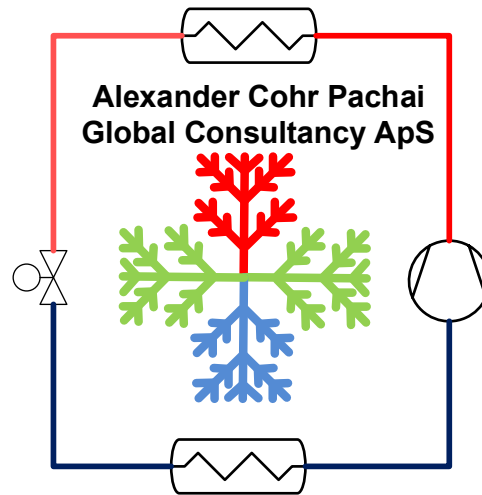


Commercial and Industrial Refrigeration Sector

Alexander Cohr Pachai



Workshop on Kigali Implementation Plans, Vienna, Austria, 14 – 16 June 2023



Challenges in a changing environment

- The challenges that came with the unrest in Europe has created a sea of innovation and changes in the energy markets
- At the same time, we see challenges with pollution with plastic and PFAS polluting the water all living mammals depend on
- The ice caps are melting at an alarming rate, science has shown that the ice caps that used to keep climates stable are now melting, and the results are droughts and wildfires.
- Uninhabitable areas are spreading, and humans are moving to safe areas; creating local turbulent political climates
- The newcomers in the safe zones need to adapt by getting trained to fit in to the new environment



The foundation for a safe future

1. Training and education – to enable a safe and efficient future, incl. certification
2. Clear and transparent legislation – to make it easy accessible for contractors
3. Enforcement – so cowboys cannot avoid following standards and certification requirements

Education, training and certification



- To ensure the safety of products and persons that meet the systems it is of importance that the systems are properly installed and maintained
- It is important to state that the owners also have a responsibility to follow the proposals for updating that comes from the certified contractor or service technician
- The states must step up the enforcement of the qualification requirements as laid down in ISO 22712/EN 13313 but also to ensure that the design is following industry standards and guidelines



Standards and guidelines are developed

- The standards for design, installation, service and decommissioning are in places and can be a basis for developing local training
- Standards are at times complicated and that is where education and training will make the difference
- Updating staff on novelties is a management responsibility
- Owners cannot claim that they are not responsible if they do not follow recommendations given by the contractor

Learn from the accidents and near miss

- Why are near miss and minor events important?
- Safety is part of the management's responsibilities
- The lessons learn have to be recorded to avoid the future similar accidents

- 1 accident can be OK; but letting it repeat is not smart



Enforcement is unfortunately necessary

Authorities around the world in all countries are generally guilty of neglecting enforcement of rules and making the companies follow the standards and local regulations.

