2024 O2C Industry Roundtable / China Refrigeration Expo 2024

The recently adopted EU F-gas Regulation Revision & related issues

Presented by Russell Patten, EPEE Director General

8-9 APRIL 2024

EPEE

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1. About EPEE: our members

CORPORATE MEMBERS

A-GAS TOGETHER WE CAN | AGC | ARKEMA
Chemours | climalife | DAIKIN CHEMICAL EUROPE
DAIKIN | COPELAND
FUJITSU | GREE | HAUSER
HITACHI Inspire the Next | Honeywell | Johnson Controls
Koura | LENNOX | LG
MITSUBISHI ELECTRIC | Panasonic
Rheem | SAMSUNG | SMARDT
SOLVAY | UNIFLAIR

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

With over **40 member** companies, national and intern associations in **22 countries**, we represent over **200,000 dire** and millions of indirect jobs across Europe. Our members hav **manufacturing sites and R&D facilities** across the EU.

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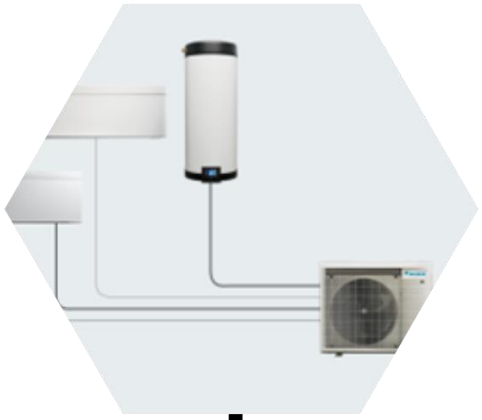
OUR PRODUCTS



Air-Conditioners

Heat Pumps

Refrigeration

From less than 1 kW to a couple hundred kW
Including different technologies, such as “split” types and “self-contained” types

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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 natural refrigerants

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

Our products come in many different forms and sizes to support heating and cooling …

Our products are used for comfort cooling/heating, they are used in all types of applications from residential, commercial, industrial
And have a capacity from less than 1 kW up to several megawatts !

Single and multi-split systems

Monobloc air to water heat pump

Ground source heat pump

Rooftop unit

Chiller

The vision of EPEE

Our industry is committed to supporting the EU Green Deal. Our products greatly contribute to the decarbonization of all European buildings

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2. History & next steps of the F-gas Regulation

2006 First F-gas Regulation

- **Prevention of leaks**:
  - containment of gases
  - proper recovery of equipment;
- **Training** and **certification**;
- **Labelling** of equipment;
- **Reporting** on imports, exports and production of F-gases;
- **Restrictions** on use of certain products with F-gases.

2014 F-gas Revision

- Ambitious **HFC phase-down**;
- **Product bans**;
- New requirements on **leak checks** for **HFCs**.

2024 F-gas Revision

- Steeper phase-down to meet **Kigali Amendment targets;**
- New **product bans** with low GWP value refrigerants;
- Extension of **leak checks** to **HFOs** and **mobile** equipment

Current Regulation

Future potential reviews

- **2027** – Review for **MAC** & **Mobile refrigeration** equipment
- **2030** – Review to assess **product bans not yet applicable at that time**
- **2040** - Review of the **needs for HFCs** & feasibility of the **virgin HFC Phase-out in 2050.**

