ETC CM Report 2022/3

Fluorinated greenhouse gases 2022

Data reported by companies on the production, import, export and destruction of fluorinated greenhouse gases in the European Union, 2007-2021

Authors:
Sylvie Ludig, Wolfram Jörß and Victoria Liste (Öko-Institut)

European Environment Agency
European Topic Centre
Climate change mitigation

Cover design: EEA

Cover image: Photo by Kévin JINER on Unsplash

Layout: Victoria Liste [Öko-Institut]

Legal notice

Preparation of this report has been funded by the European Environment Agency as part of a grant with the European Topic Centre on Climate change mitigation (ETC-CM) and expresses the views of the authors. The contents of this publication do not necessarily reflect the position or opinion of the European Commission or other institutions of the European Union. Neither the European Environment Agency nor the European Topic Centre on Climate change mitigation is liable for any consequence stemming from the reuse of the information contained in this publication.

ETC CM coordinator: Vlaamse Instelling voor Technologisch Onderzoek (VITO)

ETC CM partners: AETHER Limited, Citepa, CHMI – Czech Hydrometeorological Institute, EMISA, Stiftelsen Norsk Institutt for Luftforskning (NILU), Öko-Institut e.V. Institut für Angewandte Ökologie, Öko-Recherche GmbH - Büro für Umweltforschung und -beratung, Rijks Instituut voor Volksgezondheid en Milieu (RIVM), Gauss International Consulting S.L., Transparency for life (T4L), Klarfakt e.U., Exergia S.A., Transport & Mobility Leuven (TML), Umweltbundesamt GmbH (UBA).

Copyright notice

European Topic Centre on
Climate change mitigation
https://www.eionet.europa.eu/etcs/etc-cm

etccm@vito.be

Contents

Acknowledgements

This report was prepared for the European Environment Agency (EEA) by its European Topic Centre on Climate Change Mitigation (ETC CM). The authors of this public briefing were Sylvie Ludig, Wolfram Jörß and Victoria Liste (ETC CM partner Öko-Institut).

The EEA report coordinator was Peder Gabrielsen and the ETC CM task manager was Wolfram Jörß. Suzanne Dael (EEA) and the European Commission Directorate-General for Climate Action are thanked for their comments provided.

Briefing

Introduction

Fluorinated greenhouse gases (F-gases) contribute to climate change and in 2020 made up 2.8% of total greenhouse gas emissions in the EU-27 (EEA, 2022a). F-gases have a range of applications, particularly in the refrigeration, air conditioning and heat pump sector. Most F-gases have much higher global warming potentials than other greenhouse gases. As a consequence, even small amounts of F-gases have a negative impact on our climate and it is thus important to reduce and eventually replace their usage in order to limit F-gas emissions. This briefing outlines the important trends in the EU supply of F-gases for the period 2007-2021 and monitors EU progress under the HFC (hydrofluorocarbons) phase-down schemes of the EU F-gas Regulation and the Montreal Protocol.

Key messages

- After a slight increase in 2020, the total supply of F-gases to the EU continued its decrease in 2021. Refrigeration, air conditioning and heat pumps continue to be key applications for these gases.
- In 2021, EU consumption of HFCs was at 40% of the maximum imposed by the Montreal Protocol's Kigali Amendment.
- The EU remains on track under the HFC phase-down phase of the EU F-gas Regulation, with the EU-27 having achieved a cut of about one third of HFCs between 2020 and 2021. EU -wide placing on the market of HFCs in 2021 was 4% below the market limit.
- In 2021, the use of quota authorisations eligible to cover 2021 imports of refrigeration, air conditioning and heat pump equipment under the HFC phase-down exceeded the amount of quota authorisations freshly issued in that year. Jointly with the transfer of EU quota authorisations to the UK HFC quota system at the end of the Brexit transition period, this led to a decrease of the reserve of EU quota authorisation by 12%. However, the current size of the reserve still accounts for more than five times the amount of such equipment imported in 2021.

Hydrofluorocarbons (HFCs) account for the majority of fluorinated gas (F-gas) emissions. To reduce these, the F-gas Regulation (EU) No 517/2014 introduced an EU HFC phase-down scheme and a quota system for companies. Since 2019, the EU has also been bound by an obligation to reduce HFC use, agreed internationally under the Kigali Amendment to the Montreal Protocol.

Please consult the annex to this briefing for more graphs and data tables.

2021 was the first year after the end of the Brexit transition period. While data collected under the F-gas Regulation for 2020 and previous years covered the EU-27 and the UK jointly, 2021 data refers to EU-27 only. This is a challenge to the interpretation of trends between 2020 and 2021 as the underlying dataset (EEA, 2022b) scarcely allows a distinction of UK and EU-27 shares in pre-2021 data. Percentage change trends given in this briefing for the EU-27 scope should thus be understood as approximations rather than exact calculations.

Policy context

The Montreal Protocol was established in 1987 to cut the consumption and production of synthetic substances that destroy the protective ozone layer (ozone-depleting substances, ODS). In the EU, ODS are regulated separately under Regulation (EC) No 1005/2009 (Ozone Regulation). Phasing out ODS has led to the increased use of certain F-gases, most prominently in refrigeration and air conditioning, since the early 1990s, as these chemicals have similar properties to ODS but do not affect the ozone layer. Consequently,

emissions of F-gases in the EU, of which about 90% are HFCs, increased by about 70% between 1990 and 2014.

Because F-gases are potent greenhouse gases, they have been regulated in the EU since 2006. Total emissions have started to decline since peaking in 2014 and were about 20% lower in 2020 in the EU-27 compared with 2014 (EEA, 2022a).

The EU F-gas Regulation (EU, 2014) implements an EU-wide phase-down of HFCs, which started in 2015. Its aim is to cut EU emissions of F-gases by two thirds by 2030 compared with 2014 levels. It mandates companies to report their annual production, imports, exports and other activities involving HFCs and other F-gases and includes all the F-gases covered by the Kyoto Protocol: HFCs, perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) and others such as unsaturated HFCs and HCFCs (hydrochlorofluorocarbons), often referred to as HFOs (hydrofluoroolefins). The European Commission has published a proposal for a revised Regulation in April 2022; the co-decision process with the Council and the European Parliament is ongoing.

The EU's key climate objective is to achieve climate neutrality by 2050, with a net GHG emission reduction target of 55% by 2030 compared with 1990. This has already been adopted as the European Climate Law. Saving F-gases emissions contributes to reaching these objectives.

Key trends for HFCs

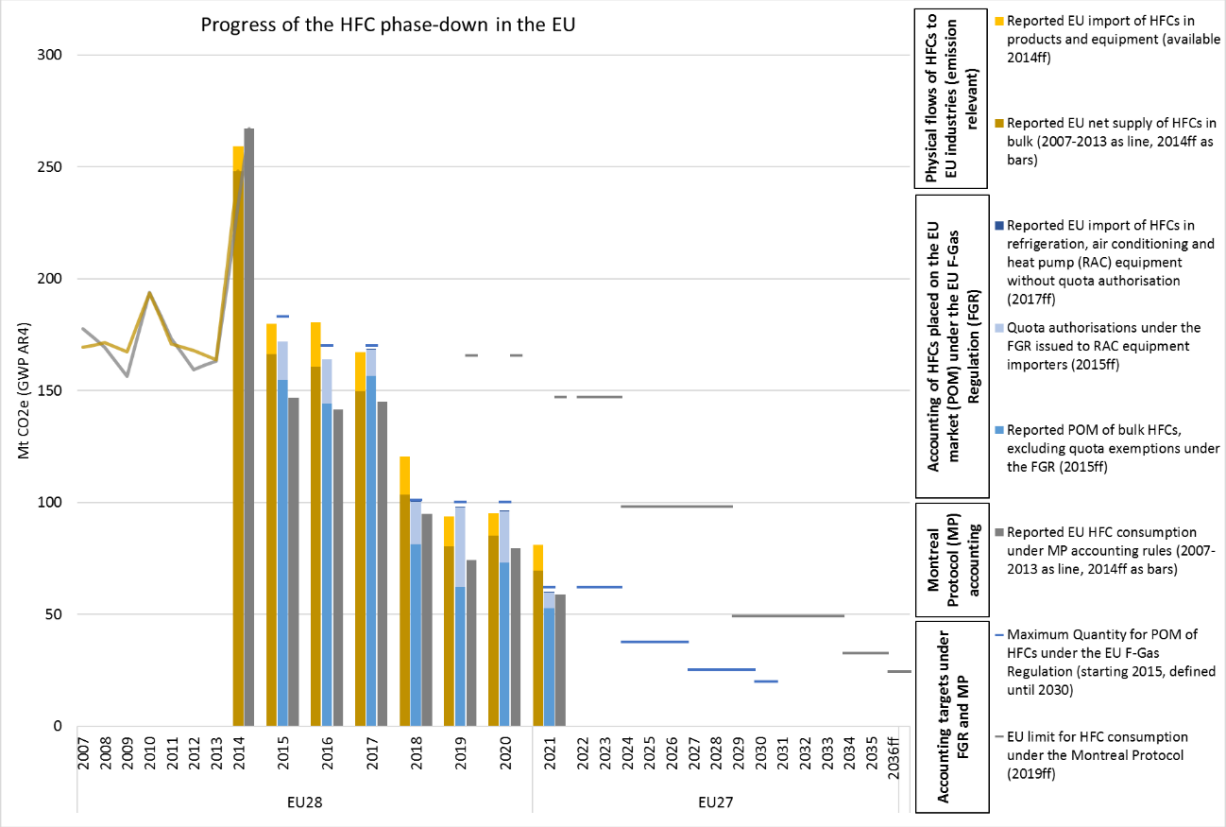
Development related to the EU use of HFCs are measured in three different metrics:

1) ***supply***, focusing on the physical use of HFCs by EU industries,
2) ***placing on the EU market*** (***POM***) measuring compliance with the EU HFC phase-down, and
3) ***consumption*** as defined under the Montreal Protocol HFC phase-down.

Due to differing definitions how imports, exports, stocks, destruction, exemptions etc. are accounted for, these metrics (all expressed in units of CO_2 equivalents) can deviate more than 20% for a given year. Please see Table 30 in the annex for detailed definitions.

Figure B-1 shows the EU HFC trends in the supply (yellow), POM (blue) and consumption (grey) metrics as well as the respective EU-internal and MP HFC phase-down limits and schedules.

Figure B-1 EU HFC supply and progress of the HFC phase-downs under the EU F-gas Regulation and the Montreal Protocol



Notes: The geographical scope of the data presented (both reported data and phase-down limits) is the EU-28 except Croatia for 2007-2008, the EU-28 for 2009-2019, the EU-27 + UK for 2020 and the EU-27 for 2021 and subsequent years. Due to differing definitions, POM data (blue) as defined under the EU F-gas Regulation are not directly comparable with consumption data (grey) as defined under the Montreal protocol.

Sources: EC (2022); EEA (2021, 2022b).

Corrected for the change in geographical scope between 2020 and 2021, EU-27 HFC supply in 2021 was about 6% below 2020. EU, probably in the context of the deep cut in available quotas between 2020 and 2021: 2021 quota for the EU-27 was 38% below 2020 quota for the EU-27 + UK, which is approximately equivalent to a cut of about one third for the EU-27. Jointly with the transfer of EU quota authorisations to the UK HFC quota system at the end of the Brexit transition period, this led to a decrease in the reserve of EU quota authorisation by 12%. However, the reserve of quota authorisations available by the end of 2021 was still more than five times the amount needed for EU-27 equipment imports in 2021.

Illegal HFC imports outside the reporting and compliance system under the F-gas Regulation continue to be alleged, and as in previous EEA reports these cannot be quantitatively accounted for in this briefing.

After significant increases in the number of companies applying for quota until 2019, the European Commission's increased scrutiny of their legitimacy has reduced the viability of mass registrations (EU, 2019). Therefore, the number of quota-holding companies has been declining since 2020. As a

consequence, the number of companies reporting on bulk HFC imports and quota authorisations decreased in 2020 and 2021 and reached 2018 levels again after more than doubling in 2019.

More graphs and data tables relating to compliance with the EU HFC phase-down are provided in the annex to this briefing.

EU contribution to the global phase-down of HFCs under the Kigali Amendment to the Montreal Protocol

The global HFC phase-down under the Montreal Protocol's Kigali Amendment introduced limits for the EU consumption of HFCs, starting in 2019 (grey lines in Figure B-1). Along with the 2020-2021 cut in available EU HFC quota, 2021 HFC consumption (grey bars in Figure B-1) in the EU-27 was 26% below joint EU-27+UK consumption in 2020, or roughly 20% below EU-27 2020 HFC consumption. EU HFC consumption was thus at approximately 40% of the 2021 limit for the EU-27 under the Montreal Protocol's Kigali Amendment.

As visualised in Figure B-1, the ratio between HFC consumption (grey bars) and the quota limit under the EU F-gas Regulation (blue lines) has been strongly fluctuating over years. The most important differences between definitions of consumption and POM in this context are the accounting of the quota exemption for metered dose inhalers (MDIs) and of HFCs in imports of precharged equipment. In the Impact Assessment accompanying the European Commission's proposal for a revised F-gas Regulation it was demonstrated that EU compliance with the Montreal Protocol beyond 2030 is not assured in all cases by the present HFC POM phase-down schedule of the EU F-gas Regulation as consumption can possibly grow larger than total POM in future years (EC, 2022a).

More graphs and data tables relating to the EU HFC phase-down under the Kigali Amendment to the Montreal Protocol are provided in the annex to this briefing.

Supply of F-gases in the EU

The total supply of F-gases [(1)] was reasonably stable from 2007 until it peaked in 2014, just before the HFC quota system entered into force. After 2015, a downwards trend reflected the effect of the EU HFC phase-down under the F-gas Regulation. The volume of EU-27 total F-gases supply (i.e. both HFCs and other F-gases) in physical tonnes in 2021 was about 7% lower than joint EU-27+ UK supply in the previous year (Figure B-2), with an about 11% lower GWP in 2021 than in 2020 (Figure B-3). As the past years' reporting data on non-HFCs lack any indication of EU-27 and UK shares, we do not attempt to estimate supply trends corrected for the change of geographic scope. Refrigeration and air conditioning (including heat pumps) continue to be key applications.

An important detail is that statistics in physical tonnes reflect the use patterns of F-gases in EU industries (Figure B-2), while the amount of F-gases expressed in carbon dioxide equivalents (CO_2e) reflects their potential relevance for climate change policy and the HFC phase-down (Figure B-3).

A key driver for the F-gases supply was the HFC supply, which decreased by about 4% in mass or 6% in CO_2e compared with 2020, corrected for the change in geographical scope. The main driver was lower imports, combined with a continuing reduction in production.

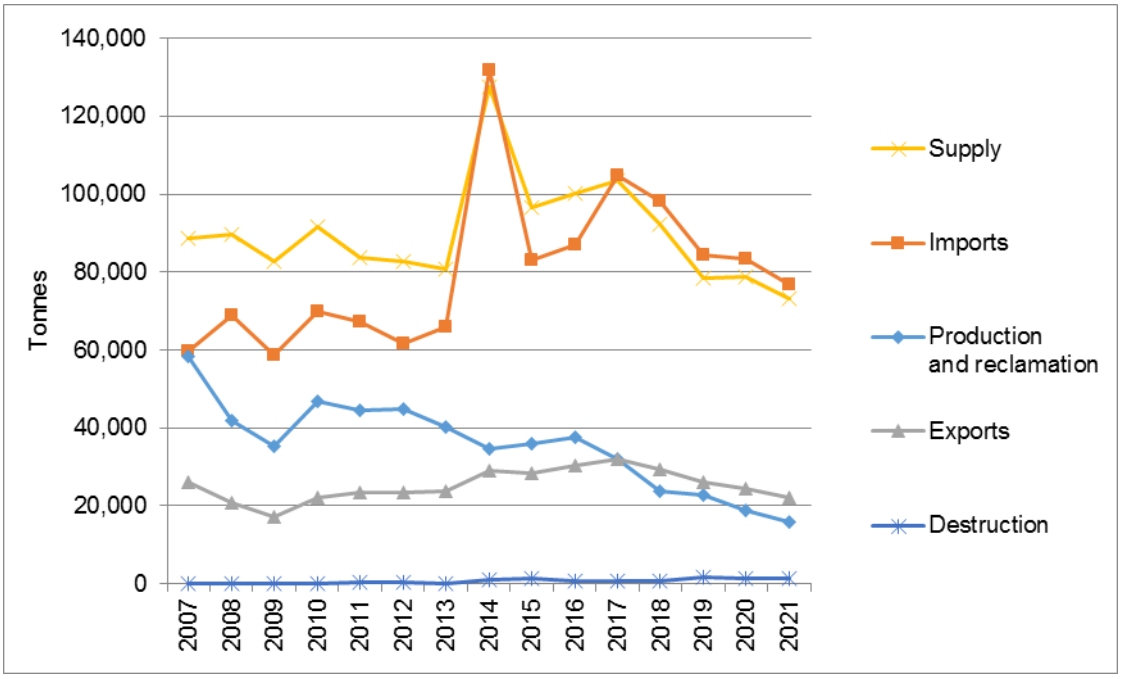
The supply of unsaturated HFCs and HCFCs with very low GWPs, replacing HFCs with significantly higher GWPs, has increased by 3% despite the change in geographical scope to make up about 25% of the EU-27 total supply of fluorinated gases in 2021. When comparing the gases with the highest GWPs for the years

---

(1) While the previous subsections only discuss HFCs, this section includes trends for supply of *all F-gases* to the EU. Where supply is measured in units of tonnes, the major difference to HFC statistics is due to low-GWP unsaturated H(C)FCs. When measured in CO_2 equivalents, the difference is primarily due to very-high-GWPs gases SF_6, PFCs and NF_3.

2020 and 2021, there was a 6% decrease for SF_6, and, less relevant for overall F-gas supply in CO_2e, an 11% increase for NF_3 and an 8% increase for PFCs (all not corrected for the change in geographical scope).

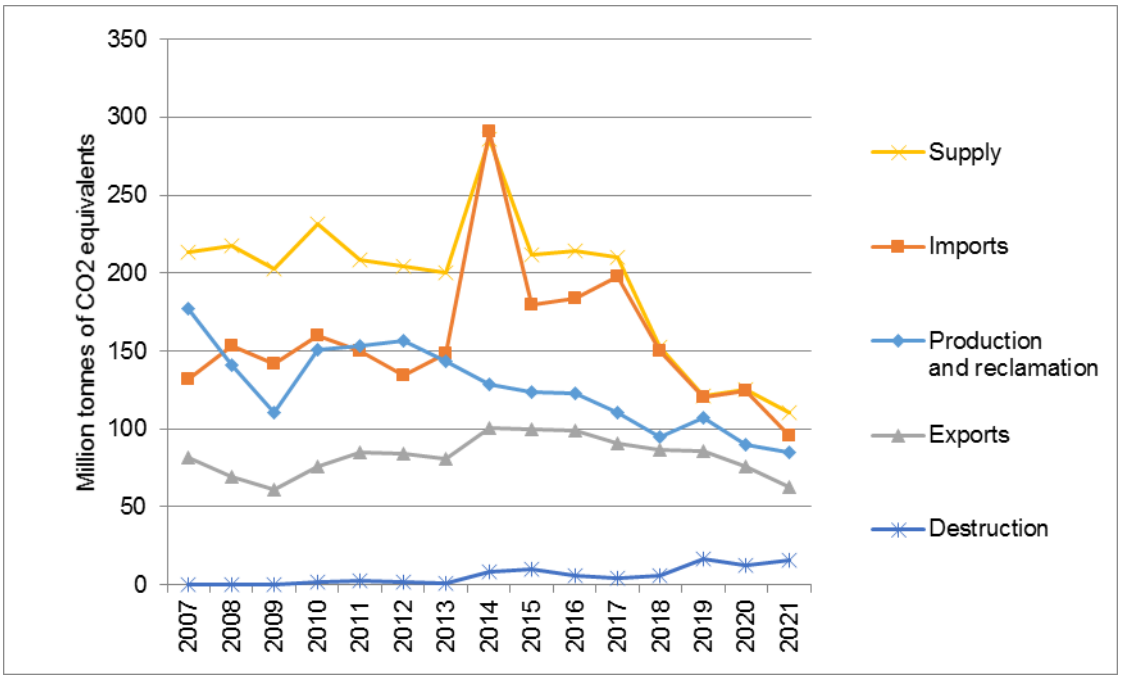
Figure B-2 Supply, production, import, export and destruction of F-gases (tonnes)



Notes: The geographical scope of the data presented is EU-27 and the UK (except Croatia) for 2007-2008, EU-27 and the UK for 2009-2020 and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, hydrofluoroethers (HFEs), alcohols and 'other' perfluorinated compounds) and HFCs, PFCs and SF6 in products and equipment were not subject to reporting for the period 2007-2013. Data presented for import and supply between 2007 and 2013 are thus limited to bulk import and bulk supply. Export is limited to bulk export for the whole time series. Data available for Croatia for the period 2009-2012 are limited to HFCs and do not cover PFCs and SF6.

Sources: EC (2011, 2014); EEA (2021, 2022b).

Figure B-3 Supply, production, import, export and destruction of F-gases (CO_2e)



Notes: The geographical scope of the data presented is EU-27 and the UK (except Croatia) for 2007-2008, EU-27 and the UK for 2009-2020 and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, hydrofluoroethers (HFEs), alcohols and 'other' perfluorinated compounds) and HFCs, PFCs and SF6 in products and equipment were not subject to reporting for the period 2007-2013. Data presented for import and supply between 2007 and 2013 are thus limited to bulk import and bulk supply. Export is limited to bulk export for the whole time series. Data available for Croatia for the period 2009-2012 are limited to HFCs and do not cover PFCs and SF6.

Sources: EC (2011, 2014); EEA (2021, 2022b).

The trend in F-gas supply in the EU reflects trends in physical flows of F-gases: production, reclamation, imports, exports and destruction in the EU.

- **Production** of F-gases has seen a steady decline since 2012. In 2021, EU-27 production of F-gases decreased again compared with 2020, both in production volume (-15%) and in GWP (-3%), corrected for the change in geographical scope.
- The quantities reported as **reclaimed** F-gases show a significant drop of about 30% without the scope correction. However, that drop is mainly due to a single UK-based company ceasing to report on HFC reclamation. Corrected for the scope change, EU-27 HFC reclamation in 2021 was at roughly the same level as 2020 while reclamation of SF_6 increased by 79%.
- **Reclaimed** HFCs account for about 8% of EU production of virgin HFCs in 2021, or 2% of total EU HFC supply (or 7% and 3%, respectively, as CO_2e). While 93% of reclaimed amounts are HFCs, SF_6 contributes to 31% of the GWP of reclaimed gas.
- Total F-gas **imports** in 2021 decreased by only 8% compared with 2020, while there was a decrease of 23% in CO_2e. The main driver was a decrease of HFC imports (-16% in tonnes / -23% in GWP), amended by a strong decrease in SF_6 imports (-64%), all percentages without scope correction. Corrected for the scope change, EU-27 HFC imports in 2021 were approximately 10% (mass) or 15% (GWP) lower than in 2020. The import increase observed in 2020, which was attributed to be a reaction to either low imports in 2019 or an anticipation of the 2021 step down in the HFC phase-down, did thus not continue in 2021.
- While the decrease in total imports was mainly due to trends observed for bulk imports, the situation is reverse for imports of F-gases contained in products and equipment. Such equipment

imports into EU-27 in 2021 were actually 21% higher than joint EU-27 + UK imports in 2020. In previous years, EU-28 equipment imports had remained more or less the same level since 2016.

