Draft Report – Analysis of HFC Allocation Program Data for 2022-2025

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Chemicals, Coatings, and Products Division
Office of Air and Radiation
U.S. Environmental Protection Agency

Contents

List of Abbreviations and Acronyms

AIM Act	American Innovation and Manufacturing Act of 2020
ASA	Application-Specific Allowance
CBI	Confidential Business Information
CFR	Code of Federal Regulations
CVD	Chemical Vapor Deposition
EPA	Environmental Protection Agency
EV	Exchange Value
EVe	Exchange Value Equivalent
FDA	Food and Drug Administration
FK	Fluoroketone
FR	Federal Register
HCFC	Hydrochlorofluorocarbon
HCFO	Hydrochlorofluoroolefin
HFC	Hydrofluorocarbon
HFO	Hydrofluoroolefin
HVACR	Heating, Ventilation, Air Conditioning, and Refrigeration
MCMEU	Mission-Critical Military End Uses
MDI	Metered Dose Inhaler
MMTEVe	Million Metric Tons of Exchange Value Equivalent
MTEVe	Metric Tons of Exchange Value Equivalent
MT	Metric Tons
ODS	Ozone-Depleting Substances
RACA	Request for Additional Consumption Allowance
RACHP	Refrigeration, Air Conditioning, and Heat Pump
RIA	Regulatory Impact Analysis
SCPPU	Structural Composite Preformed Polyurethane
SNAP	Significant New Alternatives Policy
UAE	United Arab Emirates
UK	United Kingdom
US	United States
VM	Vintaging Model

1. Introduction

The American Innovation and Manufacturing Act (AIM Act or AIM), (codified at 42 U.S.C. 7675), directs the U.S. Environmental Protection Agency (EPA) to phase down hydrofluorocarbon (HFC) production and consumption by 85 percent from historical baseline levels by 2036. HFCs are commonly used in refrigeration and air conditioning equipment, as well as in foams, aerosols, fire suppression, and other applications.

The AIM Act authorizes EPA to address HFCs in three main ways:

1. phasing down HFC production and consumption through an allowance allocation program;
2. managing HFCs and their substitutes; and
3. facilitating the transition to next-generation technologies by restricting use of these HFCs in the sector or subsectors in which they are used.

To achieve the first part, the phasedown of HFCs through an allowance program, EPA established the HFC Allocation Program in the "Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program under the AIM Act" (Allocation Framework Rule),[1] which codified the AIM Act's production and consumption phasedown schedule of HFCs. This phasedown schedule started with a 10 percent reduction in 2022 and a further decrease in 2024 to 60 percent of baseline levels.

The Agency took further related action through the "Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later Years" (2024 Allocation Rule)[2] to establish the methodology for allocating HFC production and consumption allowances for calendar years 2024 through 2028.

EPA further modified the Allowance Allocation Program in the "Phasedown of Hydrofluorocarbons: Review and Renewal of Eligibility for Application-Specific Allowances (2025 Application-specific Allowances Review and Renewal Rule),[3] which assessed the eligibility of the six applications receiving application-specific allowances (ASAs) through calendar year 2025 to continue receiving priority access to allowances.

As part of the Allocation Framework Rule, EPA finalized a comprehensive, multi-faceted approach to deter, identify, and penalize illegal activity. Part of this approach was the commitment to data transparency including, but not limited to, the release of information

[1] 86 FR 55116 (October 5, 2021).
[2] 86 FR 46836 (July 20, 2023).
[3] 90 FR 41676 (August 26, 2025).

submitted by entities via quarterly production and consumption reports. EPA releases periodic HFC data on the HFC Data Hub to meet this commitment.[4]

Since 2022, regulated entities have reported data to EPA under the HFC Allocation Program. This report shares that data and EPA's analysis of that data. Our objective is to improve program transparency and ensure that the Agency and the public have access to the latest available information. EPA is in the process of verifying production and consumption data for 2025, so 2025 results are preliminary. However, EPA has verified enough data to warrant release of the data in this report and gather feedback on the results to date. The Agency expects to fully verify all 2025 data by early fall 2026.

This report contains visualizations, possible trends, and accompanying narratives of topics including, but not limited to, HFC allowance usage, demand projections, production as a general concept, and certain reporting metrics. EPA welcomes stakeholders' review of the information contained in this report and additional insights on the data presented and/or additional information to improve the Agency's data or understanding of the data.

[4] The HFC Data Hub (including the Expanded HFC Data webpage) is available online at https://www.epa.gov/hfcs/hfc-data-hub.

2. HFC Allowance Allocation and Usage

2.1. HFC Phasedown Schedule and Associated General Pool Methodology Regulations

EPA codified the statutory phasedown schedule for production and consumption of HFCs in the AIM Act, at 40 Code of Federal Regulations (CFR) 84.7. EPA promulgated two regulations that established general pool allocation methodologies for the first two reduction periods of the phasedown schedule.[5] The schedule and the Agency's allowance allocation methodology regulations, to date, for general pool production and consumption allowances can be found in Table 1.

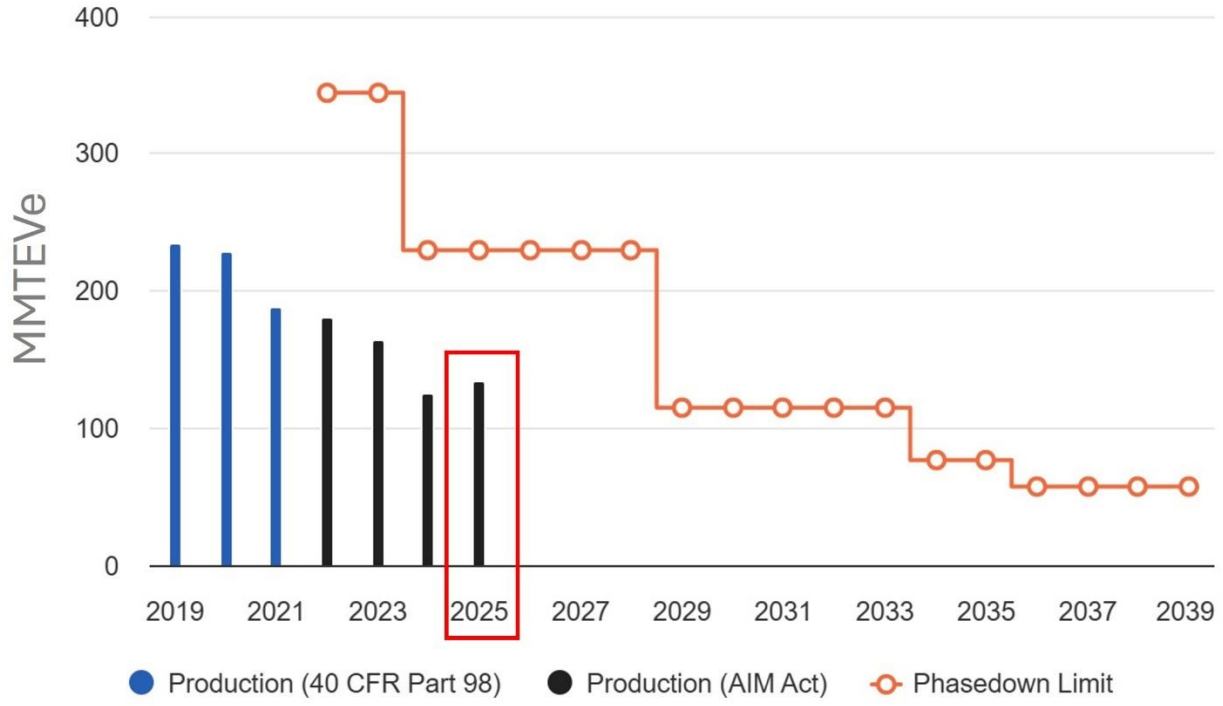
Table 1. HFC Phasedown Schedule and Allocation Methodology Regulations

Reduction Period	Percentage of production baseline (percent)	Percentage of consumption baseline (percent)	Final Rules in the *Federal Register* (FR) Governing General Pool Allocation Methodology
(1) 2022-2023	90	90	86 FR 55116; October 5, 2021
(2) 2024-2028	60	60	88 FR 46836; July 20, 2023
(3) 2029-2033	30	30	Not yet promulgated
(4) 2034-2035	20	20	Not yet promulgated
(5) 2036 and thereafter	15	15	Not yet promulgated

The figures below show verified annual HFC production and annual HFC consumption relative to the phasedown limits for 2022 through 2024. Where feasible, the distinction of 2025 data in each of the following tables will be clearly delineated. Data show that calculated U.S. HFC production to date remains well below the phasedown limit under the AIM Act (*see* Figure 1) while calculated U.S. HFC consumption has been much closer to the yearly limit under the AIM Act (*see* Figure 2). The calculated values are expressed in million metric tons of exchange value equivalent (MMTEVe). Summary tables of yearly caps, the United States' calculated production and consumption, and historical production and consumption rates are included in Appendix A.

[5] The AIM Act specifies a separate schedule for the review of certain application-specific end uses, but the overall yearly caps for production and consumption inclusive of the issuance of ASAs cannot exceed the applicable phasedown schedule limits.