The industry cannot enforce the rules on their own

Workshop on Kigali Implementation Plans, Vienna, Austria, 14 – 16 June 2023

Session 5

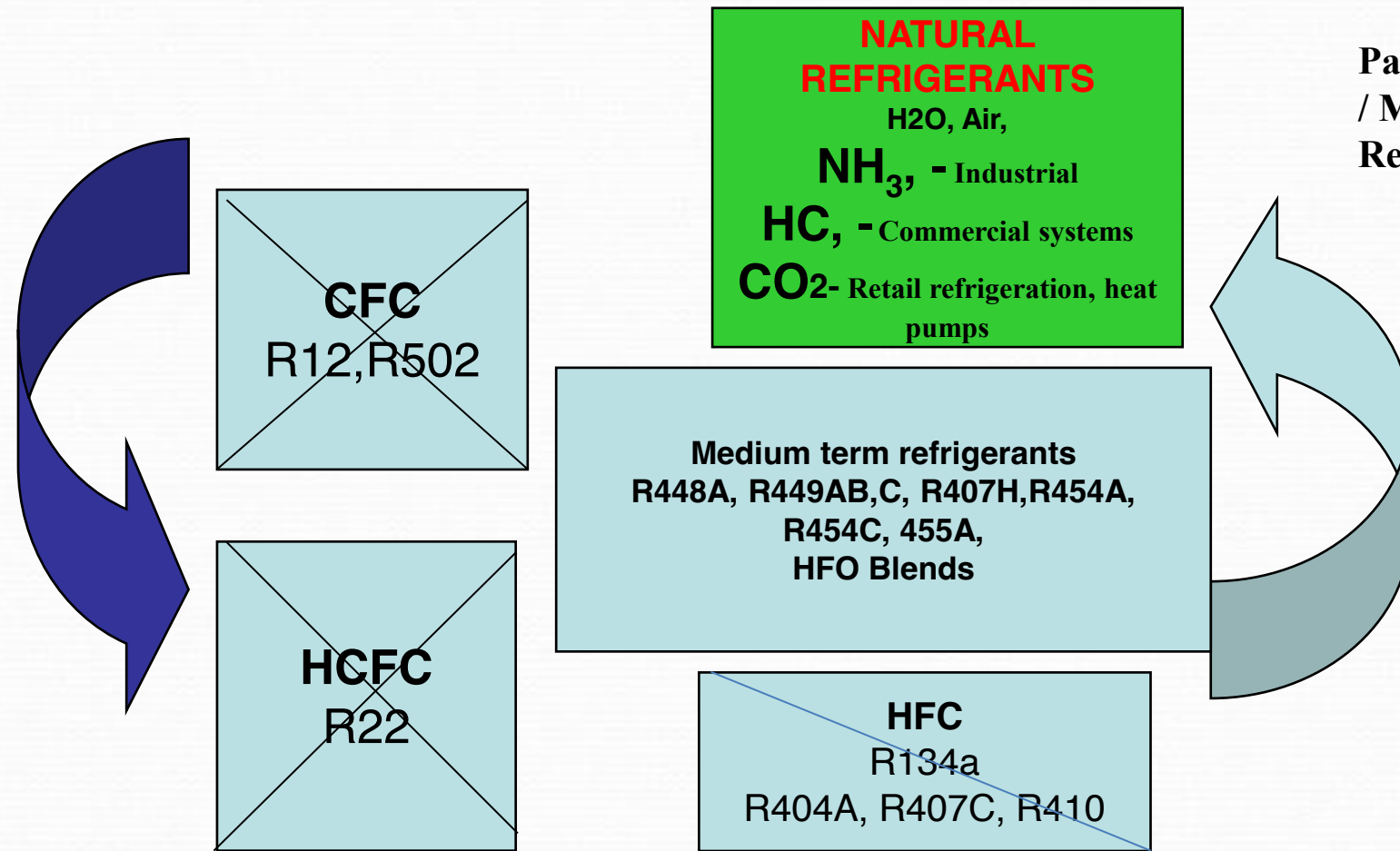
Commercial and Industrial Refrigeration

Prof. Dr. Eng. Gratiela-Maria TARLEA (1,2)

(1) TECHNICAL UNIVERSITY OF CIVIL ENGINEERING BUCHAREST

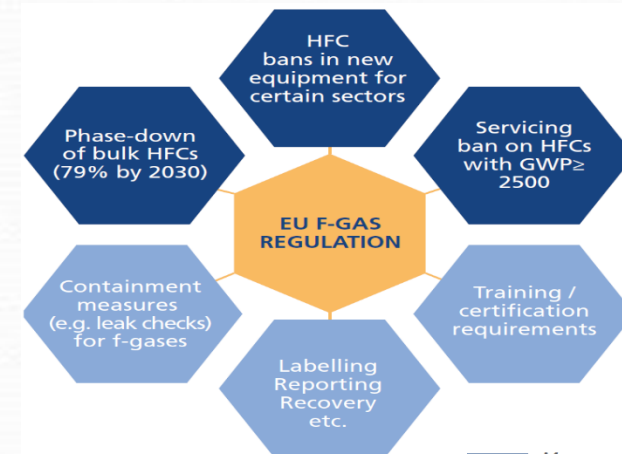
(2) THE ROMANIAN GENERAL ASSOCIATION OF REFRIGERATION



Evolution and Strategy of the Refrigerants



Paris Agreement / 2015, Kigali Amendment / 2016 / Montreal Protocol 1987/Kyoto Protocol 1997, Regulation (EU) 517/2014.

