa, IARP and Knudsen Køling. Headquartered in Milan, Epta employs a staff of 5,000 employees, with an annual production capacity of 200,000 units and a turnover of over 800 million Euros. By combining the expertise and the unique skills of each brand with systematic research and development, the Group has the ability to anticipate the most innovative global trends to help Retail, Ho.Re.Ca and Food&Beverage sectors achieve excellent levels of performance.
Commercial segment:	Hyper market, super market, hard discount, proximity and city stores, Ho.Re.Ca., Food and Beverage
	<input checked="" type="checkbox"/> Supply <input checked="" type="checkbox"/> Installation <input checked="" type="checkbox"/> Maintenance of systems

### REFRIGERATION 5

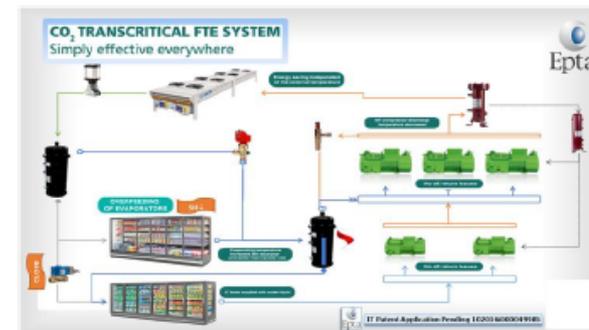
- Components and complete system
- Research and development
- Other ( Design, Engineering, Risk Analysis, Calculation Software)

Extinguishing technology lists:

- CO2 transcritical

Technology Description:

The use of CO2 - FTE Full Transcritical Efficiency



FTE combines efficiency at all climates and any season with reliability and simplicity.

This solution adds to the system an intermediate liquid receiver located between refrigerated cabinet and the compressors which permits to overfeed the refrigerated loads operating without any superheat and, as consequence, to increase the evaporator temperature and the efficiency. This additional intermediate liquid receiver collects the liquid that's coming out from the refrigerated loads and delivers the liquid accumulated directly to the frozen loads. FTE is a system solution that can be adopted in all the climates and that increase the efficiency during the whole year.

- Eliminating 100% of HCFC and HFC from refrigerating systems and substituting them with CO2, which is not toxic, not flammable and with low GWP.
- High energy efficiency at all temperatures and for any store size, in warm climates as well as in cold climates, due to the increase of the

## METODOLOGIA E ATTESE

### Dati e informazioni:

ANALISI DELLA LETTERATURA  
SCIENTIFICA INTERNAZIONALE

DICHIARAZIONE F-GAS

INVENTARIO NAZIONALE DEI GAS SERRA

ASSOCIAZIONI DI CATEGORIA E STAKEHOLDER

PARTECIPAZIONE A CONVEGNI



RIUNIONI



**CONTATTI CON...**

**REFRIGERAZIONE  
COMMERCIALE**

REFRIGERAZIONE: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNA TO CONTRIBUTO
REFRIGERAZIONE	1	ANIMA		SI	SI	SI
	2	ASSOFRIGORISTI		SI	SI	NO
	3	CECED ITALIA		SI	SI	NO
	1		ARISTON THERMO GROUP	NO	NO	NO
	2		ARNEG S.P.A.	SI	SI	SI
	3		CAREL	SI	SI	SI
	4		CRIOCABIN S.P.A.	NO	NO	NO
	5		DGM	SI	SI	SI
	6		DORIN	SI	SI	SI
	7		ENEX	SI	SI	SI
	8		EPTA	SI	SI	SI
	9		EUROKLIMAT	SI	SI	SI
	10		FRASCOLD	NO	NO	NO
	11		LU-VE	SI	SI	SI
	12		NOVA FRIGOR	SI	SI	SI
	13		NEW COLD SYSTEM	SI	SI	NO
	14		PASTOR FRIGOR	SI	SI	SI
15		SIAD	SI	SI	SI	
16		TASELLI	NO	NO	NO	
17		ZANOTTI	NO	NO	NO	

## REFRIGERAZIONE COMMERCIALE : sintesi dei contributi delle aziende

COMMERCIAL REFRIGERATION SECTOR: ALTERNATIVES OF TECHNOLOGIES TO HFCs	
EQUIPMENT	TECHNOLOGIES
Stand alone	Propane
Condensing units	HFCs with low GWP Blends with GWP around 600
Centralised systems	Traditional DX direct expansion system CO2 subcritical cascade system CO2 Transcritical Booster Pumped systems Full Transcritical Efficiency (FTE) Water Loop System Walk in cold room

