Title: The current EU refrigerant transition and key policies impacting the RACHP industry.

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The International Symposium New Refrigerants and Environmental Technology, Kobe, Japan, 23-24 October 2025

Russell Patten - Director General of EPEE

- I am Russell Patten, Director General of EPEE since November 2022. I have worked for EPEE since the association was established in Brussels, the seat of the EU, in the year 2000.

- I started my career in the European Commission and then spent 30+ years in EU consultancy representing many industry sectors (automobiles, pharma, the RACHP/EPEE sector, ventilation, transport, health, etc.)

- I have also advised many Japanese corporations and government Ministries on EU policies & Regulations, including advising the Japanese Government on the Japan-EU Economic Partnership Agreement (JEFTA).

- Thank you for inviting me again to this great conference (Kobe 2023) to be a speaker representing EPEE. I am delighted to be back and look forward to the next two days.

About EPEE: 25 years young!





Mission: Be a thought leader and the valued partner for our members, allies and political stakeholders
Vision: Championing the refrigeration, air conditioning and heat pump (RACHP) sector and shaping policies and assisting in their application for long-term sustainability.

Our members: EPEE's membership is composed of over 40 members, including 28 companies as well as national and international associations. With manufacturing sites and R&D facilities across the EU, which innovate for the global market.

EPEE counts 7 Japanese members

MITSUBISHI ELECTRIC
Panasonic
DAIKIN
DAIKIN CHEMICAL EUROPE
FUJITSU
DAIKIN
MITSUBISHI HEAVY INDUSTRIES
JRAIA

Our sector: Our sector fulfils essential societal needs: safe food supply and medicine, productivity and comfort heating and cooling in homes, hospitals and offices, industrial heating and cooling and process heating and cooling, recovery of waste heat and reduction of dependency on fossil fuels.

3rd EU F-gas Regulation

2006: 1st EU F-gas Regulation + MAC Directive

Main measures: installers certification + leak checking requirements (containment)

MAC Directive: GWP150 limit for AC in passenger cars

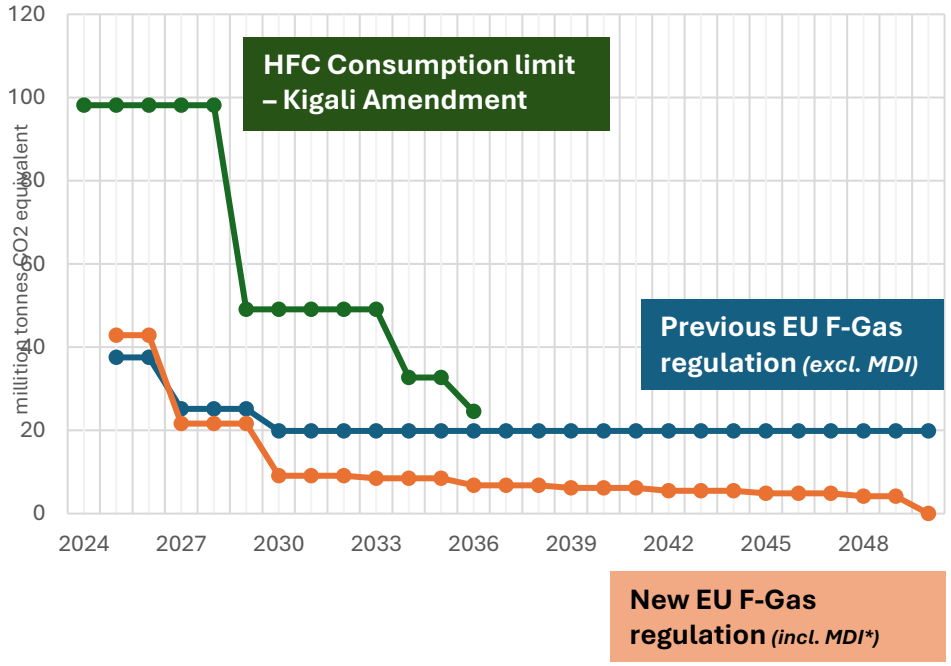
2014: 2nd EU F-gas Regulation

Additional measures: F-Gas quota system (phase down) + GWP limits on several products

