RACHP Equipment & PFAS

Date

EPEE

OUR PRODUCTS

Air-Conditioners

Heat Pumps

Refrigeration

From less than 1 kW up to couple hundred kW
With different technologies as “split” types and “self contained” types

WHERE OUR PRODUCTS ARE USED

Home refrigeration

Vaccine storage

Transport refrigeration

Sports facilities

Grocery stores

Offices and schools

Homes

Hospitals

EPEE

OUR MEMBERS

CORPORATE MEMBERS

A-GAS TOGETHER WE CAN
AGC
ARKEMA
Brizer
CAREL
Carrier
Chemours
climalife
DAIKIN
DAIKIN CHEMICAL EUROPE
DAIKIN
Danfoss ENGINEERING TOMORROW
COPELAND
FUJITSU
GREE
HITACHI Inspire the Next
Honeywell
Johnson Controls
Koura
LENNOX
LG
MITSUBISHI ELECTRIC
MITSUBISHI HEAVY INDUSTRIES
Panasonic
Rheem
SAMSUNG
Schneider Electric
SMARDT
SOLVAY
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ASSOCIATION MEMBERS

AFCE
AGORIA
AHRI AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
AREA
ASERCOM
EFCTC European Fluorocarbons Technical Committee
ehpa european heat pump association
FETA
Fachverband Gebäude-Klima e.V.
JRAIA
KRAJOWE FORUM CHŁODNICTWA
STEK
Uniclima

EPEE's membership is comprised of 46 member companies and national associations across Europe realising a turnover of over 30 billion Euros and employing more than 200,000 people in Europe. Our member companies manufacture most of their products in the EU.

