



PFAS restriction in the context of the
RACHP applications
*Second Open Ad-Hoc Belgium REACH Committee
(BCR) on uPFAS restriction, [REDACTED],
chair of the EPEE PFAS Impulse Team*



6
Sept.
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EPEE represents the full product range of refrigeration, AC and heat pump equipment...
...using a diversity of refrigerants – HFCs, HFOs and non-fluorinated alternatives.



Residential Heat Pumps, e.g. hydronic



Air/Air Heat Pumps for residential and commercial use



Large AC and heat pumps (chillers, VRFs, rooftops, ...)



Commercial Refrigeration



Industrial Refrigeration



Transport refrigeration



District Heating and Cooling

We need to address environmental concerns while meeting the industry's needs.

Interplay between F-gas, Ecodesign, and PFAS

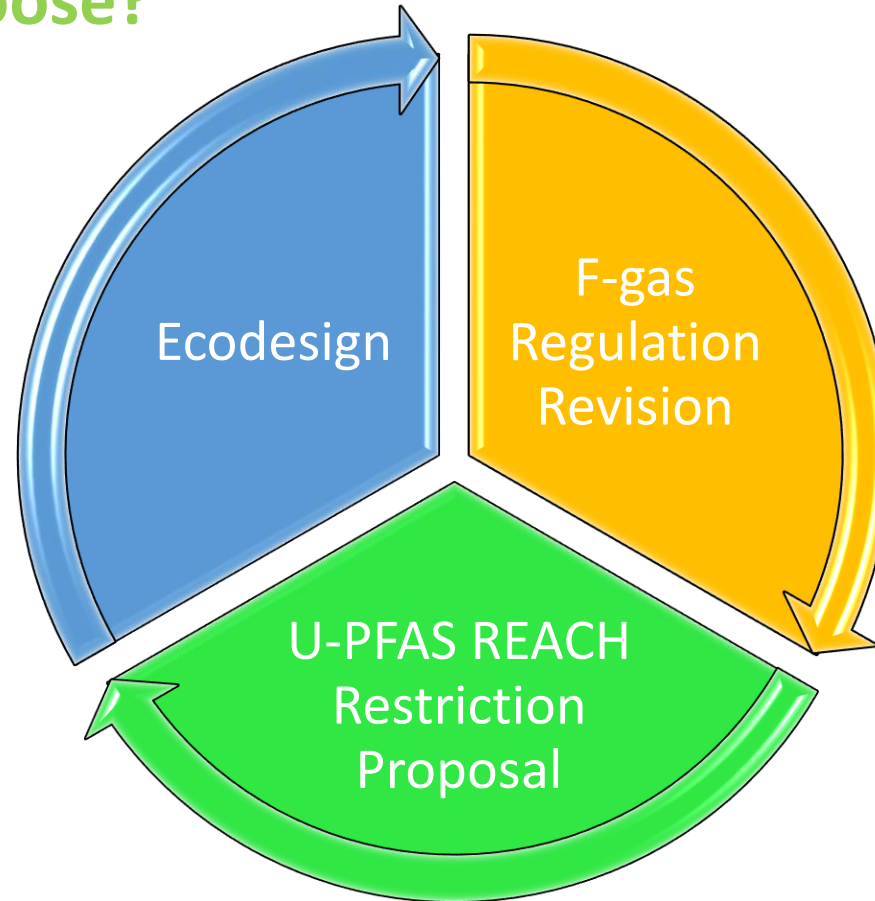
Which refrigerant to choose?

Energy Efficiency First Principle:

“taking utmost account of cost-efficient energy efficiency measures in shaping energy policy and making relevant investment decisions.”

The so-called “natural refrigerants” cannot always guarantee the same level of:

- safety,
- energy efficiency
- and affordability.



F-gas Regulation: 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-PFAS REACH Restriction:

Proposal to restrict the use of PFAS including F-gases and equipment using fluoropolymers

Date of implementation:
2025-2026...?