- In 2021, overall **bulk exports** of F-gases from the EU continued their strong decrease since 2017 and decreased by about 10% compared with 2020; a decrease of 17% is visible in CO_2e (both without scope correction). The trend depends on the gas: 2021 HFC exports, without scope correction, were about 25% lower than in 2020 while decreasing by 32% in terms of GWP. Given strong HFC export activities reported in previous years for the UK, however, EU-27 HFC exports in 2021 can be estimated to at levels close to 2020. For SF_6, 2021 exports were about constant compared with 2020. Exports of **F-gases contained in products and equipment** are not subject to obligatory reporting.
- **Destruction and feedstock use** of F-gases is mainly reported for HFCs. The amounts destroyed increased by about 10% in 2021 after significantly decreasing the year before. Destruction of non-HFCs also increased significantly but remains at a low level (about 5% of gases destroyed in 2021 were non-HFCs). The steep increase in 2019 had been due to the systematic inclusion of unwanted or off-grade gases destroyed after production before sale in the reporting scope. HFC amounts used as feedstock for chemical production processes have increased by 13% compared with 2019. As both destruction and feedstock use have hardly been reported from UK companies, a scope correction for the EU-27 trends is not necessary.

More graphs and tables summarising data reported by companies on the production, import, export and destruction of F-gases in the EU, for the period 2007-2021, are contained in the annex to this briefing. The annex also documents the methodology used, in particular for the calculation of the supply, placing on the market and consumption metrics, and institutional arrangements.

References

EC, 2011, Fluorinated greenhouse gases 2010 — Data reported by companies on the production, import and export of fluorinated greenhouse gases in 2010, Confidential report to the European Commission and Member States' Competent Authorities, Umweltbundesamt, Vienna.

EC, 2014, Croatian HFC imports and exports 2009-2012, confidential data set considered for the calculation of reference values for Croatian companies, DG CLIMA, European Commission.

EC, 2022a, Impact Assessment Report accompanying the document "Proposal for a Regulation of the European Parliament and of the Council on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2104"; Commission Staff Working Document; SWD(2022) 96 final, Strasbourg, 5.4.2022

EC, 2022b, 'Confidential data set extracted from the HFC Registry', 5 May 2022, DG CLIMA, European Commission, Brussels.

EEA, 2021, Fluorinated greenhouse gases 2021 — Data reported by companies on the production, import and export of fluorinated greenhouse gases in the European Union, 2007-2020, Public Briefing, European Environment Agency (https://www.eea.europa.eu/publications/fluorinated-greenhouse-gases-2021).

EEA, 2022a, 'EEA greenhouse gas data viewer', European Environment Agency (www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer) accessed 15 August 2022.

EEA, 2022b, Fluorinated greenhouse gases 2022 — Confidential dataset: Compilation and analysis of data reported by companies on the production, import, export, destruction and feedstock use of fluorinated greenhouse gases in the European Union, European Environment Agency.

EU, 2006, Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases (OJ L 161, 14.6.2006, p. 1-11).

EU, 2014, Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006 (OJ L 150, 20.5.2014, p. 195–230).

EU, 2019, Commission Implementing Regulation (EU) 2019/661 of 25 April 2019 ensuring the smooth functioning of the electronic registry for quotas for placing hydrofluorocarbons on the market (OJ L 112, 26.4.2019, p. 11-15).

IPCC, 2001, Third assessment report — Climate change, Intergovernmental Panel on Climate Change (https://www.ipcc.ch/ipccreports/tar/, last accessed 14 Nov 2017).

IPCC, 2007, IPCC fourth assessment report — Climate change, Intergovernmental Panel on Climate Change (http://www.ipcc.ch/report/ar4/), last accessed 14 Nov 2017.

Montreal Protocol on Substances That Deplete the Ozone Layer, international treaty, adopted in Montreal on 16 September 1987.

Fluorinated greenhouse gases 2022

Data reported by companies on the production, import, export and destruction of fluorinated greenhouse gases in the European Union, 2007-2021

ANNEX TO BRIEFING

European Environment Agency
European Topic Centre
Climate change mitigation

1 Introduction to the Annex

1.1 Annex structure

This annex includes the following sections:

This introductory Section 1 outlines legal arrangements and their implementation.

Figures

Section 2 contains figures on reporting companies.

Section 3 presents figures on production, imports, exports and destruction of fluorinated greenhouse gases as reported by companies. Section 4 presents key indicators for the EU, based on reported data about the supply of F-gases to the EU market and their intended applications.

Section 5 shows figures on progress under the EU HFC phase-down, while section 6 shows figures on progress under the global HFC phase-down under the Montreal Protocol.

Data Tables

Section 7 provides detailed data tables for the figures presented in sections 2 to 6.

Additional Information

Section 8 briefly explains the terminology used throughout the document, section 9 details the gases covered by the EU F-gas Regulation and thus this document and section 10 outlines the calculation methods used.

1.2 Scope

The data contained in this annex is based on submissions for the year 2021 as received by 01 August 2022 (which includes some late reports and corrections received after the legal deadline on 31 March 2021). Data for previous years were changed slightly after some corrections were submitted.

Data for 2007-2013 are covered by the old 2006 F-gas Regulation, while data for 2014 and onwards are covered by the new 2014 Regulation. Due to the different reporting frameworks, data from the two periods are not always directly comparable.

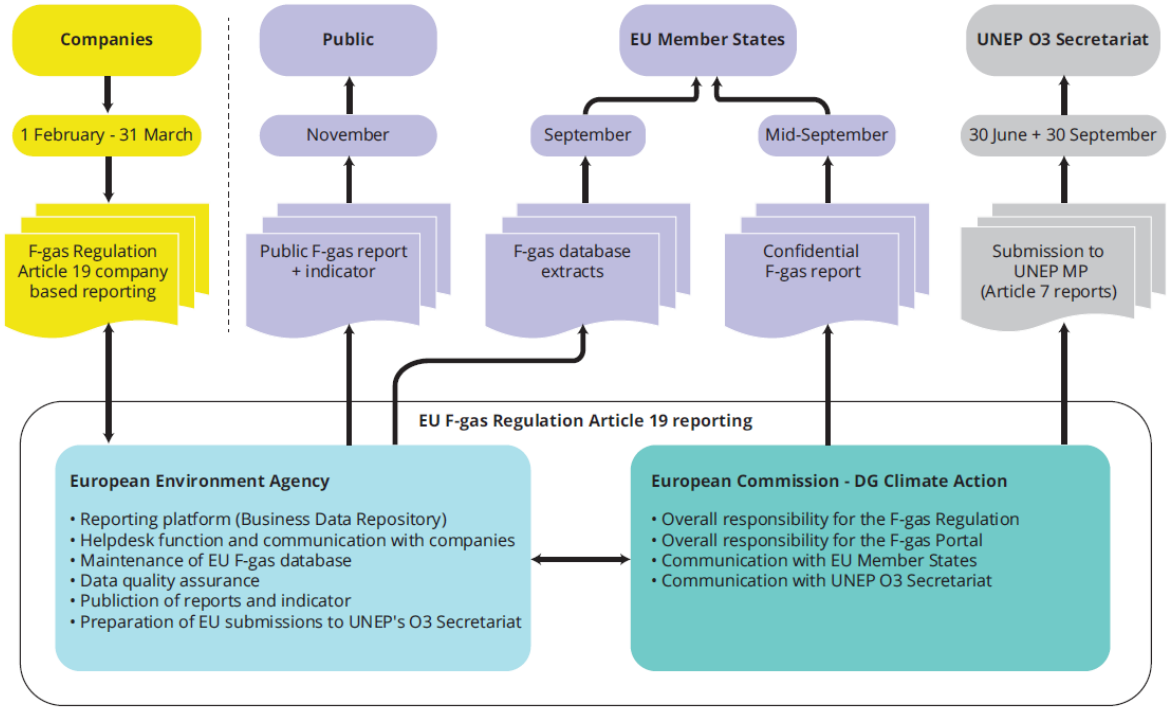
The geographical scope for data presented for the years until 2019 is the EU-28. Data for 2020 relates to the EU-27 and the United Kingdom and data for 2021 onwards relates to the EU-27.

1.3 Institutional arrangements

Companies that need to report are obliged to register with the European Commission's F-gas portal [(2)], which also hosts the HFC registry pursuant to Article 17 of the 2014 F-gas Regulation.

(2) https://webgate.ec.europa.eu/fgas

Figure 1-1 Institutional arrangements



Source: EEA, 2021.

Since 2012, the European Commission has given the responsibility for collecting, archiving and evaluating the data reported by companies to the European Environment Agency (EEA). The reporting process is executed through the EEA's online platform, the Business Data Repository (BDR), while technical support for the F-gas reporting process is provided by the EEA's European Topic Centre on Climate Change Mitigation (ETC CM) [(3)].

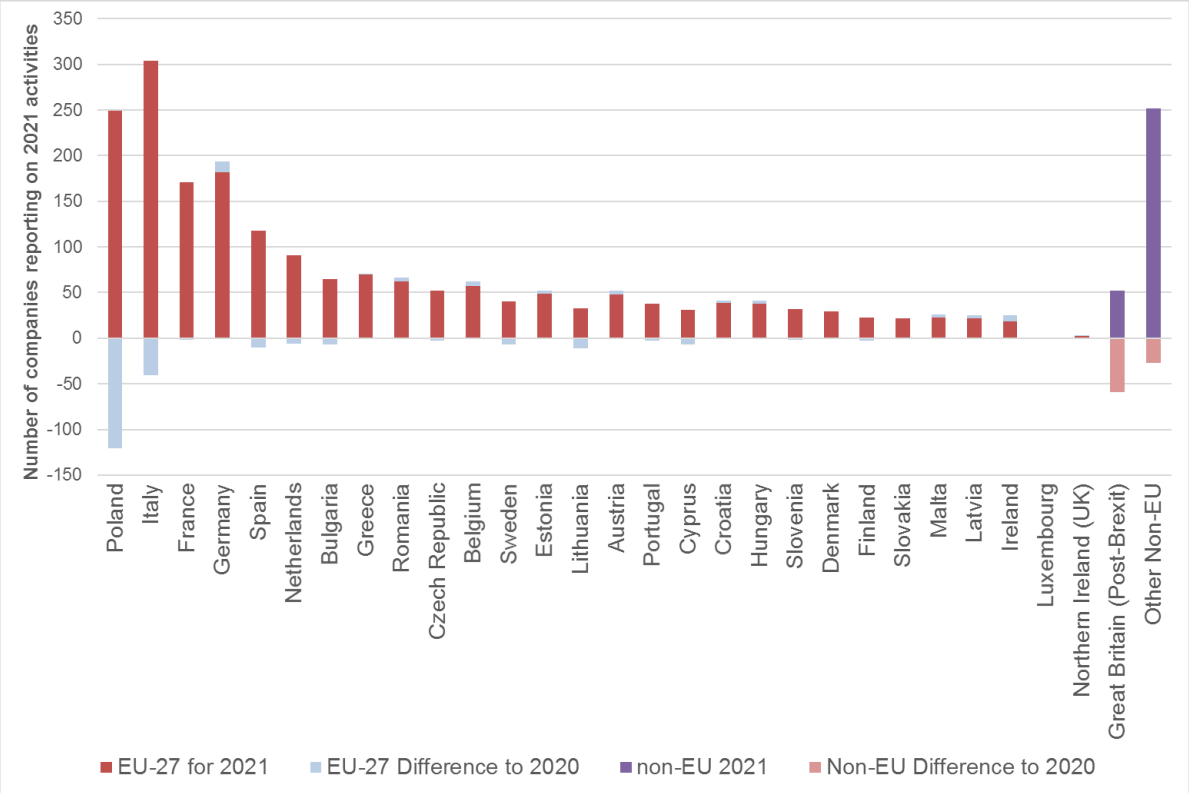
1.4 Confidentiality

The F-gas Regulation requires that the confidentiality of the information submitted by companies is protected (Article 19(8)). The EEA takes appropriate measures to protect confidentiality and prevent publication of commercially sensitive information. These measures include public reporting of F-gases data only at higher levels of aggregation, to protect data that are the result of reports from fewer than three corporate groups, and additional steps to prevent deduction of sensitive information. It is for confidentiality reasons that some of the statements about F-gas activity in this report are of a general nature and do not refer to exact figures or percentages. A summary of the confidentiality measures applied to the data published in this report is included at the beginning of Section 7.

(3) https://www.eionet.europa.eu/etcs/etc-cm

2 Figures on companies reporting in 2022

Figure 2-1 Reporting companies by Member State



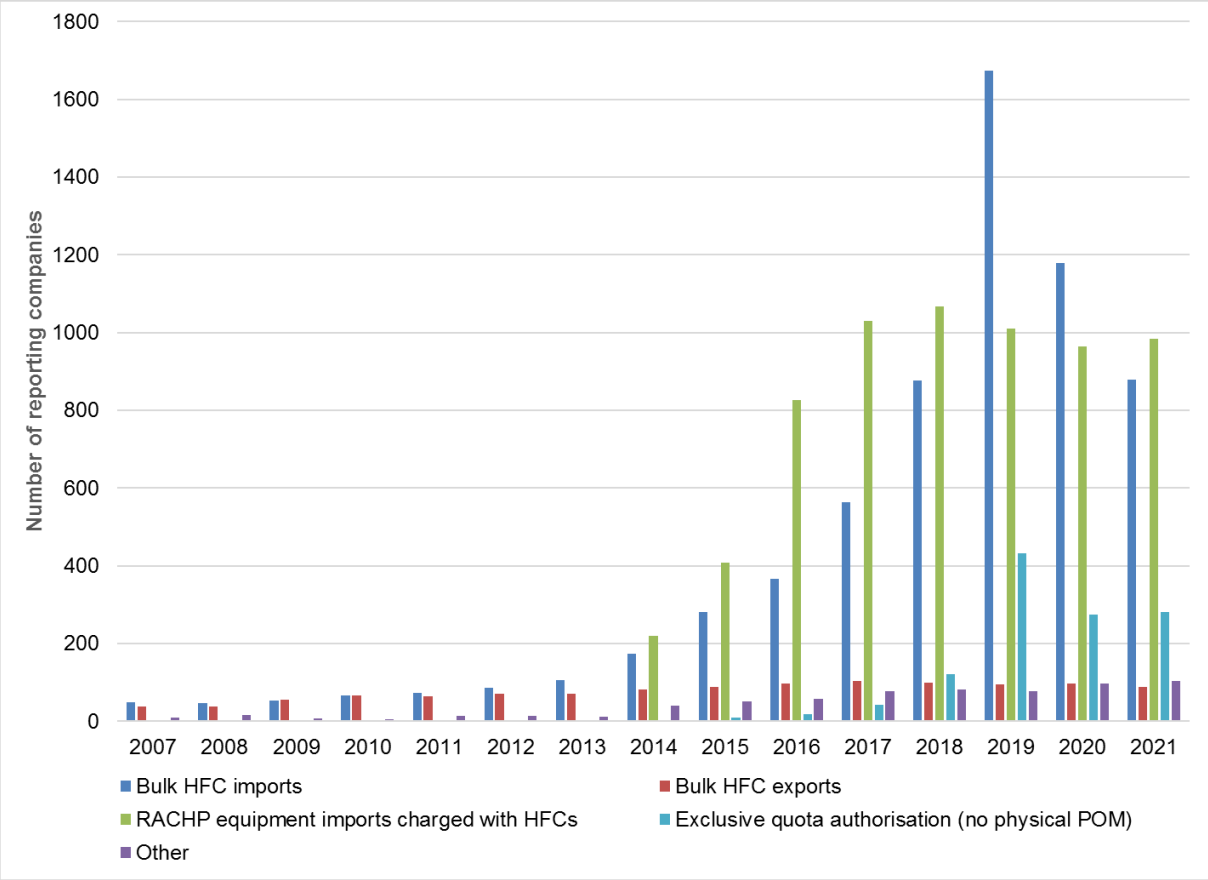
Note: Nil reports not included.

Other Non-EU countries: Brazil**,** British Virgin Islands, Canada, China, Egypt, Gibraltar, Hong Kong, India, Japan, Korea, Malaysia, Marshall Islands, Mexico, Monaco, Norway, Russia, Saudi Arabia, Serbia, Singapore, Switzerland, South Africa,, Taiwan, Turkey, United States, United Arab Emirates.

Source: EEA, 2022b.

Table 23 in Section 7 (Data tables, page 64) presents a breakdown of reporting companies by countries and reported activities for 2021.

Figure 2-2 Reported activities, 2007-2021



Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

For a more detailed breakdown of reported activities over time, please refer to Table 25 in Section 7 (Data tables, page 66).

3 Figures on F-gas activity in the European Union

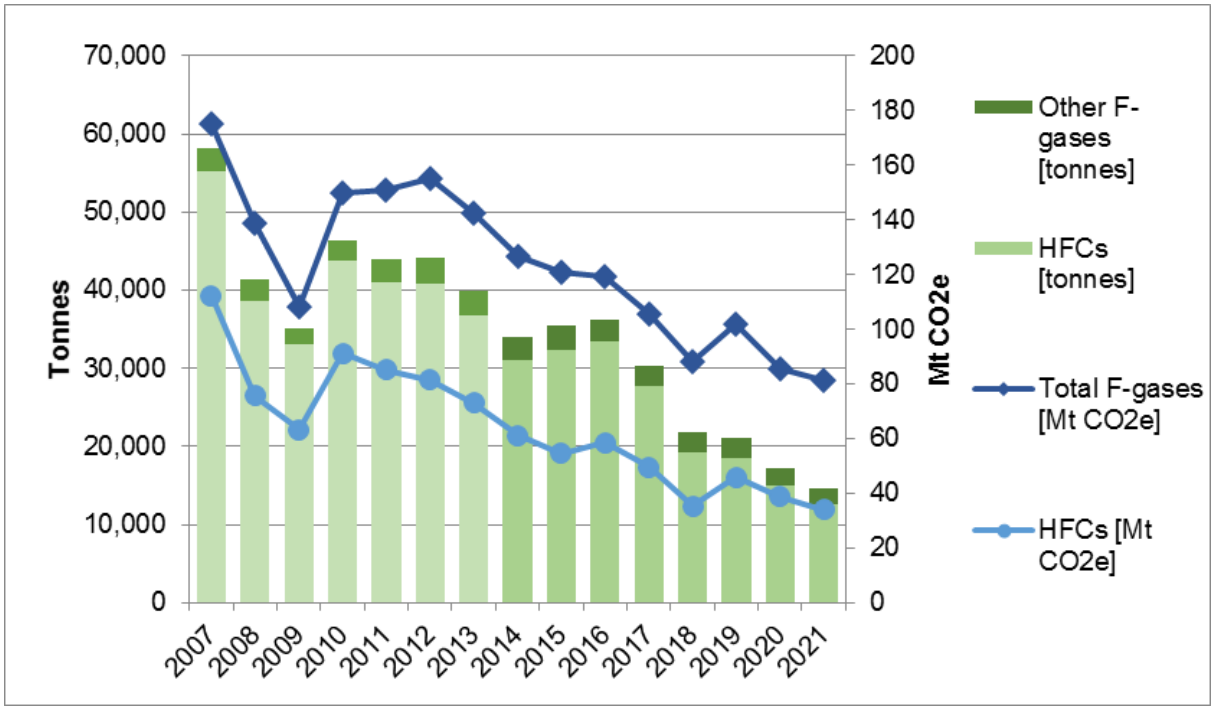
This chapter presents data reported by companies on:

- production and reclamation (Section 3.1);
- imports, both bulk and in products/equipment, and bulk exports (Section 3.2);
- destruction (Section 3.3).

3.1 Production and reclamation

'Production' refers to the production of virgin F-gases. The F-gas Regulation defines 'reclamation' as 'the reprocessing of a recovered fluorinated greenhouse gas in order to match the equivalent performance of a virgin substance, taking into account its intended use'. Note that reclaimed HFCs do not count as 'placed on the market' and are not subject to the limits of the HFC phase-down.

Figure 3-1 EU production of fluorinated gases

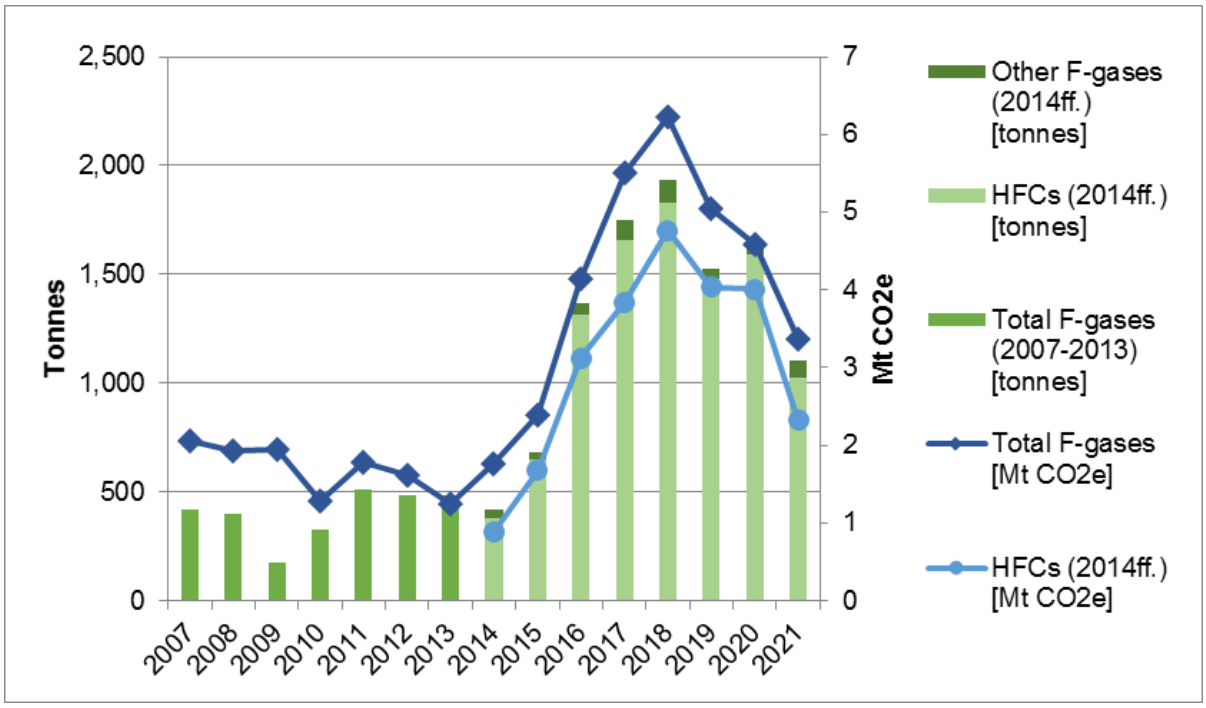


Note: The geographical scope of presented data is the EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

A tabular overview on F-gases produced in the EU since 2007 in tonnes and CO_2e is given in Table 1 and Table 2 in section 7 (Data tables, page 42f.).