Figure 1. Annual Calculated HFC Production Compared to Phasedown Limit (MMTEVe)[a]



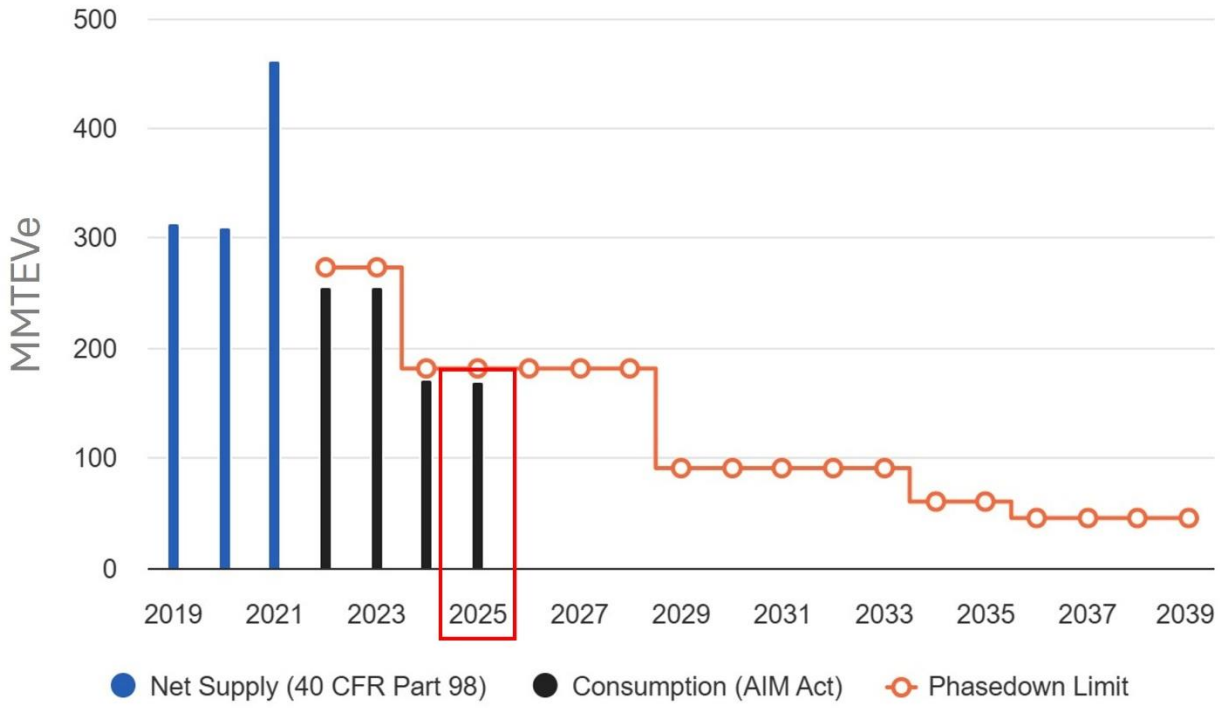
Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Pre-2022 data were collected per requirements under 40 CFR part 98, while data shown for 2022-2025 were reported in accordance with regulations established under the AIM Act. Values represent production. *Calendar year 2025 data (indicated by the red box) are preliminary and undergoing verification as of the finalization of this report*.

Comparing the relevant phasedown limit values or cap for production and consumption, the production limit is substantially higher than the consumption limit over the same time periods. This difference comes from the distinction in the statutory and regulatory definitions of "production" and "consumption." Under EPA's regulatory definitions, "Production/Produce" means the manufacture of a regulated substance from a raw material or feedstock chemical (but not including the destruction of a regulated substance by an approved technology). It does not include: (1) the manufacture of a regulated substance that is used and entirely consumed (except for trace quantities) in the manufacture of another chemical; (2) the reclamation, reuse, or recycling of a regulated substance; or (3) insignificant quantities of a regulated substance inadvertently or coincidentally generated from any of the following, independent circumstances: during a chemical manufacturing process, resulting from unreacted feedstock, from the listed substance's use as a process agent present as a trace quantity in the chemical substance being manufactured, as an unintended byproduct of research and development applications, or during semiconductor manufacturing processes. The definition of

"Consumption" means production plus imports minus exports.[6] Consistent with the AIM Act, EPA calculated the United States' HFC production and consumption baselines by incorporating substantial portions of HFC activity that occurred between 2011 and 2013. In those years, the United States produced large amounts of regulated HFCs, resulting in a higher production cap.

The statutory and regulatory requirements to produce a regulated HFC requires expenditure of an equal amount of production and consumption allowances. Meaning that in the absence of any allowance adjustments, the producers of HFCs are numerically limited by their consumption allowances. In combination with entities that solely import, by expending consumption allowances only, EPA anticipates that the trend showing the substantial buffer between calculated production and the applicable limit will continue. Information on the use rate of production allowances and the chemicals being produced will be discussed in Sections 2.2.1 and 3.1 of this report.

Figure 2. Annual Calculated HFC Consumption Compared to Phasedown Limit (MMTEVe)[a]



Source: U.S. EPA. (2025). *HFC Data Hub.* Available online at https://www.epa.gov/hfcs/hfc-data-hub.[a] Pre-2022 data were collected per requirements under 40 CFR part 98 for "net supply," while data shown for 2022-2025 were reported in accordance with regulations established under the AIM Act. "Net supply" is near

[6] This addition and subtraction of materials is near-identical to the concept of net supply.

equivalent but not equal to the term "consumption." *Calendar year 2025 data (indicated by the red box) are preliminary and undergoing verification as of the finalization of this report.*

As seen in the Figures 1 and 2, the United States' levels of calculated consumption when compared to the cap is much tighter than the levels of production when compared to the cap. After accounting for consumption allowances that are expended during production, remaining consumption allowances are used to import regulated HFCs. Producers and importers of regulated HFCs participate in a competitive market and have a wide variety of customers who need or desire these bulk chemicals, some of which are not produced domestically. Customers include, but are not limited to, heating, ventilation, air conditioning, and refrigeration (HVACR), foam-blowing, fire extinguisher, solvent, and aerosol industries, as well as eligible application-specific end users specifically listed in the AIM Act.

2.2. General Pool Allowances: Usage and Transfers

EPA will allocate the HFC production and consumption allowances each October 1st, in the year prior to the year in which the allowances may be used, *i.e.*, allowances for 2027 will be issued October 1, 2026.[7] Each allowance holder will then decide how to use their allowances, *i.e.*, expended for production or import; transferred to another entity; etc.

To date, most allowance holders have not used all of their allowances within the corresponding calendar year. Since allowances are only for a specific calendar year, any allowances that are not used, expire. Tables 2 and 3, below, display general pool allowances holders' and their allowance usage and transfer trends between 2022 and 2025. The complete annual datasets for calendar year 2022 through 2024 can be found on EPA's HFC Data Hub and are available as spreadsheets in the docket for this notice.[8] Calendar year 2025 data are preliminary and undergoing verification as of the finalization of this report.

2.2.1. Production Allowances: Expenditures, Transfers, and Remaining Available

The following tables show HFC production allowance usage between 2022 and 2025. EPA notes that because the United States' production baseline is significantly higher than the consumption baseline, the yearly cap for production will always be higher than the consumption cap. In the absence of any allowance adjustments, the producers of HFCs are numerically limited by their consumption allowances, not their production. Producing regulated HFCs requires expending an equal amount of production and consumption

[7] 40 CFR 84.9(d) and 40 CFR 84.11(d).
[8] The HFC Data Hub (including the Expanded HFC Data webpage) is available online at https://www.epa.gov/hfcs/hfc-data-hub.

allowances. Therefore, EPA expects that in any given year, there will always be a significant number of unused production allowances, even if all or nearly all, consumption allowances are expended. Additionally, when considering transfer activities, the sum of unused allowances and expended allowances may not equal 100 percent.

Table 2 shows all companies EPA issued production allowances to and those that received inter-company transfers from an existing producer in the 2022-2025 period. Generally, producers of regulated HFCs appear to be using a higher percentage of their issued allowances in 2024 and 2025 versus in 2022 or 2023. This is not unexpected because of the phasedown schedule; all things being equal, if relative production activity stays the same, while the number of allowances issued decreases, allowance expenditure rates would increase. While overall production allowance usage as a percentage of total allowances allocated is up in 2024 and 2025, there are some entities that are using relatively fewer production allowances. Possible explanations include, but are not limited to, shifts to other regulated chemicals with lower EVs that require less allowances to produce; existing or newly developed business relationships with other HFC producers; or existing or newly developed business relationships with entities which may confer ASAs.

Table 2. General Pool Production Allowance Expenditure (MTEVe), 2022-2025

Entity	2022 Production Allowances Expended (Percent of Issued Allowances)[a]	2023 Production Allowances Expended (Percent of Issued Allowances)[a]	2024 Production Allowances Expended (Percent of Issued Allowances)[a]	*2025 Production Allowances Expended (Percent of Issued Allowances)[a,b]*
Honeywell International (now Solstice)	72,229,088.6 (42%)	69,850,227.7 (41%)	56,302,374.4 (50%)	*50,418,560.3 (45%)*
Chemours	42,025,078.7 (56%)	44,750,343.4 (59%)	33,542,979.8 (67%)	*41,487,806.7 (84%)*
Arkema	41,805,764.8 (83%)	33,776,946.7 (67%)	11,851,537.9 (44%)	*16,121,699.2 (61%)*
Mexichem Fluor DBA Koura	24,035,682.5 (59%)	15,178,199.3 (37%)	23,756,861.4 (71%)	*26,471,816.2 (81%)*
Daikin America[c]	Did not produce	91,895.5 (N/A)	138,069.2 (N/A)	*Did not produce*
IsleChem by Aceto[c]	44,673.4 (N/A)	10,644.9 (N/A)	46,300.0 (N/A)	*22,432.1 (N/A)*
Iofina Chemical	1,339.7 (76%)	1,299.1 (74%)	775.5 (67%)	*363.5 (32%)*

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Includes expenditure of production allowances received as transfers; values are compared to the number of allowances issued by EPA. Values do not include expenditures of conferred application-specific

allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic producers.

[b] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[c] These entities were not issued allowances by EPA, so percentages are not applicable.

Table 3 shows how HFC production allowances issued by EPA were transferred between entities that produced regulated HFCs between 2022 and 2025. Fluctuations in how entities transfer production allowances may be explained by existing or new business relationships with other producers, with respect to either volume or the types of chemicals being manufactured. Though the 2025 production and consumption data are still being verified, transfers require EPA to issue a non-objection notice after a review for approvability; therefore, transfer data for calendar year 2025 is wholly accurate and complete.