The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission with the overarching aim of making the European Union (EU) climate neutral in 2050



 Measures to avoid use of f-gases
 Measures to prevent leakage of f-gases

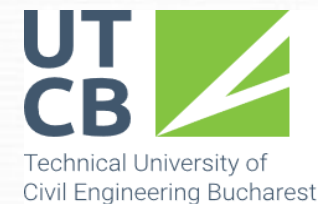
The challenges and opportunities in adopting low GWP refrigerants:

- Major challenges

- Lack of locally-demonstrated and affordable alternative refrigerants; Lack of local capacities to install alternative technologies; Lack of local training facilities for training on low GWP technologies and refrigerants; RAC service technicians are not familiar with standards that are used in R/AC/HP/RE systems and equipment; Lack of maintenance capacities and opportunities to learn the latest policies and technologies; Larger potential risks of failure and accidents; Lack of opportunities to exchange the latest development of technologies outside of the countries where the equipment is imported;
- **Cost problems!** The technologies are not all the time available and affordable! Ex: For HC: YES for trans critical CO₂: NO.

- Opportunities

- Develop research /innovation in the field of R/AC/HP/RE;
- **Concept of Cost- Eco-Efficiency of a commercial or industrial system;**
- Congress as a national forum where cooling technologies are shown in each country/region could be organized.



AGFR-The Romanian General Association for Refrigeration - National CERTIFICATION BODY

Do you need special training or skills to adopt the new technologies?

Following tasks :

- The elaboration of development strategies in the field of R/AC/HP/RE;
- The initiation of law projects, of regulations and standards in the field of R/AC/HP/RE;

This AGFR has succeeded to achieve the following objectives:

There were elaborated packages of concrete measures in the field of:

- Protection of the environment and management of the refrigerants;
- Certification of the professional competence of companies and specialists working in refrigeration and air conditioning, training of specialists by means of courses;
- International Projects.



Training



We organized different training levels:

Technicians- Romanian General Association for Refrigeration and PFACR;
Qualification requirements (ISO 22712/EN 13313);

Graduated (Engineers) - RAC curricula introduced;

Post-graduated and dedicated training ;