COMMERCIAL REFRIGERATION SECTOR	
STAND-ALONE UNITS	Company
	ARNEG S.P.A.
	EPTA

COMMERCIAL REFRIGERATION SECTOR	
CONDENSING UNITS	Company
	ARNEG S.P.A.
	CAREL
	DORIN
	EPTA
	LU-VE

COMMERCIAL REFRIGERATION SECTOR	
TRADITIONAL DX DIRECT EXPANSION SYSTEM	Company
	ARNEG S.P.A.
	CAREL
	DGM
	NOVA FRIGOR

COMMERCIAL REFRIGERATION SECTOR	
CO2 TRANSCRITICAL BOOSTER	Company
	ARNEG S.P.A.
	CAREL
	DGM
	DORIN
	ENEX
	EPTA
	EUROKLIMAT
	LU-VE
	NOVA FRIGOR
	SIAD

COMMERCIAL REFRIGERATION SECTOR	
WATER LOOP SYSTEM	Company
	ARNEG S.P.A.
	CAREL
	EPTA
	LU-VE

COMMERCIAL REFRIGERATION SECTOR	
CO2 SUBCRITICAL CASCADE SYSTEM	Company
	ARNEG S.P.A.
	CAREL
	DGM
	DORIN
	ENEX
	EPTA
	EUROKLIMAT
	LU-VE
	NOVA FRIGOR
	SIAD

COMMERCIAL REFRIGERATION SECTOR	
PUMPED SYSTEMS	Company
	ARNEG S.P.A.
	CAREL
	EPTA
	LU-VE

COMMERCIAL REFRIGERATION SECTOR	
WATER IN COLD ROOM	Company
	ARNEG S.P.A.
	CAREL
	CRIOCABIN
	EPTA
	LU-VE
	RIVACOLD
	ZANOTTI

COMMERCIAL REFRIGERATION SECTOR	
FULL TRANSCRITICAL EFFICIENCY (FTE)	EPTA

**CONTATTI CON...**

**CONDIZIONAMENTO**

CONDIZIONAMENTO: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNA TO CONTRIBUTO
CONDIZIONAMENTO	1	ASSOCLIMA (COSTRUTTORI SISTEMI DI CLIMATIZZAZIONE)		SI	SI	NO
	2	AICAR ASSOCIAZIONE ITALIANA CONDIZIONAMENTO DELL'ARIA RISCALDAMENTO E REFRIGERAZIONE		NO	NO	NO
	1		ACM KAELTE KLIMA SRL	NO	NO	NO
	2		AERMEC	NO	NO	NO
	3		ARISTON THERMO	NO	NO	NO
	4		ARGOCLIMA	NO	NO	NO
	5		BALTUR	NO	NO	NO
	6		BAXI	NO	NO	NO
	7		BLUE BOX GROUP	NO	NO	NO
	8		CARRIER	NO	NO	NO
	9		CLIVET	NO	NO	NO
	10		DAIKIN	NO	NO	NO
	11		DE' LONGHI	NO	NO	NO
	12		DECSA	NO	NO	NO
	13		EMMETI	NO	NO	NO
	14		EURAPO	NO	NO	NO
	15		EUROFRED ITALY	NO	NO	NO
	16		EUROKLIMAT	SI	SI	SI
	17		FERROLI	NO	NO	NO
	18		FONDERIE SIME	NO	NO	NO
	19		GALLETTI	NO	NO	NO

**CONTATTI CON...**

**CONDIZIONAMENTO**

CONDIZIONAMENTO: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
	20		G.I. HOLDING	NO	NO	NO
	21		G.E.D. TOYOTOMI ITALIA	NO	NO	NO
	22		HAIER AC ITALY TRADING	NO	NO	NO
	23		HIDROS	NO	NO	NO
	24		HISENSE	NO	NO	NO
	25		HITACHI EUROPE	NO	NO	NO
	26		IMMERGAS	NO	NO	NO
	27		IT COOLING SYSTEM	NO	NO	NO
	28		JOHNSON CONTROLS SYSTEMS AND SERVICE ITALY	NO	NO	NO
	29		LG ELECTRONICS ITALIA	NO	NO	NO
	30		MITSUBISHI ELECTRIC HYDRONICS AND IT COOLING SYSTEMS (MEHITS)	NO	NO	NO
	31		MITSUBISHI ELECTRIC EUROPE	NO	NO	NO
	32		MIDEA	NO	NO	NO
	33		OLIMPIA SPLENDID	NO	NO	NO
	34		PANASONIC ITALIA (Branch Office of Panasonic Marketing Europe GmbH)	NO	NO	NO
	35		PARADIGMA ITALIA	NO	NO	NO
	36		RHOSS	NO	NO	NO
	37		RIELLO	NO	NO	NO
	38		ROBERT BOSCH ITALIA	NO	NO	NO
	39		ROBUR	NO	NO	NO
	40		SABIANA	NO	NO	NO