Table 3. General Pool Production Allowance Transfer Activity (MTEVe), 2022-2025

Entity	2022 Production Allowance Transfers (Percent of Issued Allowances)[a]	2023 Production Allowance Transfers (Percent of Issued Allowances)[a]	2024 Production Allowance Transfers (Percent of Issued Allowances)[a]	2025 Production Allowance Transfers (Percent of Issued Allowances)[a]
Chemours	-16,026,773.7 (-9%)	-14,505,244.1 (-8%)	4,462,000.0 (9%)	5,081,024.40 (10%)
Honeywell International (now Solstice)	10,380,742.0 (14%)	10,387,421.9 (14%)	-2,332,695.6 (-2%)	-8,424,093.30 (-8%)
Arkema	3,012,551.3 (6%)	1,809,139.1 (4%)	-3,269,360.2 (-12%)	256,443.65 (1%)
Mexichem Fluor DBA Koura	1,791,901.7 (4%)	1,450,655.2 (4%)	531,736.8 (2%)	2,533,835.39 (8%)
Daikin America[b]	0.0 (Did not produce)	147,690.0 (N/A)	156,000.0 (N/A)	0.0 (Did not produce)
IsleChem by Aceto[b]	50,005.0 (N/A)	11,645.0 (N/A)	46,948.4 (N/A)	27,400.0 (N/A)
Iofina Chemical[c]	0.0 (0%)	0.0 (0%)	0.0 (0%)	0.0 (0%)

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Negative values indicate the entity transferred away more allowances to other producers than they received from other producers; values are compared to the number of allowances issued by EPA where negative percentages indicate the entity transferred away allowances.

[b] These entities were not issued allowances by EPA, so percentages are not applicable.

[c] Unlike other producers, Iofina historically produced only one low-EV chemical (HFC-41) and continues to only produce this chemical.

In some cases, between 50 and 65 percent of allowances issued to domestic producers went unused. This was more prevalent in 2022 and 2023 than in 2024 and 2025.

EPA reiterates that overall production allowance expenditures or remaining production allowances available at the end of any calendar year may not be representative of overall HFC activity, as production is primarily limited by the available consumption allowances rather than production allowances, and producers have the choice of importing regulated HFCs in addition to producing them.

2.2.2. Consumption Allowances: Expenditures, Transfers, and Remaining Available

Tables 4-11 show the top 15 entities that used their HFC consumption allowances to import regulated HFCs (by volume and by percent) between 2022 and 2025. In each instance, the total number of consumption allowances expended for imports only (not production) and allowance adjustments have been included. These allowance adjustments include administrative consequences, acquisitions, requests for additional consumption allowances (RACAs), and transfers. Adjustments for consumption allowances do not include the conferral of ASAs, as those are their own category of allowances. Similarly, any ASAs that are conferred to entities and subsequently used to import regulated HFCs are not included in expenditure values, and any conferred ASAs that were unused at the end of the year are not reflected in remaining available consumption allowance values.

EPA compares certain entities' remaining allowances at the end of the calendar year, relative to the number of allowances they were issued by the Agency. Consumption allowance usage for imports, expressed as a percent of allowances issued, is a helpful marker when compared to the volume of allowances used for imports where an entity was not issued many allowances. By including allowance adjustments, there are instances when the number of expended consumption allowances exceeds 100 percent of the number of allowances issued.

Each table shows a summary of allowance activity of the top 15 entities from 2022 through 2025, who either expended the most consumption allowances for imports numerically or expended the highest percentage of their issued allowances on imports. Some entities imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import, and this noncompliance has been identified in the applicable table(s). EPA's longstanding position has been to issue allowances to entities that are prepared to use them to ensure continuity in the HFC market. The variety of entities with robust import activity (either on an MTEVe basis or percentage of allowances

issued basis) seems to demonstrate that the vast majority of HFC consumption allowance holders are, in fact, consistently importing HFCs.

EPA notes that the number of consumption allowances initially issued to an entity does not appear to influence whether those entities can effectively use their allowances. In other words, when expressed as a percentage of consumption allowance issued, entities that received "many" allowances and entities that received "few" allowances seem to be equally capable of expending them. This indicates that, all things being equal, there do not appear to be systemic barriers created by EPA's requirements for HFC imports that disproportionately affect one type of importer over another.

When comparing the numeric and percentage values, there are several companies who imported regulated HFCs in higher amounts by MTEVe, within the relevant year, but used a smaller percentage of their total allowances. Notably, this is because these entities are also domestic producers of regulated HFCs, and a substantial portion of their consumption allowances are expended for production.

Several companies legally imported regulated HFCs in amounts that were much larger than the number of allowances that were initially issued in one or more years between 2022 and 2025. The robust nature of HFC consumption allowance transfers is described in a separate section of this document, and EPA recognizes that high allowance expenditures for imports may be due to several factors. The Agency based its allocation methodology for historical importers on their relative market share calculated from their highest three years of consumption activity (including imports) between 2011 and 2019. Accordingly, some importers may be continuing to provide required or wanted regulated HFCs to their existing customers, while modestly expanding their customer base in response to existing needs. Other historical importers who did not have as high of relative market shares between 2011 and 2019, may have altered their portfolio after the phasedown began due to other trends or technological advances in the HFC market and acquired additional consumption allowances to meet new or evolving customer demands. EPA is also aware that companies have developed or formed new business relationships, for existing or new HFC blends, and have independently identified the most appropriate means to source the needed chemicals (*e.g.*, contracting to another entity to import on their behalf instead of importing directly).

Some companies listed in the following tables imported regulated HFCs without expending the requisite number of allowances at the time of import. In such cases, EPA has

addressed these situations through administrative consequences, enforcement actions, or a combination of both mechanisms.[9]

Table 4. Top 15 Entities - 2022 General Pool Consumption Allowances Used for HFC Imports

Entity	Consumption Allowances Used for HFC Imports (MTEVe)[a]	Consumption Allowances Used for Imports (Percent of Issued Allowances)[b]
IGas Holdings	26,912,683.2	104%
National Refrigerants	20,729,348.1	105%
Chemours	13,822,156.8	41%
Arkema	6,692,513.4	22%
Weitron	6,496,426.7	103%
Honeywell International (now Solstice)[c]	3,882,577.6	5%
A-Gas	3,566,201.3	111%
ICool USA	3,464,965.4	102%
Hudson Technologies	2,977,034.6	100%
Daikin America	2,836,198.6	91%
FluoroFusion Specialty Chemicals[c]	2,559,308.2	100%
AutoZone Parts	2,334,055.6	94%
Walmart	2,238,074.6	98%
RMS of Georgia	1,480,488.5	91%
Lenz Sales & Distribution	1,106,309.0	100%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.
[b] When compared to the number of allowances issued under EPA's methodology.
[C] At some point in 2022, these entities imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 5. Top 15 Entities - 2022 General Pool Consumption Allowances Used for Imports by Percent

Entity	Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
Bluon[b]	2253%	33,404.3
Electronic Fluorocarbons[b]	238%	104,116.0

[9] Information about EPA's administrative consequences can be found on this webpage: https://www.epa.gov/hfcs/administrative-consequences-under-hfc-allocation-rule. Information about EPA's enforcement actions under the AIM Act can be found on this webpage: https://www.epa.gov/enforcement/enforcement-american-innovation-and-manufacturing-act-2020.

Entity	Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
American Air Components[b]	205%	200,000.0
Waysmos USA	130%	633,451.9
A-Gas	111%	3,203,908.1
Cross World Group	111%	200,000.0
National Refrigerants	105%	19,773,949.5
IGas Holdings	104%	25,901,569.7
AFK & Co.[b]	103%	193,335.9
Weitron	103%	6,327,828.6
Nature Gas Import and Export	102%	818,264.6
ICool USA	102%	3,401,343.4
RTR Suppliers	101%	198,000.0
FluoroFusion Specialty Chemicals[b]	100%	2,548,297.7
Fireside Holdings Inc (DBA American Refrigerants)	100%	199,978.5

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers; only includes entities that received initial allowances from EPA. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[b] At some point in 2022, these entities imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 6. Top 15 Entities - 2023 General Pool Consumption Allowances Used for HFC Imports

Entity	Consumption Allowances Used for HFC Imports (MTEVe)[a]	Consumption Allowances Used for Imports (Percent)[b]
IGas Holdings	25,932,896.3	100%
National Refrigerants	20,321,072.1	103%
Chemours	14,696,499.6	44%
Arkema	8,017,933.1	26%
Weitron	6,337,178.7	100%
Honeywell International (now Solstice)	6,153,532.2	7%
A-Gas	4,035,044.8	126%
ICool USA	3,307,359.4	97%
Daikin America	3,147,925.1	101%
Hudson Technologies	2,984,861.7	100%
FluoroFusion Specialty Chemicals	2,551,702.4	100%
Walmart	2,270,748.5	100%

Entity	Consumption Allowances Used for HFC Imports (MTEVe)[a]	Consumption Allowances Used for Imports (Percent)[b]
RMS of Georgia	1,600,000.8	99%
AutoZone Parts	1,485,438.3	60%
First Continental International	1,342,671.1	174%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[b] When compared to the number of allowances issued under EPA's methodology.