EXAMPLE : THE ROMANIAN GENERAL ASSOCIATION OF REFRIGERATION AGFR - National Lead

REAL ALTERNATIVES 4 LIFE
 Certified technicians in ROMANIA

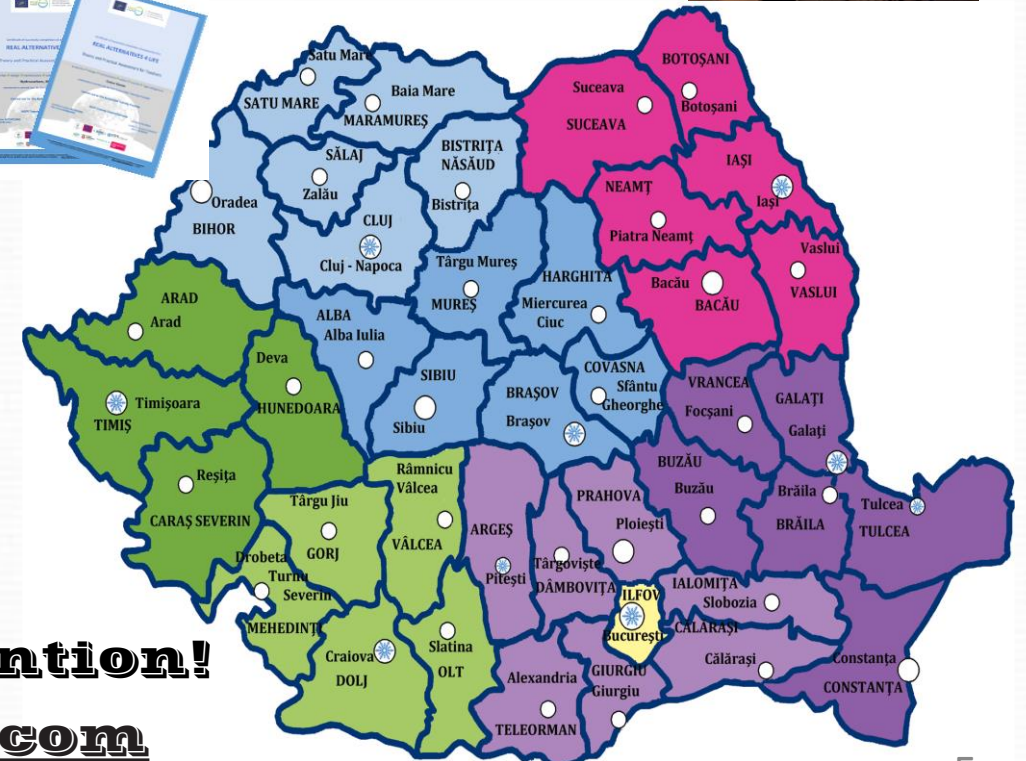


The 8th National Regions

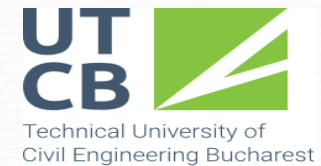


- REGIUNEA 1** - Regiunea de Dezvoltare Nord-Est
 Județe: Iași, Botoșani, Neamț, Suceava, Bacău, Vaslui, Sucursala Iași
- REGIUNEA 2** - Regiunea Sud-Est
 Județele Vrancea, Galați, Brăila, Tulcea, Buzău, Constanța, Sucursala Galați
- REGIUNEA 3** - Regiunea Sud Muntenia
 Județele Prahova, Dâmbovița, Argeș, Ialomița, Călărași, Giurgiu, Teleorman, Sucursala Pitești
- REGIUNEA 4** - Regiunea Sud-Vest Oltenia
 Județele Mehedinți, Gorj, Vâlcea, Olt, Dolj, Sucursala Craiova
- REGIUNEA 5** - Regiunea de Dezvoltare Vest a României
 Județele Arad, Caraș-Severin, Hunedoara și Timiș, Sucursala Timișoara
- REGIUNEA 6** - Regiunea de Dezvoltare Nord-Vest
 Județele Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu-Mare și Sălaj, Sucursala Cluj
- REGIUNEA 7** - Regiunea Centru
 Județele: Alba, Sibiu, Mureș, Harghita, Covasna, Brașov, Sucursala Brașov
- REGIUNEA 8** Regiunea București-Ilfov, Sucursala București

Flammable Refrigerants & CO₂
 Theoretical and Practical Training and Certification



Advertising – Site www.agfro.ro
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 Conferences with natural refrigerants



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WORKSHOP ON KIGALI IMPLEMENTATION PLANS



SESSION 5 COMMERCIAL AND INDUSTRIAL REFRIGERATION PANEL DISCUSSION



Vasil Eftimov
Vienna, Austria
14 – 16.06.2023



EXAMPLE OF ANALYSIS OF CONSUMPTION IN COMMERCIAL AND INDUSTRIAL REFRIGERATION FOR PERIOD 2020 – 2022 (from KIP PRP)