Figure 3-2 EU reclamation of fluorinated gases



Note: The geographical scope of presented data is the EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013.

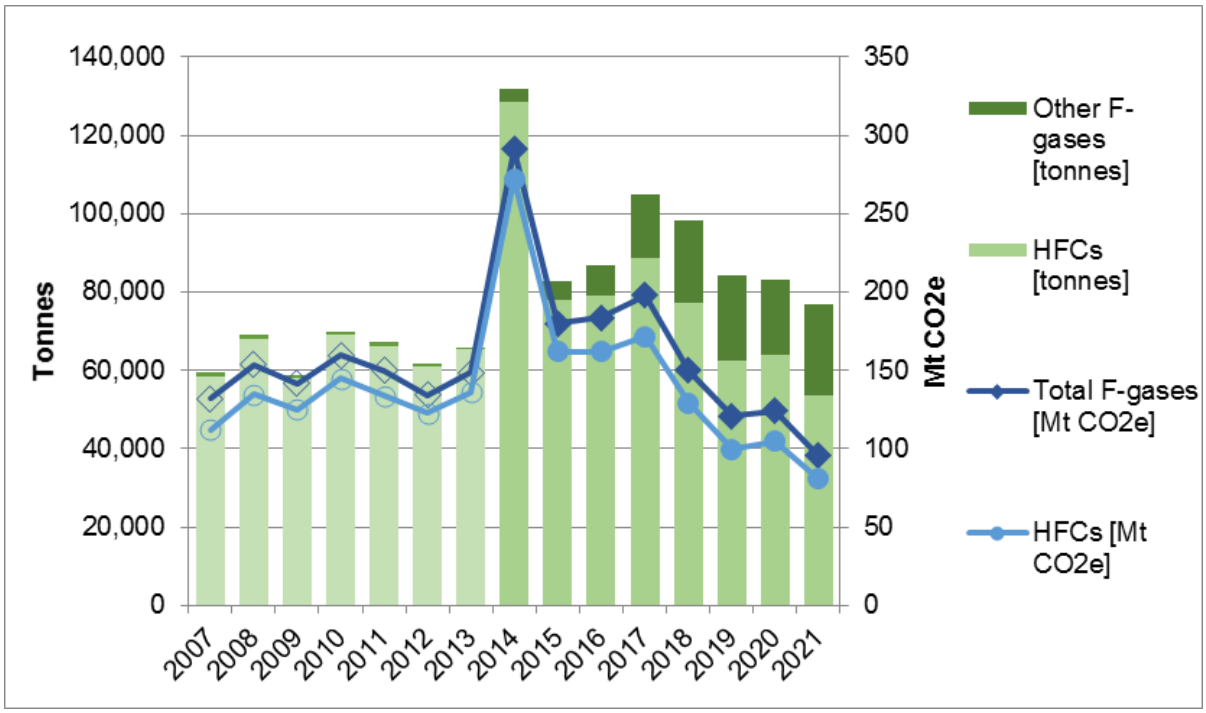
Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

3.2 Imports and exports

3.2.1 Imports

Detailed data on total imports can be found in Table 5 and Table 6 in section 7 (Data tables, page 46f.).

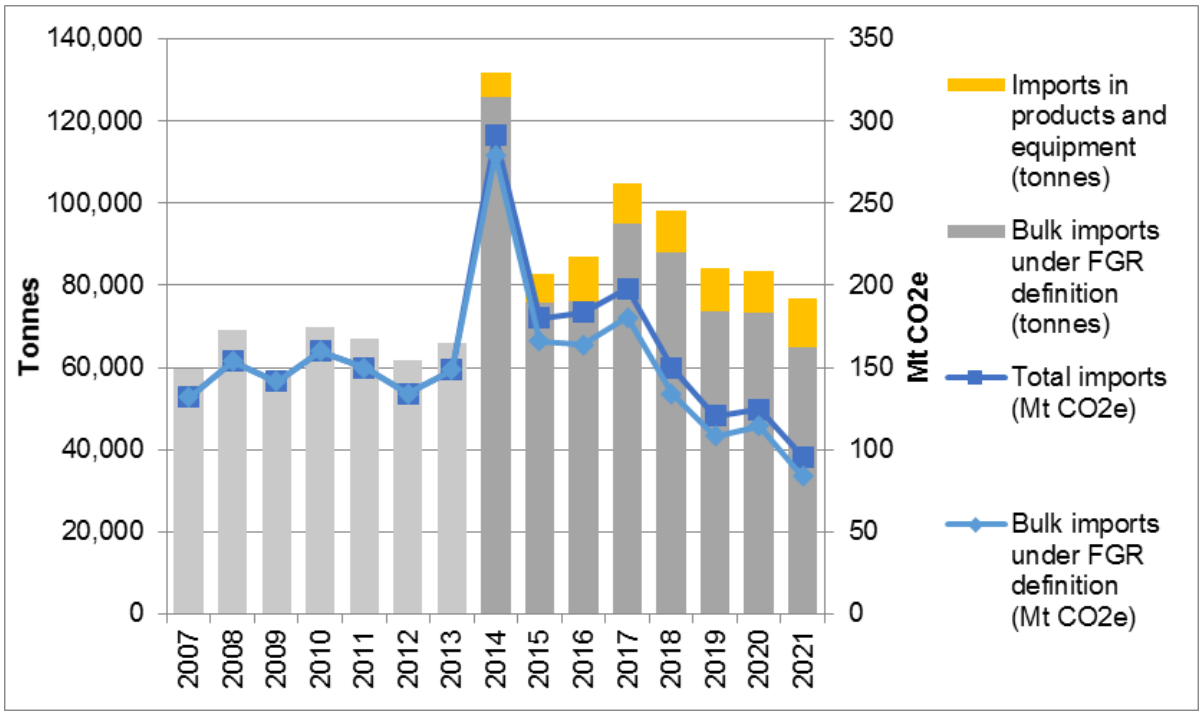
Figure 3-3 EU imports of fluorinated gases



Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Figure 3-4 EU imports by type

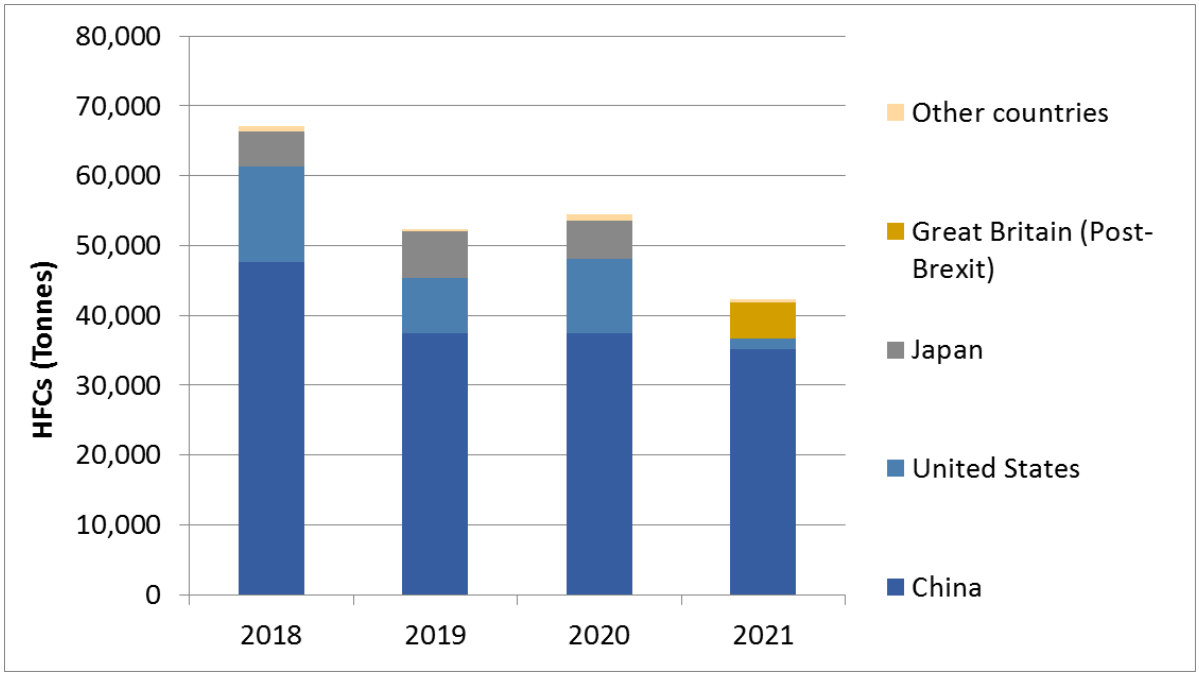


Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. Bulk imports under FGR definition starting 2014 do include imports of pre-blended polyols which are thus not included in the amounts shown for imports in products and equipment.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

3.2.2 *Bulk Imports*

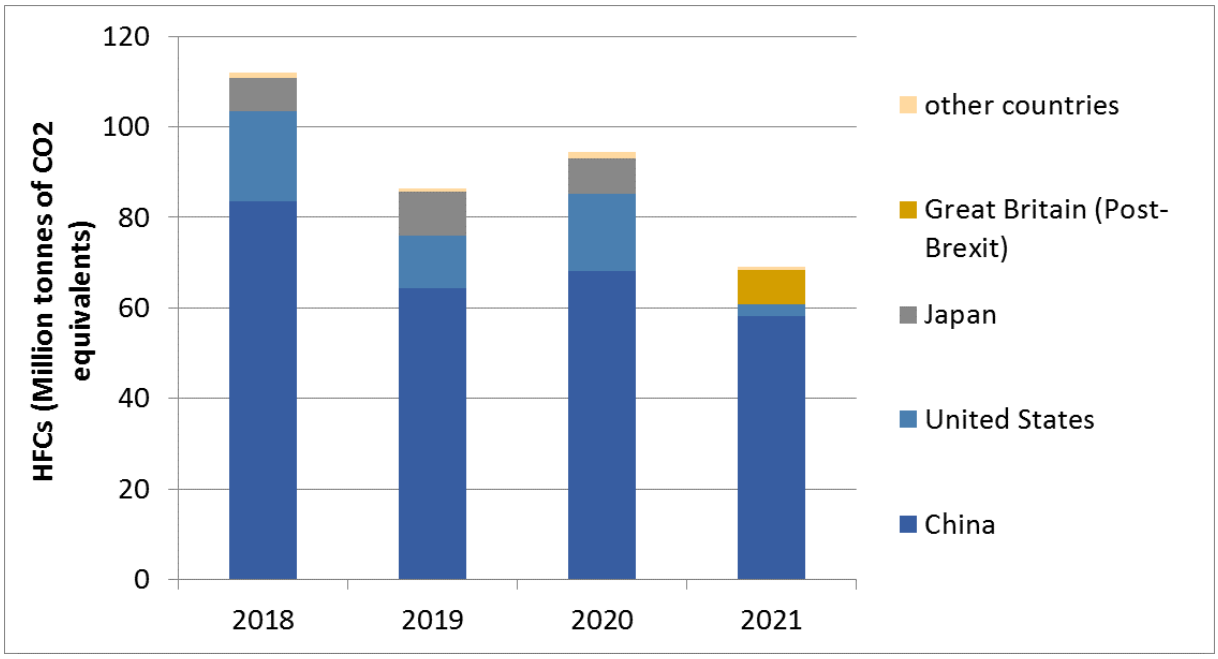
Figure 3-5 Origin of bulk HFC imports (tonnes)



Note: The geographical scope of presented data is EU-28 for 2018-2019, EU-27+UK for 2020, and EU-27 for 2021. Bulk imports presented here are cleared of imports of pre-blended polyols and thus compatible with the MP definition.

Sources: EEA, 2021 and 2022b.

Figure 3-6 Origin of bulk HFC imports (GWP)



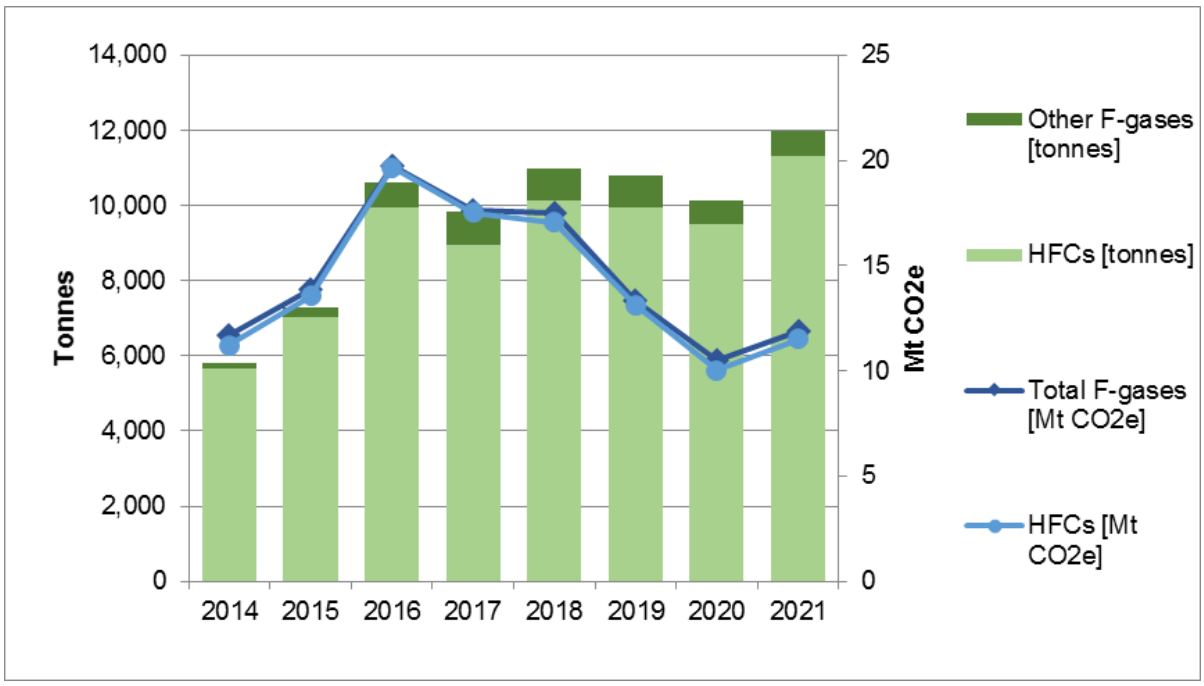
Note: The geographical scope of presented data is EU-28 for 2018-2019, EU-27+UK for 2020, and EU-27 for 2021. Bulk imports presented here are cleared of imports of pre-blended polyols and thus compatible with the MP definition.

Sources: EEA, 2021 and 2022b.

Detailed data on bulk F-gas imports is contained in Table 7 and Table 8 in section 7 (Data tables, page 48f.).

3.2.3 *Imports contained in products and equipment*

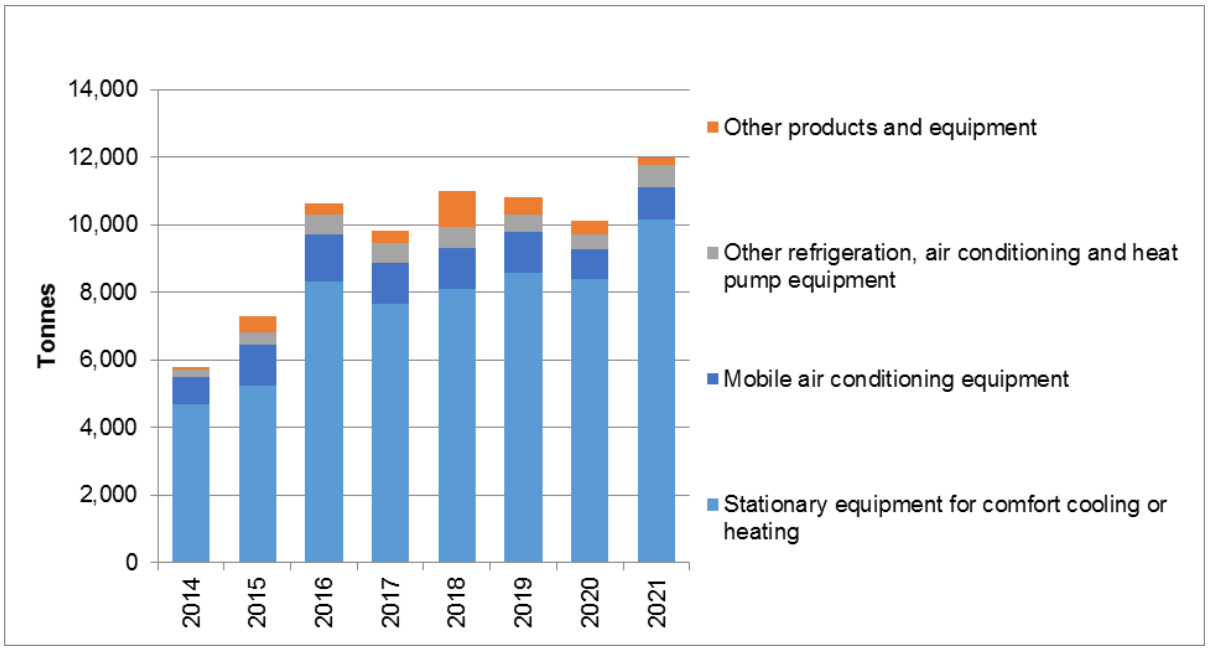
Figure 3-7 EU imports of fluorinated gases within products and equipment



Note: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. Imports of pre-blended polyols are not included in the data shown.

Sources: EEA, 2021 and 2022b.

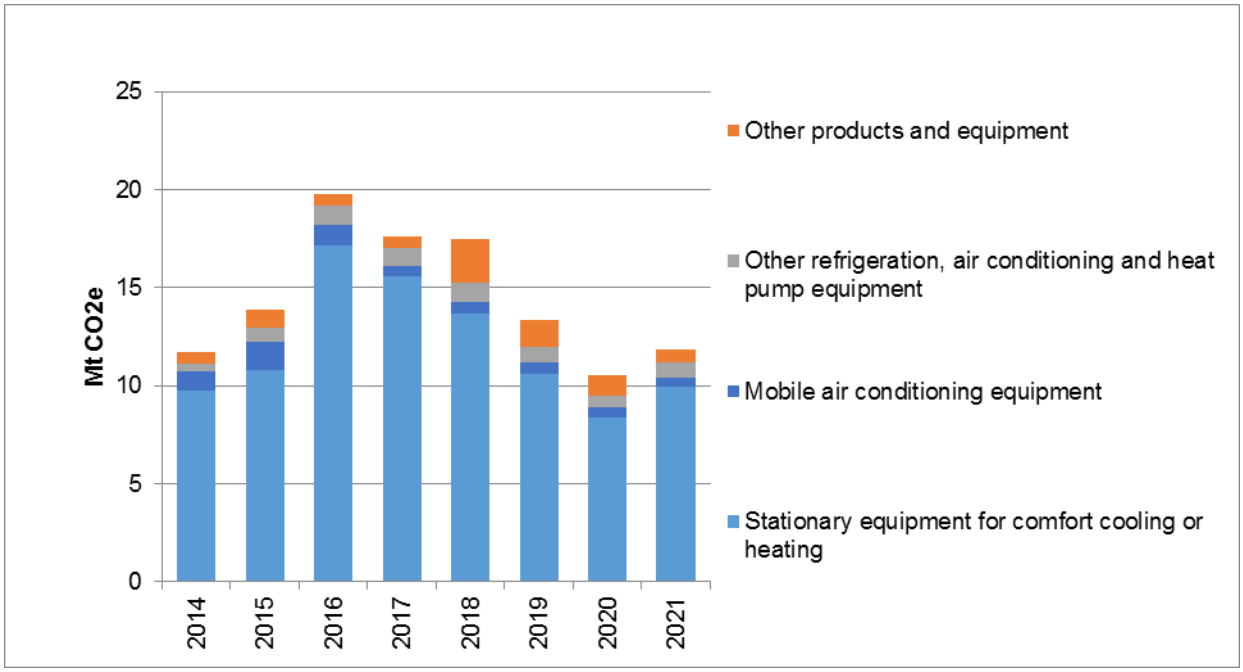
Figure 3-8 Categories of EU supply in products and equipment of fluorinated gases (tonnes)



Note: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. Imports of pre-blended polyols are included since 2018.

Sources: EEA, 2021 and 2022b.

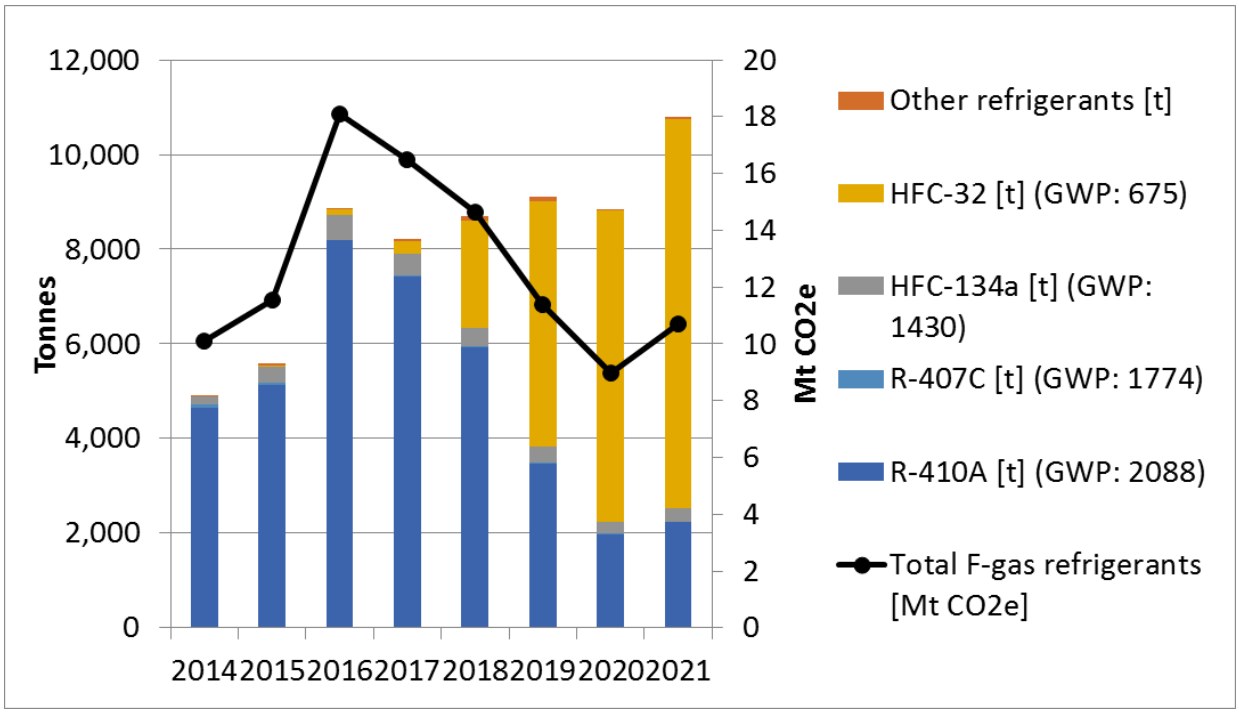
Figure 3-9 Categories of EU supply in products and equipment of fluorinated gases (CO_2e)



Note: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. Imports of pre-blended polyols are included since 2018.