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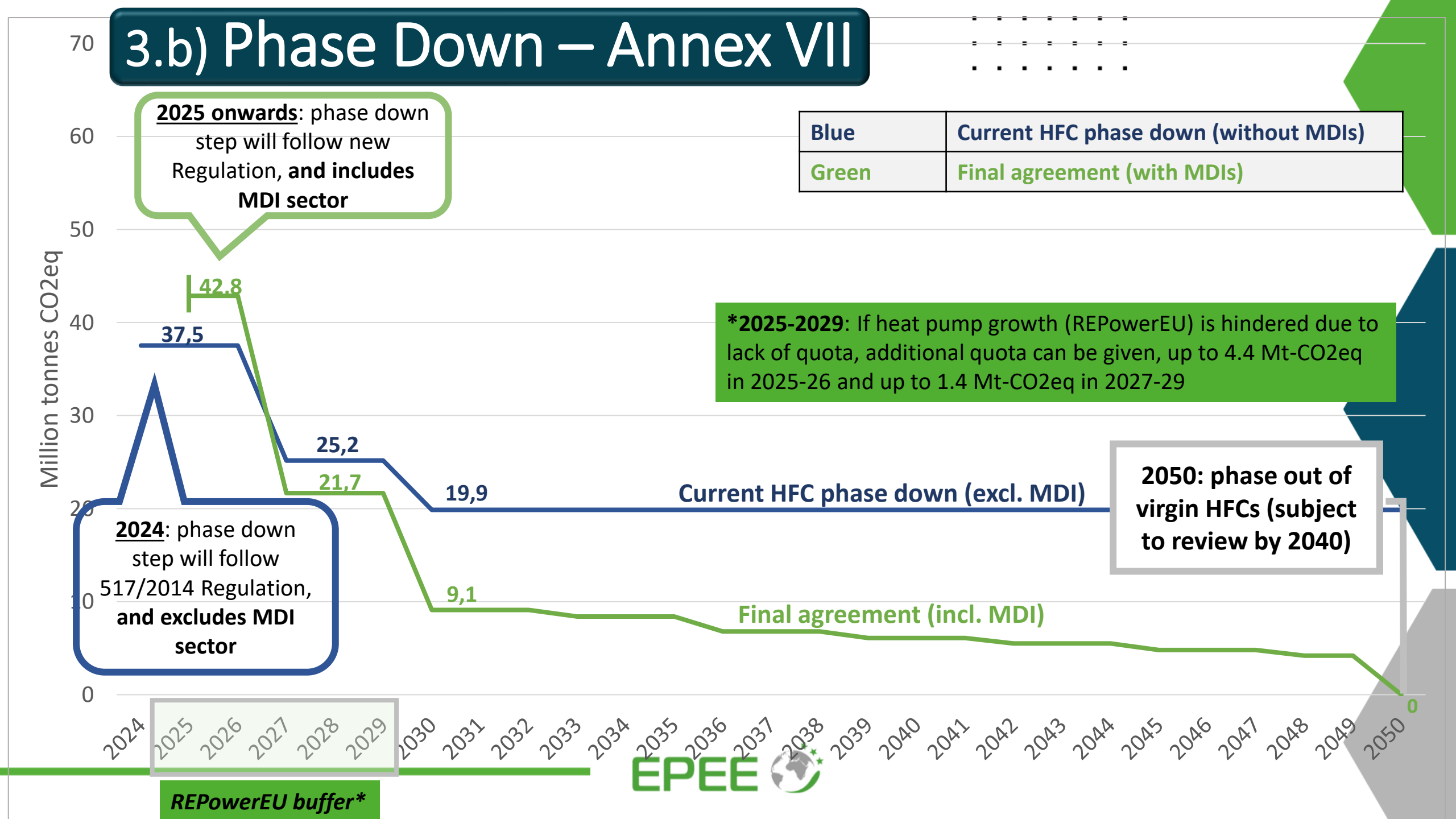
3.b) Phase Down – Annex VII



2025 onwards: phase down step will follow new Regulation, **and includes MDI sector**

2024: phase down step will follow 517/2014 Regulation, **and excludes MDI sector**

Blue	Current HFC phase down (without MDIs)
Green	Final agreement (with MDIs)

***2025-2029**: If heat pump growth (REPowerEU) is hindered due to lack of quota, additional quota can be given, up to 4.4 Mt-CO2eq in 2025-26 and up to 1.4 Mt-CO2eq in 2027-29

2050: phase out of virgin HFCs (subject to review by 2040)

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Placing on the Market Bans - Structure

Mobile equipment

'mobile' *means normally in transit during operation*

No additional product bans on mobile equipment (MAC Directive remains unchanged)

Stationary equipment

'stationary' *means not normally in transit during operation and includes moveable room air-conditioning appliances*

Several product bans are introduced for stationary equipment

- **Refrigeration**
  - Self-contained systems
  - Split systems
- **Chillers**
- **AC and HPs**
  - Self-contained systems
  - Split systems

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*

*except when required to meet safety requirements

From 2015

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

From 2022

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]

From 2025

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

From 2026

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

From 2030

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

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

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

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

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***

The 3 (product ban)+1(quota) exemptions of the F-gas Regulation

2 Exemptions that can be used without time limit by the installer and manufacturer:

Safety exemption

NEW

To fulfil safety requirements, it is possible to install equipment using higher GWP refrigerants for the dedicated bans.