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

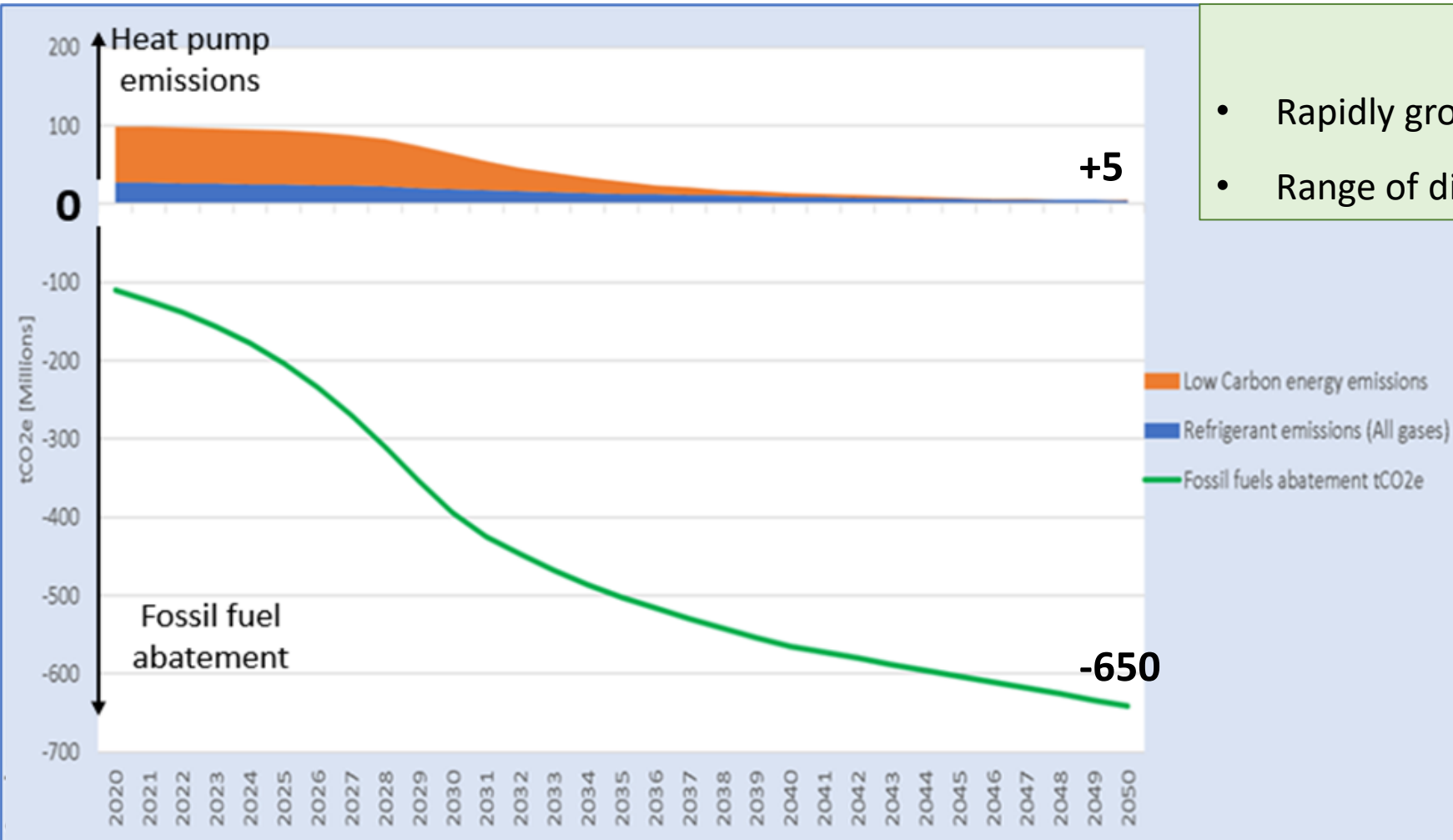
- ➔ Assesses the **best pathways** towards achieving the Kigali Amendment.
- ➔ Gives data on the **placing on the market** and on the **emissions** of all types of refrigerants including CO2 emissions based on systems efficiency.

EPEE is planning to submit detailed data on the emissions of F-gases for the Public Consultation.

First outcome:

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

Example of the model outcome simulating the CO2 and refrigerant emissions based on the roll out of Heat Pumps in the EU