Sources: EEA, 2021 and 2022b.

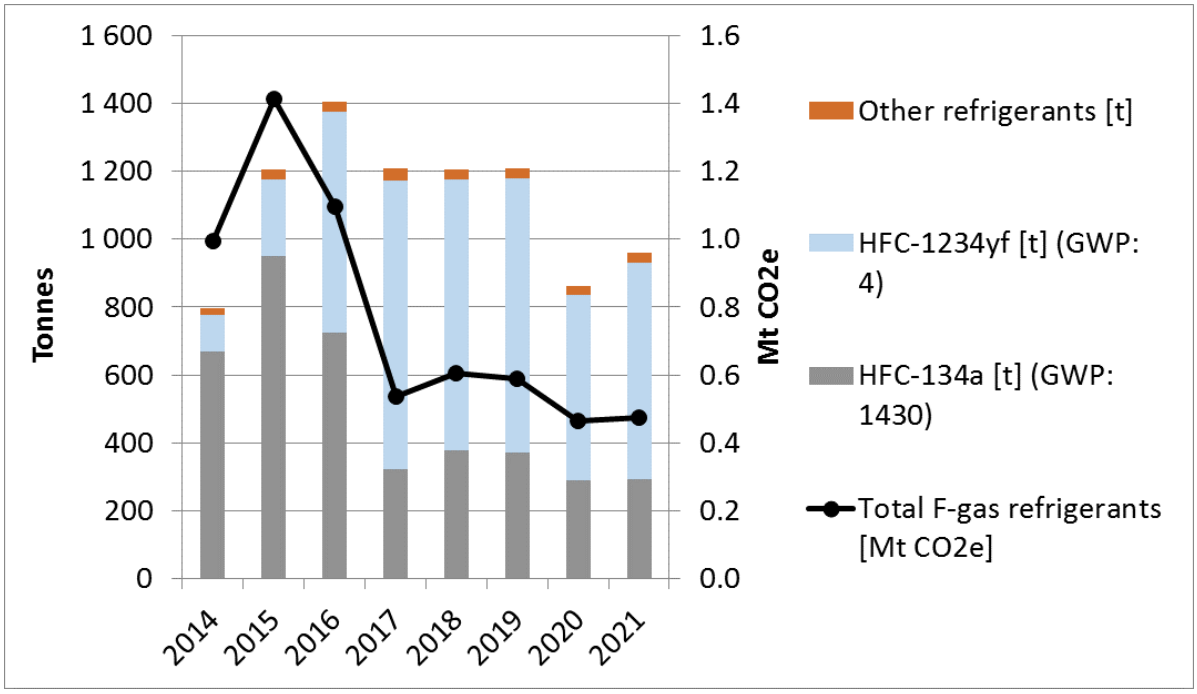
Figure 3-10 Refrigerants in imported stationary RACHP equipment (tonnes)



Note: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EEA, 2021 and 2022b.

Figure 3-11 EU imports of fluorinated gases within air conditioning equipment for vehicles



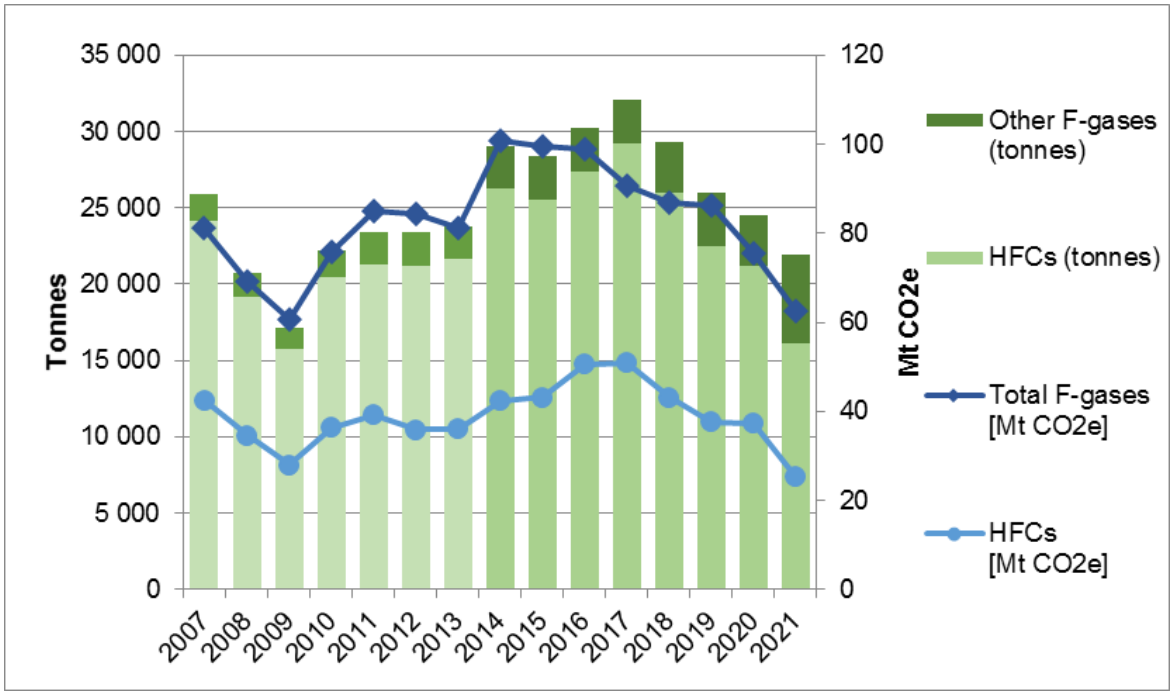
Note: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EEA, 2021 and 2022b.

Detailed data on F-gases in imported products and equipment are listed in Table 9 and Table 10 in section 7 (Data tables, page 50f.). Equipment imports by equipment category are given in Table 11 and Table 12 (page 51f.).

3.2.4 Exports

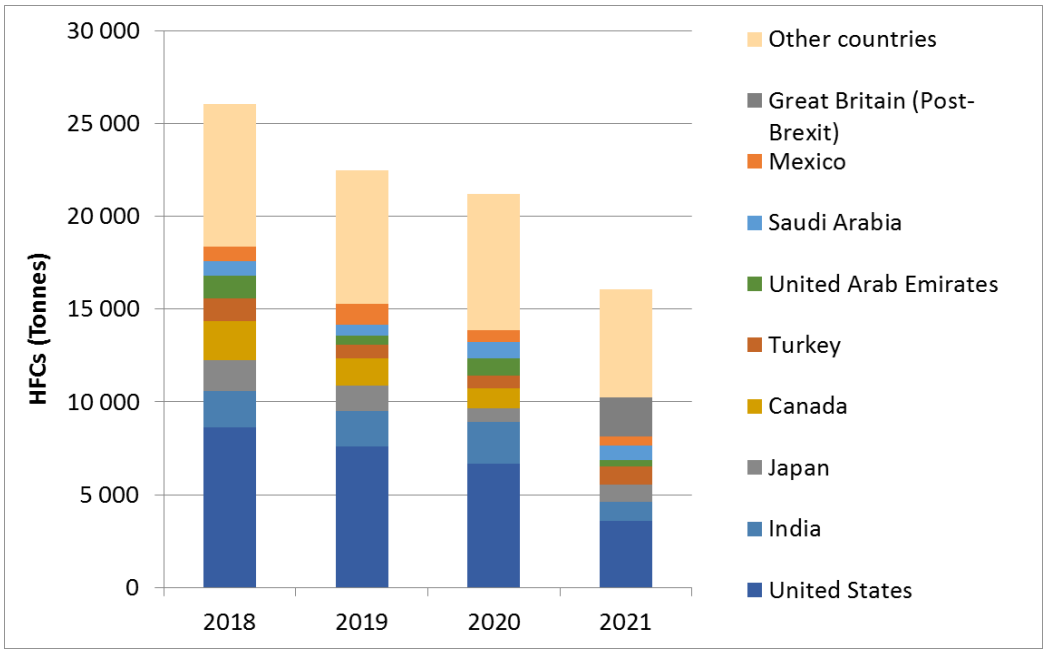
Figure 3.12 EU bulk exports of fluorinated gases



Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. Bulk exports shown for 2014-2017 include gases exported in pre-blended polyols. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

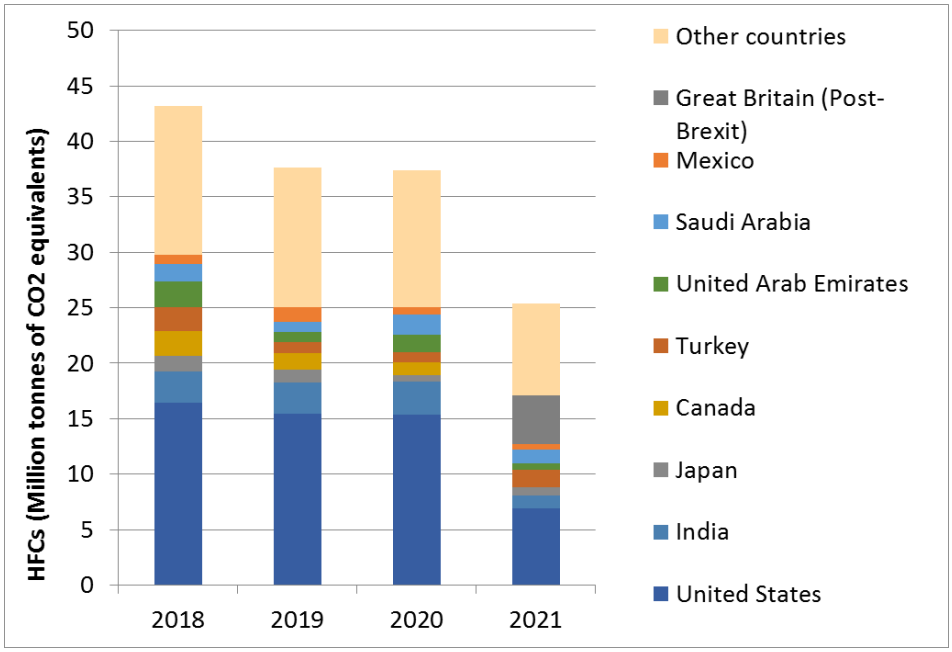
Figure 3-13 Destination of bulk HFC exports (tonnes)



Note: The geographical scope of presented data is EU-28 for 2018-2019, EU-27+UK for 2020, and EU-27 for 2021. Bulk imports presented here are cleared of imports of pre-blended polyols and thus compatible with the MP definition.

Sources: EEA, 2021 and 2022b.

Figure 3-14 Destination of bulk HFC exports (GWP)



Note: The geographical scope of presented data is EU-28 for 2018-2019, EU-27+UK for 2020, and EU-27 for 2021. Bulk imports presented here are cleared of imports of pre-blended polyols and thus compatible with the MP definition.

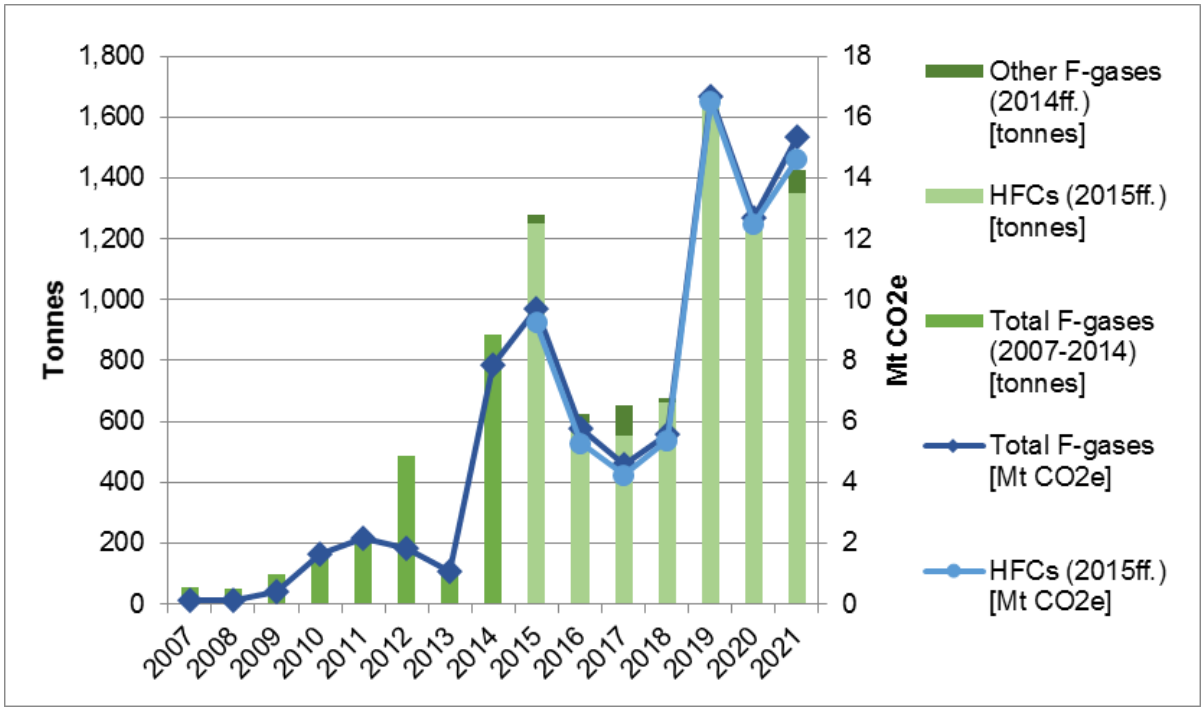
Sources: EEA, 2021 and 2022b.

Detailed data on exports can be found in in Table 13 and Table 14 in section 7 (Data tables, page 52f.).

3.3 Destruction of fluorinated gases

This section presents the amounts of F-gases reported as destroyed.

Figure 3-15 EU destruction of fluorinated gases



Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013.

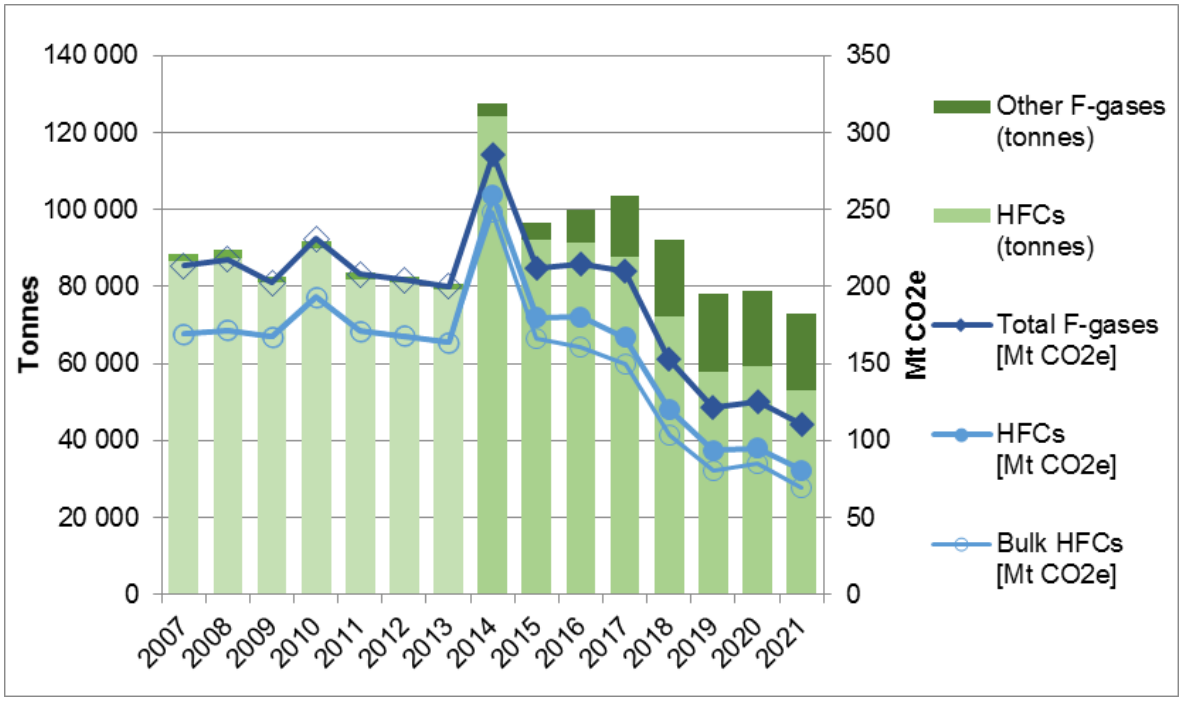
Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

4 Figures on the supply of fluorinated gases to the EU

Supply of fluorinated gases is a metric used by the EEA that provides information on the actual use of fluorinated gases by EU industries. It is calculated primarily from reported production, imports and exports [4].

4.1 Trends in the EU supply by gas

Figure 4-1 EU supply of fluorinated gases

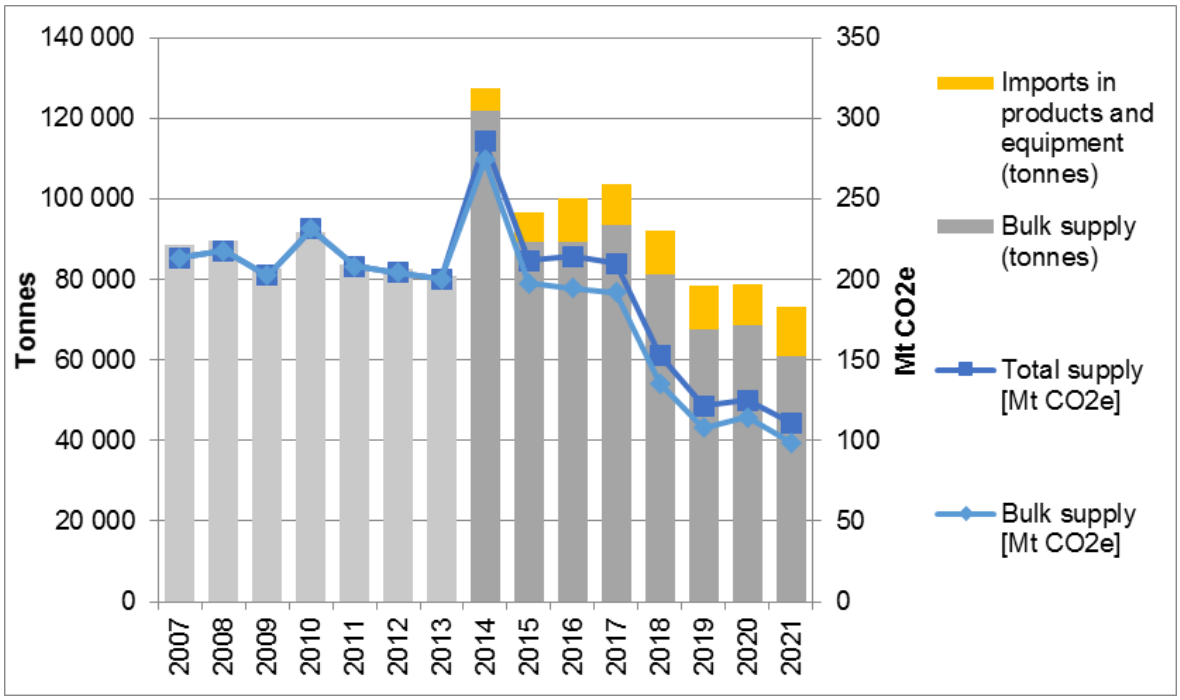


Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

[4] For methodological details on the calculation of EU supply, please refer to section 10, which explains the difference between the metrics of 'EU supply', 'placing on the market', and 'consumption', which are relevant for different aspects of the legal framework.

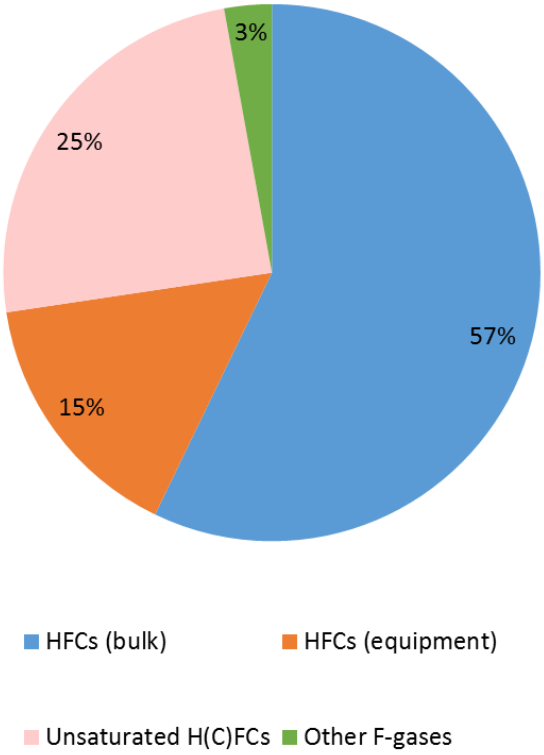
Figure 4-2 EU supply of fluorinated gases by types



Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. Imports of pre-blended polyols, available since 2018, were assigned to the supply in products and equipment.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

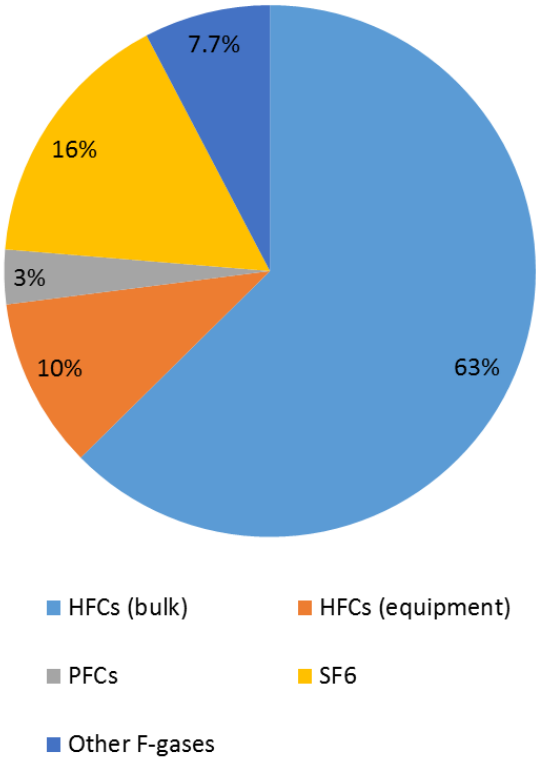
Figure 4-3 **2021 total supply by types and groups of fluorinated gases (% tonnes)**



Note: The geographical scope of presented data is EU-27.