**CONTATTI CON...**

**CONDIZIONAMENTO**

CONDIZIONAMENTO: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
	41		SAMSUNG ELECTRONICS ITALIA	<b>NO</b>	<b>NO</b>	<b>NO</b>
	42		SYSTEMAIR	<b>NO</b>	<b>NO</b>	<b>NO</b>
	43		TECNOCLIMA	<b>NO</b>	<b>NO</b>	<b>NO</b>
	44		TERMAL	<b>NO</b>	<b>NO</b>	<b>NO</b>
	45		TOSHIBA ITALIA MULTICLIMA	<b>NO</b>	<b>NO</b>	<b>NO</b>
	46		TRANE ITALIA	<b>NO</b>	<b>NO</b>	<b>NO</b>
	47		UNICAL	<b>NO</b>	<b>NO</b>	<b>NO</b>
	48		VAILLANT-SAUNIER DUVAL	<b>NO</b>	<b>NO</b>	<b>NO</b>
	49		VISSMANN	<b>NO</b>	<b>NO</b>	<b>NO</b>
	50		VORTICE ELETTROSOCI ALI	<b>NO</b>	<b>NO</b>	<b>NO</b>

## CONDIZIONAMENTO: sintesi dei contributi delle aziende

- **1 SOLO CONTRIBUTO RICEVUTO DA EUROKLIMAT**
- **CHILLER A PROPANO**



**CONTATTI CON...**

**SCHIUME**

SCHIUME: AZIENDE CONTATTATE						
TORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
IUME	1	AIPE ASS. ITALIANA POLISTIRENE SPANSO		NO	NO	NO
	2	ANPE ASS. NAZ. POLIURETANO ESPANSO RIGIDO SEGRETERIA ANPE - ASS. NAZ. POLIURETANO ESPANSO RIGIDO		SI	SI	NO
	3	ASSOCIAZIONE ITALIANA PRODUTTORI MATERIE PLASTICHE		NO	NO	NO
	4	ASSOCIAZIONE IMPRESE DI IMPERMEABILIZZAZIONI ITALIANE		NO	NO	NO
	1		CANNON AFROS	NO	NO	NO
	2		SINTECO S.R.L	SI	SI	NO
	3		HONEYWELL RAPPRESENTANTE DI GENERAL GAS	SI	SI	NO
	4		TAGOS SRL	SI	SI	SI

## SCHIUME : sintesi dei contributi delle aziende

- 1 SOLO CONTRIBUTO RICEVUTO DA TAGOS SRL
- POLIURETANO ESPANSO
- PANNELLI RIGIDI IN POLIURETANO ESPANSO
- HFO, HC, WATER BLOWING



## CONTATTI CON...

## SISTEMI FISSI ANTINCENDIO

SISTEMI FISSI ANTINCENDIO: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
ANTINCENDIO	1	ANIMA- CONFINDUSTRIA		SI	SI	NO
	1		GIELLE-IT- BA	SI	SI	SI
	2		GASTEC- VESTA	SI	SI	SI
	3		CPF INDUSTRIALE	SI	SI	NO

## SISTEMI FISSI ANTINCENDIO : sintesi dei contributi delle aziende

- ESTINGUENTI CHIMICI (NOVEC)
- GAS INERTI
- CILINDRI E VALVOLE CHE GARANTISCONO L'EFFICACIA ESTINGUENTE
- SISTEMA OXY – MONITOR
- F-GAS BANK

GIELLE HFC FREE FIRE EXTINGUISHING SYSTEMS			
GL-1230	Novac 1230 (FK 5-1-12) gas	ODP = 0	GWP = 1
GL-Inert100	Nitrogen gas	ODP = 0	GWP = 0
GL-Inert55	Nitrogen and argon blend	ODP = 0	GWP = 0
GL-Inert01	Argon gas	ODP = 0	GWP = 0
GL-Inert541	Nitrogen, Argon and CO2	ODP = 0	GWP = 0.1

NUMBER OF CYLINDERS NECESSARY TO PROTECT AN AREA OF 1000 M <sub>3</sub> DEPENDING ON THE TYPE OF EXTINGUISHING AGENT	
HFC-227ea	5 bb da 150 l
HFC-125	4 bb da 150 l
HFC-23	5 bb da 134 l
Halon1301	3 bb da 120l
Inert Gas	18 bb da 140 l a 300 bar



**CONTATTI CON...**

**AEROSOL**

<b>AEROSOL: AZIENDE CONTATTATE</b>						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
AEROSOL	1	AIA - FEDERCHIMICA Assogastecnici e Associazione Italiana Aerosol Assogastecnici		SI	SI	NO
	1		HONEYWELL rappresentante di General Gas	SI	SI	NO
	2		AMBRO-SOL S.R.L.	NO	NO	NO
	3		General Gas	NO	NO	NO