Year	Sector	Sub sector	Sub sector system	HFC-134a		HFC-32		R-407C		R-410A		HCFC-22		R-404A		R-507A		Total Servicing need (tonnes CO2 equiv.)	Total Manufacturing need (tonnes CO2 equiv.)	
				Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)	Servicing need (tonnes CO2 equiv.)	Manufacturing need (tonnes CO2 equiv.)			
2020 -2022	Refrigeration	Domestic refrigeration	Refrigerator and freezers	1,25%														0,29%		
		<i>Domestic refrigeration Total</i>			1,25%														0,29%	
		Commercial refrigeration	Small stand-alone equipment		0,28%	0,95%								1,77%	0,67%	2,10%			0,44%	1,68%
			Condensing units		3,00%	3,50%								12,95%	11,96%	7,52%			6,73%	6,04%
			Large central pack systems		6,67%	22,87%								37,79%	62,49%	34,84%			32,14%	29,54%
		<i>Commercial refrigeration Total</i>			9,96%	27,32%							52,51%	75,13%	44,46%			39,31%	37,25%	
		Transport refrigeration	Road transport (vans, trucks, trailers)		10,14%										8,68%				6,44%	
		<i>Transport refrigeration Total</i>			10,14%										8,68%	6,07%			6,44%	4,20%
		Industrial refrigeration	Small / medium sized systems		2,14%	34,99%								15,37%	16,19%	49,46%	100,00%	100,00%	11,06%	44,37%
		<i>Industrial refrigeration Total</i>			2,14%	34,99%							15,37%	16,19%	49,46%	100,00%	100,00%	11,06%	44,37%	
		<i>Refrigeration Total</i>			23,49%	62,32%							67,88%	0,00%	100,00%	100,00%	100,00%	100,00%	57,10%	85,82%

CHALLENGES

AVAILABILITY OF ALTERNATIVES

Are low-GWP alternatives available in the country ?

AVAILABILITY OF TECHNOLOGY

Is equipment using low-GWP available in the country ?

QUALIFIED PERSONNEL

Installers and service technicians have possibilities to gain qualification on low-GWP technologies ?

STANDARDS

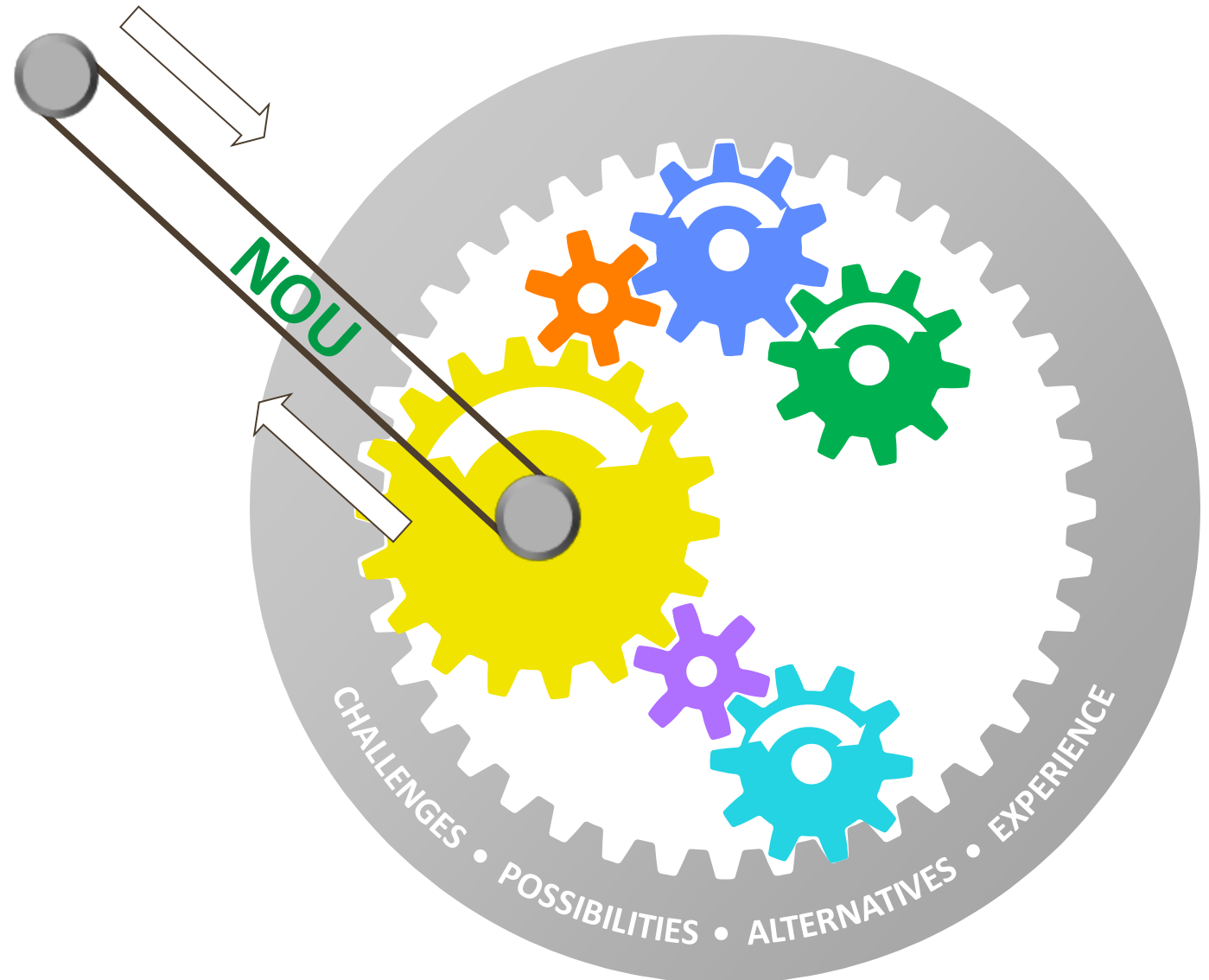
Are safety standards and standards related to energy efficiency available ?