Source: EEA, 2022b.

Figure 4-4 **2021 total supply by types and groups of fluorinated gases (% CO_2e)**



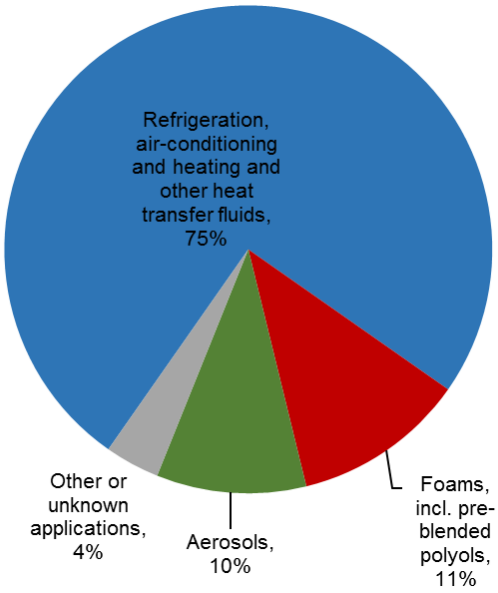
Note: The geographical scope of presented data is EU-27.

Source: EEA, 2022b.

Detailed data on total supply and bulk supply are given in Table 15 and Table 18 in section 7 (Data tables, page 54f.). For supply in imports and equipment, please refer to Table 9 and Table 10 (page 50f).

4.2 Intended applications of EU supply of F-gases

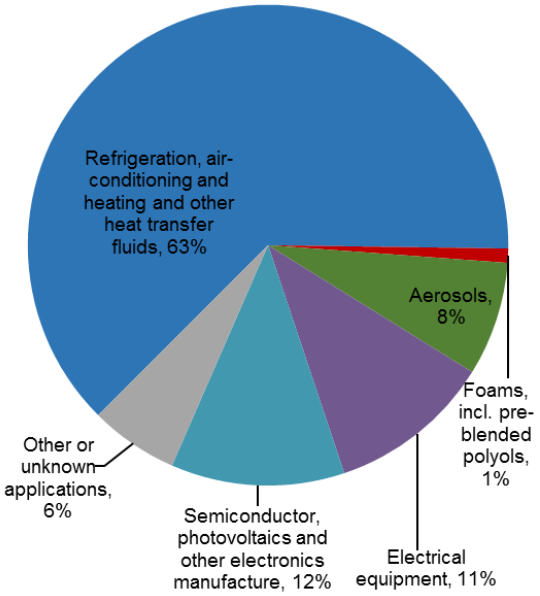
Figure 4-5 **2021 EU F-gases supply by intended applications (% tonnes)**



Note: The geographical scope of presented data is EU-27.

Source: EEA, 2022b.

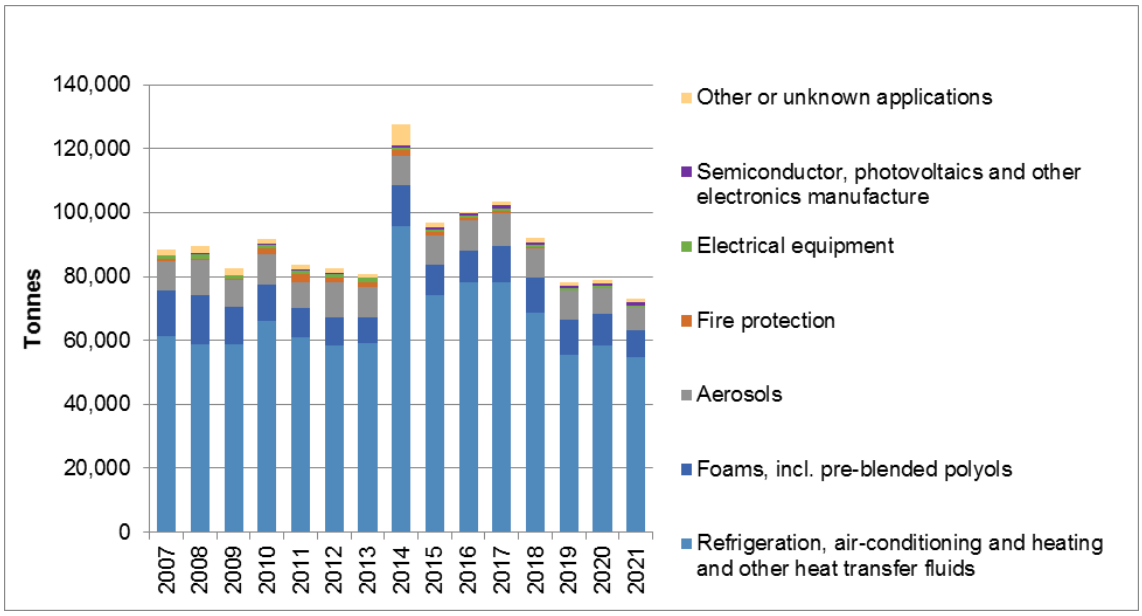
Figure 4-6 **2021 EU F-gases supply by intended applications (% CO_2e)**



Note: The geographical scope of presented data is EU-27.

Source: EEA, 2022b.

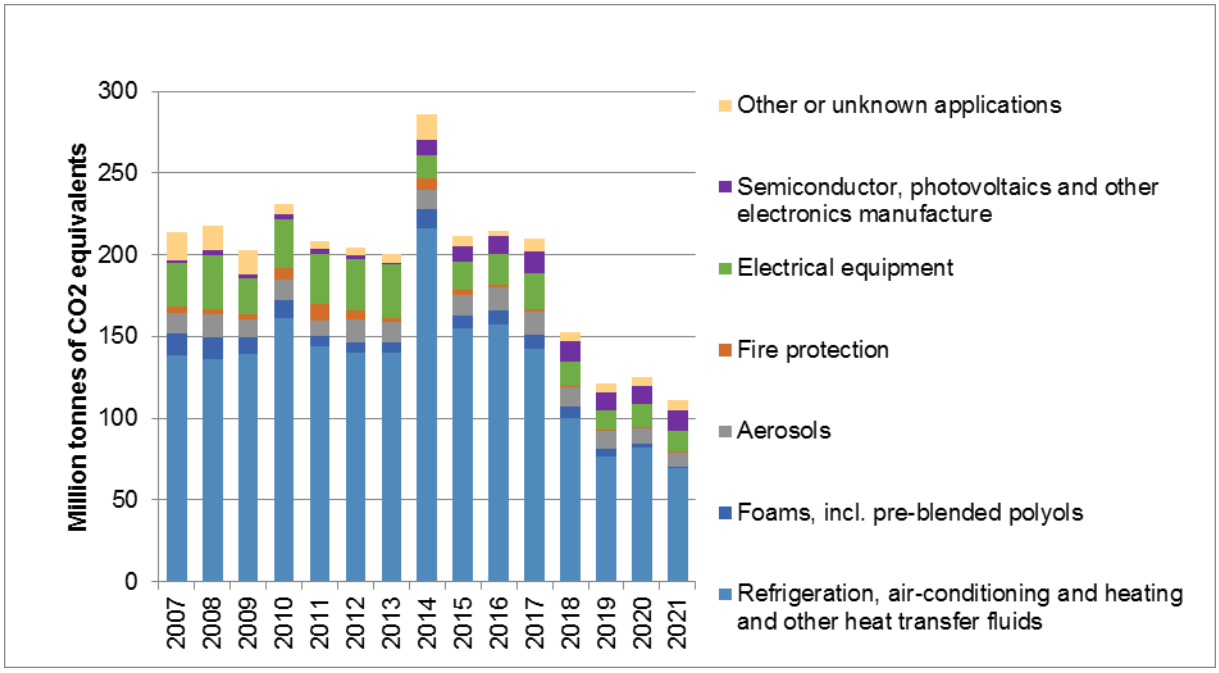
Figure 4-7 Intended applications of EU total supply of fluorinated gases (tonnes)



Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Figure 4-8 Intended applications of EU total supply of fluorinated gases (CO_2e)



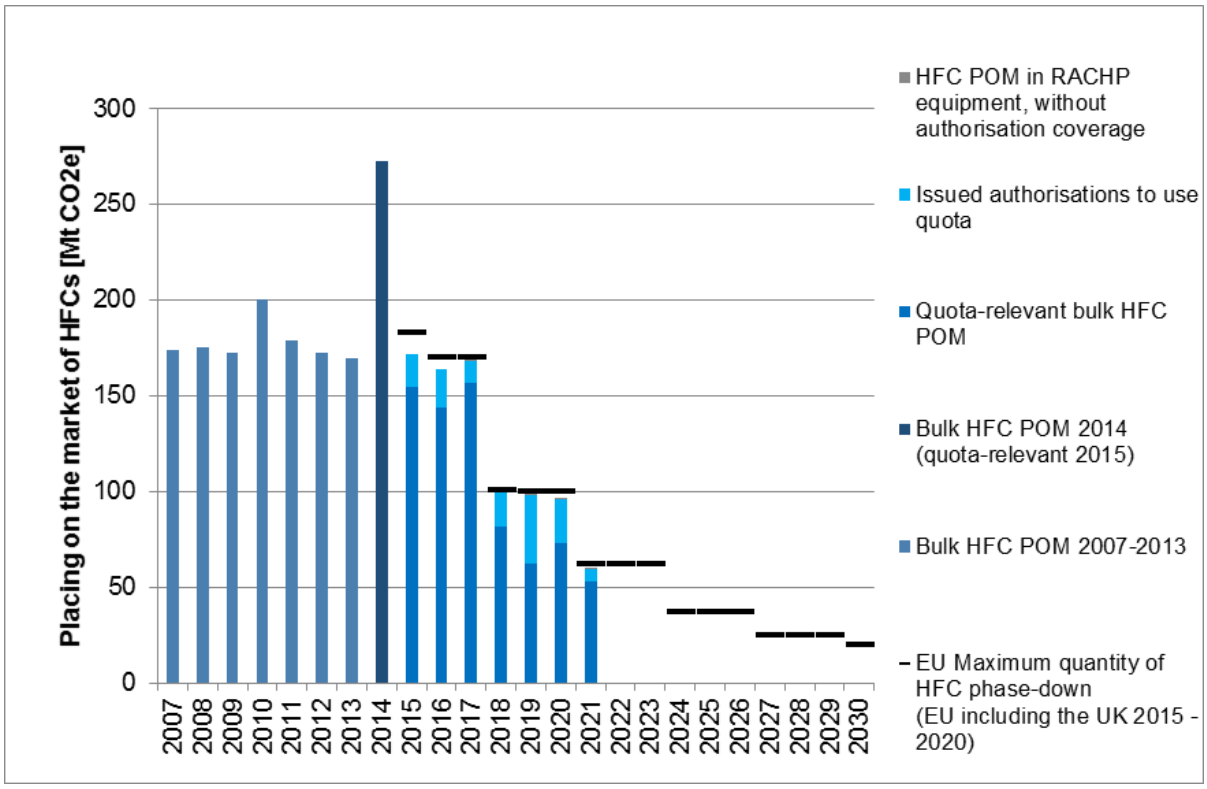
Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 imported in products and equipment were not subject to reporting for the years 2007-2013. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Detailed data on intended applications can be found in tables Table 19 to Table 20, in section 7 (page 60f). For categories of supply in products and equipment, please refer to Table 11 and Table 12 (page 51f). For details of the calculation methods, please refer to section 10.

5 Figures on the progress of the EU HFC phase-down

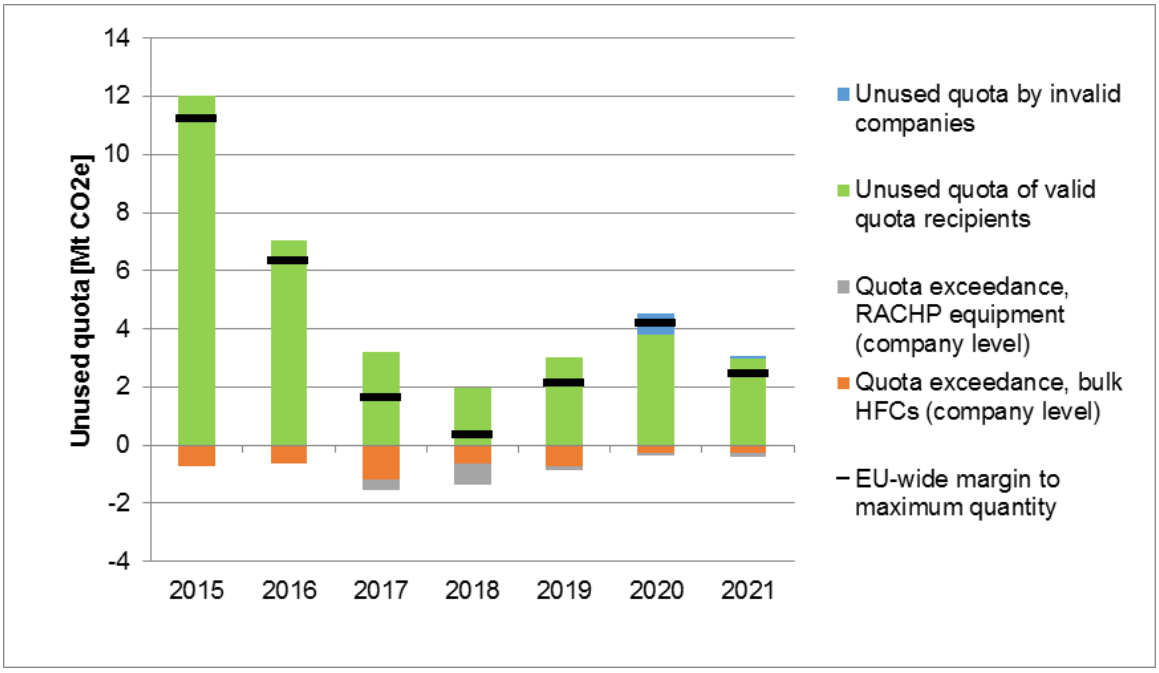
Figure 5-1 Progress of the EU HFC phase-down



Notes: POM, placing on the market. Values from 2007 to 2013 are based on the reporting obligations of the previous F-gas Regulation (EC) No 842/2006 and are therefore not fully comparable with data from 2014 onwards (based on the obligations of the revised F-gas Regulation (EU) No 517/2014). The geographical scope of presented POM data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. The maximum quantities of the EU HFC phase-down shown for 2015-2019 are given for the EU-28, the maximum quantity for 2020 applies to the EU-27 and the United Kingdom. Maximum quantities for 2021 onwards are given for the EU-27.

Sources: EC, 2011, 2014 and 2020; EEA, 2021 and 2022b.

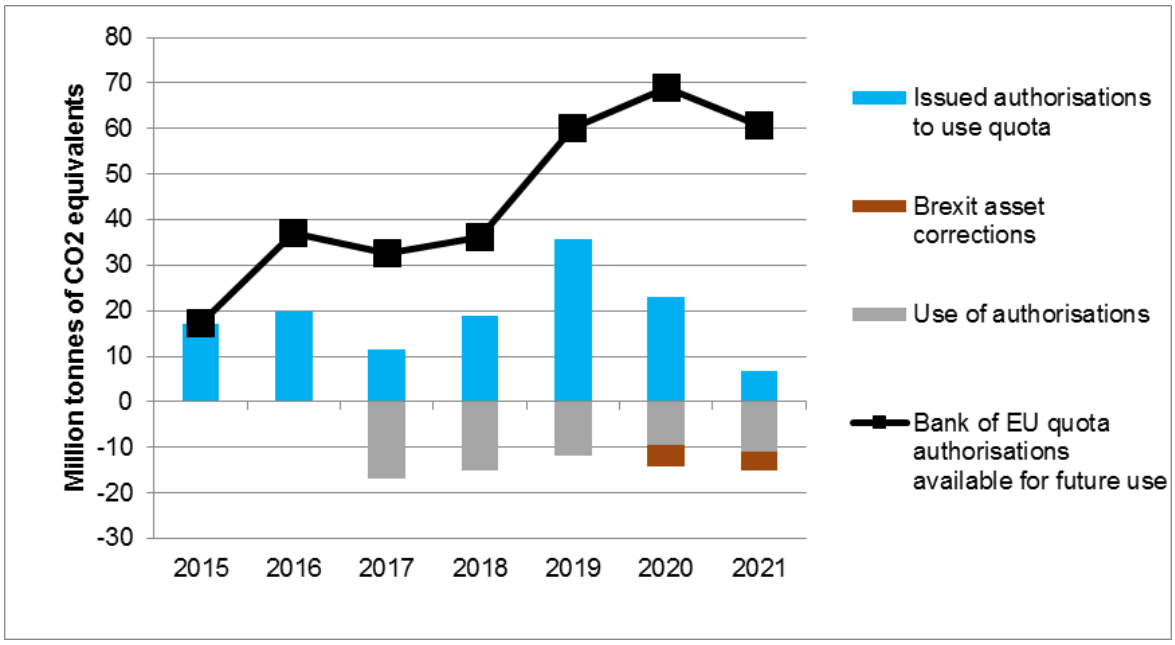
Figure 5-2 Balance between placing on the market of HFCs and related quotas at EU level



Note: The data for 2021 have not yet undergone scrutiny by the European Commission. The geographical scope of presented data is EU-28 for 2015-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2022b; EEA, 2021 and 2022b.

Figure 5-3 Bank of authorisations for HFCs in RACHP equipment imports



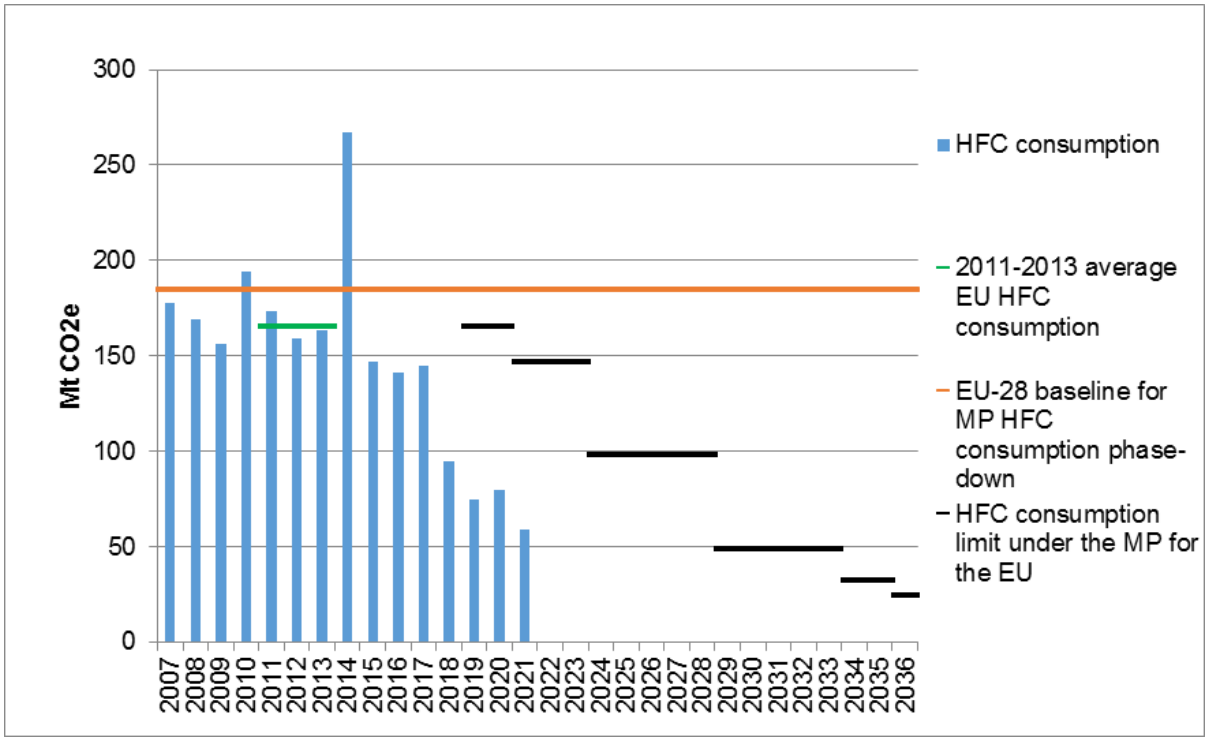
Notes: RACHP: refrigeration, air conditioning and heat pumps. The geographical scope of presented data is EU-28 for 2015-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2022b and EEA, 2022b.

A tabular overview data related to the progress of the HFC phase-down under the FGR is given in Table 21 in section 7 (Data tables, page 62).

6 Figures on the international HFC phase-down under the Montreal Protocol

Figure 6-1 EU progress under the Montreal Protocol HFC phase-down



Notes: MP, Montreal Protocol. HFCs covered under the Montreal Protocol include all HFCs covered under EU F-gas Regulation No 517/2014, except HFC-161 (see 9). The geographical scope of presented HFC consumption data EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020 and EU-27 from 2021 onwards.

The HFC consumption limit is shown for EU-27+UK for 2019 and 2020 and for EU-27 from 2021 onwards.

Sources: EC, 2011, and 2014; EEA, 2021 and 2022b.

A tabular overview of HFC consumption is given in Table 22 in section 7 (Data tables, page 63).

7 Data tables

7.1 Measures to protect confidential data

The EEA takes appropriate steps to protect the confidentiality of commercially sensitive information in accordance with Article 19 (8) of the new F-gas Regulation. Throughout the report, three rules are applied to all numbers and figures to determine whether a data item must remain confidential.

Three-company group rule. This rule stipulates that any value that is published must be the sum of at least three different companies. In addition, companies are invited to specify affiliates in their report. These groups of affiliates, if mutually confirmed, count as one company for the purpose of this evaluation.

5% significance rule. The contributions of small companies to any value may be insignificant, and larger companies' confidentiality may be compromised despite the first rule. Therefore, a value remains confidential if fewer than three companies make up more than 95% of the total, discounting the smallest contributors that make up 5% of the sum.