2024: 3rd EU F-gas Regulation

- **Stricter HFC phase down:** A phase-out virgin HFC by 2050 (subject to reviews)
- **New product bans:** First (new) product bans for RACHP applying from 2025
- **Extended containment measures:** Scope extension for recovery, leak checking & logbooks requirements
- **Extended training and certification**
- **New export restrictions:** Export restrictions for products using refrigerants with GWP>1000
- **Additional servicing restrictions:** New servicing ban for AC and HP, extended ban for refrigeration equipment

HFC Phase Down under the EU F-gas Regulation



C. Placing on the Market Prohibitions– Annex IV

Bans on Stationary Refrigeration	Date of entry into force
• Fridges/freezers for commercial with F-gas **≥ GWP150** • Any self-contained refrigeration equipment, excluding chillers, with F-gas **≥GWP150*** • All other refrigeration equipment, excl. chillers, with F-gas **≥GWP2500 (Except -50°C applications)**	1 Jan 2025
Domestic refrigerators and freezers → **No F-gases***	1 Jan 2026
All other refrigeration equipment with F-gas **≥GWP150***	1 Jan 2030

Bans on Stationary Chilllers (whose primary function is to cool a heat transfer fluid for refrigeration, process, preservation or comfort purposes)	Date of entry into force
• Chillers ≤12kW with F-gas **≥GWP150*** • Chillers >12kW with F-gas **≥GWP750***	1 Jan 2027
Chillers ≤12kW → ***no F-gases****	*1 Jan 2032***

Bans on Stationary split Air Conditioning & Heat Pumps	Date of entry into force
Single split with <3kg of HFCs **≥GWP 750**	1 Jan 2025
Split ≤12 kW air-to-water with F-gas **≥GWP150***	1 Jan 2027
Split ≤12 kW air-to-air with F-gas **≥GWP150*** Split >12 kW with F-gas **≥GWP750***	1 Jan 2029
Split >12 kW with F-gas ***≥GWP150****	*1 Jan 2033***
Split ≤12 kW → ***no F-gases****	*1 Jan 2035***