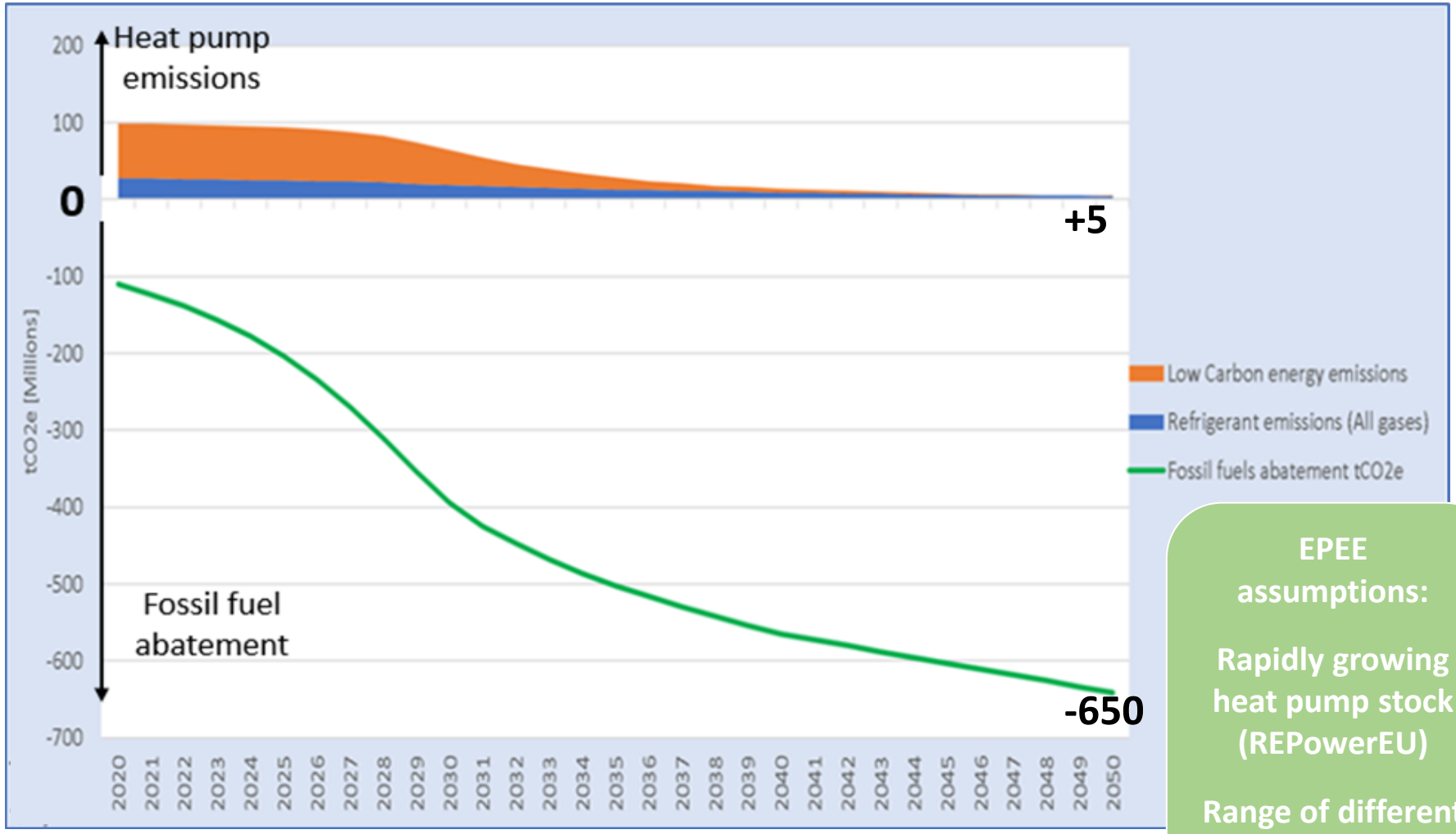
EPEE

Role of RACHP sector in society

Cooling and heating are fundamental needs for society:

Refrigeration	Reduces food loss and thereby reduces CO2 emissions. Ensures safe and affordable food supplies. Safe transport of vaccines and medicine.
Comfort and industrial cooling	Necessary for health protection and productivity in homes, hospitals, offices and process industry.
Comfort and industrial heating	Heat pumps reduce dependency on fossil fuels, but also support DHC networks and recover waste heat.

Emissions of the sector: example from the model



EPEE assumptions:

Rapidly growing heat pump stock (REPowerEU)

Range of different lower-GWP refrigerants used

Since 2012, EPEE has developed a powerful *HFC Outlook EU Model* tool, in recent years in partnership with UNEP:

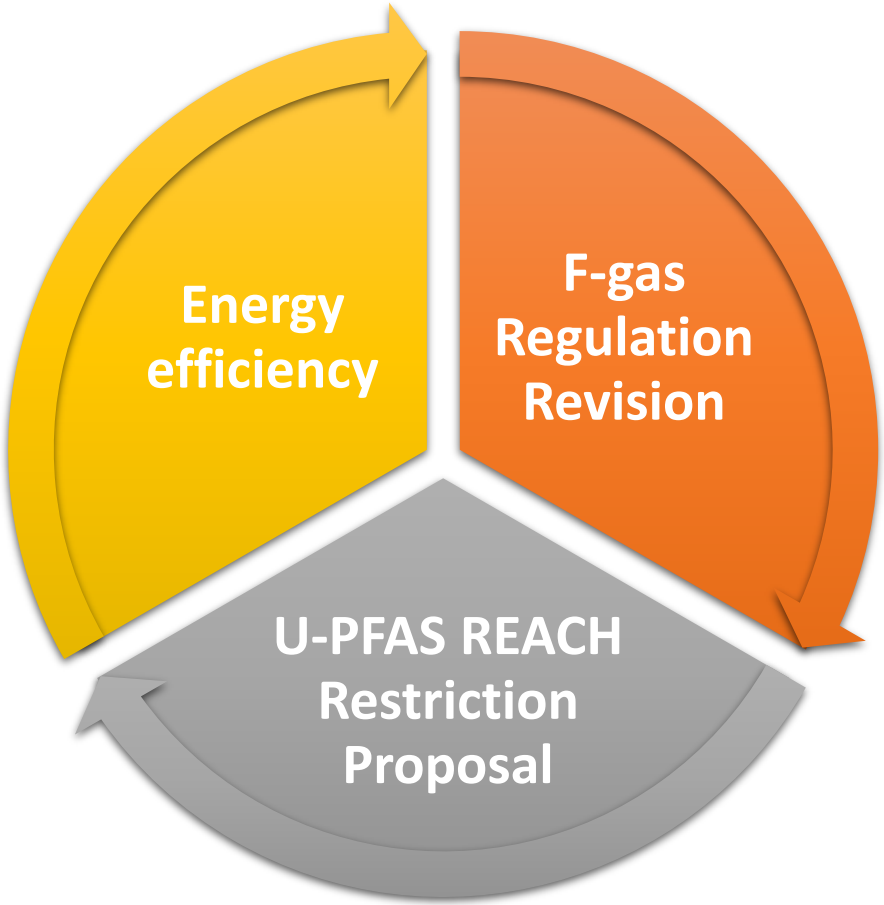
➔Assesses the **best pathways** towards achieving the Kigali Amendment.
➔Gives data on the **placing on the market** and on the **emissions** of all types of refrigerants, including CO2 emissions based on system efficiency.