Ecodesign exemption

It is possible to install equipment using higher GWP refrigerants when its lifecycle CO_2 emissions are lower.

2 Exemptions that can be requested by Member States to the Commission for up to 4 years:

Exemption from product bans:

→ ***When alternatives:***

- *Are **not available**, or*
- *Cannot be used for **technical or safety reasons**, or*
- *Lead to **disproportionate costs***

Exemption from HFC Quota requirements if:

NEW

1. Alternatives are not available, or not technically possible, or not safe or lead to a risk for public health AND
2. Sufficient supply of HFC leads to disproportionate costs

Servicing and Maintenance Ban – Art. 13

<table>
<tr><th colspan="2"></th><th>2025</th><th>2026</th><th>2027</th><th>2028</th><th>2029</th><th>2030</th><th>2031</th><th>2032</th><th>2033</th><th>2034</th><th>2035</th><th>2036 onwards</th></tr>
<tr><td rowspan="2">Refrigeration equipment*</td><td>Virgin refrigerant</td><td colspan="7">GWP2500
Since 2020 already applicable ≥40 tonnes CO2eq (from 2025, applicable to all)</td><td colspan="5">GWP750**
referring to stationary refrigeration equipment, with the exclusion of chillers</td></tr>
<tr><td>Recycled / reclaimed refrigerant</td><td colspan="5">No service prohibition</td><td colspan="7">GWP2500</td></tr>
<tr><td colspan="13"></td></tr>
<tr><td rowspan="2">Air conditioning and heat pump equipment</td><td>Virgin refrigerant</td><td>No service prohibition</td><td colspan="11">GWP2500**</td></tr>
<tr><td>Recycled / reclaimed refrigerant</td><td colspan="7">No service prohibition</td><td colspan="5">GWP2500</td></tr>
</table>

**exempting equipment intended for applications designed to cool products to temperatures below -50°C*

**Following a substantiated request by a competent authority of a Member State, the Commission shall assess the availability of reclaimed and recycled fluorinated greenhouse gases. Where the assessment points to a verified shortage of a reclaimed and recycled fluorinated greenhouse gas, the Commission may, exceptionally, by means of implementing acts, authorise an exemption from the bans, for up to four years, to the extent needed to address the identified shortage.

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Training & certification

➔ **Containment and training / certification measures have been extended to HFC-alternative refrigerants**

	HFC – HFC blends	HFOs	Natural Refrigerants
Logbooks	✓(from 5 tonnes CO2eq)	✓(from 1 kg)	
Leak checks	✓(from 5 tonnes CO2eq)	✓(from 1 kg)	
Certification	✓	✓	✓
Recovery	✓	✓	WEEE (hydrocarbons)

New requirements

➔ **Scope extension for mobile equipment:**

Product scope for containment measures extended for mobile equipment
(a) stationary refrigeration equipment;
(b) stationary air-conditioning equipment
(c) stationary heat pumps;
(d) refrigeration units of refrigerated trucks and trailers;
(e) (NEW) refrigeration units of refrigerated light-duty vehicles, intermodal containers including reefers and train wagons;
(f) (NEW) air-conditioning equipment and heat pumps in heavy duty vehicles, vans, non road mobile machinery used in agriculture, mining and construction operations, trains, metros, trams and aircraft.

Requirements for new categories applicable from 12 March 2027

Import & export ban

Export ban

- For RACHP equipment using **F-gases with GWP ≥ 1000**
- To all non-EU countries
- **Applies only** when an EU product ban for the same equipment category is already applicable.

Applicable: from 12 March 2025

Import and export ban

- For **HFCs** and **equipment containing HFCs**
- From/To countries that **did not ratify Kigali amendment of Montreal Protocol**

Applicable: from 1 January 2028

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Potential future reviews

No later than 1 July 2027

Report assessing the ability of **Mobile Refrigeration** and **MAC** to move to **alternative refrigerants**. (1)

No later than 1 July 2028

Report to be published assessing the impact of the Regulation on the Health sector (including MDIs).

No later than 1 July 2030

Report on **product bans not yet applicable at that time** (1):
Are alternatives ➔ cost-effective, technically feasible, energy efficient, sufficiently available and reliable ?