Table 7. Top 15 Entities - 2023 General Pool Consumption Allowances Used for HFC Imports by Percent

Entity	Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[a]	Number of Allowance Issued (MTEVe)
Bluon	1454%	33,459.8
Ability Refrigerants	212%	200,000.0
Reclamation Technologies	199%	200,000.0
First Continental International	174%	769,838.0
A-Gas	126%	3,209,232.5
Cross World Group	113%	200,000.0
National Refrigerants	103%	19,806,810.9
GlaxoSmithKline	101%	536,367.9
Daikin America	101%	3,120,932.2
AFK & Co.	100%	193,335.9
Fireside Holdings Inc (DBA American Refrigerants)	100%	199,978.5
Lenz Sales & Distribution	100%	1,110,319.3
Chemp Technology	100%	200,000.0
Creative Solution	100%	200,000.0
EDX Industry	100%	200,000.0

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers; only includes entities that received initial allowances from EPA. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

Table 8. Top 15 Entities - 2024 General Pool Consumption Allowances Used for HFC Imports

Entity	Consumption Allowances Used for HFC Imports (MTEVe)[a]	Consumption Allowances Used for Imports (Percent)[b]
IGas Holdings[c]	21,368,548.0	127%
National Refrigerants	13,097,703.5	102%
Chemours	13,023,131.5	59%
Weitron	4,051,250.0	99%
Mexichem Fluor DBA Koura	3,734,210.3	23%
RGAS LLC	3,662,104.5	124%
First Continental International	2,776,056.4	559%
A-Gas	2,634,293.7	120%
Daikin America	2,009,489.2	100%
Hudson Technologies	1,933,802.0	100%
Technical Chemical	1,920,881.7	87%
FluoroFusion Specialty Chemicals	1,856,961.0	113%
Walmart	1,470,268.6	100%
ICool USA	1,405,678.8	64%
AutoZone Parts	1,306,516.6	100%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[b] When compared to the number of allowances issued under EPA's methodology.

[c] At some point in 2024, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 9. Top 15 Entities - 2024 General Pool Consumption Allowances Used for HFC Imports by Percent

Entity	Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[a]	Number of Allowance Issued (MTEVe)
First Continental International	559%	496,747.8
Wego Chemical Group	379%	36,492.6
Summit Refrigerants	254%	128,987.8
Waysmos USA	175%	361,839.8
IGas Holdings[b]	127%	16,846,810.7
Electronic Fluorocarbons	127%	67,293.9
RGAS LLC	124%	2,951,990.2
A-Gas	120%	2,199,784.7
FluoroFusion Specialty Chemicals	113%	1,647,053.3
Wilhelmsen Ships Service[b]	105%	26,063.9

Entity	Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[a]	Number of Allowance Issued (MTEVe)
National Refrigerants	102%	12,780,590.6
Hudson Technologies	100%	1,928,081.5
Reclamation Technologies	100%	256,685.4
A.C.S. Reclamation & Recovery	100%	128,987.8
Lenz Sales & Distribution	100%	716,447.4

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers; only includes entities that received initial allowances from EPA. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[b] At some point in 2024, these entities imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 10. Top 15 Entities - 2025 General Pool Consumption Allowances Used for HFC Imports[a]

Entity	*Consumption Allowances Used for HFC Imports (MTEVe)[b]*	*Consumption Allowances Used for Imports (Percent)[c]*
IGas Holdings	*22,425,683.1*	*136%*
National Refrigerants	*13,491,694.3*	*108%*
Chemours	*5,266,243.6*	*24%*
Weitron	*4,984,168.1*	*124%*
First Continental International	*3,448,926.0*	*708%*
RGAS LLC	*3,096,113.1*	*107%*
A-Gas	*2,529,371.5*	*117%*
ICool USA	*2,198,513.9*	*102%*
FluoroFusion Specialty Chemicals[d]	*1,933,157.6*	*120%*
Technical Chemical	*1,713,914.1*	*79%*
Hudson Technologies	*1,650,725.5*	*78%*
Solstice Advanced Materials US (formerly Honeywell)	*1,611,317.4*	*3%*
Walmart	*1,437,594.4*	*100%*
RMS of Georgia	*1,029,233.0*	*99%*
Daikin America	*993,427.8*	*50%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[b] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[c] When compared to the number of allowances issued under EPA's methodology.

[d] At some point for 2025, this entity reported to EPA as having imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 11. Top 15 Entities - 2025 General Pool Consumption Allowances Used for HFC Imports by Percent[a]

Entity	*Consumption Allowances Used for HFC Imports Compared to Issued Allowances (Percent)[b]*	*Number of Allowance Issued (MTEVe)*
First Continental International	*708%*	*486,962.7*
Cross World Group	*234%*	*126,446.8*
Waysmos USA	*201%*	*354,712.2*
Summit Refrigerants	*138%*	*126,446.8*
IGas Holdings	*136%*	*16,514,965.1*
Weitron	*124%*	*4,009,333.5*
FluoroFusion Specialty Chemicals[c]	*120%*	*1,614,609.9*
A-Gas	*117%*	*2,156,453.7*
National Refrigerants	*108%*	*12,528,840.8*
RGAS LLC	*107%*	*2,893,842.3*
ICool USA	*102%*	*2,155,102.6*
Lina Trade	*100%*	*126,446.8*
CC Packaging	*100%*	*122,653.4*
Automart Distributors DBA Refrigerant Plus	*100%*	*126,446.8*
Lenz Sales & Distribution	*100%*	*702,334.8*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[b] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, and transfers; only includes entities that received initial allowances from EPA. Values do not include expenditures of conferred application-specific allowances, as an equal starting and end point may be most accurately reflected by how many allowances these entities received under EPA's methodology for historic HFC activity.

[C] At some point for 2025, this entity reported to EPA as having imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Tables 12-19 show all HFC consumption allowance transfer activity (by volume and by percent) between 2022 and 2025. The number of HFC consumption allowances transferred to or from entities, also includes allowance adjustments, including administrative consequences, acquisitions, request for additional consumption allowances, and transfers. Adjustments for consumption allowances do not include the conferral of ASAs, as those are their own category of allowances. As a result, it is possible for entities to appear, when expressed as a percentage, as if they are transferring more allowances than they received from EPA. EPA reiterates that 2025 production and consumption data are still being verified, but to the extent that transfers require the Agency

to issue a non-objection notice after a review for approvability, transfer data for calendar year 2025 is wholly accurate and complete.

Beginning in 2024, there was an observed increase in the number of participants and activity in the transfer market compared to 2022 and 2023. In 2022 and 2023, there were 15 or fewer participants either transferring or receiving HFC consumption allowances, compared to 2024 where there were 24 entities that transferred allowances away and 2025 where more than 30 entities transferred allowances away. As the regulated community gains more experience with the HFC phasedown in general, it is reasonable to see an increase in transfers. As one example, companies may have been initially reluctant to transfer their consumption allowances due to a range of factors, including but not limited to, the submission and approval process, or treatment in any future rulemakings concerning EPA's allocation methodology. Another factor that may have affected a subset of entities beginning in 2024 was lifting the restrictions on transfers. Entities that were previously issued allowances in 2022 and 2023 as new market entrants were prohibited from transferring allowances to other entities in years prior to 2024.

Additionally, it's possible that transfer activity increased beginning in 2024 due to anomalies in retail pricing. For example, EPA observed that standard contractor-sized cylinders of R-410A were being sold at one-third of the expected cost in 2024, and as a result, some importers may have found it more advantageous to transfer their consumption allowances to other entities to either produce or import on their behalf in this particular year. As previously described in the allowance expenditure discussion that accompanies Tables 4 through 11, certain entities may have developed new or evolving business relationships necessitating a higher number or frequency of transfers. Lastly, EPA is aware that some entities may be transferring their HFC consumption allowances solely for monetary gain and are no longer in the HFC market either as a direct importer or distributor.

The Agency also notes that the total number of allowances transferred ranged from approximately 6.5 percent (2023) to 6.7 percent (2022) when compared to the number of consumption allowances available to the general pool, *i.e.*, excluding allowances issued to application-specific end users. These percentages increased to approximately 8.2 percent in 2024 and 12.0 percent in 2025. In other words, even as the total number of available allowances decreased as a result of the phasedown schedule reduction step that began in 2024, relative consumption allowance transfer activity increased.

Table 12. 2022 General Pool Consumption Allowance Transfers to Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers to Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Honeywell International	16,295,925.5	-20%
RGAS LLC	621,860.0	-48%
Daikin America	241,112.6	-8%
GlaxoSmithKline	201,400.0	-38%
Advanced Specialty Gases	164,808.0	-58%
RMS of Georgia	130,592.0	-8%
Linde	83,182.7	-16%
Refrigerants, Inc.	26,506.2	-100%
Mondy Global	22,870.9	-7%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] When compared to the number of allowances issued under EPA's methodology; these values are expressed as negative because they were transfers away from the corresponding entities.

Table 13. 2022 General Pool Consumption Allowance Transfers from Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers Received from Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Chemours	10,620,744.0	32%
Mexichem Fluor DBA Koura	3,226,142.5	13%
Arkema	1,507,030.6	5%
A-Gas	571,428.6	18%
Bluon	250,000.0	748%
Weitron	193,585.0	3%
Waysmos USA	156,960.0	25%
ChemPenn, LLC	124,373.3	N/A (not issued allowances)
Electronic Fluorocarbons	79,221.5	76%
National Refrigerants	62,750.0	0%
IsleChem by Aceto	50,005.0	N/A (not issued allowances)
Cross World Group	25,244.0	13%
Nature Gas Import and Export	17,600.0	2%
RTR Suppliers	2,600.0	1%
Fireside Holdings Inc (DBA American Refrigerants)	619.0	0%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] When compared to the number of allowances issued under EPA's methodology.

Table 14. 2023 General Pool Consumption Allowance Transfers to Other Entities Compared Allowances Issued

Entity	Consumption Allowance Transfers to Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Honeywell International (now Solstice)	14,505,244.1	-18%
Arkema	1,008,622.3	-3%
Solvay Fluorides	1,002,459.1	-91%
RGAS LLC	474,518.0	-37%
Air Liquide USA	226,065.0	-45%
ICool USA	110,250.0	-3%
Mondy Global	66,116.7	-21%
Refrigerants, Inc.	26,484.6	-100%
Linde	19,031.8	-4%
Advanced Specialty Gases	16,658.3	-6%
Electronic Fluorocarbons	2,924.9	-3%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] When compared to the number of allowances issued under EPA's methodology; these values are expressed as negative because they were transfers away from the corresponding entities.

