Executive Summary:

EPEE – representing the Refrigeration, Air Conditioning and Heat Pump Industry in Europe – presents the following key recommendations on the revision of the EU F-Gas Regulation:

1. Strengthen key provisions to further prevent F-Gas emissions

To further improve the Regulation for effectively preventing emissions into the atmosphere, EPEE recommends to

- Extend requirements on containment and recovery to all refrigerants.
- Use electronic logbooks to move towards an EU-wide overview on leakage and recovery.
- Extend training and certification requirements to all refrigerants.
- Introduce more stringent penalties for non-compliance.
- Ensure the alignment of national measures on F-Gases with the EU single market.

2. Factor in the need for F-Gases to achieve the 2030 and 2050 decarbonisation objectives

The flexible choice of a wide range of refrigerants, including HFCs, is needed for the scaling up of technologies required to achieve the European Green Deal. EPEE’s modelling work projects massive potential to reduce energy emissions with Refrigeration, Air Conditioning and Heat Pump equipment. For any adjustment of the F-Gas Regulation, the European Commission must factor in the massive CO₂ abatement potential of all heat pump technologies and the “Energy Efficiency First” principle.

3. Keep the current ambitious HFC phase-down schedule and ensure freedom of choice

The Phase-Down system must remain the cornerstone of the F-Gas Regulation. Bans on specific HFCs risk paralyzing innovation and market forces. The current ambition of the phase-down steps by 2030 should not be increased and must be carefully calibrated to the European Green Deal objectives.

4. Take into account different scope and counting methods when aligning with international commitments

In seeking alignment with the Montreal Protocol, any modification of the scope of the HFC phase-down should not create a negative impact on the accessibility and availability of HFCs for the Refrigeration, Air Conditioning and Heat Pump sector.
Introduction

EPEE, representing the Refrigeration, Air Conditioning and Heat Pump (RACHP) Industry in Europe, has been a long-time supporter of the 2014 EU F-Gas Regulation (EU 517/2014). Delivering emission savings year after year since its entry into force, it has become the effective gold standard worldwide for reducing emissions from fluorinated greenhouse gases (F-Gases).

F-Gases, and HFCs in particular, are used as refrigerants in RACHP equipment, which in turn are key technologies to achieve 2050 climate neutrality by decarbonising heating and cooling. HFCs were introduced as alternatives to ozone depleting substances, facilitating their phase-out in Europe. However, due to their Global Warming Potential (GWP), HFC use and related emissions are being minimised and refrigerants with lower climate impact are being phased in, where this is safe, energy efficient, technically and economically feasible and does not hamper the green energy transition.

In view of the upcoming revision of the EU F-Gas Regulation, this position paper outlines the major opportunities and challenges to further improve the existing policy framework in line with the European Green Deal, the EU’s 2030 climate and energy objectives and the international commitments of the Kigali Amendment to the Montreal Protocol.

The paper includes figures from the HFC Outlook EU model by Gluckman Consulting, which forecasts the future developments on RACHP equipment in the EU and UK, taking into account:

- the growing stock of RACHP equipment,
- consumption and demand of HFC refrigerants by the RACHP sector,
- greenhouse gas emissions from refrigerants,
- greenhouse gas emissions from the energy used by this equipment, and
- the decarbonisation contribution by heat pumps.
1. Strengthen key provisions of the Regulation to further prevent F-Gas emissions

EPEE recommendations on envisaged policy options\(^1\) around the European Commission’s Objective C “Improving implementation and enforcement”:

- Extend the collection and reporting requirements on containment and recovery to all refrigerants.
- Use electronic logbooks to move towards an EU-wide overview on leakage and recovery.
- Extend training and certification requirements to all refrigerants.
- Introduce more stringent penalties for non-compliance.
- Ensure alignment of national measures on F-Gases with the EU single market.

EPEE members are fully committed to the F-Gas Regulation and have helped implementing its complex set of requirements. The revision needs to build on, rather than recast, this system and further improve harmonisation, implementation, and enforcement at the EU level to effectively prevent emissions.

- Requirements on Containment and Recovery

Leakage control and record keeping have rightly been key pillars of the F-Gas Regulation since 2006. With proper use and maintenance, refrigerants will remain in the equipment and not leak into the atmosphere. The F-Gas Regulation has helped to effectively reduce such leakage, but more can be done. EPEE recommends extending the F-Gas provisions on containment and recovery to all types of refrigerants, including non-fluorinated alternatives. This would have numerous benefits in terms of environmental protection, safety, and energy efficiency.