No later than 1 July 2040

Review (1):

- The **needs for HFCs** where still used
- The **2050 phase-out** of HFC quotas

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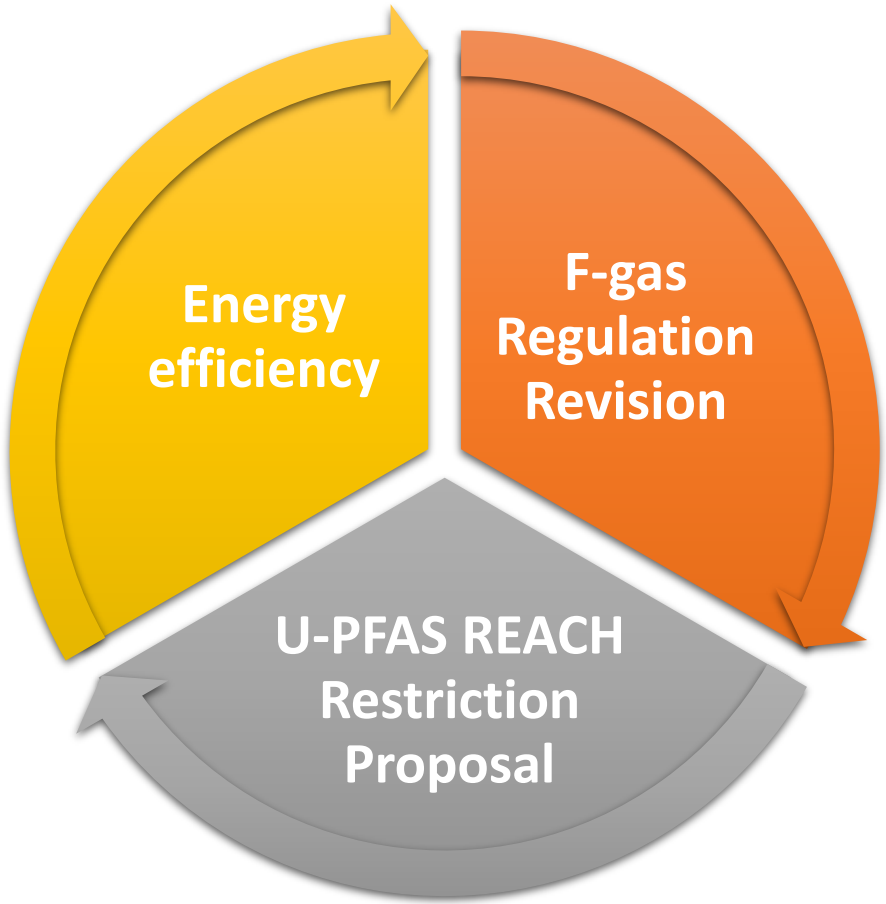
(1) Where appropriate, the review shall be accompanied by a legislative proposal

Interplay of PFAS and other files

Energy Efficiency-first Principle: *"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**



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

The first two F-gas Regulations (2006/2014) are considered to be very successful.

Entered into force on March 11, 2024

PFAS REACH Restriction:
Proposal to restrict the use of PFAS including F-gases and fluoropolymers

Date of entry into force: 2028 - 2029?

PFAS Restriction proposal

January 2023

5 countries, called the 'Dossiers submitters', provided their proposal for a **broad ban on PFAS** to ECHA. The aim to address the effects of PFAS on human health and the environment.

The definition of per- and polyfluoroalkyl substances (PFAS) used in the proposal is based on the work of the OECD, and covers a very large range of chemicals, including:

- Most of the **fluorinated gases** used as refrigerants
- All **fluoropolymers** (such as PTFE, FKM, etc)

Following the ECHA process and REACH restriction process, a ban could be decided **on manufacture, use and placing on the market**, with **only a 18-month transition period**.

Due to the large scope, there are already concerns regarding its enforceability for Members States.

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Timeline of the PFAS Restriction proposal

September 2023

ECHA public consultation ends

Record number of responses to the consultation: **over 5600 comments!**

January 2024 – December 2026

Regulatory process with ECHA's Committees: RAC for **risk assessment to environment and health**, and SEAC for **socio-economic aspects.** Then ECHA gives its opinion to the Commission.

We are here

Member States work on their own draft opinions but nothing will be public until the file gets to the Commission

2027

The Commission publishes its proposal.

2028

Scrutiny period for Parliament and Council.

2029

Potential entry into force

This is not an official timeline!

RACHP applications should be reviewed in **2025 at the earliest.**

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EPEE position on PFAS

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.