Table 15. 2023 General Pool Consumption Allowance Transfers from Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers Received from Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Chemours	13,019,528.3	39%
Mexichem Fluor DBA Koura	1,114,532.5	4%
A-Gas	656,350.5	20%
First Continental International	625,800.0	81%
Bluon	500,000.0	1494%
Wego Chemical Group	278,100.0	N/A (was not issued allowances)
Ability Refrigerants	255,865.0	128%
Cross World Group	25,223.4	13%
IsleChem by Aceto	11,645.0	N/A (was not issued allowances)
Daikin America	1,000.0	0% (rounded)
Fireside Holdings Inc (DBA American Refrigerants)	619.0	0% (rounded)

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] When compared to the number of allowances issued under EPA's methodology.

Table 16. 2024 General Pool Consumption Allowance Transfers to Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers to Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Arkema	8,063,078.1	-40%
Honeywell International (now Solstice)	2,332,695.6	-4%
ICool USA	766,500.0	-35%
Solvay Fluorides	675,911.9	-95%
Advance Auto Parts	462,262.5	-100%
Waysmos USA	366,349.5	-101%
Technical Chemical	238,374.0	-11%
ComStar International	231,929.3	-100%
Advanced Specialty Gases	184,520.7	-100%
KiddeFenwal, LLC	129,280.9	-100%
Hungry Bear	129,280.9	-100%
TradeQuim	129,280.9	-100%
North American Refrigerants	129,280.8	-100%
SDS Refrigerant Services	128,987.8	-100%
Wesco HMB	128,956.8	-100%
Reclamation Technologies	128,663.9	-50%
AW Product Sales & Marketing	78,169.0	-100%
USSC Acquisition Corp	73,500.0	-87%
Nature Gas Import and Export	25,733.3	-5%
AFS Cooling	18,786.6	-15%
ChemPenn, LLC	14,320.0	-100%
Fireside Holdings Inc (DBA American Refrigerants)	10,715.3	-8%
Daikin America	89.8	-0% (rounded)
ACT Commodities	49.9	-99%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] When compared to the number of allowances issued under EPA's methodology; these values are expressed as negative because they were transfers away from the corresponding entities.

Table 17. 2024 General Pool Consumption Allowance Transfers from Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers from Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Chemours	8,004,985.8	59%
First Continental International	2,322,165.0	559%
Mexichem Fluor DBA Koura	955,404.2	23%
RGAS LLC	710,313.7	124%
A-Gas	421,925.7	120%

IGas Holdings	415,000.0	127%
FluoroFusion Specialty Chemicals	220,885.0	113%
Summit Refrigerants	200,000.0	254%
Electronic Fluorocarbons	148,399.6	127%
Wego Chemical Group	101,863.4	379%
IsleChem by Aceto	38,907.9	N/A (not issued allowances)
Ohio Green Systems LLC	85.5	N/A (not issued allowances)

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] When compared to the number of allowances issued under EPA's methodology.

Table 18. 2025 General Pool Consumption Allowance Transfers to Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers to Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Solstice Advanced Materials US (formerly Honeywell)	8,576,727.7	-16%
Arkema	5,195,682.7	-26%
AutoZone Parts	1,248,087.6	-98%
Daikin America	945,175.8	-48%
Solvay Fluorides	700,446.7	-100%
Advance Auto Parts	454,128.2	-100%
Nature Gas Import and Export	444,564.3	-86%
Technical Chemical	417,154.4	-19%
Reclamation Technologies	379,000.0	-100%
ComStar International	228,366.4	-100%
Air Liquide USA	158,550.0	-50%
Advanced Specialty Gases	135,097.2	-75%
KiddeFenwal, LLC	127,006.0	-100%
AFS Cooling	127,005.9	-100%
SDS Refrigerant Services	127,005.9	-100%
TradeQuim	127,005.9	-100%
Tyco Fire Products	127,005.9	-100%
North American Refrigerants	126,991.9	-100%
A.C.S. Reclamation & Recovery	126,945.0	-100%
Ability Refrigerants	126,688.5	-100%
Hungry Bear	125,685.0	-99%
GlaxoSmithKline	120,120.0	-35%
Metalcraft Inc	102,239.8	-100%
Chemp Technology	99,785.7	-79%

AW Product Sales & Marketing	76,793.5	-100%
Wesco HMB	66,682.9	-53%
MEK Chemical Corporation	52,747.8	-100%
Wego Chemical Group	23,159.8	-65%
Wilhelmsen Ships Service	21,000.0	-82%
ChemPenn, LLC	14,122.5	-100%
Fireside Holdings Inc (DBA American Refrigerants)	1,100.0	-1%

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] When compared to the number of allowances issued under EPA's methodology; these values are expressed as negative because they were transfers away from the corresponding entities.

Table 19. 2025 General Pool Consumption Allowance Transfers from Other Entities Compared to Allowances Issued

Entity	Consumption Allowance Transfers from Other Entities (MTEVe)	Transferred Allowances (Percent)[a]
Mexichem Fluor Inc.	6,356,024.1	39%
Chemours	6,015,847.7	28%
First Continental International	2,939,359.0	604%
Weitron	961,632.1	24%
West Coast Distribution Center, Inc.	757,503.0	N/A (was not issued allowances)
National Refrigerants	656,067.8	5%
A-Gas	472,161.7	22%
FluoroFusion Specialty Chemicals	317,491.8	20%
Hudson Technologies	294,520.9	14%
IGas Holdings	206,206.6	1%
Cross World Group	169,771.2	134%
RGAS LLC	62,539.4	2%
Summit Refrigerants	48,500.0	38%
IsleChem by Aceto	27,400.0	N/A (was not issued allowances)
ICool USA	25,115.6	1%
AC Pro Inc.	11,023.8	N/A (was not issued allowances)
Matheson Tri-Gas, Inc.	7,619.0	35%
Amneal Pharmaceuticals	167.4	N/A (was not issued allowances)

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] When compared to the number of allowances issued under EPA's methodology.

Tables 20-27 show the top 15 entities, by MTEVe, with the most remaining available consumption allowances (by volume and by percent) at the end of each year between 2022

through 2025. In each instance, the total number of consumption allowances expended (for both production and imports) as well as allowance adjustments have been accounted for. These adjustments reflect administrative consequences, acquisitions, requests for additional consumption allowances, and transfers. Adjustments for consumption allowances do not include the conferral of ASAs, as those are their own category of allowances. Similarly, any ASAs that are conferred to entities, and subsequently used to import regulated HFCs, are not included in expenditure values. Any conferred ASAs that were unused at the end of the year are also not reflected in remaining available allowance values. The tables comparing the remaining consumption allowances to the number of allowances that were issued only include entities that received allowances from EPA. Consumption allowance usage expressed as a percentage of allowances issued may be a helpful marker when compared to the volume of allowances (*e.g.*, an entity may appear to have a high number of unused allowances, but that number may be proportionally low when compared to the number of allowances issued). Due to the inclusion of all allowance adjustments, there are instances when the number of unused allowances when expressed as a percentage of the number of allowances issued is greater than 100 percent. Some companies listed in the following tables imported regulated HFCs without expending the requisite number of allowances at the time of import. In such cases, EPA has addressed them through administrative consequences, enforcement actions, or a combination of both mechanisms.[10]

When comparing the data in the following tables to tables showing the number of allowances used for imports, and their corresponding percentages, we see certain entities are legally importing regulated HFCs totaling more than 100 percent of the number of issues allowances issued to them. However, these entities also have a substantial number of remaining allowances at the end of the applicable year by both MTEVe and percentage of issued allowances. EPA notes that these occurrences, while not intuitive, are regulatorily permissible. Specifically, the comparison point for percentages is based on the number of allowances issued to each entity, whereas total allowance activity adjusts for the factors described earlier in this section. For example, an entity may have obtained more HFC consumption allowances than they needed through transfers and may have submitted requests and been granted more consumption allowances (*i.e.*, RACAs for exports) than they could feasibly use before the end of the calendar year. Additionally, entities may have chosen to use ASAs that were conferred to them for imports, rather than

[10] Information about EPA's administrative consequences can be found on this webpage: https://www.epa.gov/hfcs/administrative-consequences-under-hfc-allocation-rule. Information about EPA's enforcement actions under the AIM Act can be found on this webpage: https://www.epa.gov/enforcement/enforcement-american-innovation-and-manufacturing-act-2020.

expending EPA-issued HFC consumption allowances or allowances obtained as part of a transfer.

Producers of regulated HFCs manufacture these chemicals in a manner that aligns with market conditions, including but not limited to: customer needs, infrastructure capacity, and other internal or external factors that necessitate periodic or unscheduled increases or decreases in production. As noted in Section 2.2.1 discussing production allowances and expenditure, EPA reiterates that producers are limited by the number of consumption allowances they hold. Meaning, manufacturing regulated HFCs in an amount equal to an entity's production allowances requires the company to receive transferred consumption allowances, or have approved RACAs. The latter requires exports to occur and a request to be made to EPA. The Agency recognizes that there may be periods of higher or lower production, but overall, regulated HFCs are typically produced throughout the year. As a result of variation in production, some producers may have remaining consumption allowances at the end of the calendar year, in part due to approved RACAs that could not be used for production.

Importers who rely on a combination of domestic and international customers face similar challenges using their approved requests for additional consumption allowances. Due to factors like port of entry logistics or delays, the overall import processing times, or the inability to import standard business quantities, (*e.g.*, full containers of regulated HFCs), these entities may not be able to use RACAs as effectively as intended.

Lastly, there are instances where international suppliers of regulated HFCs require their customers (importers) to order minimum quantities, (*e.g.*, 1,000 metric tons [MT] or a specific number of cylinders per order). This results in importers having remaining consumption allowances available that cannot be used because they are less than their suppliers' minimum order requirement.