**CONTATTI CON...**

**TRAINING**

TRAINING: AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
TRAINING	1	ASSOFRIGORISTI		SI	SI	NO
	2	ATF Associazione Tecnici del freddo		SI	SI	NO
			CENTRO STUDI GALILEO	SI	SI	SI

## TRAINING: sintesi dei contributi

- **1 SOLO CONTRIBUTO RICEVUTO DA CENTRO STUDI GALILEO**
- **FORMAZIONE PER TECNICI**
- **OPPORTUNITA' PER LE AZIENDE AL FONDO MULTILATERALE DI MONTREAL**

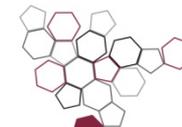


## CONFRONTO TRA COMPARTI: ASSOCIAZIONI CONTATTATE

<b>ASSOCIAZIONI</b>				
<b>SETTORE</b>	<b>NUM. ASSOCIAZIONI</b>	<b>RISPOSTE RICEVUTE</b>	<b>DESTATO INTERESSE</b>	<b>NUM. CONTRIBUTI RICEVUTI</b>
<b>REFRIGERAZIONE</b>	3	3	2	1
<b>CONDIZIONAMENTO</b>	2	1	1	0
<b>SCHIUME</b>	4	1	1	0
<b>AEROSOLS</b>	1	1	1	0
<b>ANTINCENDIO</b>	1	1	1	0

## CONFRONTO TRA COMPARTI: AZIENDE CONTATTATE

AZIENDE					
SETTORE	NUM. AZIENDE CONTATTATE	RISPOSTE RICEVUTE		DESTATO INTERESSE	NUM. CONTRIBUTI RICEVUTI
REFRIGERAZIONE	17	5 NESSUNA	11 Sì	1	11
CONDIZIONAMENTO	50	49 NESSUNA	1 Sì	1	1
SCHIUME	4	2 NESSUNA	3 Sì	3 (di cui 1 estera)	1
AEROSOLS	3	2 NESSUNA	1 Sì	1 estera	0
ANTINCENDIO	3	3 Sì		3	2



## CONFRONTO TRA COMPARTI: ASSOCIAZIONI/AZIENDE CONTATTATE

TRAINING: ASSOCIAZIONI/AZIENDE CONTATTATE						
SETTORE	NUM.	ASSOCIAZIONE	AZIENDA	RISPOSTO	DESTATO INTERESSE	CONSEGNATO CONTRIBUTO
TRAINING	1	ASSOFRIGORISTI		SI	SI	NO
	2	ATF Associazione Tecnici del freddo		SI	SI	NO
			CENTRO STUDI GALILEO	SI	SI	SI

## CONCLUSIONI

- ***Primo censimento nazionale*** sulle tecnologie alternative agli HFC ***made in Italy*** nei settori della refrigerazione, del condizionamento dell'aria, delle schiume, degli aerosol, dei sistemi fissi di protezione antincendio e della formazione vengono messe insieme
- ***Genesis***: nasce dalle esigenze del contesto internazionale (Kigali) e dallo studio ISPRA sulle Alternative agli HFC ( 2 anni di lavoro)
- La mancanza di omogeneità nelle informazioni sulla distribuzione e i contributi ricevuti riflette la ***diversità dei settori in termini di fatturato totale e numero di aziende***

## CONCLUSIONI

- Il numero di aziende, che effettivamente hanno partecipato all'indagine, è inferiore a quello inizialmente proposto, era 15, suddiviso come segue:

Sector surveyed	Nr. of participating companies
Refrigeration	11
Air Conditioning	1
Foams	1
Aerosols	0
Fire Protection	2

- **Criticità** relativa alla **disponibilità di dati** e alla **partecipazione con contributi**

## CONCLUSIONI



- Sebbene l'Italia non sia produttrice di sostanze refrigeranti, notevole è l'impegno delle nostre imprese nella ricerca e nello sviluppo di nuove tecnologie nei settori che utilizzano gli HFC. A differenza dei grandi produttori Giappone e Usa, nel nostro Paese esistono realtà imprenditoriali leader mondiali nei settori della refrigerazione, condizionamento, schiume e sistemi fissi antincendio che si impongono sui mercati internazionali grazie alle loro innovative tecnologie, alla personalizzazione del prodotto in base alle esigenze del cliente, alle condizioni climatiche e alle condizioni locali proprio come se fosse un abito sartoriale.



**ISPRA**

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Dipartimento per la Valutazione, i controlli e la sostenibilità ambientale



Sistema Nazionale  
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# Thank you for the attention



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