- Availability of credible data

Despite the mandatory keeping of records, there is still a lack of available, fact-based data regarding leakage rates and recovery rates. Considering that leakage control has the triple benefit of reducing emissions, ensuring safety, and maintaining energy efficiency, EPEE fully supports the use of the electronic logbooks, which have already shown a positive impact in some Member

\(^1\) As proposed in the “Evaluation and impact assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gases” briefing paper from 6 May 2021, drafted by the European Commission’s Consultants.
States. EPEE believes that an EU-wide overview using electronic databases will be essential to support science-based policymaking.

In this context, recovery, recycling and reclamation (RRR) of F-Gases play a key role in reducing emissions. With the 2014 F-Gas Regulation, RRR schemes have become increasingly important as the HFC phase-down exerts pressure on the availability of HFCs. However, there is currently no or very little data available related to RRR of HFCs. A better understanding of RRR would be the first and essential step to assess avenues for boosting RRR.

- **Training and certification**

With the introduction of the HFC phase-down and the need to transition to lower GWP refrigerants, it has become increasingly important for installers and service technicians to be able to handle flammable, high-pressure, and toxic refrigerants safely and efficiently, whether they are fluorinated or non-fluorinated gases. A uniform level of competence at the EU level, as well as sufficient training opportunities and information at the national level are essential to achieve this goal. To this end, EPEE calls for the establishment of a minimum harmonised level of competence at the EU level and to provide for a certification of technicians which are extended to all refrigerants.

- **Penalties for non-compliance**

Penalties for infringements of the F-Gas Regulation must be effective, proportionate, and dissuasive. According to the regulation, Member States are required to lay down the rules on penalties applicable to infringements. However, experience has shown that several Member States took a long time – too long – to notify their penalty schemes to the European Commission. Moreover, penalty schemes differ widely between the Member States. To ensure proper enforcement of the F-Gas Regulation, stringent and dissuasive penalty schemes remain a key factor for success. Therefore, introducing minimum penalties for non-compliance would be a step in the right direction.

- **National measures on F-Gases undermining the EU single market**

Divergent national rules can undermine the economies of scale in R&D and innovation on efficient technologies. Such measures mainly consist of national safety legislations and building codes. Their harmonised and consistent application must be ensured across the EU.

---

2 Among these Member States are Poland, Slovakia, Italy, Hungary, Germany
2. Factor in the need for F-Gases to achieve the 2030 and 2050 decarbonisation objectives

EPEE recommendations on envisaged policy options for the European Commission’s Objective A “Raising ambition in line with the European Green Deal”:

Any adjustment of the F-Gas Regulation must factor in following aspects of the Green Deal:

- the massive CO₂ abatement potential of all heat pump technologies
- the important CO₂ saving potential of energy efficiency
- the “Energy Efficiency First” principle, which should always prioritise energy saving opportunities stipulated in EU laws such as Ecodesign, the Energy Performance of Buildings Directive and the Energy efficiency Directive.

Modelling the nexus between refrigerant and energy emissions

EPEE is committed to the European Green Deal and its goal to achieve climate neutrality by 2050 and agrees with the European Commission that the European building sector must massively reduce carbon emissions for the EU to reach its 2030 and 2050 climate and energy targets. Overall, heating and cooling represents roughly half of the total final energy consumption in Europe. Space and hot water heating account for most of the energy used in and emissions from buildings. The RACHP sector is a key solutions provider for reducing these emissions.

In its recent “Fit for 55” legislative proposals to achieve the 2030 target, the European Commission proposed ambitious 2030 objectives and measures for the building sector, namely:

- a 40% share of renewable energy in the EU energy mix, with the share of renewable energy sources for buildings to reach 49%;
- a 39-41% energy efficiency target, with highly ambitious building renovation policies; and
- an extended Emission Trading Scheme which will also cover CO₂ emissions from energy used in the building sector.

Today, the technologies to support this green transition of heating and cooling are readily available and scalable. Energy-use in buildings will increasingly be based on decarbonised electricity rather than fossil fuels. Thermal storage, waste heat and cold recovery, as well as smarter, more efficient electricity use will allow for an optimal integration of heating and cooling with the electricity sector. In particular, the uptake of heat pumps, both residential and large scale, will play a pivotal role in this transition.
The flexible choice of a wide range of refrigerants, including HFCs, is needed for the massive and rapid scaling up of these technologies and to accommodate the full variety of applications in a safe and energy efficient manner. Their potential to abate emissions from fossil fuels and reduce the indirect emissions from electricity consumption is much bigger than the direct emissions from the refrigerants which these technologies rely upon.