Interplay between PFAS and other files

<u>Energy Efficiency First Principle</u>:
"taking utmost account of cost-efficient energy efficiency measures in shaping energy policy and making relevant investment decisions."

So-called "natural refrigerants" cannot always guarantee the same level of:

- **safety**
- **energy efficiency**
- **affordability**



<u>F-gas Regulation:</u> Further pushes the HFC Phase Down and transitions towards HFOs and non-fluorinated alternatives

The two first F-gas Regulations are in place since 2006/2014 and are considered to be very successful.

Date of implementation: 2024

<u>U-PFAS REACH Restriction:</u>
Proposal to restrict the use of PFAS including F-gases and equipment using fluoropolymers

Date of implementation: 2028

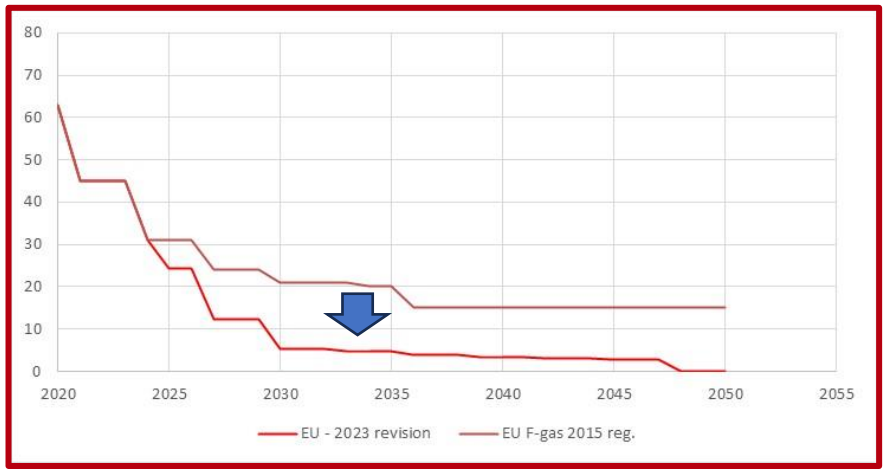
The F-gas Regulation

Regulates the use of fluorinated gases, as the transposition of the 1987 Montreal Protocol and the 2016 Kigali Amendment.

The first two Regulations already led to significant decrease in emissions.