Table 20. Top 15 Entities - 2022 General Pool Remaining Available Consumption Allowances

Entity	Remaining Available Consumption Allowances (MTEVe)[a]	Remaining Available Consumption Allowances (Percent)[b]
Chemours	3,055,806.4	9%
Arkema	1,802,766.2	6%
Mexichem Fluor DBA Koura	525,538.3	2%
A-Gas	322,751.8	10%
Air Liquide USA	228,382.3	46%

Entity	Remaining Available Consumption Allowances (MTEVe)[a]	Remaining Available Consumption Allowances (Percent)[b]
Certified Refrigerant Services	200,000.0	100%
Linde	171,980.6	32%
Technical Chemical	161,313.9	17%
AutoZone Parts	148,483.1	6%
First Continental International	80,565.9	10%
Resonac America, Inc.[c]	73,344.7	100%
Walmart	38,724.7	2%
Daikin America	38,443.0	1%
Weitron	24,986.9	0% (rounded)
National Refrigerants	14,799.6	0% (rounded)

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption. allowances, transfers, and consumption allowance expenditure (including both production and import).

[b] When compared to the number of allowances issued by EPA.

[c] At some point in 2022, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 21. Top 15 Entities - 2022 General Pool Remaining Available Consumption Allowances by Percent

Entity	Remaining Available Consumption Allowances Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
Certified Refrigerant Services	100%	200,000.0
Resonac America, Inc.[b]	100%	73,344.7
Sciarra Laboratories	100%	8,700.0
SynAgile Corporation	100%	1,125.1
ACT Commodities	100%	77.8
Air Liquide USA	46%	497,703.2
Iofina Chemical	34%	1,262.8
Linde	32%	531,619.8
Transocean Offshore Deepwater Drilling	23%	16.7
Technical Chemical	17%	972,523.8
First Continental International	10%	768,560.8
A-Gas	10%	3,203,908.1
Chemours	9%	33,327,301.0

Entity	Remaining Available Consumption Allowances Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
AutoZone Parts	6%	2,482,538.7
Arkema	6%	31,023,931.5

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import); only includes entities that received initial allowances from EPA.
[b] At some point in 2022, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 22. Top 15 Entities - 2023 General Pool Remaining Available Consumption Allowances

Entity	Remaining Available Consumption Allowances (MTEVe)[a]	Remaining Available Consumption Allowances (Percent)[b]
Arkema	6,870,734.0	22%
Mexichem Fluor DBA Koura	1,269,601.9	5%
Honeywell International (now Solstice)	520,827.2	1%
Chemours	365,443.1	1%
Linde	215,480.2	40%
Advance Auto Parts	190,699.1	100%
American Air Components	159,191.5	80%
Air Liquide USA	85,327.7	17%
USSC Acquisition Corp	78,321.0	60%
Resonac America, Inc.[c]	73,466.6	100%
First Continental International	52,966.9	7%
Bluon	46,995.4	140%
Meraki Group	43,933.7	22%
Metalcraft Inc	37,370.0	23%
Tulstar Products	33,099.1	5%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import).
[b] When compared to the number of allowances issued by EPA.
[c] At some point in 2023, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 23. Top 15 Entities - 2023 General Pool Remaining Available Consumption Allowances by Percent

Entity	Remaining Available Consumption Allowances Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
Bluon	140%	33,459.8
Advance Auto Parts	100%	190,699.1
Resonac America, Inc.[b]	100%	73,466.6
Sciarra Laboratories	100%	8,700.0
SynAgile Corporation	100%	1,125.1
ACT Commodities	100%	77.8
Transocean Offshore Deepwater Drilling	100%	16.8
American Air Components	80%	200,000.0
USSC Acquisition Corp	60%	131,451.0
Iofina Chemical	53%	1,264.9
Linde	40%	532,503.3
Wilhelmsen Ships Service	25%	40,392.5
Metalcraft Inc	23%	161,000.0
Arkema	22%	31,075,488.7
Meraki Group	22%	200,000.0

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.

[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import); only includes entities that received initial allowances from EPA.

[b] At some point in 2023, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 24. Top 15 Entities - 2024 General Pool Remaining Available Consumption Allowances

Entity	Remaining Available Consumption Allowances (MTEVe)[a]	Remaining Available Consumption Allowances (Percent)[b]
Chemours	998,443.7	5%
Honeywell International (now Solstice)	788,661.9	1%
Air Liquide USA	269,399.3	84%
Mexichem Fluor DBA Koura	234,630.9	1%
Arkema	173,169.0	1%
Electronic Fluorocarbons	149,286.7	222%
GlaxoSmithKline	148,358.8	43%

Golden Refrigerant	129,292.3	100%
Tyco Fire Products	129,292.3	100%
First Continental International	91,024.8	18%
Tulstar Products	78,677.4	17%
National Refrigerants	77,402.4	1%
Technical Chemical	49,568.7	2%
Weitron	48,301.2	1%
Matheson Tri-Gas, Inc.	47,672.1	217%

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption. allowances, transfers, and consumption allowance expenditure (including both production and import).
[b] When compared to the number of allowances issued by EPA.

Table 25. Top 15 Entities - 2024 General Pool Remaining Available Consumption Allowances by Percent

Entity	Remaining Available Consumption Allowances Compared to Issued Allowances (Percent)[a]	Number of Allowances Issued (MTEVe)
Electronic Fluorocarbons	222%	67,293.9
Matheson Tri-Gas, Inc.	217%	22,015.7
Golden Refrigerant	100%	128,987.8
Tyco Fire Products	100%	128,987.8
Sciarra Laboratories	100%	5,604.6
SynAgile Corporation	100%	725.8
Transocean Offshore Deepwater Drilling	100%	11.0
Air Liquide USA	84%	321,682.9
Iofina Chemical	51%	817.1
GlaxoSmithKline	43%	347,339.2
Ability Refrigerants	30%	128,987.8
First Continental International	18%	496,747.8
KiddeFenwal, LLC	17%	128,987.8
Tulstar Products	17%	473,694.4
Chemp Technology	7%	128,987.8

Source: U.S. EPA. (2025). *HFC Data Hub*. Available online at https://www.epa.gov/hfcs/hfc-data-hub.
[a] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import); only includes entities that received initial allowances from EPA.

Table 26. Top 15 Entities - 2025 General Pool Remaining Available Consumption Allowances[a]

Entity	*Remaining Available Consumption Allowances (MTEVe)[b]*	*Remaining Available Consumption Allowances (Percent)[c]*
Mexichem Fluor Inc.	*1,520,121.1*	*9%*
Chemours	*1,404,062.9*	*6%*
Hudson Technologies	*782,715.1*	*37%*
West Coast Distribution Center, Inc.	*757,503.0*	*N/A (Not issued allowances)*
Linde	*293,488.1*	*87%*
Solstice Advanced Materials US (formerly Honeywell)	*224,048.5*	*0% (rounded)*
A-Gas	*200,160.6*	*9%*
Arkema	*160,296.2*	*1%*
Air Liquide USA	*158,165.8*	*50%*
Electronic Fluorocarbons	*77,741.6*	*118%*
Meraki Group	*45,860.7*	*36%*
Daikin America	*44,278.9*	*2%*
Technical Chemical	*38,699.7*	*2%*
Matheson Tri-Gas, Inc.[d]	*36,128.4*	*167%*
Harp USA	*32,970.7*	*7%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[b] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import).

[c] When compared to the number of allowances issued by EPA.

[d] At some point in 2025, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

Table 27. Top 15 Entities - 2025 General Pool Remaining Available Consumption Allowances by Percent[a]

Entity	Remaining Available Consumption Allowances Compared to Issued Allowances (Percent)[b]	Number of Allowances Issued (MTEVe)
Matheson Tri-Gas, Inc.[c]	*167%*	*21,582.0*
Electronic Fluorocarbons	*118%*	*65,968.2*
SynAgile Corporation	*100%*	*711.3*
Sciarra Laboratories	*100%*	*5,500.4*
ACT Commodities	*100%*	*49.2*
Transocean Offshore Deepwater Drilling	*100%*	*10.6*
Linde	*87%*	*336,839.5*
Iofina Chemical	*75%*	*800.3*
Air Liquide USA	*50%*	*315,346.4*
Hudson Technologies	*37%*	*2,129,502.6*
Meraki Group	*36%*	*126,446.8*
Freskoa USA	*22%*	*126,446.8*
Wilhelmsen Ships Service	*17%*	*25,550.4*
Mexichem Fluor Inc.	*9%*	*16,117,355.6*
A-Gas	*9%*	*2,156,453.7*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[b] Factors in administrative consequences and/or acquisitions, requests for additional consumption allowances, transfers, and consumption allowance expenditure (including both production and import); only includes entities that received initial allowances from EPA.

[c] At some point in 2025, this entity imported more regulated HFCs than they had the necessary allowances required to be expended at the time of import.

2.3. Application-Specific Allowance Usage

The AIM Act required EPA, beginning on December 27, 2020, to allocate the full quantity of allowances necessary for the production or consumption of HFCs for the exclusive use in six specified applications for a five-year period. Allocations for the six applications are based on projected, current, and historical trends. To implement this provision, EPA established ASAs. In the 2025 Application-specific Allowance Review and Renewal Rule, EPA renewed eligibility for ASAs for five applications for the full five-year period from 2026-2030: propellants in metered dose inhalers (MDIs); structural composite preformed polyurethane (SCPPU) foam for marine use and trailer use (hereafter referred to as SCPPU foam for marine and trailer uses); the etching of semiconductor material or wafers and the cleaning of chemical vapor deposition (CVD) chambers within the semiconductor

manufacturing sector; mission-critical military end uses (MCMEU); and onboard aerospace fire suppression.[11]

ASA holders may acquire HFCs through the conferral of their allowances up the supply chain to their suppliers or by expending ASAs for direct import of the HFCs. From 2022 to 2025, EPA allocated approximately two to five percent of the total allocation of allowances to ASA holders. In addition to conferring or expending their allowances, ASA holders can also choose to purchase HFCs from a domestic producer, importer, or other supplier without using their own ASAs, like most other companies who use HFCs. Since allowances must only be expended at the time the HFCs are produced or imported, the purchase of HFCs already imported or produced does not require allowances.