*FC Outlook EU*, the modelling tool used by EPEE, has therefore been extended to assess also emissions related to energy use when operating heating and cooling systems, as well as the decarbonisation impact by replacing fossil fuel-based heating systems with electric heat pumps.

In contrast, the projections from the AnaFgas modelling presented at the stakeholder meeting in May 2021, which has been used by the European Commission in assessing the F-Gas Regulation, so far only focuses on the refrigerant emissions and thus do not factor in the full abatement potential of energy emissions in heating and cooling. Disregarding this crucial link between F-Gases and decarbonisation jeopardises a major pillar of the European Green Deal.

**Avoided emissions through heat pumps**

In line with the EU’s 2030 and 2050 climate and energy targets, the *HFC Outlook EU* projects a massive replacement of fossil fuel heating with electric heat pumps. The graph above shows that
the emissions from energy consumption (orange) and from refrigerants (blue) will drastically reduce over time despite a growing market - thanks to already existing EU policies. The green wedge shows the abated emissions from replacing fossil fuel heating by heat pumps.

These abated emissions could offset all emissions from the refrigeration, air conditioning and heat pump equipment in the EU well before 2030. By 2050, they could reach up to 600 million tonnes of CO₂.

**The importance of energy efficiency**

The electricity needed to run increased amounts of electric heating and cooling will emit drastically less than today. The overall CO₂ emission from energy use will fall to very small amounts by 2050 as the European power system is projected to be almost fully decarbonised.

But even with low carbon electricity, energy efficiency remains an important target: The *HFC Outlook EU* shows a 35% growth in cooling demand in EU28 between 2020 and 2050 (through growing use of comfort cooling & refrigeration), and a 500% growth in heating delivered by heat pumps (to replace fossil fuel heating). As a consequence, the total thermal energy, i.e. the heat and cold supplied by stationary RACHP equipment is projected to almost triple to 3,900TWh in 2050 from currently 1,300TWh.

However, the actual electricity input needed to generate this massive heating and cooling capacity in 2050 could rise from 570TWh today to only around 900TWh in 2050, despite the tripling of heat and cold supplied. This is due to two reasons: heat is produced much more efficiently in electric heat pumps than through burning of fossil fuels. Secondly, equipment will become even more efficient, in line with current EU policies such as Ecodesign Regulations, the Energy Performance of Buildings Directive, and the Energy Efficiency Directive. Respecting the “Energy Efficiency First” Principle proposed by the European Commission will therefore be crucial for the optimal decarbonisation of the heating and cooling sector.
3. Keep the current ambitious HFC phase-down schedule and ensure freedom of choice

Further EPEE recommendations on envisaged policy options around the European Commission’s Objective A “Raising ambition in line with the European Green Deal”:

- The phase-down system must remain the cornerstone of the F-Gas Regulation. Bans on specific HFCs risk paralysing innovation and market forces. EPEE believes that there is no potential for further bans in the RACHP sector.
- The current ambition of the phase-down steps by 2030 should not be increased and must be carefully calibrated to the European Green Deal objectives.
- To ensure competitiveness of EU industry in the export market, it is necessary to allow the exemption of pre-charged equipment exports from quota requirements.

![Figure 4.16: 2F1 Refrigeration and Air conditioning: EU-KP HFC emissions](image)

Source: EEA

EPEE fully supports the need to reduce HFC emissions from F-Gases in the RACHP sector, which represent 2.1% of the total greenhouse gas emissions in Europe. Figures from the European Environment Agency (eea.europa.eu)

---

Environmental Agency (EEA) indicate the success of the current ambitious HFC phase-down. Since the entry into force of the current F-Gas Regulation in 2014, emissions from RACHP equipment have started to decline considerably despite a growing market as the graph above shows.

**Phase-down and bans**

The HFC phase-down system, in which producers and importers are allocated gradually decreasing quotas of HFCs, provides the flexibility and predictability needed for industry to deliver the most energy efficient, safe, and affordable solutions to achieve the EU climate and energy targets. It must remain the cornerstone of the F-Gas Regulation.

In contrast, bans of specific HFCs in specific applications risk pre-imposing technologies and therefore paralysing innovation and market forces. EPEE believes there is no feasibility to impose additional bans in the RACHP sector, because – similar to the principles of the EU Ecodesign Framework Directive – bans should not have a negative impact on functionality, safety, energy efficiency, decarbonisation, circular economy, and affordability for end-users.

**Phase-down quota**

The future of the HFC phase-down must have as its foundation a model for the F-Gas market that is sufficiently robust, granular, and takes into account the need for a massive uptake of heat pumps and more efficient RACHP equipment to achieve the European Green Deal.