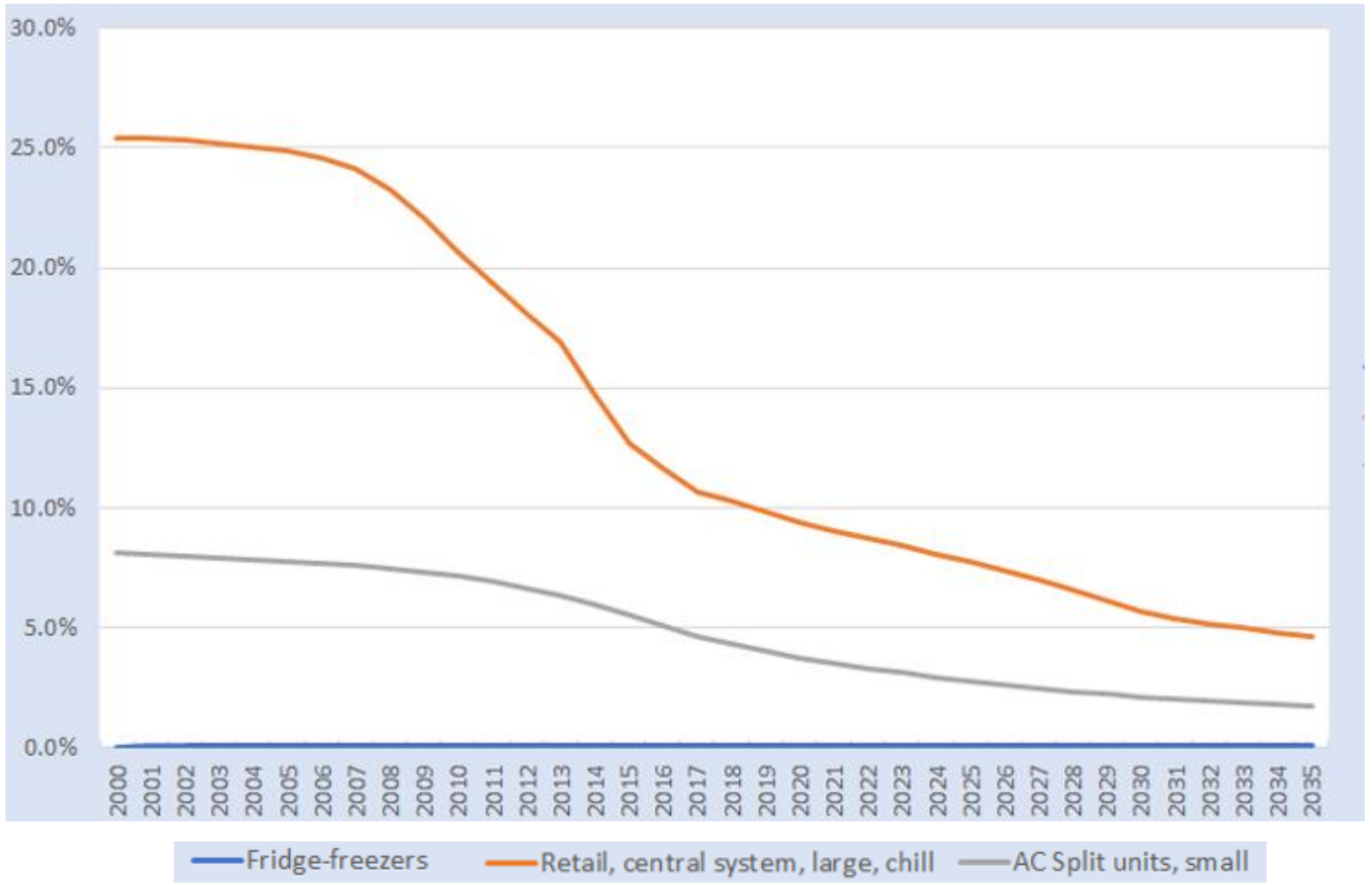
The third one, to be fully adopted in March 2024, will contain:

- stricter containment measures for HFCs, HFOs and blends
- full F-gas product bans after 2030 for several product categories with review of their feasibility by 2030.
- full phase out of virgin HFCs by 2050 with a review clause in 2040



This Regulation has a **similar purpose** as the PFAS Restriction proposal, as it also reduces environmental release and impact.