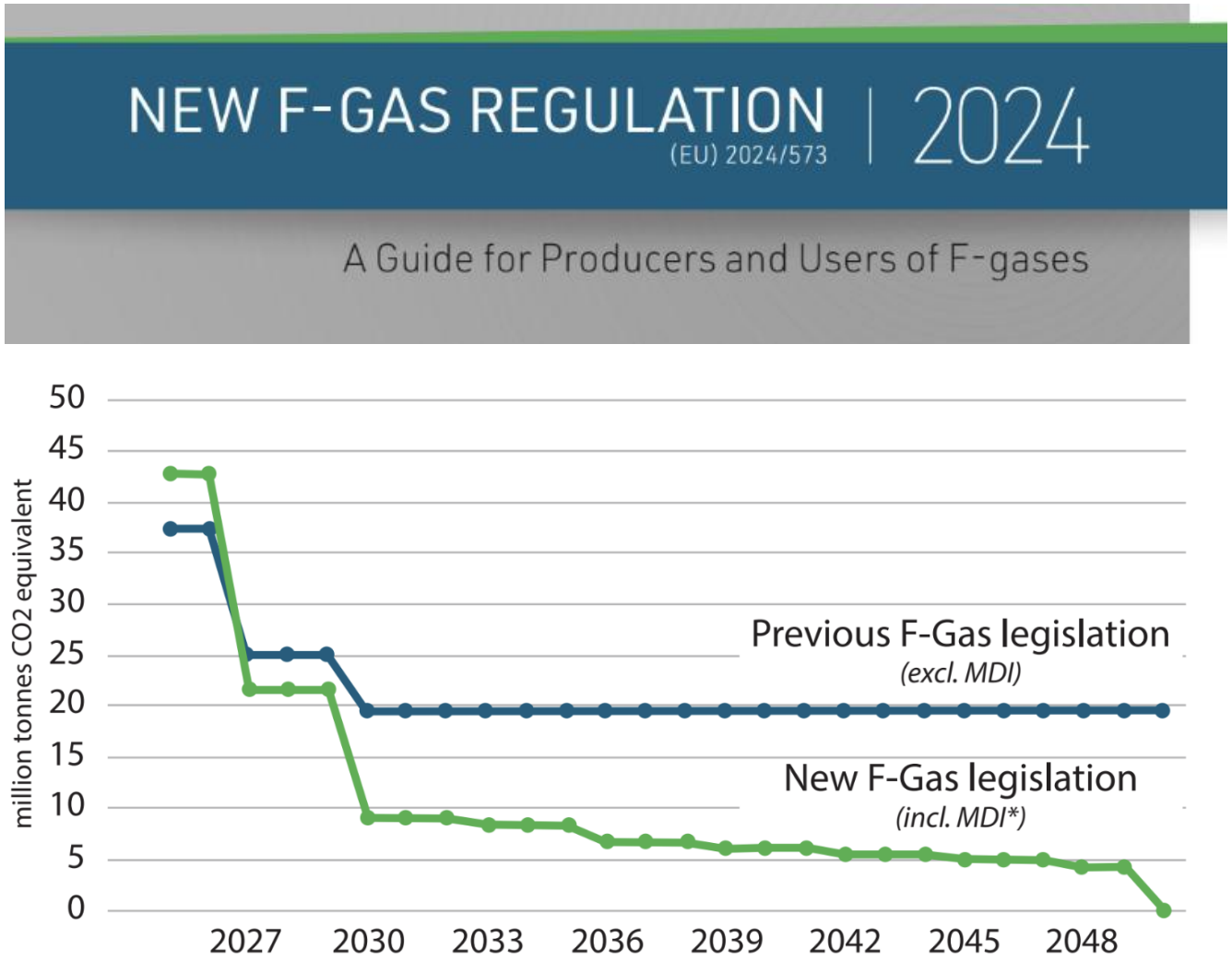
Bans on Stationary self-contained Air Conditioning & Heat Pumps	Date of entry into force
• ≤12 kW with F-gas **≥GWP150**** • 12-50kW with F-gas **≥GWP150****	1 Jan 2027
> 50kW with F-gas **≥GWP150****	1 Jan 2030
≤12 kW → ***no F-gases****	*1 Jan 2032***

*except when required to meet safety requirements

** If safety requirements apply, **GWP750** becomes the limit.

*** review by 2030 to assess feasibility of post 2030 bans

F-gas Regulation Revision Brochure



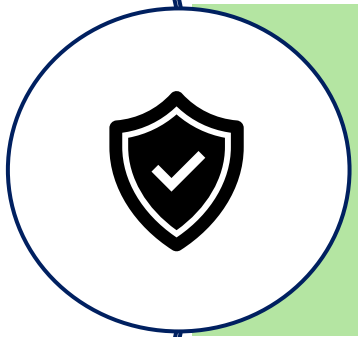
bitly

- The guide is publicly available on EPEE's website;

Broadening EPEE's scope

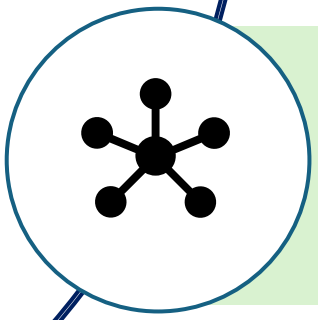
A successful EU F-gas Regulation Implementation:

EPEE is actively contributing to a proper and feasible implementation of the Regulation, advocating for industry positions and providing guidance to the sector: Safety Exemption White Paper, issue guidance to policymakers and end-users.