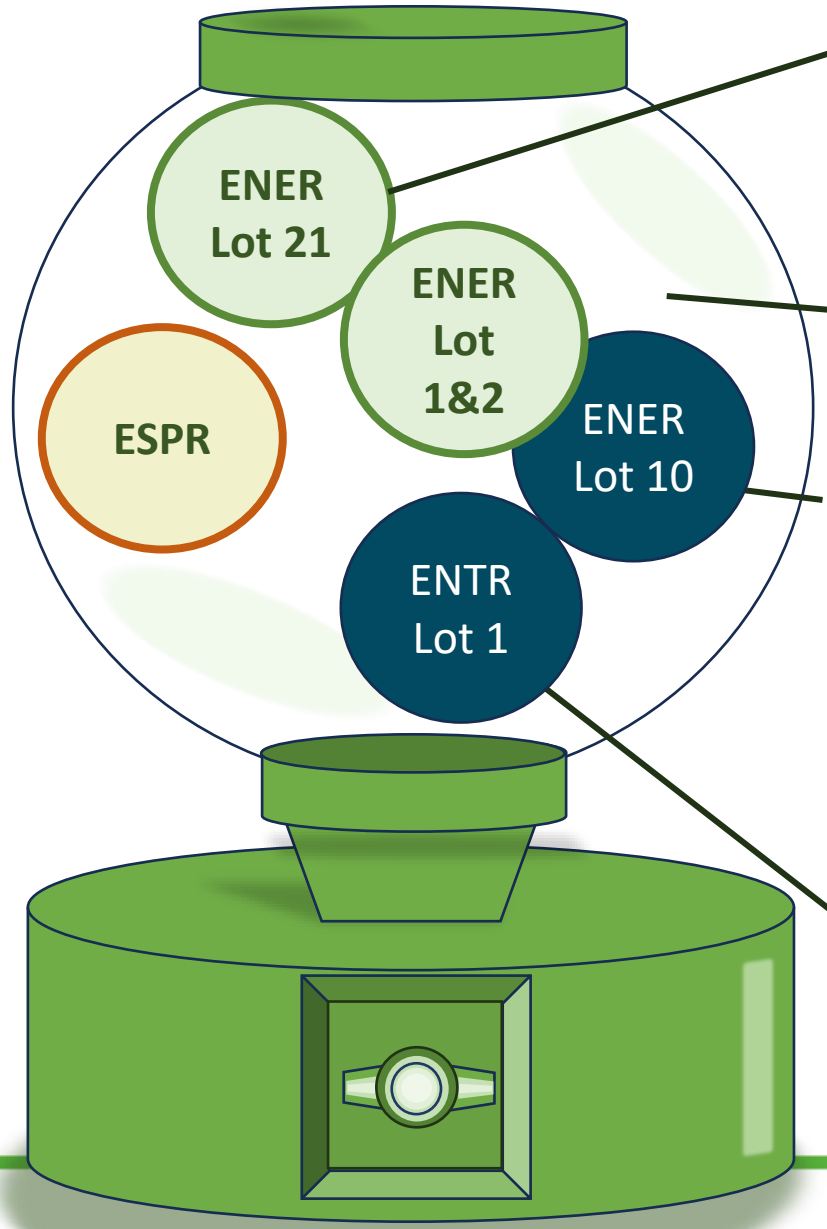
Fluoropolymers

- 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.

Ecodesign Working Group Overview



Product group : High-temperature process chillers and VRF systems

<u>Priority : Secure EPEE as the leading voice</u>

- Goal : Balanced regulation which leaves room to innovations and new technologies

Product group : air-to-air heat pumps and air conditioning

<u>Priority : provide comments and data to the Commission</u>

- Attention given to MEPS
- Major interplay with F-gas/PFAS

Product group : Space and water heater

<u>Priority : Advocacy towards Member States and Commission</u>

- Goal : 115% minimum efficiency requirement to phase out fossil fuel boilers

Product group : professional refrigeration units

- Major interplay with F-gas/PFAS: raise issue of conducting studies with a proper consideration of potential threats