Suppliers may request that ASA holders confer allowances to them as part of their transaction agreement, or an ASA holder may choose to confer their allowances to their suppliers. The supplier may then expend those conferred ASAs to produce or import HFCs or confer them again up the supply chain. Alternatively, the supplier may choose to expend their own production and/or consumption allowances to produce or import those HFCs.[12]

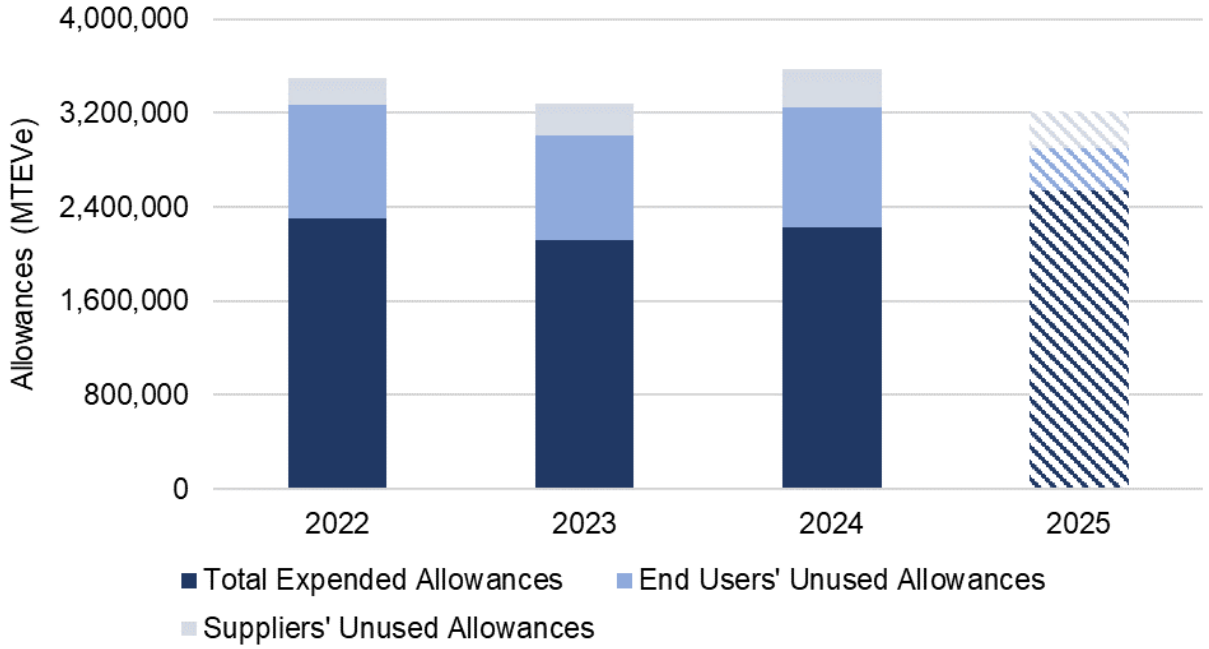
Figures 3-7 show ASA activity from 2022 to 2025 for all applications and the semiconductor and MDI applications separately. In the figures, the height of each bar represents the total number of allowances allocated in the listed year across applications. Figures that include MDI allowance activity also reflect consumption allowances allocated to GlaxoSmithKline.[13] To protect confidential business information, EPA is not providing disaggregated data on SCPPU foam for marine and trailer uses and onboard aerospace fire suppression and the number of unused ASAs held by MDI suppliers.[14] Data for 2025 are preliminary at this time. The figures do not show data for defense sprays or MCMEU. The figures do not reflect minor allowance adjustments from administrative consequences, pro rata distributions, allowance transfer offsets, or additional consumption allowances. Appendix A includes the data tables for these figures, as well as data on adjustments.

Figure 3 shows initial allowance allocations and allowances left unused by end users and suppliers at the end of each year, from 2022 to 2025. “Unused” allowances include allowances that are unexpended, unconferred, or untransferred consumption allowances

[11] 90 FR 41676 (August 26, 2025).
[12] EPA does not participate in the transactions between an ASA holder and their supplier and has little insight into the reasons why entities choose to confer ASAs or why suppliers choose to expend their own production and consumption allowances or conferred ASAs.
[13] As a historical HFC importer, GlaxoSmithKline is the only ASA holder that also receives general pool allowances.
[14] For more information on how EPA treats data collected under the AIM Act, see 86 FR 55116, 55191 (October 5, 2021).

by GlaxoSmithKline by the end of the year. Figure 3 depicts how many allowances remained for end users and suppliers at the end of each calendar year, where suppliers' remaining ASAs are based only on approved conferrals.

Figure 3. ASAs Unused by ASA Holders vs. Suppliers (all applications) (MTEVe), 2022-2025[a,b,c]



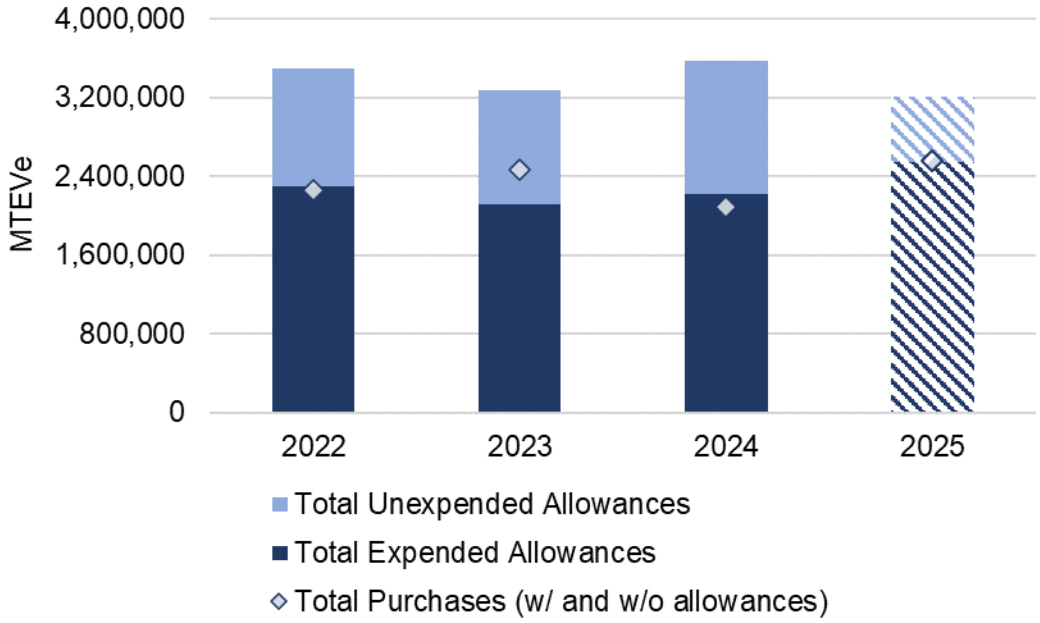
Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] The height of each bar represents the total number of ASAs allocated in the listed year across applications. Data does not include allowance activity for defense sprays or mission-critical military end uses. Allowances for MDIs include consumption allowances allocated to GlaxoSmithKline.
[b] "Total Expended Allowances" excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023. "Total Expended Allowances" includes both expenditure by suppliers and expenditure by end users to directly import HFCs.
[c] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

From 2022 to 2025, an average of about 32 percent of all allocated allowances went unused by ASA end users and suppliers across all applications, with 2024 being the year with the highest percentage of allowances unused at 38 percent. This indicates that in some cases, suppliers did not need or were not able to use allowances that ASA holders had conferred to them. There are a variety of possible explanations for why suppliers would not use all the allowances conferred to them. One explanation is that they may have had sufficient production and/or consumption allowances of their own. The Agency's current methodology for issuing production and consumption allowances to historical producers and importers accounts for data from 2011 to 2019, when these allowance holders may have been producing or importing regulated HFCs, including the amounts needed for ASA

uses. ASA holders may also confer too late in the calendar year such that there is not enough lead time to import a shipment of HFCs. HFC suppliers may choose to require a conferral if they are using a domestic HFC inventory to fill the order. EPA does not have insights into which factors are contributing the most to ASAs going unused.

Figure 4 compares total expended and unexpended allowances remaining at the end of the year to HFC purchases reported by ASA holders. "Total Expended Allowances" includes both expenditure by suppliers and expenditure by end users to directly import HFCs.