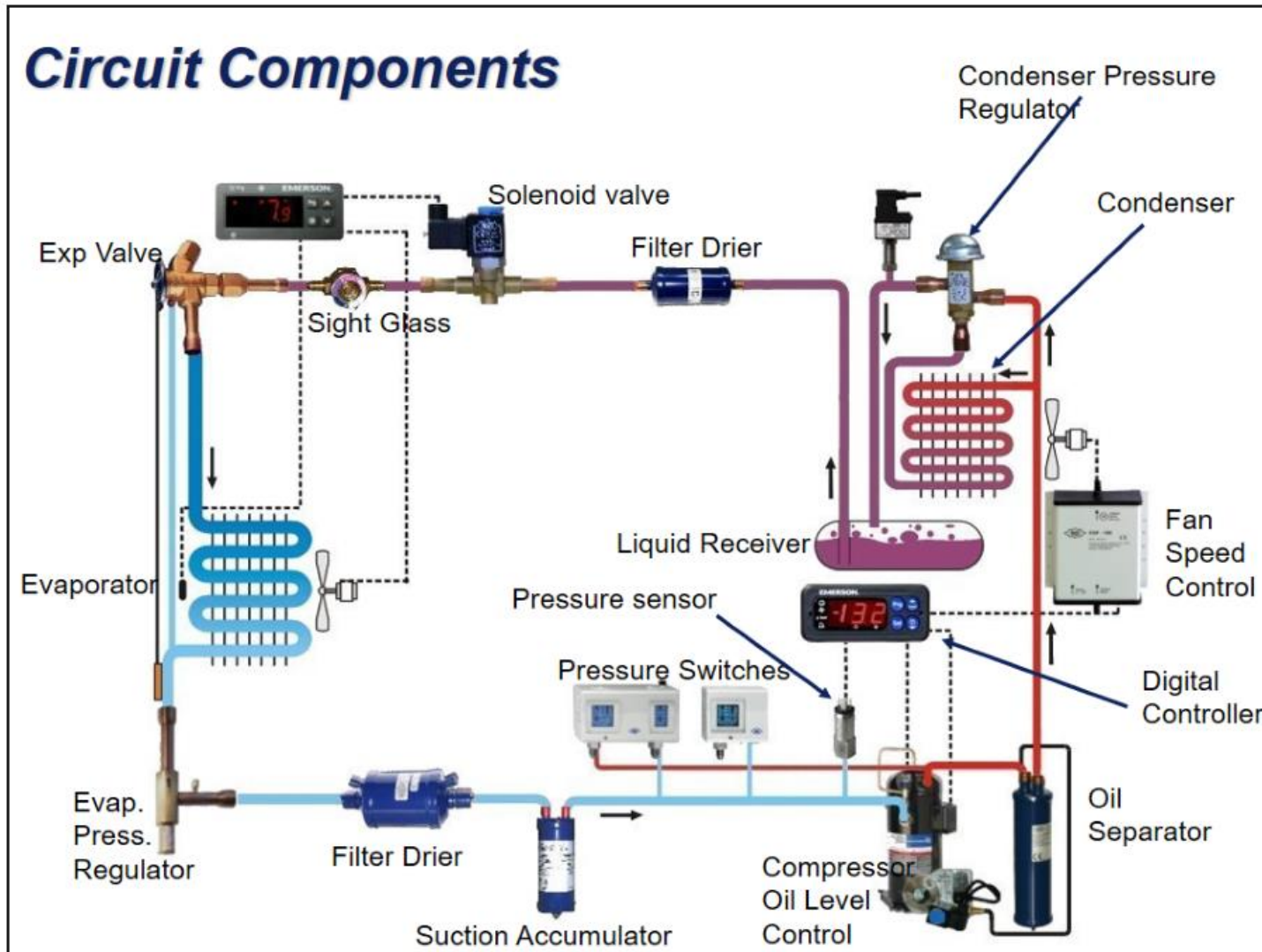
EPEE assumptions:

- Rapidly growing heat pump stock (RePowerEU)
- Range of different lower GWP refrigerants used

Degradation products of F-gases

- The rationale behind the inclusion of F-gases in the restriction scope is that some F-gases (HFCs and H(C)FOs) degrade to trifluoroacetic acid (TFA), a persistent substance.
- The independent expert views of ‘The Environmental Effects Assessment Panel’ of the Montreal Protocol under the United Nations Environment Programme (UNEP) has commented on the topics of TFA for almost a decade now.
- The most recent [EEAP 2022 Assessment Report](#) unequivocally cites a common agreement among the majority of experts that *“all PFAS should not be grouped together, persistence alone is not sufficient for grouping PFAS for the purposes of assessing human health risk, and that the definition of appropriate subgroups can only be defined on a case-by-case manner”* and that *“it is inappropriate to assume equal toxicity/potency across the diverse class of PFAS”*.
- The Report concludes that *“Trifluoroacetic acid has biological properties that differ significantly from the longer chain polyfluoroalkyl substances (PFAS) and inclusion of TFA in this larger group of chemicals for regulation would be inconsistent with the risk assessment of TFA”* ([page 25](#)).

Potential Impacts of Fluoropolymer Restriction



- Pressures up to 140 bar
- Steep pressure gradients inside components
- Demands for leak tightness due to environment and safety
- Temperature variations between -40 to + 100 Celcius
- Systems have lifetimes from 15 to more than 30 years

Example of a Vapour compression system and internal components

Potential Impacts of Fluoropolymer Restriction

The PFAS Restriction Proposal includes fluoropolymers which are essential to achieve energy efficient and durable performance of equipment:

Components impacted:

1. Compressors
2. Valves
3. Heat exchangers
4. Filters
5. Sensors
6. Electronic controls

Parts inside the components :

1. O-rings, seals, washers and gaskets
2. Bearings and bushings
3. Diaphragms
4. Seat plates
5. Caps
6. Cables
7. Lubricants

Characteristics provided by fluoropolymers to components:

1. Sealing
2. Temperature and pressure resistance
3. Chemical inertness
4. Longevity and sustainability for components
5. Electrical properties
6. Low friction

Without Fluoropolymers; component platforms need to be redeveloped. There are no guarantee that energy efficiency and cost targets can become re-established in foreseeable future.

Conclusion : Keeping a realistic approach

Vapor compression systems are essential for modern society:

- The RACHP sector enables the decarbonation of heating and the safety of the cold chain.
- A time-unlimited derogation for the RACHP applications is needed for:
 - F-gases as their consumption and use is controlled under the F-gas regulation. Their properties are essential.
 - Fluoropolymers since they have unique properties that cannot be substituted.
 - A review clause to be included.
- A time unlimited derogation for maintenance of systems within their lifetime including their spare parts
 - RACHP systems have an average lifetime of 12 to 20 years
 - Maintenance is fundamental in the circular economy
- Threshold values in the PPB range are impossible to operationalize or control.
- **A holistic view is necessary to take into account the effects of EU policy on the RACHP sector as a whole.**