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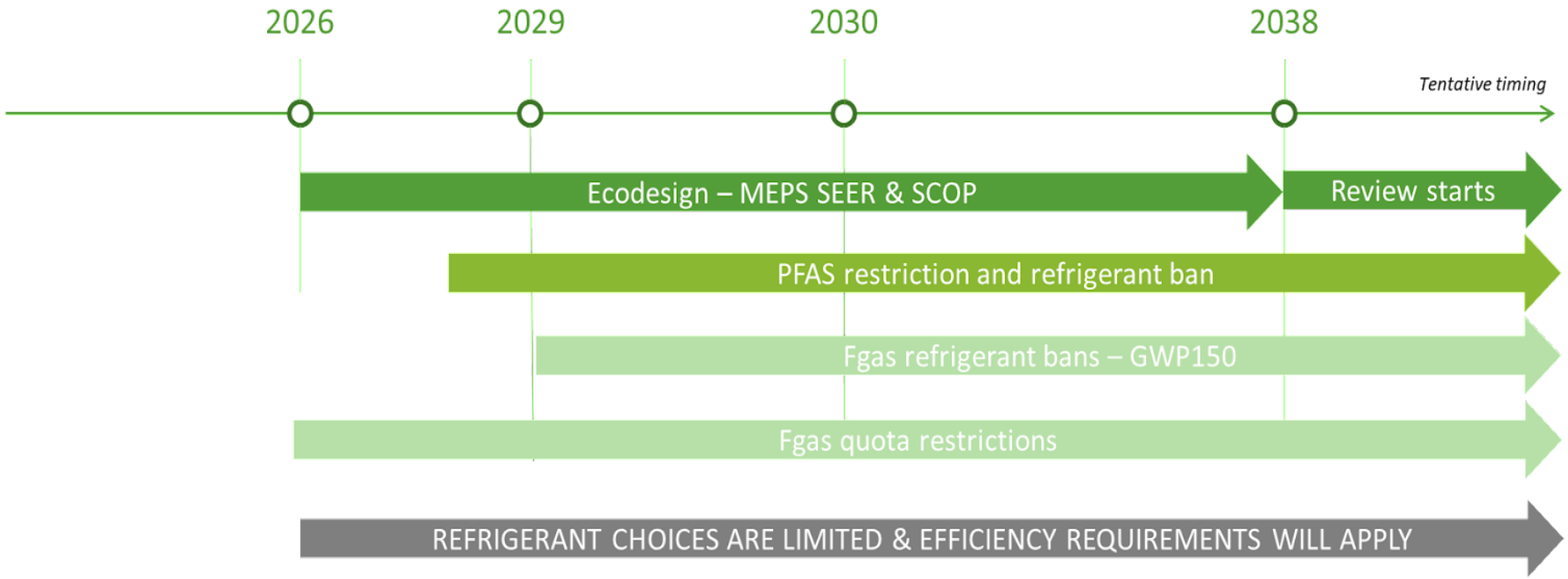
Major Interplay with F-gas Regulation

Refrigerant bans and quota restrictions → **Highly limited number of usable refrigerants** → **Unclear outcome regarding products efficiency**

Timeline of refrigerants restrictions



Most impacted product groups

ENER Lot 10
ENER Lot 21
ENTR Lot 1
ENER Lot 1&2

Main ask to the EU Institutions

Take into account the interplay with the new F-gas Regulation in the vote of revised MEPS levels

ESPR : The future of Ecodesign

The **Ecodesign for Sustainable Products Regulation will replace the Ecodesign Directive** and introduce **sustainability requirements** related to material/resource efficiency, recycled content, durability, repairability, tracking of substances of concern, …

March 2022 Publication COM proposal

22 December 2023 Political agreement

25 April 2024 **EP Plenary vote on final ESPR text**

May 2024 Final Council endorsement

June/July 2024 ESPR entry into force

March 2025 Adoption of the 1st ESPR Working Plan

Mid-2027 First product requirements start to apply

We are here

Main impacts

- Tracking of substances of concern
- Introduction of the Digital Product Passport (EPREL should be used for ErPs products)
- Introduction of reparability/recyclability/ durability indexes
- Requirements on recycled content

Lot of uncertainties regarding definitions

Next Steps

- Final adoption of the text through Plenary : 25 April 2024
- Deadline of transitional period for ongoing revisions: 2026