Preventing deduction. Deduction might be possible where a confidential value is part of a sum of substances or transactions. For example, a confidential value for sulphur hexafluoride (SF_6) may be deduced if there are figures published for perfluorocarbons (PFCs) as well as a total for SF_6 and PFCs. In the case of metrics such as 'supply', a confidential value, e.g. for 'production', may be deduced if values for both 'import' and 'export' are known and the remainder of small transactions that make up 'supply' is very small. Therefore, two steps are taken:

- In cases where a sum across substances or transactions is published, and there is only one value contributing to that sum that is confidential according to the above rules, a second part of the sum is made confidential to make sure that the lone confidential value cannot be deduced from the sum and remaining parts.
- In the case of supply metrics, a second of the major contributors (production, import and export) is made confidential if one of them is confidential according to the above rules and the remainder of small transactions makes up less than 5% of the total.

A practical guide to applying the 'three-company group rule' and '5% significance rule' measures to data

Operationalisation of the combined three-company group rule and 5% significance rule

Step 1: all values reported by companies of a given company group for a given transaction year were added up for a given transaction and substance or substance group.

$$\sum X_i = X_1 + X_2 + \cdots + X_n$$

$$X_i = individual\ reported\ value\ by\ a\ single\ reporting\ undertaking$$

$$\sum X_i = sum\ of\ individual\ reported\ values\ by\ reporting\ undertakings\ belonging\ to\ the\ same\ company\ group$$

Step 2: the sum of all absolute contributions $(\sum |\sum X_i)$ across company groups was calculated.

Step 3: the percentage of step 1 in relation to step 2 was calculated for each company group.

$$\% = \frac{|\sum X_i|}{\sum |\sum X_i|} \cdot 100$$

Step 4: the company groups were sorted in ascending order of the percentages calculated in step 3.

Step 5: an accumulated percentage was calculated across the sorted company groups.

Step 6: the number of company groups for which the accumulated percentage was larger than 5% was counted.

If the number of company groups counted in step 6 was one or two, the full aggregated value across company groups was hidden as confidential. If the number was three or more, the full aggregated value across company groups was reported and was thus not confidential.

7.2 List of data tables

Table 1 EU production of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	55 235	38 519	33 106	43 792	41 040	40 854	36 708	31 050	32 339	33 380	27 713	19 270	18 499	15 009	12 526
PFCs	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
SF6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	-	-	-
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	-
Total fluorinated gases	**58 098**	**41 359**	**35 123**	**46 440**	**44 030**	**44 220**	**39 901**	**34 049**	**35 377**	**36 159**	**30 345**	**21 787**	**21 160**	**17 219**	**14 679**
average GWP	*3 012*	*3 361*	*3 088*	*3 226*	*3 432*	*3 508*	*3 573*	*3 723*	*3 419*	*3 293*	*3 470*	*4 054*	*4 820*	*4 970*	*5 553*

Notes: '-': no data reported, 'n.a.', not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020 and EU-27 for 2021.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 2 EU production of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	112.2	75.6	63.3	91.1	85.0	81.4	73.1	61.1	54.6	58.6	49.6	35.3	45.8	38.6	34.0
PFCs	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
SF6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	-	-	-
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	-
Total fluorinated gases	**175.0**	**139.0**	**108.4**	**149.8**	**151.1**	**155.1**	**142.6**	**126.8**	**121.0**	**119.1**	**105.3**	**88.3**	**102.0**	**85.6**	**81.5**
average GWP	*3 012*	*3 361*	*3 088*	*3 226*	*3 432*	*3 508*	*3 573*	*3 723*	*3 419*	*3 293*	*3 470*	*4 054*	*4 820*	*4 970*	*5 553*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019 EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 3 EU reclamation of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	C	C	100	C	C	460	C	377	647	1 314	1 659	1 829	1 478	1 590	1 026
PFCs	-	-	-	-	-	C	-	C	C	C	C	C	C	-	-
SF6	C	C	77	C	C	C	C	C	C	C	69	C	C	C	C
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	-
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	-	-	-
Total fluorinated gases	**417**	**398**	**177**	**326**	**508**	**487**	**484**	**416**	**679**	**1 364**	**1 751**	**1 934**	**1 523**	**1 619**	**1 100**
average GWP	*4 919*	*4 860*	*10 963*	*3 961*	*3 498*	*3 321*	*2 555*	*4 250*	*3 527*	*3 033*	*3 145*	*3 223*	*3 313*	*2 837*	*3 057*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 4 EU reclamation of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	C	C	0.2	C	C	1.0	C	0.9	1.7	3.1	3.8	4.8	4.0	4.0	2.3
PFCs	-	-	-	-	-	C	-	C	C	C	C	C	C	-	-
SF6	C	C	1.8	C	C	C	C	C	C	C	1.6	C	C	C	C
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	-	-
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	-	-	-
Total fluorinated gases	**2.1**	**1.9**	**1.9**	**1.3**	**1.8**	**1.6**	**1.2**	**1.8**	**2.4**	**4.1**	**5.5**	**6.2**	**5.0**	**4.6**	**3.4**
average GWP	*4 919*	*4 860*	*10 963*	*3 961*	*3 498*	*3 321*	*2 555*	*4 250*	*3 527*	*3 033*	*3 145*	*3 223*	*3 313*	*2 837*	*3 057*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 5 Total EU imports of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	58 519	67 951	57 946	69 089	66 269	61 102	65 221	128 452	78 026	78 938	88 531	77 286	62 272	64 063	53 595
PFCs	253	306	129	230	238	310	155	350	409	363	498	416	397	341	304
SF6	747	691	671	539	587	374	483	430	382	420	565	420	410	416	151
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 900	3 413	6 356	14 609	19 235	20 437	17 730	21 763
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
Total fluorinated gases	**59 518**	**68 948**	**58 746**	**69 858**	**67 094**	**61 787**	**65 859**	**131 794**	**82 910**	**86 878**	**104 836**	**98 223**	**84 293**	**83 289**	**76 731**
average GWP	*2 215*	*2 227*	*2 412*	*2 287*	*2 232*	*2 172*	*2 257*	*2 209*	*2 170*	*2 113*	*1 887*	*1 525*	*1 432*	*1 492*	*1 243*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 in products and equipment were not subject to reporting for the years 2007-2013. The data shown for 2007-2013 are thus limited to bulk imports. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 6 Total EU imports of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	112.2	134.6	125.1	145.0	133.9	122.5	136.0	272.1	161.9	161.9	171.7	129.0	99.5	104.5	80.5
PFCs	2.6	3.2	1.4	2.5	2.5	3.2	1.6	3.4	3.9	3.6	4.7	4.0	3.8	3.2	2.9
SF6	17.0	15.8	15.3	12.3	13.4	8.5	11.0	9.8	8.7	9.6	12.9	9.6	9.3	9.5	3.4
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	0.0	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	8.5	C	C	C	C
Total fluorinated gases	**131.8**	**153.6**	**141.7**	**159.7**	**149.7**	**134.2**	**148.7**	**291.1**	**179.9**	**183.6**	**197.8**	**149.8**	**120.7**	**124.3**	**95.4**
average GWP	*2 215*	*2 227*	*2 412*	*2 287*	*2 232*	*2 172*	*2 257*	*2 209*	*2 170*	*2 113*	*1 887*	*1 525*	*1 432*	*1 492*	*1 243*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 in products and equipment were not subject to reporting for the years 2007-2013. The data shown for 2007-2013 are thus limited to bulk imports. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 7 EU bulk imports of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	58 519	67 951	57 946	69 089	66 269	61 102	65 221	122 781	70 993	68 971	79 577	67 152	52 317	54 540	42 294
PFCs	253	306	129	230	238	310	155	C	C	355	496	416	396	341	303
SF6	747	691	671	539	587	374	483	C	377	417	563	400	401	395	135
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
Total fluorinated gases	**59 518**	**68 948**	**58 746**	**69 858**	**67 094**	**61 787**	**65 859**	**125 986**	**75 606**	**76 247**	**95 013**	**87 221**	**73 475**	**73 171**	**64 747**
average GWP	*2 215*	*2 227*	*2 412*	*2 287*	*2 232*	*2 172*	*2 257*	*2 218*	*2 196*	*2 149*	*1 897*	*1 517*	*1 461*	*1 555*	*1 290*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. Bulk imports under FGR definition. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 8 EU bulk imports of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	112.2	134.6	125.1	145.0	133.9	122.5	136.0	260.9	148.3	142.3	154.1	111.9	86.4	94.5	69.0
PFCs	2.6	3.2	1.4	2.5	2.5	3.2	1.6	C	C	3.5	4.7	4.0	3.8	3.2	2.9
SF6	17.0	15.8	15.3	12.3	13.4	8.5	11.0	C	8.6	9.5	12.8	9.1	9.1	9.0	3.1
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	8.5	C	C	C	C
Total fluorinated gases	**131.8**	**153.6**	**141.7**	**159.7**	**149.7**	**134.2**	**148.7**	**279.4**	**166.0**	**163.8**	**180.2**	**132.3**	**107.4**	**113.8**	**83.5**
average GWP	*2 215*	*2 227*	*2 412*	*2 287*	*2 232*	*2 172*	*2 257*	*2 218*	*2 196*	*2 149*	*1 897*	*1 517*	*1 461*	*1 555*	*1 290*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. Bulk imports under FGR definition. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 9 EU imports of fluorinated gases within products and equipment (tonnes)

	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Tonnes**							
HFCs	5 671	7 033	9 967	8 954	10 134	9 955	9 523	11 301
PFCs	C	C	7	2	1	1	1	1
SF6	C	6	2	2	19	9	21	16
Unsaturated HFCs and HCFCs	C	C	C	C	C	C	C	C
HFEs and alcohols	-	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	-	-	-	-	-	-	-	-
Total fluorinated gases	**5 808**	**7 304**	**10 631**	**9 823**	**11 002**	**10 818**	**10 117**	**11 984**
average GWP	*2 015*	*1 898*	*1 860*	*1 792*	*1 591*	*1 235*	*1 040*	*991*

Notes: '-': no data reported, C: Confidential: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. Imports of pre-blended polyols are not included.

Sources: EEA, 2021 and 2022b.

Table 10 EU imports of fluorinated gases within products and equipment (CO_2e)

	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**							
HFCs	11.2	13.6	19.7	17.5	17.1	13.1	10.0	11.5
PFCs	C	C	0.1	0.0	0.0	0.0	0.0	0.0
SF6	C	0.1	0.1	0.1	0.4	0.2	0.5	0.4
Unsaturated HFCs and HCFCs	C	C	C	C	C	C	C	C
HFEs and alcohols	-	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	-	-	-	-	-	-	-	-
Total fluorinated gases	**11.7**	**13.9**	**19.8**	**17.6**	**17.5**	**13.4**	**10.5**	**11.9**
average GWP	*2 015*	*1 898*	*1 860*	*1 792*	*1 591*	*1 235*	*1 040*	*991*

Notes: '-': no data reported, C: Confidential: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. Imports of pre-blended polyols are not included.

Sources: EEA, 2021 and 2022b.

Table 11 Categories of imports of fluorinated gases in products and equipment (tonnes)

	2014	2015	2016	2017	2018	2019	2020	2021
Categories of products and equipment	**Tonnes**							
Stationary equipment for comfort cooling or heating	4 698	5 239	8 325	7 681	8 093	8 584	8 402	10 156
Mobile air conditioning equipment	798	1 205	1 405	1 210	1 206	1 210	863	960
Other refrigeration, air conditioning and heat pump equipment	208	363	570	559	628	530	462	666
Other products and equipment	104	496	331	373	1 076	494	391	202
Total supply in products and equipment	**5 808**	**7 304**	**10 631**	**9 823**	**11 002**	**10 818**	**10 117**	**11 984**

Notes: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. 'n.a.': not applicable: Imports of pre-blended polyols were not subject to separate reporting before 2018. '-': no data reported.

Sources: EEA, 2021 and 2022b.

Table 12 Categories of imports of fluorinated gases in products and equipment (CO_2e)

	2014	2015	2016	2017	2018	2019	2020	2021
Categories of products and equipment	**Million tonnes of CO_2 equivalents**							
Stationary equipment for comfort cooling or heating	9.8	10.8	17.1	15.6	13.7	10.6	8.4	9.9
Mobile air conditioning equipment	1.0	1.4	1.1	0.5	0.6	0.6	0.5	0.5
Other refrigeration, air conditioning and heat pump equipment	0.4	0.7	1.0	1.0	1.0	0.8	0.6	0.8
Other products and equipment	0.6	0.9	0.6	0.5	2.2	1.4	1.0	0.7
Total supply in products and equipment	**11.7**	**13.9**	**19.8**	**17.6**	**17.5**	**13.4**	**10.5**	**11.9**

Notes: The geographical scope of presented data is EU-28 for 2014-2019, EU-27+UK for 2020, and EU-27 for 2021. 'n.a.': not applicable: Imports of pre-blended polyols were not subject to separate reporting before 2018. '-': no data reported.

Sources: EEA, 2021 and 2022b.

Table 13 EU bulk exports of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	24 162	19 187	15 720	20 455	21 330	21 171	21 699	26 239	25 577	27 414	29 224	26 039	22 475	21 222	16 081
PFCs	83	57	25	C	C	255	253	91	95	132	176	C	297	212	94
SF6	1 670	1 499	1 423	C	C	2 021	1 871	2 522	2 426	2 012	1 669	1 862	2 000	1 572	1 571
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	1 246	1 504	4 198
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	8	C	10	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	10	6	C	C	C
Total fluorinated gases	**25 915**	**20 742**	**17 168**	**22 233**	**23 383**	**23 448**	**23 822**	**29 065**	**28 417**	**30 274**	**32 105**	**29 350**	**26 033**	**24 528**	**21 961**
average GWP	*3 140*	*3 342*	*3 531*	*3 411*	*3 630*	*3 599*	*3 405*	*3 469*	*3 506*	*3 263*	*2 828*	*2 958*	*3 308*	*3 077*	*2 843*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. Data given for 2014-2017 include gases exported in pre-blended polyols. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 14 EU bulk exports of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	42.5	34.6	27.9	36.4	39.3	35.9	36.0	42.4	43.2	50.7	50.9	43.2	37.6	37.4	25.4
PFCs	0.8	0.5	0.2	C	C	2.4	2.4	0.8	0.9	1.3	1.7	C	2.8	2.0	0.9
SF6	38.1	34.2	32.4	C	C	46.1	42.7	57.5	55.3	45.9	38.0	42.5	45.6	35.8	35.8
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	0.0	C	0.0	0.0	0.0
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	0.0	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	0.2	0.1	C	C	C
Total fluorinated gases	**81.4**	**69.3**	**60.6**	**75.8**	**84.9**	**84.4**	**81.1**	**100.8**	**99.6**	**98.8**	**90.8**	**86.8**	**86.1**	**75.5**	**62.4**
average GWP	*3 140*	*3 342*	*3 531*	*3 411*	*3 630*	*3 599*	*3 405*	*3 469*	*3 506*	*3 263*	*2 828*	*2 958*	*3 308*	*3 077*	*2 843*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. Data given for 2014-2017 include gases exported in pre-blended polyols. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 15 Total EU supply of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas								**Tonnes**							
HFC-23	247	184	190	299	306	137	73	94	78	63	95	54	45	40	62
HFC-32	3 987	5 086	4 430	5 390	4 930	5 025	5 334	11 060	9 384	11 022	12 053	15 535	14 488	17 064	17 754
HFC-41	C	-	C	C	C	C	C	1	2	1	1	1	1	2	3
HFC-125	12 371	12 501	13 992	18 248	15 345	15 598	15 116	25 476	17 916	18 701	17 409	13 770	9 581	9 950	8 407
HFC-134	C	-	-	C	-	-	-	-	C	C	-	-	-	-	-
HFC-134a	49 080	46 174	41 440	43 657	40 201	40 060	39 334	60 771	46 282	44 184	40 912	33 750	25 734	25 988	22 357
HFC-143	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HFC-143a	8 998	9 817	9 620	10 572	8 854	9 007	8 809	13 512	7 069	7 205	6 006	843	1 268	1 519	845
HFC-152a	4 292	6 162	5 182	4 695	4 676	4 175	3 657	6 227	3 914	3 431	3 552	3 245	3 157	2 733	2 569
HFC-227ea	789	1 767	1 776	2 082	2 052	1 479	1 610	2 695	1 948	1 753	1 628	1 501	1 252	777	451
HFC-236fa	C	C	C	30	44	31	38	52	40	42	37	C	C	18	C
HFC-245ca	-	-	-	-	-	-	-	-	-	C	-	-	-	-	-
HFC-245fa	C	C	C	C	C	C	C	C	C	C	C	C	876	C	C
HFC-365mfc	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
HFC-43-10mee	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
PFC-14	C	86	42	59	56	28	2	147	168	152	196	170	143	157	164
PFC-116	C	178	113	153	C	C	C	157	164	129	148	137	156	108	121
PFC-218	112	59	C	24	23	40	38	41	59	37	23	32	20	C	C
PFC-c-318	C	C	C	C	10	C	C	14	27	C	C	C	C	-13	C
PFC-3-1-10	C	C	-	C	C	-	-	C	C	C	C	C	C	C	-
PFC-4-1-12	-	-	-	-	-	-	-	C	C	C	-	-	-	-	-
PFC-5-1-14	C	C	C	C	C	C	C	C	C	117	C	C	C	C	C
SF6	1 810	1 860	1 435	1 522	1 502	1 490	1 535	716	909	1 004	1 225	843	727	831	778
HCFC-1233xf	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	C	C	-	-	-	-
HCFC-1233zd	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFC-1234yf	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	5 214	10 574	11 451	10 296	8 860	9 741
HFC-1234ze	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas								**Tonnes**							
HFC-1336mzz	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFE-236fa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	-	-	-
HFE-245fa1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	C	-	-	-	-	-
HFE-347mcc3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFE-347pcf2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	C	C	C
HFE-356mm1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	C	-
HFE-449sl	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	90	C	C	C	C
HFE-569sf2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
2,2,3,3,3-pentafluoropropanol	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	C	C	C
bis(trifluoromethyl)-methanol	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	321	339	381	492	433	402	C	C
PFPMIE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	-	-	-	C	C	-	-
Gas group															
HFCs	86 477	87 311	81 005	89 924	81 829	80 982	79 215	124 408	92 062	91 592	87 583	72 179	58 021	59 509	53 047
PFCs	299	398	241	303	289	243	139	480	524	464	649	563	436	358	387
SF6	1 810	1 860	1 435	1 522	1 502	1 490	1 535	716	909	1 004	1 225	843	727	831	778
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	6 305	13 400	17 767	18 353	17 380	17 899
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	303	127	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	339	381	492	C	C	C	C
Total fluorinated gases	***88 586***	***89 569***	***82 681***	***91 749***	***83 620***	***82 715***	***80 889***	***127 547***	***96 750***	***100 049***	***103 476***	***92 179***	***78 302***	***78 847***	***73 032***
average GWP	*2 410*	*2 433*	*2 451*	*2 521*	*2 489*	*2 470*	*2 473*	*2 241*	*2 186*	*2 142*	*2 027*	*1 658*	*1 552*	*1 587*	*1 517*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 in products and equipment were not subject to reporting for the years 2007-2013. The data shown for 2007-2013 are thus limited to bulk supply. The geographical scope of presented data is the EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 16 Total EU supply of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas	**Million tonnes of CO_2 equivalents**														
HFC-23	3.7	2.7	2.8	4.4	4.5	2.0	1.1	1.4	1.2	0.9	1.4	0.8	0.7	0.6	0.9
HFC-32	2.7	3.4	3.0	3.6	3.3	3.4	3.6	7.5	6.3	7.4	8.1	10.5	9.8	11.5	12.0
HFC-41	C	-	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HFC-125	43.3	43.8	49.0	63.9	53.7	54.6	52.9	89.2	62.7	65.5	60.9	48.2	33.5	34.8	29.4
HFC-134	C	-	-	C	-	-	-	-	C	C	-	-	-	-	-
HFC-134a	70.2	66.0	59.3	62.4	57.5	57.3	56.2	86.9	66.2	63.2	58.5	48.3	36.8	37.2	32.0
HFC-143	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HFC-143a	40.2	43.9	43.0	47.3	39.6	40.3	39.4	60.4	31.6	32.2	26.8	3.8	5.7	6.8	3.8
HFC-152a	0.5	0.8	0.6	0.6	0.6	0.5	0.5	0.8	0.5	0.4	0.4	0.4	0.4	0.3	0.3
HFC-227ea	2.5	5.7	5.7	6.7	6.6	4.8	5.2	8.7	6.3	5.6	5.2	4.8	4.0	2.5	1.5
HFC-236fa	C	C	C	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.4	C	C	0.2	C
HFC-245ca	-	-	-	-	-	-	-	-	-	C	-	-	-	-	-
HFC-245fa	C	C	C	C	C	C	C	C	C	C	C	C	0.9	C	C
HFC-365mfc	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
HFC-43-10mee	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
PFC-14	C	0.6	0.3	0.4	0.4	0.2	0.0	1.1	1.2	1.1	1.4	1.3	1.1	1.2	1.2
PFC-116	C	2.2	1.4	1.9	C	C	C	1.9	2.0	1.6	1.8	1.7	1.9	1.3	1.5
PFC-218	1.0	0.5	C	0.2	0.2	0.4	0.3	0.4	0.5	0.3	0.2	0.3	0.2	C	C
PFC-c-318	C	C	C	C	0.1	C	C	0.1	0.3	C	C	C	C	-0.1	C
PFC-3-1-10	C	C	-	C	C	-	-	C	C	C	C	C	C	C	-
PFC-4-1-12	-	-	-	-	-	-	-	C	C	C	-	-	-	-	-
PFC-5-1-14	C	C	C	C	C	C	C	C	C	1.1	C	C	C	C	C
SF6	41.3	42.4	32.7	34.7	34.2	34.0	35.0	16.3	20.7	22.9	27.9	19.2	16.6	18.9	17.7
HCFC-1233xf	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	C	C	-	-	-	-
HCFC-1233zd	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFC-1234yf	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	0.0	0.0	0.0	0.0	0.0	0.0
HFC-1234ze	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas	**Million tonnes of CO_2 equivalents**														
HFC-1336mzz	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFE-236fa	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	-	-	-
HFE-245fa1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	C	-	-	-	-	-
HFE-347mcc3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFE-347pcf2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	C	-	C	C	C
HFE-356mm1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-	C	-
HFE-449sl	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	0.0	C	C	C	C
HFE-569sf2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
2,2,3,3,3-pentafluoropropanol	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	C	C	C	C	C	C	C
bis(trifluoromethyl)-methanol	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5.5	5.8	6.6	8.5	7.4	6.9	C	C
PFPMIE	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	-	-	-	C	C	-	-
Gas group															
HFCs	169.3	171.5	167.4	193.5	171.0	167.9	163.7	259.2	179.8	180.4	167.2	120.6	93.6	95.2	80.9
PFCs	3.0	4.0	2.5	3.1	3.0	2.4	1.4	4.6	5.0	4.4	6.1	5.4	4.3	3.3	3.7
SF6	41.3	42.4	32.7	34.7	34.2	34.0	35.0	16.3	20.7	22.9	27.9	19.2	16.6	18.9	17.7
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	0.0	0.1	C	0.1	0.1	0.1
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	0.1	0.0	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	5.8	6.6	8.5	C	C	C	C
Total fluorinated gases	***214***	***218***	***203***	***231***	***208***	***204***	***200***	***286***	***212***	***214***	***210***	***153***	***122***	***125***	***111***
average GWP	*2 410*	*2 433*	*2 451*	*2 521*	*2 489*	*2 470*	*2 473*	*2 241*	*2 186*	*2 142*	*2 027*	*1 658*	*1 552*	*1 587*	*1 517*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II F-gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and HFCs, PFCs and SF_6 in products and equipment were not subject to reporting for the years 2007-2013. The data shown for 2007-2013 are thus limited to bulk supply. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 17 EU bulk supply of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group								**Tonnes**							
HFCs	86 477	87 311	81 005	89 924	81 829	80 982	79 215	118 737	85 028	81 625	78 629	62 044	48 066	49 986	41 746
PFCs	299	398	241	303	289	243	139	C	C	457	647	562	435	357	386
SF6	1 810	1 860	1 435	1 522	1 502	1 490	1 535	C	903	1 001	1 223	824	718	810	762
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	339	381	492	C	C	C	C
Total fluorinated gases	**88 586**	**89 569**	**82 681**	**91 749**	**83 620**	**82 715**	**80 889**	**121 739**	**89 446**	**89 418**	**93 653**	**81 177**	**67 485**	**68 730**	**61 048**
average GWP	*2 410*	*2 433*	*2 451*	*2 521*	*2 489*	*2 470*	*2 473*	*2 251*	*2 210*	*2 176*	*2 052*	*1 667*	*1 603*	*1 667*	*1 621*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. Imports of pre-blended polyols are not included since 2018.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 18 EU bulk supply of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Gas group	**Million tonnes of CO_2 equivalents**														
HFCs	169.3	171.5	167.4	193.5	171.0	167.9	163.7	248.0	166.3	160.7	149.6	103.5	80.5	85.1	69.4
PFCs	3.0	4.0	2.5	3.1	3.0	2.4	1.4	C	C	4.3	6.1	5.4	4.2	3.3	3.7
SF6	41.3	42.4	32.7	34.7	34.2	34.0	35.0	C	20.6	22.8	27.9	18.8	16.4	18.5	17.4
Unsaturated HFCs and HCFCs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
HFEs and alcohols	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	C	C	C	C	C	C	C
NF3 and other perfluorinated compounds	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	C	5.8	6.6	8.5	C	C	C	C
Total fluorinated gases	**213.5**	**218.0**	**202.6**	**231.3**	**208.2**	**204.3**	**200.1**	**274.1**	**197.7**	**194.5**	**192.2**	**135.3**	**108.2**	**114.6**	**98.9**
average GWP	*2 410*	*2 433*	*2 451*	*2 521*	*2 489*	*2 470*	*2 473*	*2 251*	*2 210*	*2 176*	*2 052*	*1 667*	*1 603*	*1 667*	*1 621*