Market Insight Study:

In view of the upcoming reports and reviews (Article 35), EPEE launched a Market Insight Report at the start of this year, to obtain a full picture of the evolution of the RACHP Market, following the entry into force of the EU F-gas Regulation. The data collected provides an understanding of the direction to lower GWP refrigerants in different parts of the RACHP market. See next slide.



Broadening EPEE's scope:

EPEE is striving to go beyond the EU F-gas Regulation, to focus on other matters such as the national F-gas developments, RRR activities, illegal trade of refrigerants, Building Codes and the EU simplification agenda.

EPEE's Market Insight Study

1) EPEE's Market Insight Analysis estimates that the virgin HFC quotas will be insufficient to cover gross demand in the coming years.

2) The analysis shows that meeting phase-down targets requires:

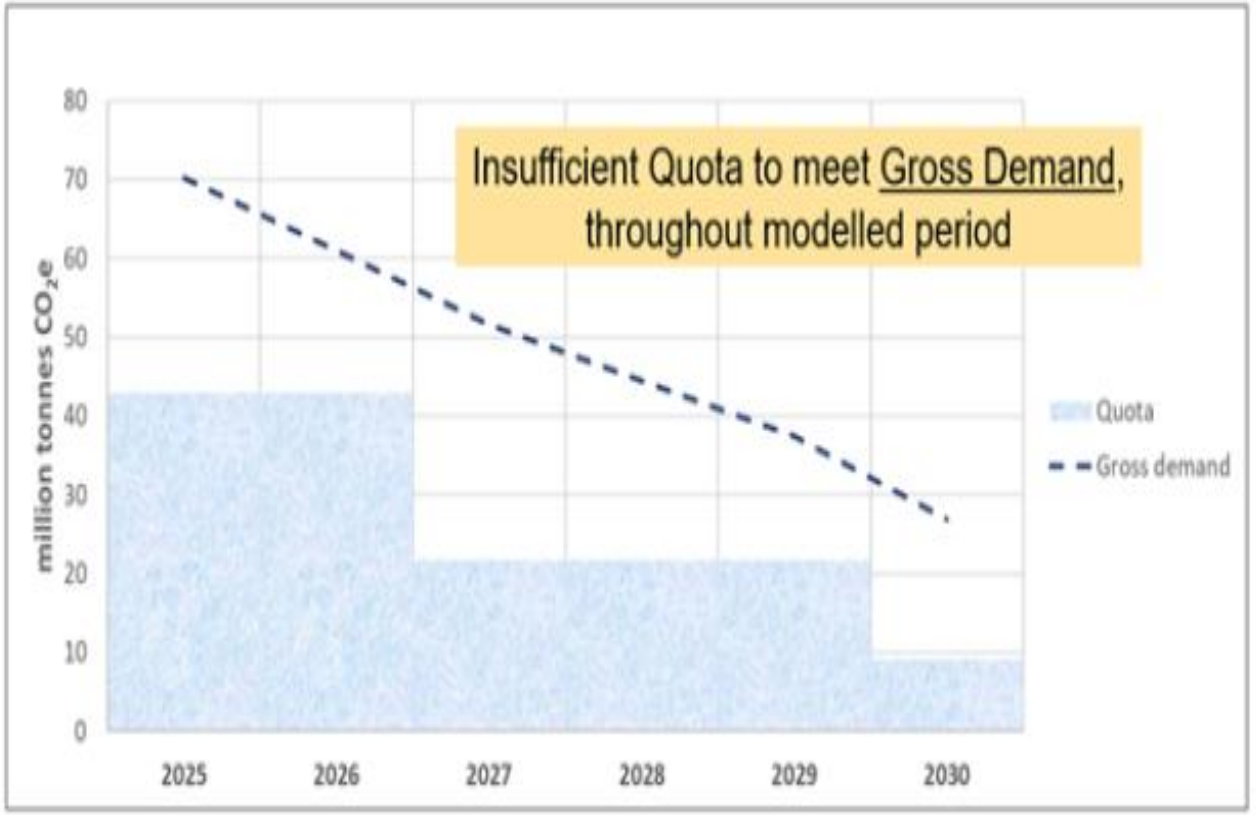
- Rapid switch to low GWP refrigerants
- Successful introduction of low GWP alternatives to current MDIs
- Significant re-use of refrigerant