MANUFACTURING FACILITIES

Are there equipment manufactures in the country? Local assembling companies in the country?

EXPERIENCE EXCHANGE

Are there congresses / workshops / informative materials promoting low-GWP technologies ?





THANK YOU FOR YOUR ATTENTION



Vasil Eftimov

Nidec

Global Appliance

embraco

Nidec

NIDEC GLOBAL APPLIANCE

UNIDO - KIP workshop 2023

Marino Bassi – Nidec GA-Embraco – Key Account Sr. Advisor

June 2023

Wide application range for commercial refrigeration



LBP

HBP



Naturally Efficient



Energy Efficiency



Reliability

FIXED SPEED

Extended cooling capacity



EL



EM



EH



F



NE



NT



NJ



SCROLL

VARIABLE SPEED

Excellence in energy efficiency



FMX



VEM



VES



FMF



VEH



VNE



VNEX



3HP



SCROLL

PACKAGE AND CONDENSING UNITS

Optimized design for better performance



Standard portfolio



Plug n' Cool



Sliding



BIOMA

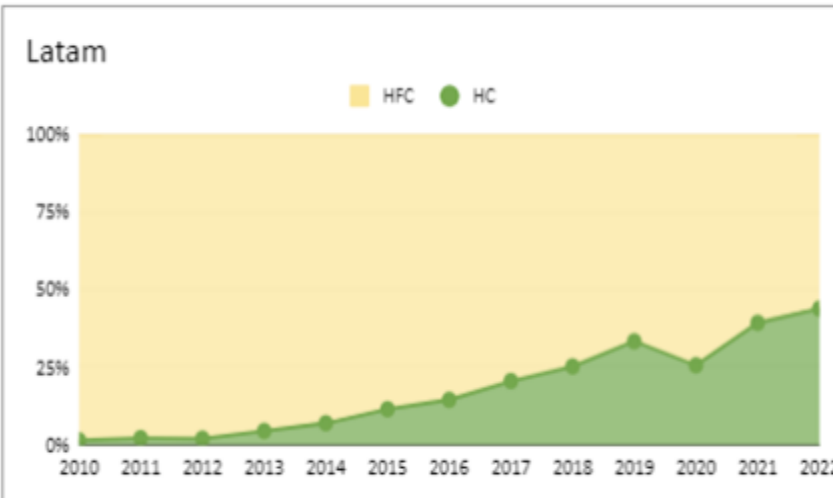
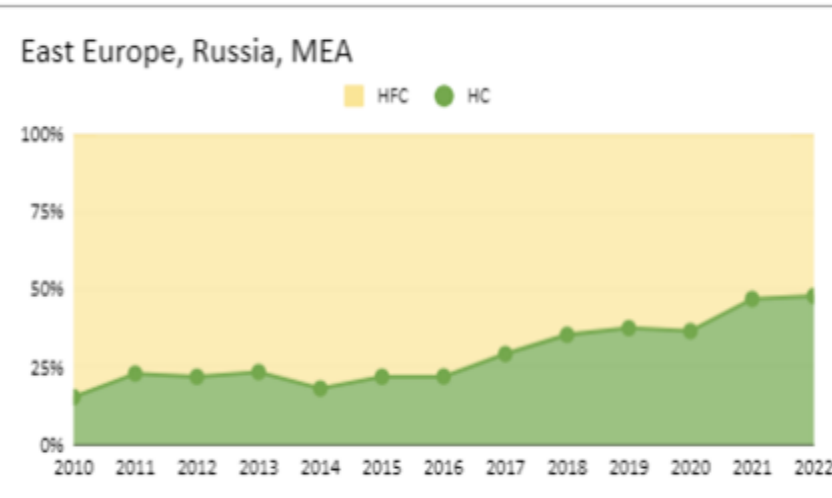
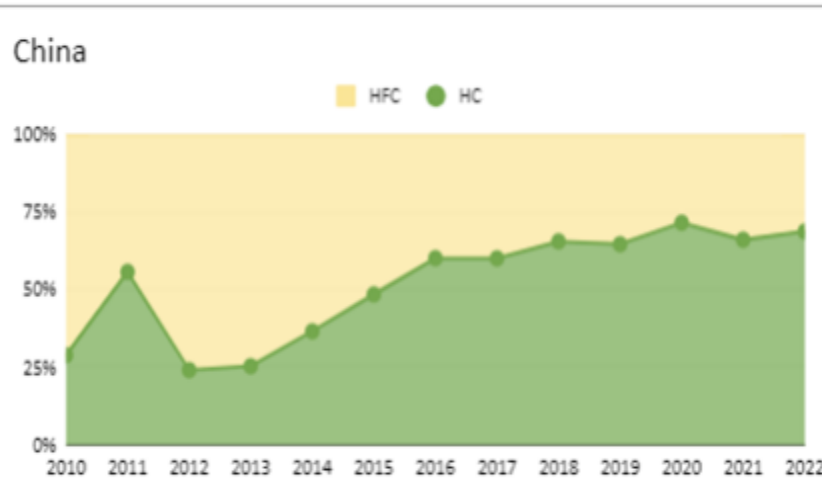
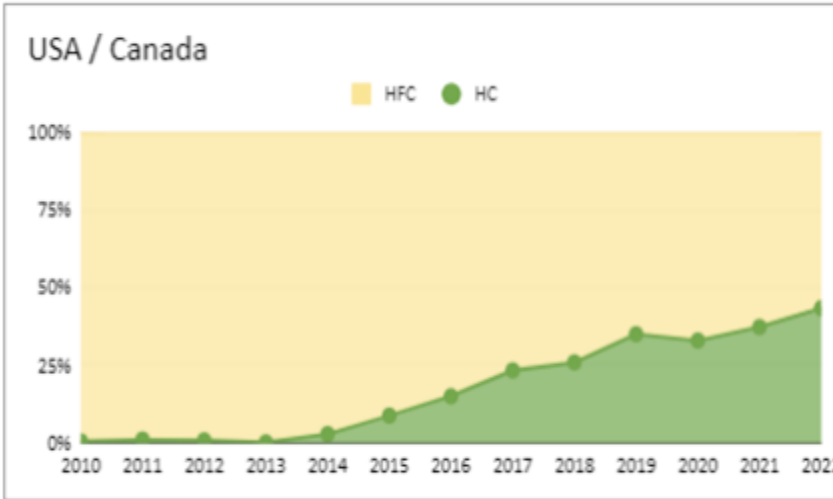
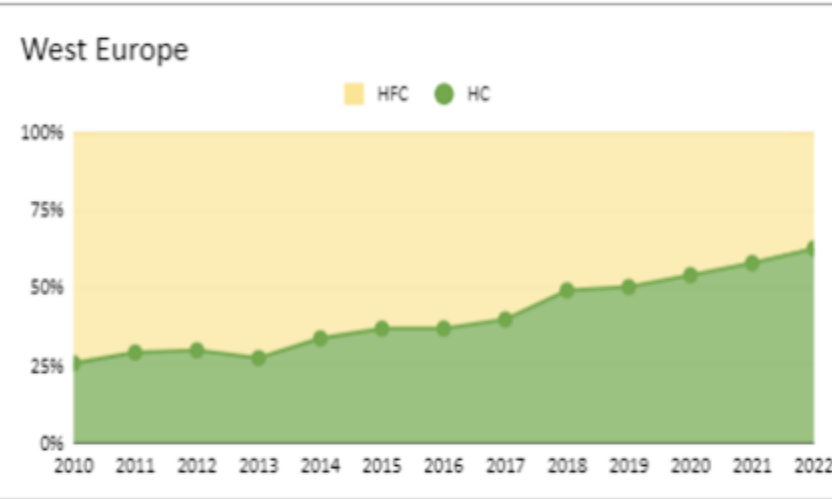
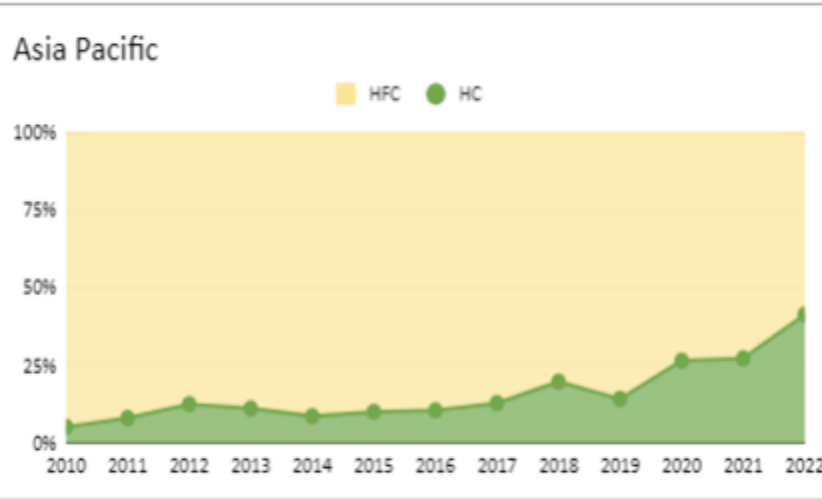