Notes: '-': no data reported, 'n.a.': not applicable, C: Confidential: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) were not subject to reporting for the years 2007-2013. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. Imports of pre-blended polyols are not included since 2018.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 19 Intended applications of EU total supply of fluorinated gases (tonnes)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Intended applications of bulk supply								**Tonnes**							
Refrigeration, air-conditioning and heating and other heat transfer fluids	61 377	58 720	58 678	65 964	61 045	58 574	58 999	95 688	74 024	78 016	78 012	68 676	55 609	58 321	54 776
Foams, incl. pre-blended polyols	14 286	15 284	11 709	11 503	9 234	8 526	8 202	12 967	9 597	10 179	11 521	11 083	11 041	9 815	8 360
Aerosols	9 090	11 131	8 425	9 547	7 808	10 950	9 690	8 954	9 356	9 397	10 300	9 109	8 964	8 204	7 250
Fire protection	649	491	531	1 677	2 508	1 451	1 385	1 858	862	596	502	324	130	150	112
Electrical equipment	1 197	1 422	969	1 290	1 344	1 362	1 419	622	745	813	951	640	534	616	539
Semiconductor, photovoltaics and other electronics manufacture	127	301	184	265	243	169	71	1 057	715	755	924	897	769	748	887
Other or unknown applications	1 861	2 219	2 185	1 501	1 437	1 684	1 124	6 402	1 452	294	1 266	1 450	1 255	992	1 107
Total fluorinated gases - Total supply	**88 586**	**89 569**	**82 681**	**91 749**	**83 620**	**82 715**	**80 889**	**127 547**	**96 750**	**100 049**	**103 476**	**92 179**	**78 302**	**78 847**	**73 032**

Notes: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and data on products and equipment were not subject to reporting for the years 2007-2013. The data presented for these years thus equal data presented for bulk supply. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. '*' Categories marked with an * were not applicable (n.a.) for reporting on 2007 – 2013. Starting 2014, the category 'aerosols' was replaced by separate categories for medical and non-medical aerosols. Feedstock use does not appear in this table as it is excluded from the scope of EU total supply.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 20 Intended applications of EU total supply of fluorinated gases (CO_2e)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Intended applications of bulk supply	**Million tonnes of CO_2 equivalents**														
Refrigeration, air-conditioning and heating and other heat transfer fluids	138.5	136.5	139.6	161.6	143.7	140.3	140.4	216.5	155.3	157.0	142.3	100.2	76.3	81.9	69.5
Foams, incl. pre-blended polyols	13.4	12.9	9.8	10.4	6.5	6.1	5.9	11.7	7.3	8.9	8.4	6.8	4.7	2.1	1.1
Aerosols	12.2	14.5	11.2	12.5	9.9	14.1	12.7	11.7	12.9	13.8	14.4	11.7	11.3	10.0	8.5
Fire protection	4.0	3.0	3.2	7.5	9.7	5.8	2.6	6.6	3.2	2.2	1.8	1.1	0.5	0.5	0.7
Electrical equipment	27.3	32.4	22.1	29.4	30.7	31.0	32.4	14.2	17.0	18.5	21.7	14.6	12.2	14.0	12.2
Semiconductor, photovoltaics and other electronics manufacture	1.5	3.2	2.1	3.1	2.8	2.1	1.0	9.4	9.9	10.6	13.2	12.4	10.9	10.9	12.9
Other or unknown applications	16.7	15.4	14.7	6.7	4.9	4.9	5.2	15.8	6.0	3.2	7.9	6.0	5.7	5.7	5.9
Total supply Total fluorinated gases	**213.5**	**218.0**	**202.6**	**231.3**	**208.2**	**204.3**	**200.1**	**285.8**	**211.5**	**214.3**	**209.8**	**152.8**	**121.5**	**125.1**	**110.8**

Notes: Annex II gases (unsaturated HFCs and HCFCs, HFEs and alcohols, and NF_3 and other perfluorinated compounds) and data on products and equipment were not subject to reporting for the years 2007-2013. The data presented for these years thus equal data presented for bulk supply. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Data available for Croatia 2009-2012 is limited to HFCs and does not cover PFCs and SF_6. '*' Categories marked with an * were not applicable (n.a.) for reporting on 2007 – 2013. Starting 2014, the category 'aerosols' was replaced by separate categories for medical and non-medical aerosols. Feedstock use does not appear in this table as it is excluded from the scope of EU total supply.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 21 HFCs placed on the market and quota compliance

			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	POM category		**Million tonnes of CO_2 equivalents**														
(1)	Bulk HFC POM 2007-2013		173.5	174.9	172.4	200.6	179.0	172.0	169.5								
(2)	Bulk HFC POM 2014 onwards									279.4	162.6	158.2	165.8	102.5	83.8	92.7	67.7
	thereof:																
(3)	*for exempted uses Art.15(2)a-f:*									C	16.5	23.3	18.8	21.1	21.6	19.7	14.9
(4)	*thereof: for exempted uses Art.15(2)a-e:*									*7.0*	*7.9*	*14.2*	*9.2*	*11.1*	*11.2*	*C*	*6.5*
(5)	*thereof: Exemption Art. 15(2)f: Pharmaceutical MDIs*									*C*	*8.6*	*9.2*	*9.6*	*10.0*	*10.3*	*C*	*8.3*
(6)	Quota-relevant bulk HFC POM 2015 onwards	*= (2) - (4); starting 2018: = (2) - (3)*									154.7	144.0	156.7	81.4	62.3	73.0	52.9
(7)	POM of HFCs in equipment 2014 onwards:	*= (8) + (10)*								11.2	13.6	19.7	17.5	15.4	12.2	9.6	11.3
	thereof:																
(8)	*HFC POM in RACHP equipment*									*11.1*	*12.8*	*19.2*	*17.0*	*15.3*	*12.0*	*9.5*	*11.2*
(9)	*thereof: without quota authorisation coverage, 2017 onwards*												*0.4*	*0.7*	*0.2*	*0.1*	*0.1*
(10)	*HFC POM in other equipment*									*0.1*	*0.7*	*0.5*	*0.5*	*0.2*	*0.2*	*0.1*	*0.1*
(11)	Total physical HFC POM 2014 onwards (bulk + equipment)	*= (2) + (7)*								290.6	176.2	177.8	183.4	117.9	96.0	102.2	79.1
(12)	Quota authorisations issued 2015 onwards										17.1	19.9	11.6	18.8	35.7	23.0	6.8
(13)	Quota-relevant POM 2015 onwards	*= (6) + (9) + (12)*									171.8	163.9	168.6	100.8	98.1	96.1	59.8
(14)	Maximum quantity of HFC phase-down										183.1	170.3	170.3	101.2	100.3	100.3	62.3
	Quota compliance 2015 onwards:																
(15)	Unused quota (company level)										12.0	7.1	3.2	2.0	3.0	4.5	3.0

			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	POM category		**Million tonnes of CO_2 equivalents**														
(16)	*thereof: unused quota reserved for invalid companies*										-	-	-	-	-	*0.7*	*0.1*
(17)	Quota exceedance (company level)										0.7	0.6	1.6	1.4	0.9	0.3	0.4
(18)	*thereof: production / bulk import of HFCs*	*= (17) - (9)*									*0.7*	*0.6*	*1.2*	*0.6*	*0.7*	*0.3*	*0.3*
(19)	EU-wide margin to maximum quantity	*= (14) - (13)*									11.2	6.3	1.6	0.4	2.2	4.2	2.5

Notes: '-': no data reported; n.a., not applicable, C: Confidential, POM: Placing on the market, RACHP: refrigeration, air conditioning, and heat pumps: The geographical scope of presented POM data EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2011, 2014 and 2020; EEA, 2021 and 2022b.

Table 22 Consumption of HFCs covered under the Montreal Protocol

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Million tonnes of CO_2e														
EU consumption of HFCs covered under the Montreal Protocol	177.5	169.3	156.4	194.0	173.2	159.4	163.1	267.0	146.9	141.4	145.1	94.8	74.4	79.4	59.0

Note: The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021.

Sources: EC, 2011 and 2014; EEA, 2021 and 2022b.

Table 23 Companies reporting on 2021, by Member State and reported activities

Country	Total	thereof:						
		Producers	Importers	Exporters	Equipment importers	Feedstock users	Destruction companies	Quota authorisers
Austria	48	-	35	-	15	-	-	1
Belgium	57	1	17	10	36	-	1	3
Bulgaria	65	-	28	1	34	-	-	11
Croatia	39	-	17	2	26	-	-	4
Cyprus	31	-	11	-	19	-	-	2
Czech Republic	52	-	21	1	28	-	1	2
Denmark	29	-	13	3	16	-	-	1
Estonia	49	-	31	-	7	-	-	15
Finland	23	-	5	1	15	-	2	1
France	171	3	40	11	122	1	2	11
Germany	182	3	50	18	114	1	7	11
Greece	70	-	24	5	40	-	-	1
Hungary	38	-	13	-	25	-	-	-
Ireland	18	-	7	1	11	-	-	1
Italy	304	-	192	15	100	-	-	13
Latvia	22	-	14	-	6	-	-	1
Lithuania	33	-	22	-	10	-	-	3
Luxembourg	1	-	1	1	-	-	-	-
Malta	23	-	8	1	13	-	-	1
Northern Ireland (UK)	2	-	1	-	1	-	-	-
Netherlands	91	1	29	7	60	-	1	9
Poland	249	-	146	7	68	-	1	33
Portugal	38	-	8	3	25	-	-	4
Romania	62	-	15	-	45	-	-	3
Slovakia	22	-	10	-	9	-	1	2
Slovenia	32	-	7	-	24	-	-	-
Spain	118	-	42	12	71	-	-	7
Sweden	40	-	12	3	26	-	1	3
EU Total	**1909**	**8**	**819**	**102**	**966**	**2**	**17**	**143**
Great Britain	52	-	29	4	17	-	-	13
Other Non-EU	**252**	**n.a.**	**48**	**1**	**13**	**n.a.**	**n.a.**	**181**

Note: Companies may report for more than one activity type. Companies only reporting on stocks appear in totals but not under activities. Non-EU companies are not eligible to report as producers, feedstock users, or destruction companies. '-': no data reported, 'n.a.': not applicable

Source: EEA, 2022b.

Table 24 Non-EU companies reporting on 2021, by location of Only Representative

EU Country of Only Representative	Total represented non-EU companies	Thereof from																								
		United Arab Emirates	Albania	Australia	Brazil	Canada	Switzerland	China	Egypt	Hong Kong	India	Japan	Korea, Republic of	Monaco	Marshall Islands	Malaysia	Norway	Serbia	Russian Federation	Saudi Arabia	Singapore	Turkey	Taiwan, Province of China	Great Britain (Post-Brexit)	United States	Virgin Islands, British	South Africa
Belgium	18	2	-	-	1	-	-	-	1	-	-	1	-	-	-	-	1	-	-	1	-	2	-	7	1	-	1
Bulgaria	4	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cyprus	44	-	-	-	-	-	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Czech Republic	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Estonia	12	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	-	-
France	8	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	6	-	-	-
Germany	20	-	-	-	-	-	-	2	-	-	-	2	2	-	-	1	-	-	-	-	-	-	1	9	3	-	-
Ireland	164	-	1	-	-	-	-	152	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	7	-	1	-
Italy	10	1	-	-	-	-	2	2	-	-	1	1	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-
Lithuania	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malta	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	9	-	-	-	-	-	3	-	-	-	-	1	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-
Poland	4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-
Spain	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-
EU Total	**303**	**3**	**1**	**1**	**1**	**1**	**6**	**204**	**1**	**1**	**2**	**5**	**3**	**1**	**1**	**1**	**5**	**1**	**1**	**1**	**1**	**2**	**1**	**51**	**6**	**1**	**1**

Note: '-': no data reported

Source: EEA, 2022b.

Table 25 Activities reported 2007–2021

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Reports Received	**77**	**86**	**94**	**110**	**125**	**133**	**153**	**468**	**780**	**1284**	**1729**	**2137**	**3157**	**2481**	**2213**
of which mention:															
Production of F-gases	6	11	7	7	9	9	8	10	9	9	8	8	9	9	8
thereof: HFC production	*4*	*9*	*5*	*5*	*7*	*7*	*6*	*6*	*6*	*6*	*5*	*5*	*7*	*7*	*7*
Bulk import of F-gases	55	53	58	70	77	91	112	187	293	379	577	895	1693	1197	896
thereof: bulk HFC import	*48*	*47*	*53*	*66*	*73*	*86*	*107*	*173*	*282*	*366*	*563*	*877*	*1674*	*1179*	*880*
Bulk export of F-gases	44	47	64	75	74	81	82	92	99	111	119	115	112	113	107
thereof: bulk HFC export	*37*	*39*	*55*	*67*	*64*	*70*	*72*	*81*	*89*	*98*	*104*	*100*	*94*	*97*	*89*
Import of products or equipment pre-charged with F-gases	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	228	427	840	1040	1079	1021	976	996
thereof: RACHP equipment charged with HFCs	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*220*	*409*	*826*	*1029*	*1067*	*1011*	*965*	*985*
Destruction	6	8	7	8	10	11	10	10	15	13	13	16	17	17	17
Supply of quota authorisation	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	20	34	94	335	842	357	337
thereof: quota authorisation without any EU production, import or export	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*9*	*18*	*41*	*114*	*424*	*267*	*262*

Note: 'n.a.': not applicable: The reporting obligation for equipment importers applied for reporting on 2014 for the first time. Reporting on quota authorised to other companies has been applying since 2015. The geographical scope of presented data is EU-28 except Croatia for 2007-2008, EU-28 for 2009-2019, EU-27+UK for 2020, and EU-27 for 2021. Companies may report on more than one activity. RACHP equipment: refrigeration, air conditioning, and heat pumps.

Sources: EEA, 2022b.

8 Terminology

Fluorinated gases (F-gases)

F-gases covered by this report can be grouped into:

- gases contained in Annex I of the new F-gas Regulation, as listed in Table 26 in Section 9 of this report;
- gases contained in Annex II of the new F-gas Regulation, as listed in Table 27 in Section 9 of this report.

Jointly, those gases are referred to in this report as 'fluorinated gases' or 'F-gases'.

The list of reportable fluorinated gases under the old F-gas Regulation was restricted to HFCs, PFCs and SF_6, as identified in section 9 on page 69.

Annex I F-gases

F-gases under Annex I of the new F-gas Regulation include HFCs, PFCs and SF_6. The majority of these gases have high GWPs.

The gases of Annex I of the new F-gas Regulation are given in section 9 of this annex.

Hydrofluorocarbons (HFCs)

HFCs are relatively short aliphatic organic compounds that contain fluorine, carbon and hydrogen. They are most commonly used as refrigerants. Nineteen HFCs and their GWPs are listed in Annex 1. All HFCs in Annex 1, except HFC-152 and HFC-161, were previously covered by the old F-gas Regulation (EC) No 842/2006. Any mixture (blend) that includes at least one HFC is considered an HFC under the F-gas Regulation and therefore is covered by the quota system. The GWP of such a mixture is calculated according to Annex IV of the F-gas Regulation.

Perfluorocarbons (PFCs)

PFCs are relatively short aliphatic organic compounds that contain fluorine and carbon only. They are most commonly used in semiconductor manufacture. Seven PFCs and their GWPs are listed in Annex 1. All PFCs in Annex 1 were previously covered by the old F-gas Regulation.

Sulphur hexafluoride (SF6)

SF_6 is an inorganic compound; because it is an excellent electrical insulator, its main use is in the electrical industry. SF_6 is a potent greenhouse gas; its GWP is listed in Annex 1. SF_6 was also covered by the old F-gas Regulation.

Annex II F-gases

'Other fluorinated greenhouse gases' are listed in Annex II of Regulation No 517/2014 and include:

- unsaturated hydro(chloro)fluorocarbons (Section 1 of Annex II);
- fluorinated ethers and alcohols (Section 2 of Annex II);
- other perfluorinated compounds, including NF_3 (Section 3 of Annex II).

All these gases and their GWPs are listed in section 9 of this annex. The Annex II F-gases were not covered by the reporting obligations under the old F-gas Regulation (EC) No 842/2006.

Bulk gases and gases contained in equipment

Gases contained in gas containers, including bottles and isotanks, are referred to as bulk gases, irrespective of the absolute amounts of gases handled. Bulk gases are to be differentiated from gases contained in products or equipment, as different reporting obligations apply.

Mixtures

Mixtures of fluorinated gases are often used in industrial applications. In their reports under Article 19 of the F-gas Regulation (EU) No 517/2014, companies report on their transactions (import, export, etc.) of such mixtures, while specifying their composition. For the purpose of the present aggregation report, the amounts of mixtures are recalculated as the proportions of their constituent fluorinated gases as listed in section 9, unless indicated otherwise.

Annex IV gases

Annex IV of the new F-gas Regulation lists some non-fluorinated greenhouse gases that have GWPs that also need to be considered when determining the GWP of a mixture. These gases and their GWPs are also listed in section 9 of this annex (Table 28). For all other substances included in a mixture, a default value of 0 is used for the calculation the GWP.

Nil report

A nil report is a notification by a company that it considers itself not obliged to report under the F-gas Regulation.

Global warming potentials (GWPs)

GWPs are used to make different gases comparable in terms of their potential impact on climate change. The multiplication of a quantity of a gas by its GWP results in that quantity expressed as CO_2e.

The GWPs used under the new F-gas Regulation are in line with those published in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) (IPCC, 2007). The old F-gas Regulation (EC) No 842/2006 used the earlier set of GWPs published by the IPCC in its Third Assessment Report (TAR) (IPCC, 2001). Accordingly, previous EEA technical reports on fluorinated gases up to 2014 used TAR GWPs.

Quantities of F-gases are reported in physical tonnes. Conversion of the figures into CO_2e based on gas-specific GWPs facilitates a focus on the potential warming effect caused by these gases after release to the atmosphere. Both metrics are used in this report when analysing the data.

The GWPs of gases used for the present report are listed in section 9. GWPs of mixtures are calculated according to Annex IV of the new F-gas regulation (EU, 2014).

9 Gases covered by Regulation (EU) No 517/2014

Table 26 Annex I of Regulation (EU) No 517/2014

Gas	GWP (AR4)	Gas group	Reference	Coverage in the 'old' F-gas Regulation 842/2006
HFC-23	14 800	HFCs	Annex I Section 1	covered
HFC-32	675	HFCs	Annex I Section 1	covered
HFC-41	92	HFCs	Annex I Section 1	covered
HFC-125	3 500	HFCs	Annex I Section 1	covered
HFC-134	1 100	HFCs	Annex I Section 1	covered
HFC-134a	1 430	HFCs	Annex I Section 1	covered
HFC-143	353	HFCs	Annex I Section 1	covered
HFC-143a	4 470	HFCs	Annex I Section 1	covered
HFC-152	53	HFCs	Annex I Section 1	not covered
HFC-152a	124	HFCs	Annex I Section 1	covered
HFC-161	12	HFCs	Annex I Section 1	not covered
HFC-227ea	3 220	HFCs	Annex I Section 1	covered
HFC-236cb	1 340	HFCs	Annex I Section 1	covered
HFC-236ea	1 370	HFCs	Annex I Section 1	covered
HFC-236fa	9 810	HFCs	Annex I Section 1	covered
HFC-245ca	693	HFCs	Annex I Section 1	covered
HFC-245fa	1 030	HFCs	Annex I Section 1	covered
HFC-365mfc	794	HFCs	Annex I Section 1	covered
HFC-43-10mee	1 640	HFCs	Annex I Section 1	covered
PFC-14 (CF4)	7 390	PFCs	Annex I Section 2	covered
PFC-116 (C2F6)	12 200	PFCs	Annex I Section 2	covered
PFC-218 (C3F8)	8 830	PFCs	Annex I Section 2	covered
PFC-3-1-10 (C4F10)	8 860	PFCs	Annex I Section 2	covered
PFC-4-1-12 (C5F12)	9 160	PFCs	Annex I Section 2	covered
PFC-5-1-14 (C6F14)	9 300	PFCs	Annex I Section 2	covered
PFC-c-318 (c-C4F8)	10 300	PFCs	Annex I Section 2	covered
SF6	22 800	SF6	Annex I Section 3	covered

Sources: EU, 2006; EU, 2014.