3) Furthermore, the Market Insight Analysis shows that the transition is expected to be very challenging for certain technologies, especially for split air conditioning and heat pump systems:

- Air-to-air single splits

- Air-to-water splits.

These products will be subject to GWP 150 bans in 2027 and 2029, with no alternatives available on the market



* Gross demand represents the total amount of HFCs required in all HFC markets, without taking into account any re-use of recovered refrigerant EPEE's 2025 Market Insight Analysis

4) Close monitoring of the market situation is necessary and with this yearly study EPEE aims to contribute to stakeholder information, market monitoring and EU F-Gas legislation assessment to best capture the available technologies.

The PFAS Restriction Proposal

- In 2023, five European countries made a proposal to the European Chemicals Agency (ECHA) for a broad ban on all PFAS based on concerns for human health & environment, covering some 10,000 substances.

- Proposed is a full ban on the manufacture, placing on the market and use after 18 months transition period or a full ban with time limited or unlimited derogations on specific uses.

- For the RACHP sector, this would mean a full re-design of equipment and components as most F-gases & all fluoropolymers used by the sector are considered as PFASs (OECD definition).

- ECHA needs to make a recommendation to the European Commission which will then make a legislative proposal to be approved by the Member States (Council) & the European Parliament after which there will be an 18 months implementation period.

- We do not expect anything before 2028/2029 at the very earliest.

EPEE POSITION ON F-GASES AND FLUOROPOLYMERS

OUR STARTING POINT

Our RACHP sector provides critical use applications enabling the European society and contributing to productivity, well-being, health and decarbonization of the energy supply.

Fluorinated gases already fulfil safety, efficiency, affordability and regulatory requirements. Alternative refrigerants, while already in use by many EPEE members, are not always suitable today for all applications in all conditions.

F-gas emissions are already well-handled, there is evidence of continuous progress in emission reduction, driven mainly by the F-gas Regulation, while recovery and reclamation of gases is on the rise.

EPEE INITIAL POSITION (SEPT 2023)

For F-gases:

➤ Full time-unlimited derogation for F-gases used in RACHP applications, with a review clause 10 years after 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.

PFAS: latest info

- **On fluorinated gases**: still no guarantee of derogations, however RACHP products could be defined as ‘industrial uses’ which would help to obtain derogations with the Commission.

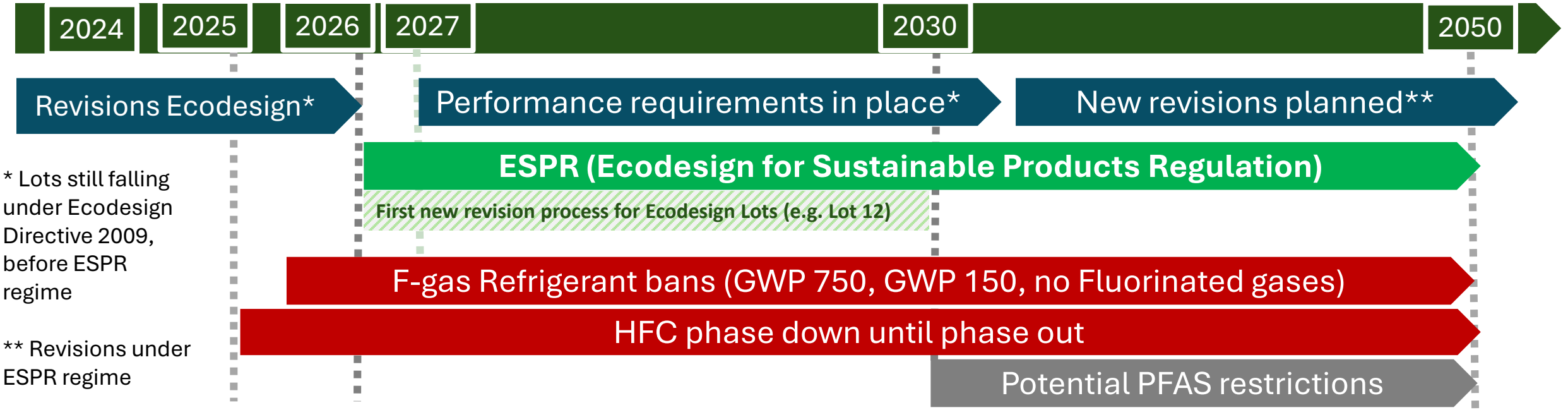
- The double regulation with the F-gas Regulation is still an issue.