Hawk



Self-contained cabinets - CR

Refrigerant trends per macro-areas (Nidec - Embraco)



HCs system EERs grow in a similar way

HCs are considered the global solution for commercial self-contained cabinets (naturally efficient)

HCs – safety use



MSDSs

- Hazard statements: H220 Extremely flammable gas
- Carry out a risk assessment before the use
- Only experienced and properly instructed persons should handle it.
- Use only properly specified equipment that is suitable for this product

Safety standard requirements

- Only competent trained technicians are authorized to open circuit with flammable refrigerants

Cabinet handbooks

- Only engineers who have been trained in the safe handling and use of hydrocarbons (HCs) refrigerants should work on this system.

Africa – use of HCs

U-3ARC - New Refrigerants - Open letter to sellers of dangerous technologies in Africa

“.... given the various international reports on climate change and the involvement of Africa in this global phenomenon, U-3ARC **declares in the introduction of flammable refrigerants and technologies that use them in Africa inappropriate, until local technicians are trained**. This preliminary training must be accompanied by a vast awareness campaign among users ..”

U-3ARC (Union of Associations of African Actors in Refrigeration and Air Conditioning) has been created during the General Assembly held in Ouagadougou, Burkina Faso on September 24, 2020 by 30 associations of refrigeration and air conditioning actors from 29 countries