Table 27 Annex II of Regulation (EU) No 517/2014 (not covered by old Regulation (EC) No 842/2006)

Gas	GWP (AR4)	Gas group	Reference
HFC-1234yf	4	Unsaturated HFCs/HCFCs	Annex II Section 1
HFC-1234ze	7	Unsaturated HFCs/HCFCs	Annex II Section 1
HFC-1336mzz	9	Unsaturated HFCs/HCFCs	Annex II Section 1
HCFC-1233zd	5	Unsaturated HFCs/HCFCs	Annex II Section 1
HCFC-1233xf	1	Unsaturated HFCs/HCFCs	Annex II Section 1
HFE-125	14 900	HFEs and alcohols	Annex II Section 2
HFE-134	6 320	HFEs and alcohols	Annex II Section 2
HFE-143a	756	HFEs and alcohols	Annex II Section 2
HCFE-235da2 (isofluorane)	350	HFEs and alcohols	Annex II Section 2
HFE-245cb2	708	HFEs and alcohols	Annex II Section 2
HFE-245fa2	659	HFEs and alcohols	Annex II Section 2
HFE-254cb2	359	HFEs and alcohols	Annex II Section 2
HFE-347 mcc3 (HFE-7000)	575	HFEs and alcohols	Annex II Section 2
HFE-347pcf2	580	HFEs and alcohols	Annex II Section 2
HFE-356pcc3	110	HFEs and alcohols	Annex II Section 2
HFE-449sl (HFE-7100)	297	HFEs and alcohols	Annex II Section 2
HFE-569sf2 (HFE-7200)	59	HFEs and alcohols	Annex II Section 2
HFE-43-10pccc124	1 870	HFEs and alcohols	Annex II Section 2
HFE-236ca12 (HG-10)	2 800	HFEs and alcohols	Annex II Section 2
HFE-338pcc13 (HG-01)	1 500	HFEs and alcohols	Annex II Section 2
HFE-347mmy1	343	HFEs and alcohols	Annex II Section 2
2,2,3,3,3-pentafluoropropanol	42	HFEs and alcohols	Annex II Section 2
bis(trifluoromethyl)-methanol	195	HFEs and alcohols	Annex II Section 2
HFE-227ea	1 540	HFEs and alcohols	Annex II Section 2
HFE-236ea2 (desfluoran)	989	HFEs and alcohols	Annex II Section 2
HFE-236fa	487	HFEs and alcohols	Annex II Section 2
HFE-245fa1	286	HFEs and alcohols	Annex II Section 2
HFE 263fb2	11	HFEs and alcohols	Annex II Section 2
HFE-329mcc2	919	HFEs and alcohols	Annex II Section 2
HFE-338mcf2	552	HFEs and alcohols	Annex II Section 2
HFE-338mmz1	380	HFEs and alcohols	Annex II Section 2
HFE-347mcf2	374	HFEs and alcohols	Annex II Section 2
HFE-356mec3	101	HFEs and alcohols	Annex II Section 2
HFE-356mm1	27	HFEs and alcohols	Annex II Section 2
HFE-356pcf2	265	HFEs and alcohols	Annex II Section 2
HFE-356pcf3	502	HFEs and alcohols	Annex II Section 2
HFE 365mcf3	11	HFEs and alcohols	Annex II Section 2
HFE-374pc2	557	HFEs and alcohols	Annex II Section 2

Gas	GWP (AR4)	Gas group	Reference
- $(CF_2)_4CH(OH)$ -	73	HFEs and alcohols	Annex II Section 2
NF_3 (nitrogen trifluoride)	17 200	Other perfluorinated compounds	Annex II, Section 3
c-C_3F_6 (perfluorocyclopropane)	17 340	Other perfluorinated compounds	Annex II, Section 3
PFPMIE	10 300	Other perfluorinated compounds	Annex II, Section 3
SF_5CF_3	17 700	Other perfluorinated compounds	Annex II, Section 3

Note: Annex II F-gases were not covered under the old F-gas Regulation (EC) No 842/2006.

Source: EU, 2014.

Table 28 Non-fluorinated gases in Annex IV of Regulation (EU) No 517/2014 (not covered by the old Regulation (EC) No 842/2006)

According to Annex IV of the new F-gas Regulation (EU) No 517/2014, the GWP of mixtures containing gases outside the scope of Annexes I and II of Regulation (EU) No 517/2014 are to be calculated using the GWPs given here for the non-fluorinated gases. For other constituents of mixtures that are not listed here (e.g. ODS), a GWP value of zero shall be used.

Substance	Formula	GWP (AR4)
R-170 (Ethane)	CH_3CH_3	6
R-290 (Propane)	$CH_3CH_2CH_3$	3
R-600 (Butane)	$CH_3CH_2CH_2CH_3$	4
R-600A (Isobutane)	$CH(CH_3)_2CH_3$	3
R-601 (Pentane)	$CH_3CH_2CH_2CH_2CH_3$	5
R-601A (Isopentane)	$(CH_3)_2CHCH_2CH_3$	5
C5H10 (Cyclopentane)	C_5H_{10}	5
R-610 (Ethoxyethane, diethyl ether)	$CH_3CH_2OCH_2CH_3$	4
R-611 (Methyl formate)	$HCOOCH_3$	25
R-702 (Hydrogen)	H_2	6
R-717 (Ammonia)	NH_3	0
R-744 (Carbon dioxide)	CO_2	1
R-1150 (Ethylene)	C_2H_4	4
R-1270 (Propylene)	C_3H_6	2
E-170 (Dimethyl ether)	CH_3OCH_3	1
CH_3Cl (Methyl chloride)	CH_3Cl	13
$CHCl_3$ (Chloroform)	$CHCl_3$	31
Methylene chloride	CH_2Cl_2	9
CH_4 (Methane)	CH_4	25
N_2O (nitrous oxide)	N_2O	298

Source: EU, 2014.

10 Calculation methods

This section provides documentation for:

- Calculation of EU imports (page 73)
- Calculation of EU exports (page 73)
- Calculation of EU supply (page 73);Calculation of HFC amounts placed on the market (POM) under the EU HFC phase-down (page 74) and
- Calculation of HFC consumption under the international HFC phase-down under the Montreal Protocol (page 75).

Table 30 (page 79) provides a summary comparison between the three metrics supply, POM, and consumption.

Calculation of EU imports

HFC imports reported from intermediate storage under customs warehousing after inward processing are not considered for the EU imports statistics. This data is available since 2018. However such data is relevant for the calculation of amounts placed on the market (POM).

Calculation of EU exports

HFC exports reported to intermediate storage under customs warehousing after inward processing are not considered for the EU exports statistics. This data is available since 2018. However such data is relevant for the calculation of amounts placed on the market (POM).

Data reported for the export of pre-blended polyols, available since 2018, is not considered for the EU statistics on bulk exports.

Calculation of EU supply

Total supply (TS)

'EU total supply' is a parameter that provides information on the actual use of fluorinated gases by EU industries. Notably, TS also includes gases that are contained in exported products and equipment. In the logic of the supply metrics used in this report, such gases count towards the gas demand of EU industries. 'EU total supply' is the sum of 'EU bulk supply' and 'EU supply in products/equipment'. It is comparable to the net supply metric used in earlier EEA reports on F-gases.

Bulk supply (BS)

The 'bulk supply' metric is focused on emission-relevant supplies of bulk gases to EU industries and therefore does not cover EU supplies intended for feedstock or destruction. Starting in 2014, BS has been defined as:

> Bulk supply (BS) = production (1A) – destroyed (captured) production (1D) + full imports (2A) – full exports (3A) + 1 January stocks from own import/production (4B) – 31 December stocks from own import/production (4G) + reclamation (4K) – POM intended for destruction (6B) – feedstock use (7A).
> Since 2018, the new reporting items on imports (2A_pp) and exports (3A_pp) of pre-blended polyols are considered: Imports of pre-blended are subtracted and exports of pre-blended polyols are added in the equation for BS.

Since 2019, the explicit inclusion of non-captured production in the reporting scheme was reflected in order to exclude the emissions of non-captured production from supply: non-captured production

totals (1Aa) are subtracted and amounts of non-captured production used as feedstock (1A_fs1) are added in the equation for BS. Furthermore, imports from and exports into EU intermediate storage under customs warehousing after inward processing were excluded from the BS calculation (those amounts are also excluded from the data shown in this report for imports and exports, respectively).

For the years 2007-2013, bulk supply (BS) is calculated as follows:

BS = Production + Imports – Exports + Stocks 1 January – Stocks 31 December + Reclamation – own feedstock use – intended application: feedstock.

EU supply in products/equipment

The 'EU supply in products/equipment' (SPE) metric covers the amount of fluorinated gases that are imported into the EU within products or equipment and placed on the market. Exports of F-gases within products and equipment are not reported under the new F-gas Regulation (No 517/2014) or subtracted for the SPE metric. Thus, the SPE metric covers only imports and it is not intended to cover the net flows of F-gases within products or equipment across EU borders.

SPE is calculated as the sum of all gases reported in Section 11 of the reporting questionnaire. Since 2018, the new reporting item on imports of pre-blended polyols (2A_pp) is added. No data on SPE were collected before 2014.

Intended applications of bulk or total supply

In Section 6 of the reporting questionnaire, companies report on the intended applications of bulk gases supplied to the EU market (6X). This metric differs from bulk supply in the way it accounts for re-exports, amounts intended for destruction and feedstock. It is calculated as follows:

> 6X = (net) production (1E = 1A–1D) + full imports (2A) – re-exports within products of own bulk imports (2B) – bulk re-exports of own imports (3B) + 1 January stocks from own import/production (4B) – 31 December stocks from own import/production (4G) + reclamation (4K).

To estimate the intended applications of EU bulk or total supply, a five-step process is used:

1 Per gas, determine the proportion of each reported application in a subset of categories without export (6A), destruction (6B), leakage (6U) and accountancy adjustments (6V).
2 Assume leakage and accountancy adjustments in bulk or total supply to be equal to the amounts reported in Section 6 and subtract those from total bulk or total supply.
3 Apply the proportions determined in step 1 to the remainder of bulk or total supply.
4 Assign any remainder to the category 'Other or unknown applications' (6T).
5 Assign all net exports of pre-blended polyols (3A_pp-2A_pp) to the intended application 6G (pre-blended polyols).

Calculation of HFC amounts placed on the market (POM) under the EU HFC phase-down

The quota of relevant POM starting in 2015 is calculated as:

Bulk HFCs physically placed on the market (4M), converted into CO_2e

minus

Exemptions under Article 15(2) (5A + (5B) + 5C_exempted + 5D + 5E), converted into CO_2e (5F is included in the exemptions from 2017)

plus

Issued authorisations (9A).

For years where the POM compliance exercise by DG CLIMA has been completed, The POM amounts given are based on the POM established in the HFC registry.

Bulk HFC POM 2007-2013 is calculated per year and per company based on data reported under the old F-gas Regulation as:

HFC production, converted into CO_2e

plus

HFC imports, converted into CO_2e

minus

HFC exports, converted into CO_2e

plus

1 January HFC stocks, converted into CO_2e

minus

31 December HFC stocks, converted into CO_2e

minus

HFCs used for feedstock, converted into CO_2e

minus

HFC supplies intended for feedstock use, converted into CO_2e.

Where the amount thus calculated is negative for a given company in a given year, the POM is set to zero before calculating the EU total as the sum of all companies.

Calculation of HFC consumption under the international HFC phase-down under the Montreal Protocol

The HFCs considered under the Montreal Protocol are all HFCs as listed in Annex I, Section 1 of the new F-gas Regulation No 517/2014 (see 9, page 69), except HFC-161.

HFC consumption starting in 2019 is calculated as follows:

Starting 2019, HFC consumption under the MP is calculated separately for HFC-23 (Annex F, Group II under the MP) and all other HFCs (Group I) covered by the MP:

For Group I HFCs, the calculation approach as depicted below for 2018 is continued with the additional element that imports from und exports to dependent overseas territories are not considered. A list of dependent territories is given in Table 29 (page 78). However, for the calculation of HFC consumption starting 2021, marking the end of the Brexit transition period, trade with UK overseas territories was considered for EU consumption.

For Group II HFCs / HFC-23, generated amounts not captured are not taken into account. In additions to the calculation scheme for Group I HFCs, the following data is thus subtracted/added:

minus

uncaptured HFC production (1Aa), converted into CO_2e

plus

destroyed uncaptured HFC production (1A_a), converted into CO_2e

plus

uncaptured HFC production used as feedstock (1A_fs1), converted into CO_2e

HFC consumption in 2018 is calculated as follows:

HFC production (1A), converted into CO_2e

minus

HFC production for feedstock use within the Union (1A_fs), converted into CO_2e

minus

HFC production for other uses exempted under the Montreal Protocol (1A_ex), converted into CO_2e (1A_ex is not yet applicable as no exemptions have been agreed upon under the Montreal Protocol so far)

plus

HFC imports (2A), converted into CO_2e

minus

HFC imports of pre-blended polyols (2A_pp), converted into CO_2e

minus

imports of used, recycled or reclaimed HFCs (2C), converted into CO_2e

minus

virgin HFC imports for feedstock use (2D), converted into CO_2e

minus

virgin HFC imports exempted under the Montreal Protocol (2E), converted into CO_2e (2E is not yet applicable as no exemptions have been agreed so far under the Montreal Protocol)

minus

HFC exports (3A), converted into CO_2e

plus

HFC exports of pre-blended polyols (3A_pp), converted into CO_2e

plus

exports of used, recycled or reclaimed HFCs (3G), converted into CO_2e

plus

virgin HFC exports for feedstock use (3H), converted into CO_2e

plus

virgin HFC exports exempted under the Montreal Protocol (3I), converted into CO_2e (3I is not yet applicable as no exemptions have been agreed so far under the Montreal Protocol)

minus

Total HFC destruction (8D), converted into CO_2e.

Imports reported from and exports reported to intermediate storage under customs warehousing after inward processing are not considered as imports or exports for the purpose of consumption under the MP.

HFC consumption starting in 2014 - 2017 is calculated as follows:

HFC production (1A), converted into CO_2e

plus

HFC imports (2A), converted into CO_2e

minus

HFC exports (3A), converted into CO_2e

plus

HFC exports for recycling (3D), converted into CO_2e

plus

HFC exports for reclamation (3E), converted into CO_2e

plus

HFC exports for destruction (3F), converted into CO_2e

minus

HFC feedstock use (7A), converted into CO_2e

minus

Total HFC destruction (8D), converted into CO_2e.

HFC consumption until 2013 is calculated from data reported under the old F-gas Regulation as follows:

HFC production, converted into CO_2e

plus

HFC imports, converted into CO_2e

minus

HFC exports, converted into CO_2e

plus

HFC exports for recycling, reclamation or destruction, converted into CO_2e

minus

Reporting companies' own HFC destruction, converted into CO_2e

minus

HFC amounts supplied by reporting companies to third parties for destruction, converted into CO_2e

minus

HFCs used for feedstock, converted into CO_2e

minus

HFC supplies intended for feedstock use, converted into CO_2e

Table 29 Dependent overseas territories of the EU-27 and the United Kingdom

Territory	MS Dependency relation
Anguilla	UK
Aruba	NL
Bermuda	UK
Bonaire, Sint Eustatius and Saba	NL
British Indian Ocean Territory	UK
Cayman Islands	UK
Curaçao	NL
Falkland Islands (Malvinas)	UK
Faroe Islands	DK
French Polynesia	FR
French Southern Territories	FR
Gibraltar	UK
Greenland	DK
Guernsey	UK
Isle of Man	UK
Jersey	UK
Montserrat	UK
New Caledonia	FR
Pitcairn	UK
Saint Barthélemy	FR
Saint Helena, Ascension and Tristan da Cunha	UK
Saint Pierre and Miquelon	FR
Sint Maarten (Dutch part)	NL
South Georgia and the South Sandwich Islands	UK
Turks and Caicos Islands	UK
Virgin Islands, British	UK
Wallis and Futuna	FR

Source: EEA, 2021.

Table 30 Scope of supply, POM, and consumption metrics

			Supply	Placing on the market (POM), relevant for compliance with the EU HFC phase-down	Consumption, relevant for compliance with the MP HFC phase-down
		covered gases	*applicable to total F-gases and single gases/gas groups (e.g. HFCs)*	*HFCs of Annex I of EU F-gas Regulation 517/2014, including HFC shares and non-HFC shares of HFC-containing mixtures*	*HFCs of Annex I of EU F-gas Regulation 517/2014 except HFC-161, including HFC shares of HFC-containing mixtures*
		units used	*both physical tonnes and t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*
Transactions covered		**Type of contribution**			
Production	captured amounts	plus	yes	yes	yes
	Uncaptured amounts	plus	yes	yes	no
	Emissions of uncaptured amounts	minus	yes	no	not applicable
Reclamation		plus	yes	no	no
Recycling		plus	no	no	no
Bulk imports	from EU intermediate storage under customs warehousing after inward processing	plus	no	yes	no
	from dependent overseas territories	plus	yes	yes	no
	from other origins	plus	yes	yes	yes (except import of recycled and used bulk HFCs)
Imports in products and equipment	Pre-blended polyols	plus	yes	yes	no
	Refrigeration, air conditioning and heat pump (RACHP) equipment	plus	yes	2015-2016: no starting 2017, only amounts not covered by quota authorisations	no
	other products and equipment	plus	yes	no	no

			Supply	Placing on the market (POM), relevant for compliance with the EU HFC phase-down	Consumption, relevant for compliance with the MP HFC phase-down
		covered gases	*applicable to total F-gases and single gases/gas groups (e.g. HFCs)*	*HFCs of Annex I of EU F-gas Regulation 517/2014, including HFC shares and non-HFC shares of HFC-containing mixtures*	*HFCs of Annex I of EU F-gas Regulation 517/2014 except HFC-161, including HFC shares of HFC-containing mixtures*
		units used	*both physical tonnes and t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*
Transactions covered		**Type of contribution**			
Bulk exports	into EU intermediate storage under customs warehousing after inward processing	minus	no	exports from own production and exports from own imports are subtracted. Other bulk exports subtracted if directly supplied by the importer/producer to the exporter (exemption Art. 15(2)c)	no
	to dependent overseas territories	minus	yes		no
	to other destinations	minus	yes		yes (except export of recycled and used bulk HFCs)
exports in products and equipment	Pre-blended polyols	minus	no	yes	no
	other products and equipment	minus	no	subtracted in case the contained gases had never been placed on the market after bulk import (re-export, reported in section 2B)	no
Destruction	of EU production, destroyed before placing on the market and imports for destruction	minus	yes	yes (exemption Art. 15(2)a)	yes
	of used gases recovered within the EU	minus	no	no	yes
Feedstock use		minus	yes	yes (exemption Art. 15(2)b)	yes (HFC production for feedstock use in the Union and HFC import for feedstock use)
Supplies to military uses		minus	no	yes (exemption Art. 15(2)d)	no
Supplies to semiconductor industry		minus	no	yes (exemption Art. 15(2)e)	no

		Supply	Placing on the market (POM), relevant for compliance with the EU HFC phase-down	Consumption, relevant for compliance with the MP HFC phase-down
	covered gases	*applicable to total F-gases and single gases/gas groups (e.g. HFCs)*	*HFCs of Annex I of EU F-gas Regulation 517/2014, including HFC shares and non-HFC shares of HFC-containing mixtures*	*HFCs of Annex I of EU F-gas Regulation 517/2014 except HFC-161, including HFC shares of HFC-containing mixtures*
	units used	*both physical tonnes and t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*	*t CO_2e (GWP: AR4)*
Transactions covered	**Type of contribution**			
Supplies to pharmaceutical MDIs	minus	no	not considered 2015-2017, considered 2018 onwards (exemption Art. 15(2)f)	no
1 January stocks	plus	full EU-based stocks from own production or own import considered, stocks under customs warehousing not considered, stocks from EU purchases not considered	only those EU-based stocks from own production or own import considered that have not yet been placed on the market, stocks under customs warehousing not considered, stocks from EU purchases and stocks from own imports/own production already placed on the market not considered	no
31 December stocks	minus			
HFC quota authorisations issued by producers/importers	plus	no	yes	no

List of abbreviations

Abbreviation	Name
EEA	European Environment Agency
BDR	Business Data Repository of the EEA
CFC	Chlorofluorocarbon
CO_2	Carbon dioxide
CO_2e	CO_2 equivalent
EC	European Commission
DG CLIMA	Directorate-General for Climate Action of the European Commission
EEA	European Environment Agency
ETC/CME	European Topic Centre for Climate Change Mitigation and Energy
EU	European Union
EU-27	Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden
EU-28	Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom
AR4	Fourth Assessment Report of the IPCC
F-gases	Fluorinated gases
FGR	F-gases Regulation (EU) 517/2014
GWP	Global warming potential
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HFE	Hydrofluoroether
HFO	Hydrofluoroolefin
IPCC	Intergovernmental Panel on Climate Change
kg	Kilogramme
kt	Kilotonne
MP	Montreal Protocol
Mt	Megatonne
NF_3	Nitrogen trifluoride
ODS	Ozone-depleting substances
PFCs	Perfluorocarbons
PFPMIE	Perfluoropolymethylisopropylether
POM	Placing on the market
QA/QC	Quality assurance/quality control

Abbreviation	Name
R-134a	Refrigerant classification of HFC-134a
R-404A	Refrigerant mixture of HFCs (52% HFC-143a, 44% HFC-125, 4% HFC-134a)
R-407C	Refrigerant mixture of HFCs (52% HFC-134a, 25% HFC-125, 23% HFC-32)
R-410A	Refrigerant mixture of HFCs (50% HFC-125, 50% HFC-32)
R-507A	Refrigerant mixture of HFCs (50% HFC-143a, 50% HFC-125)
RACHP	Refrigeration, air conditioning and heat pump
SF_6	Sulphur hexafluoride
t	Tonne
TAR	Third Assessment Report of the IPCC
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

European Topic Centre on
Climate change mitigation

https://www.eionet.europa.eu/etcs/etc-cm

The European Topic Centre on Climate change mitigation (ETC-CM) is a consortium of European institutes under contract of the European Environment Agency.

European Environment Agency
European Topic Centre
Climate change mitigation