- On **fluoropolymers/components** (sealing applications) a time limited derogation is now proposed (12 years) which is a positive step.

- Still a risk of unilateral bans at National level (e.g., France) and there is a strong debate in the public opinion.

- The Chemicals action plan of July 2025 provided some clarity: ‘*Where adequate alternatives in terms of performance and safety are not available*, the continued use of PFAS in industrial applications may be allowed for critical applications’

Eco-design Policies: a critical time for our Lots



* Lots still falling under Ecodesign Directive 2009, before ESPR regime

** Revisions under ESPR regime

Implementation Ecodesign revisions coinciding with implementation of F-gas requirements, and potential PFAS restrictions. **Refrigerant options will be limited.**

Increased efficiency requirements may force a transition to lower efficient products rather, which may result in the **opposite effect of the efficiency first principle**.

The transition to alternative refrigerants will not necessarily increase at all time the efficiency. Several aspects play an important role in selecting the right refrigerant.

Eco-design Policies: Focus on ENER Lot 1 and ENER Lot 10

Our priority Lots in EPEE

Lot	Respective applications
ENER Lot 1 & 2	Space and water heaters
ENTR Lot 1	Professional refrigeration (condensing units and process chillers namely)
ENER Lot 10	Air-to-air heat pumps and air-conditioners
ENER Lot 21	Air heating and cooling equipment

As we speak, two revisions are or will be under stakeholders' consultation: ENER Lot 1 and ENER Lot 10.

ENER Lot 1: space heaters

Public Consultation is expected this month. EPEE had meetings with the working group to prepare a strong response.

Our stakes:

- Testing methods, incl. the compensation method that is not yet proved to be viable.
- Unfair treatment of the heat pump technology with too many requirements while conventional heating devices have it easier.
- We are attentive to minimum efficiency requirements to secure our technology on the market.

ENER Lot 10: air-to-air heat pumps and air-conditioners

Public Consultation should occur next year. The file experiences a major delay.

Our stakes:

- MEPS' levels: Lot 10 products are in critical danger if MEPS are too stringent, since they pile up with severe bans from the F-gas Reg (+ potential PFAS restriction). We want to keep current MEPS for all multi-splits and for single splits of ≥6kW as they seem unfeasible to reach as proposed.
- Refrigerants limitation is hampering the installation of units (e.g.,units with flammable refrigerants are often not possible on balconies and windowsills).
- We aim to secure a market towards efficient products!