Emissions of the sector: low leakage rates



More graphs and data are available in the full submission of EPEE.

Emissions and leakage rates vary between products but are **generally low.**

Many small equipment types are factory-built sealed systems, with low operational leakage rate – below 1% per year.

Degradation products of F-gases

One of the reasons for the inclusion of F-gases is the partial degradation into trifluoroacetic acid (TFA), however **many independent experts and scientists consider TFA to be of low concern for human health and the environment:**

EEAP, 2022:

"all PFAS should not be grouped together, persistence alone is not sufficient for grouping PFAS for the purposes of assessing human health risk"

"based on projected future use of these precursors of TFA [including HFC/HFO], no harm is anticipated"

Emissions from refrigerants defined as PFAS

Outcome:

The emissions of PFAS refrigerants are decreasing year by year which indicates progress in reducing environmental impact.

	HFCs						HFOs				Total [tons]
	R-125	R-134a	R-143a	R-227ea	R-245fa	R-365MFC	R-1233zd(E)	R-1234yf	R-1234ze(E)	R-1336mzz	
2020	10.016	19.071	3.653	200	72	114	1	1.546	94	0	**34.766**
2025	8.503	16.099	2.424	169	-	-	15	3.617	384	6	**31.218**
2030	4.809	9.703	187	81	-	-	29	6.022	670	12	**21.512**
2035	2.654	4.301	20	-	-	-	43	8.686	999	17	**16.720**

From 2020 to 2035, the emissions will **decrease by more than two**.

Granularity of applications

› The use of F-gases is diversified across RACHP applications, with specific products having **specific characteristics that influence the choice of refrigerants**.

A broad restriction would:

- Impede the **optimal refrigerant choice** for new equipment
- Lead to **premature obsolescence**
- Generate **unnecessary waste**
- Hamper the **recovery and reclamation** of refrigerants

Use of fluoropolymers

Fluoropolymers are **essential** for the functionality and tightness of RACHP products, with unique characteristics:

Sealing to prevent the release of refrigerant into atmosphere

Temperature and pressure resistance facing differentials from -50°C to 175°C and from near vacuum conditions up to 120 bar

Persistence and chemical inertness in aggressive environment

Unique electrical properties, like the low dielectric constant that does not break down when subjected to important electric fields

Low friction that enables components to be more sustainable and require fewer repairs

Today there is no viable alternative that can fulfill all the same criteria.

Lack of alternatives to fluoropolymers

Two possibilities:

- A return to previously used components, which were replaced for efficiency/safety reasons (e.g. lead)
- Development and implementation of innovative components.

The unlimited derogation included in the Proposal for “national safety standards and building codes” does not cover fluoropolymers, **making it counterintuitive as equipment will not properly function without fluoropolymers.**

Internal estimation of time for developing alternatives to fluoropolymers, based on industry experience.

EPEE recommendations

For F-gases:

- Full time-unlimited derogation for F-gases used in RACHP applications, with a review clause 10 years after the EIF to assess efficiency/availability of alternatives, but also for:
- Maintenance and refilling
- Reclamation and recycling of refrigerants
- Exports of pre-charged equipment

A reconsideration of the concentration limits as the current value proposed may jeopardize the efforts to recover, reclaim and reuse refrigerants.

For fluoropolymers:

- Full time-unlimited derogation for fluoropolymers used in RACHP applications, with a review clause 10 years after the EIF to assess availability and viability of alternatives, but also for:
- Spare parts, waste treatment and exports

A reconsideration of concentration thresholds to not hamper the circularity of components.

Thank you for your attention!

EPEE

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