Heat pumps in the decarbonisation

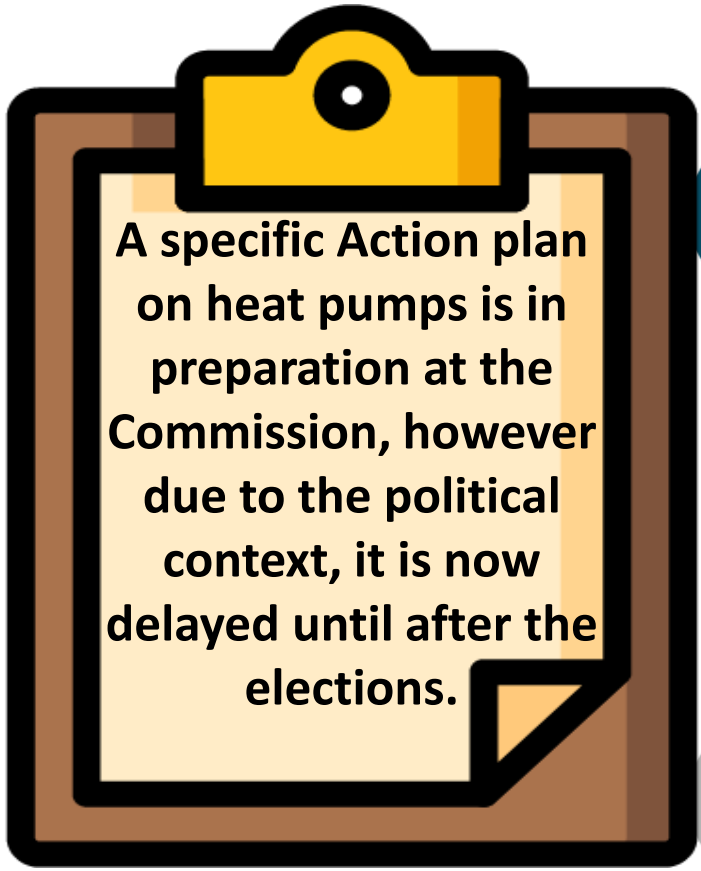
Heat pumps will contribute significantly to the decarbonisation of all European buildings: offices, schools, hospitals, households, etc. But they also:

Provide **flexibility** to the electricity grid

Contribute to the penetration of **renewable energy**

Can harness **waste heat** from data centers, industrial processes

Around 20 million heat pumps are to be installed in the EU by 2026, and nearly **60 million by 2030** (RePowerEU).



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EPEE Manifesto

7 *ways to carbon neutrality*

1. **Recognizing the critical role of RACHP technologies in energy efficiency and climate mitigation.**
2. **Implementing the energy efficiency first principle.**
3. **Harnessing the sustainability, safety, and affordability of our products.**
4. **Achieving the 2050 decarbonization target.**
5. **Addressing the future of industry competitiveness and the single market.**
6. **Implementing Green Deal files at the national level & completing the Green Deal at the EU level.**
7. **Allowing for transparent and scientifically-based policymaking.**