Energy, Efficiency & the Environment

Two main legislative files will be of key importance to EPEE

Clean Industrial Deal

The CID is a European Commission initiative from February 2025 designed to boost European industry's competitiveness and resilience by **focusing on decarbonization and clean technologies.**

Affordable Energy Action Plan

The Plan published in February 2025 aims to **lower energy costs** by reducing supply costs and **improving energy efficiency**. It also lays down several legislative files to achieve this: Heating and Cooling Strategy and Electrification Action Plan

Heating and Cooling Strategy

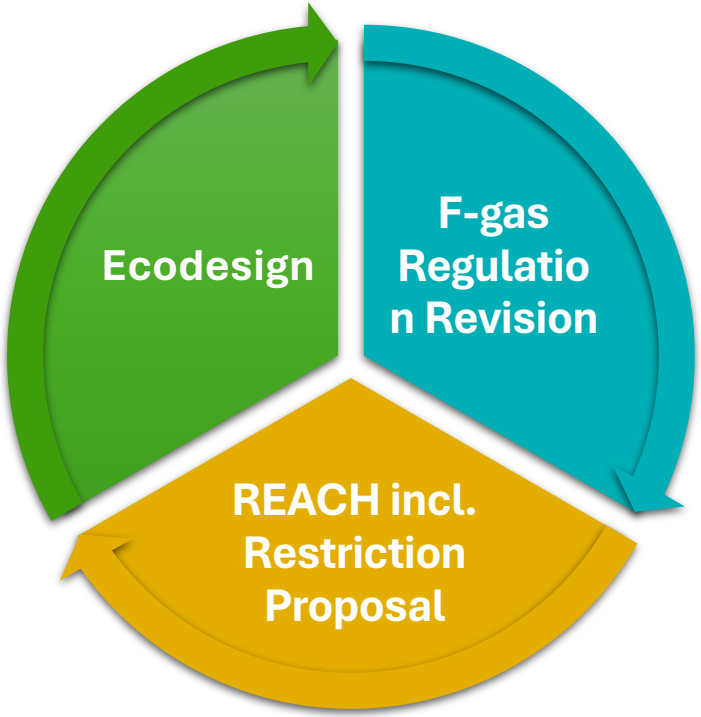
- Adoption: expected Q1 2026.
- Aims to **decarbonise the heating and cooling sector** by promoting energy efficiency, integrating renewable energy sources, and repurposing waste heat from industry into district heating and cooling systems, with the goal of achieving climate neutrality by 2050.

Electrification Action Plan

- Adoption: expected Q1 2026.
- Aims to accelerate the **shift from fossil fuels to clean electricity** across buildings, industry, and transport to meet climate targets and enhance energy security.

Finally: The Interplay between F-gas, Eco-design and PFAS:

Ecodesign
Several product regulations are under revision and are demanding stricter efficiency requirements and levels.



F-gas Regulation:
Entered into force 11 March 2024, further contains, accelerates the HFC Phase Down and transitions towards HFOs and non-fluorinated alternatives.

PFAS REACH Restriction: proposal to restrict the use of PFAS including F-gases and equipment using fluoropolymers – ongoing legislative process. Expected date of implementation: 2028/29 and Entry into force 2030-31.

How can we achieve the stricter ecodesign requirements if refrigerants are being limited? Non-fluorinated refrigerants cannot always guarantee the same level of: safety, energy efficiency and affordability.
In the end, the sum of F-gas, PFAS and Ecodesign restrictions will hamper the energy efficiency first principle.

Concluding Remarks

1. The Japanese RACHP industry continues to be impacted severely by EU policy and regulation, and more than ever and for the foreseeable future.

2. Regarding the refrigerants transition, the EU is going at a faster pace, and compounded by the future PFAS restriction, which could ban all F-gases and HFOs in just a few year's time!

3. Climate change is still rife, but there is a window of opportunity as the EU becomes more focused on competitiveness, suggesting that they may listen more to industry concerns.

4. Hence my recommendation that the Japanese RACHP industry continues to engage in EU-Brussels policy, and I hope with the support that EPEE has and will continue to provide.