The provisional calculations of the *HFC Outlook EU* model – which already factor in further refrigerant transitions and re-use of refrigerants - indicate that the current phase-down quota as calculated by the European Commission would only be feasible if there is a low market growth in RACHP equipment and without counting in the refrigerant needs for exporting equipment outside the EU.

Factoring in the massive decarbonisation of heating in line with the European Green Deal, could result in quota needs not in line with the current HFC phase-down quota for 2030.

**Exemption of exports of pre-charged equipment**

To ensure a fair and equal treatment of manufacturers inside and outside the EU, the F-Gas Regulation envisaged to treat pre-charged equipment the same way as bulk gas: imports of pre-

---

4 EPEE objects to this calculation method, specified in Annex V of the current Regulation, which would penalise the RACHP sector for decisions on and developments in exempted HFC-using sectors. The current methodology gives no certainty about the amount of HFCs that would be available to RACHP users going forward. Any exempted uses (e.g. MDI uses) will reduce the HFCs available to non-exempt sectors.
charged equipment are included in the phase-down quota while it is allowed to exempt all exports of pre-charged equipment.

However, in practice, exemption of pre-charged equipment exports is only partially possible by using the Inward Processing Relief (IPR) customs procedure, which presents certain limitations concerning its actual application. The F-Gas Regulation revision represents the perfect opportunity to simplify and facilitate the existing exemptions, as well as to add measures that support European manufacturers to maintain their production in the EU. If exemptions cannot be used in practice, the HFC quota needed will be higher.

4. Take into account different scope and counting methods when aligning with international commitments

EPEE recommendation on envisaged policy options around the European Commission’s Objective B “Seeking Alignment with the Montreal Protocol”:

- Modification of the scope of the HFC phase-down should not create a negative impact on the accessibility and availability of HFCs for the RACHP sector.

EPEE fully supports the alignment of the F-Gas Regulation with the 2016 Kigali Amendment to the Montreal Protocol, which aims at reducing HFC consumption globally to avoid up to 0.5°C of global warming by 2100.

Level of commitment and inclusion of HFC consumption in sectors other than RACHP

The many differences between the scope and calculation methods of the F-Gas Regulation and the Montreal Protocol make comparisons difficult. The Kigali Amendment commits the EU to reducing all HFC consumption by 85% by 2036. EPEE notes that, according to the HFC Outlook EU, the EU28 RACHP sector itself will reduce its HFC consumption by more than 85% between 2015 and 2036.

The Montreal Protocol currently covers all HFC applications, including some currently exempted from the need for quota under the F-Gas Regulation, such as metered-dose inhalers (MDIs). While EPEE takes a neutral position on non-RACHP sectors, we would like to caution that any exemptions in other key sectors should not create a negative impact on the accessibility of HFCs for the RACHP sector.
Annex – the HFC Outlook EU Model

The HFC Outlook EU by Gluckman Consulting builds on the initial modelling work done for EPEE in 2012, which modelled a trajectory for an HFC phase-down in the EU in view of the previous revision of the F-Gas Regulation. It looks at all relevant gases: HCFCFs, HFCs and all lower GWP alternatives.

The HFC Outlook EU projections are built bottom-up, looking at more than 50 different sub-sectors both in the refrigeration and the comfort cooling and heating sector, and for each of the for markets: residential, commercial, transport and industry.

EPEE members, which include the globally leading companies in the RACHP value chain, are providing input and technological advice on the parameters used in the model.

Compared to the 2012 modelling work, the HFC Outlook EU has been extended to project not only greenhouse gas emissions from refrigerants, but also the energy-related emissions from the equipment using these refrigerants. Energy parameters are modelled separately for each sub-sector, by taking into account the evolution of Europe’s electricity carbon emission factors and parameters which influence the efficiency of equipment and its use.

This extension also allows HFC Outlook EU to project the amounts of avoided emissions through the heat delivered from heat pumps, which would otherwise have been delivered by burning fossil fuels.

About EPEE:

EPEE represents the Refrigeration, Air-Conditioning and Heat Pump industry in Europe. Founded in the year 2000, EPEE’s membership is composed of over 50 member companies as well as national and international associations from three continents (Europe, North America, Asia). With manufacturing sites and research and development facilities across the EU, which innovate for the global market, EPEE member companies realize a turnover of over 30 billion Euros, employ more than 200,000 people in Europe and also create indirect employment through a vast network of small and medium-sized enterprises such as contractors who install, service and maintain equipment. Please see our website (https://www.epeeglobal.org/) for further information.