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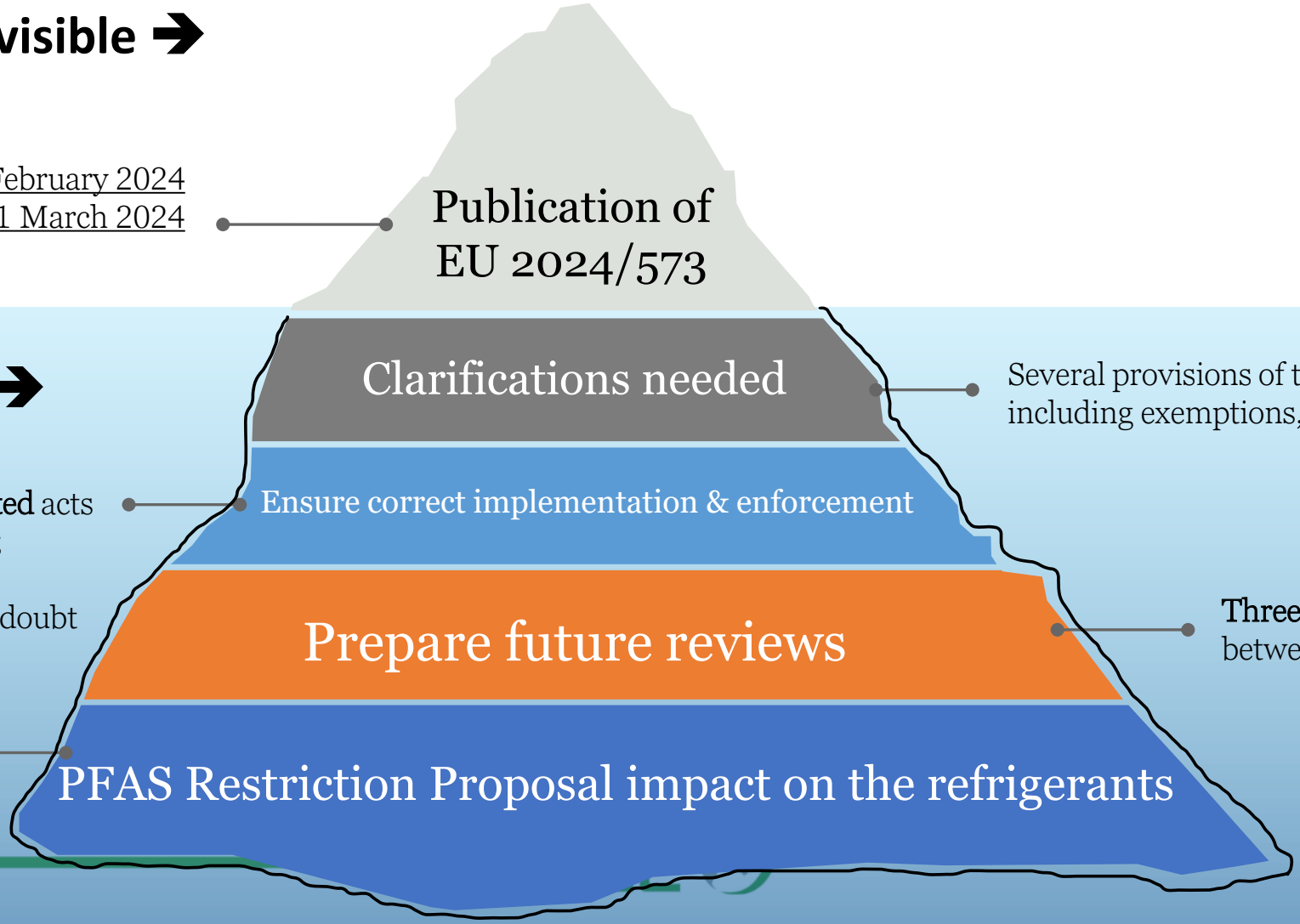
4. The F-gas Regulation Iceberg

What is already visible ➔

Text **published** at the OJ on 20 February 2024
Entry into force on 11 March 2024



What is coming ➔

EPEE Manifesto

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Annex: EPEE Manifesto

7 *ways to carbon neutrality*

1. We call on the EU Institutions and Member States to recognize the immense role our industry plays in driving energy efficiency, reducing the use of fossil fuels, and supporting climate mitigation in pursuit of the 90% greenhouse gas reduction goal.

2. Energy efficiency and energy savings must be at the centre of EU policy.

3. Our industry supports the green transition, and we look forward to the Commission pressing ahead with its planned Heat Pump Action Plan and supporting Member States in incentivizing the decarbonization of heating.

Annex: EPEE Manifesto

7 *ways to carbon neutrality*

4 Our industry supports the green transition, and we look forward to the Commission pressing ahead with its planned Heat Pump Action Plan and supporting Member States in incentivizing the decarbonization of heating.

5 We look forward to a holistic approach involving all industry actors in strengthening the electricity grid's resilience, e.g. Ecodesign and interconnectivity standards.

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Annex: EPEE Manifesto

7 *ways to carbon neutrality*

6

We call for stable and long-term incentive programmes to foster consumer confidence when investing in building renovation and decarbonization technologies like heat pumps, such as those that were established at Member State level under the transposition of the Energy Efficiency Directive and Energy Performance of Buildings Directive.

7

The EU's decision-making process should ensure and increase transparency during all the steps of its process, for example on PFAS and their safe use in products, or by sharing impact assessments in a timely manner. The challenges with overlapping policies — like the F-gas regulation, Ecodesign, and potentially PFAS restrictions under ECHA — must be addressed to ensure certainty for industry innovation and investments.

The 3 things to Recall – they are a must!

1. The RACHP industry in Europe is and will continue to be legislated – a key deadline is coming up in 2030
2. As Chinese/global manufactures you need to stay ahead of the game – EPEE can help you
3. Our industry is a key solution provider to decarbonize Europe

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Thank you for your attention and I would be pleased to take any questions!

Russell Patten, Director General, EPEE

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