❖ **It has been a privilege to have been invited to speak at this conference & I hope I have been able to provide you with useful and informative updates from the EU. Thank you for your attention.**

Annexes: Placing on the Market Prohibitions– Annex IV

Placing on the Market Prohibitions (Annex IV) – Stationary Refrigeration

*'**Refrigeration**' means the process of maintaining or lowering the temperature of a product, substance, system or other items*

Ban 2: Domestic refrigerators and freezers **≥GWP150** *[current F-gas Regulation]*

Ban 3: Fridges/freezers for commercial use HFCs **≥ GWP150**

Ban 6: Multipack centralized refrigeration systems for commercial use **≥40kW ≥GWP150** ***Except primary circuit cascade systems (≥GWP1500)***

[current F-gas Regulation]

Ban 3: Fridges/freezers for commercial use F-gas **≥GWP150**

Ban 4: Any self-contained refrigeration equipment, excluding chillers* F-gas **≥GWP150**

Ban 5: All other (excluding chillers and equipment covered in bans 6 and 4) refrigeration equipment F-gas **≥GWP2500**

Except -50°C applications

*except when required to meet safety requirements

Ban 5: All other refrigeration equipment (excluding chillers and equipment covered in bans 6 and 4) F-gas **≥GWP150***

From 2015 | **From 2022** | **From 2025** | **From 2026** | **From 2030**

Ban 2: Domestic refrigerators and freezers **No F-gases***

Placing on the Market Prohibitions (Annex IV) Chillers

'chiller' means a single system whose primary function is to cool a heat transfer fluid (such as water, glycol, brine or CO2) for refrigeration, process, preservation or comfort purposes.

EPEE is working on a clarification of the definition to be submitted to the Commission.

Ban 7: Chillers ≤12kW
F-gas **≥GWP150***

Ban 7: Chillers >12kW
F-gas **≥GWP750***

Impact assessment at the latest by 1 Jan 2030 to check the feasibility for the post-2030 bans

From 2027

From 2032

Ban 7: Chillers ≤12kW
no F-gases*

*except when required to meet safety requirements

Placing on the Market Prohibitions (Annex IV)
Stationary AC & HP Self-contained

'**Heat pump**' means an equipment capable of using ambient heat and/or waste heat from air, water or ground sources to provide heat or cooling and is based on the interconnection of one or more components forming a closed cooling circuit in which a refrigerant circulates to extract and release heat

'**Air conditioning** means the process of treating air to meet the requirements of a conditioned space by controlling its temperature, humidity, cleanliness or distribution

Ban 8: Self-contained AC & HP ≤12 kW
F-gas **≥GWP150***

Ban 8: Self-contained AC & HP for 12-50kW
F-gas **≥GWP150***

Impact assessment at the latest by 1 Jan 2030 to check the feasibility for the post-2030 bans

* If safety requirements apply, **GWP750** becomes the limit.

Ban 8: Self-contained AC & HP ≤12 kW
no F-gases*

Ban 8: Self-contained plug-in room air-conditioning equipment which is moveable between rooms by the end-user
HFCs **≥GWP150** *[current F-gas Regulation]*

Ban 8: Self-contained >50kW
F-gas **≥GWP150***

Placing on the Market Prohibitions (Annex IV) Stationary Split AC & HP

'**Heat pump**' means an equipment capable of using ambient heat and/or waste heat from air, water or ground sources to provide heat or co oling and is based on the interconnection of one or more components forming a closed cooling circuit in which a refrigerant circulates to extract and release heat

'**Air conditioning** means the process of treating air to meet the requirements of a conditioned space by controlling its temperature, humidity, cleanliness or distribution

*except when required to meet safety requirements

Ban 9: Single split with <3kg of HFCs **≥GWP 750** *[current F-gas Regulation]*

Ban 9: Split AC & HP (≤12 kW) air-to-air **≥GWP150***

Ban 9: Split AC & HP (>12kW) **≥GWP750***

Impact assessment at the latest by 1 Jan 2030 to check the feasibility for the post-2030 bans

Ban 9: Split AC & HP (≤12 kW) **no F-gases***

Ban 9: Split AC & HP (≤12 kW) air-to-water **≥GWP150***

Ban 9: Split AC & HP (>12kW) **≥GWP150***