Figure 4. ASA Expenditures and Reported Purchases (all applications) (MTEVe), 2022-2025[a,b,c]



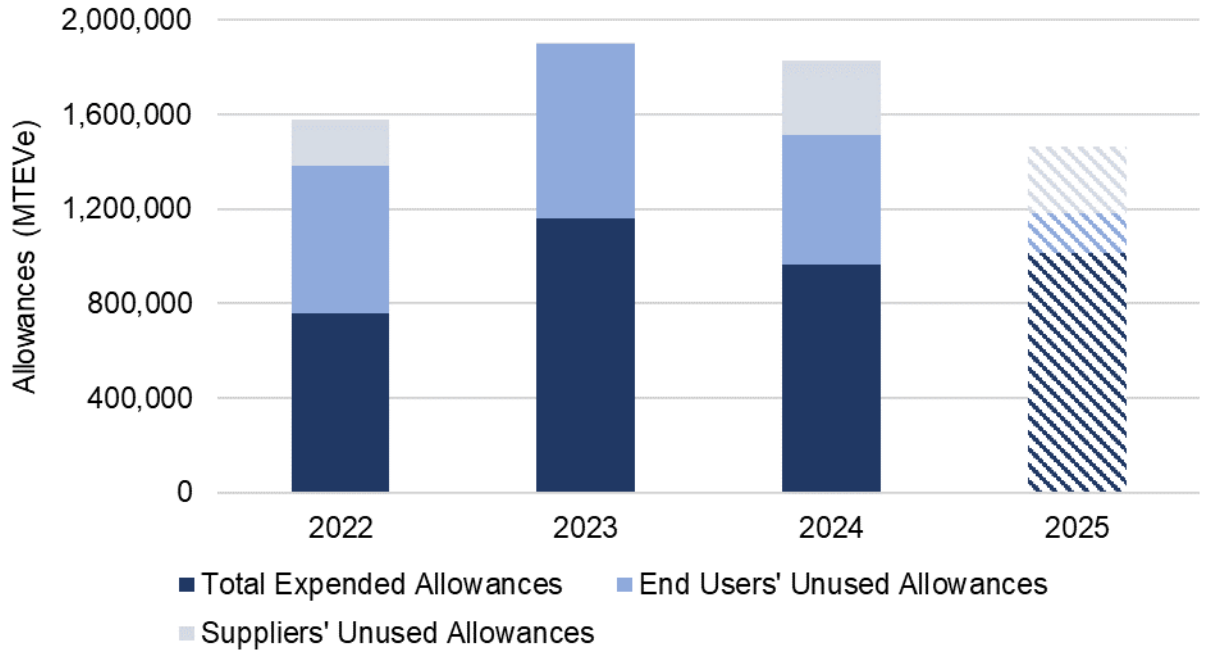
Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] Data does not include activity for defense sprays or mission-critical military end uses. Allowances for MDIs include consumption allowances allocated to GlaxoSmithKline.
[b] "Total Expended Allowances" excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023. "Total Expended Allowances" includes both expenditure by suppliers and expenditure by end users to directly import HFCs.
[c] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

The quantity of expended ASAs each year appears to roughly approximate total HFC purchases for that year; but since end users have the option to purchase HFCs on the open market without the use of ASAs, HFC purchases can sometimes exceed ASA expenditures, like in 2023. However, there may be other factors that cause purchases to not align with allowance expenditure within a given year, such as ASA holders purchasing material that suppliers produced or imported in the prior year.

Figures 5 to 7 show the same data as Figures 3 and 4 but are limited to the semiconductor and MDI applications.

Figure 5 shows semiconductor allowance activity where "unused" allowances include unexpended and unconferred semiconductor allowances by the end of the year.

Figure 5. Semiconductor Allowances Unused by ASA Holders vs. Suppliers (MTEVe), 2022-2025[a,b,c]



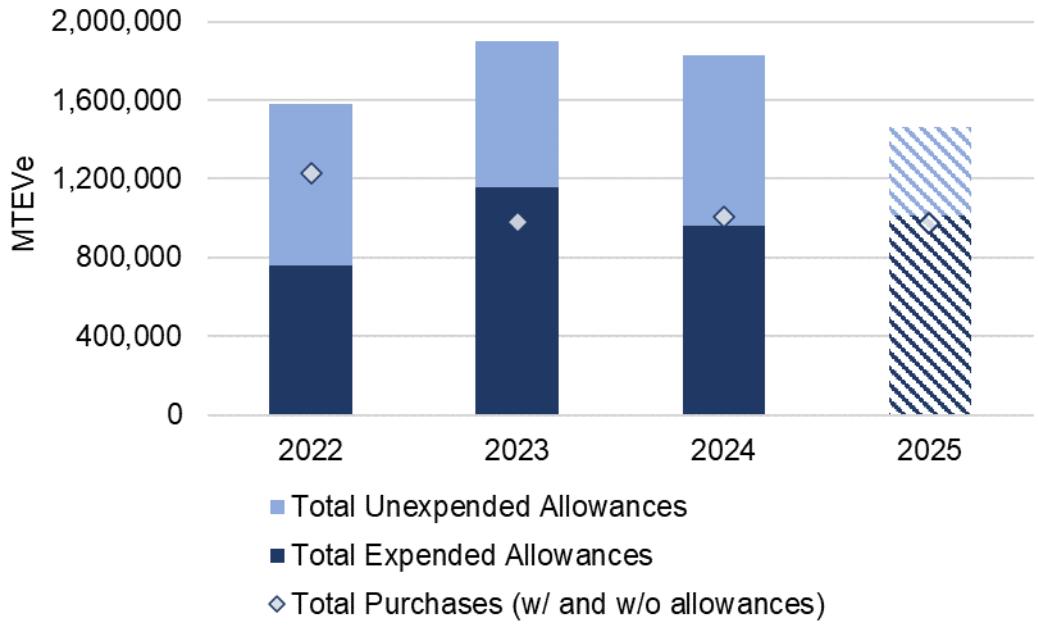
Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] The height of each bar represents the total number of ASAs allocated in the listed year for the semiconductor application.
[b] "Total Expended Allowances" excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023.
[c] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

On average, semiconductor end users and suppliers used approximately 58 percent of allowances that were allocated from 2022 to 2025. This may suggest one or a combination of the following: (1) end users were able to purchase a portion of the needed HFCs without the use of ASAs; (2) suppliers had the means to supply ASA holders without having to expend ASAs, by either relying on their own production and consumption allowances or drawing from existing domestic inventory; and (3) ASA holders did not need their full ASA allocations. In 2022 and 2023, two suppliers illegally imported HFCs without the requisite number of allowances, which they reported as expending ASAs for semiconductor use; however, the allowances were not conferred. These quantities are not reflected in Figure

5.[15] EPA notes that in 2023, suppliers expended nearly all ASAs semiconductor end users properly conferred, however, nearly 40 percent of semiconductor ASAs were not conferred and thus went unused.

Figure 6 shows the levels of HFC purchases compared to expended allowances in the semiconductor application. EPA notes that the data for HFC purchases displays only what is reported to EPA. The Agency is aware that there are various entities that use HFCs for semiconductor etching and/or CVD chamber cleaning but have not requested or received ASAs to date. EPA is not aware why some entities have chosen not to request ASAs, however, possible explanations include, but are not limited to, their suppliers have had the means to supply HFCs by using their own allowances or drawing from existing domestic inventory; they use a small quantity of HFCs; or the semiconductor end users have relied on their own domestic inventory. As a result, the total amount of purchases may not be representative of the total U.S. HFC demand for semiconductor etching and CVD chamber cleaning.

Figure 6. Semiconductor Allowance Expenditures and Reported Purchases (MTEVe), 2022-2025[a,b]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] "Total Expended Allowances" excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023.

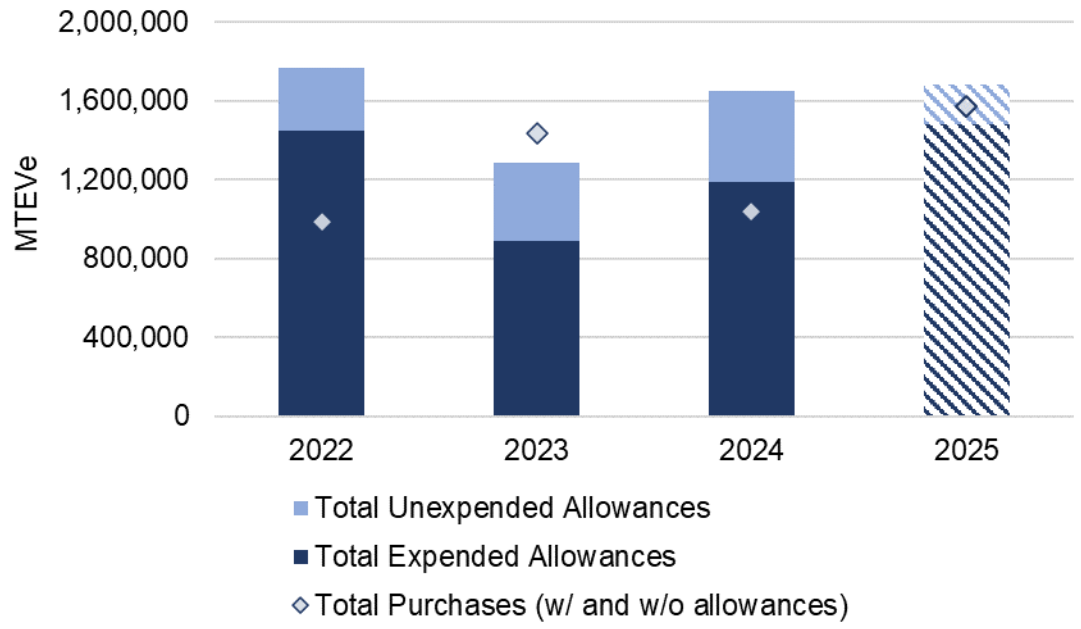
[15] EPA has issued administrative consequences and/or taken enforcement action for entities that imported without allowances for semiconductor use without having the requisite ASAs. See Docket ID No. CAA-09-2024-0038.

[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

Generally, semiconductor end users have reported purchasing HFCs in quantities similar to the quantity of allowances expended by their suppliers. However, in 2022, semiconductor HFC purchases exceeded allowance expenditures. In addition to the factors described above with respect to Figure 4, such as suppliers relying on stocks from prior years, another possible explanation for the mismatch in purchases and allowance expenditure in 2022 is that 2022 was the first year of the HFC Allocation Program and stakeholders were still becoming familiar with the regulatory provisions for the conferral and use of ASAs. In each year from 2022 to 2025, semiconductor ASA holders reported purchasing a smaller quantity of HFCs on an MTEVe basis than EPA allocated to the application. On average, HFC purchases made by semiconductor ASA holders only account for 63 percent of the application's total allocated amount.

Figure 7 compares the levels of HFC purchases to allowances expended in the MDI application. "Total Expended Allowances" includes both expenditure by suppliers and expenditure by end users to directly import HFCs. This figure also includes consumption allowances allocated to and expended by GlaxoSmithKline as a historical importer.

Figure 7. MDI Allowance Expenditures and Reported Purchases (MTEVe), 2022-2025[a,b,c]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] Allowances include consumption allowances allocated to GlaxoSmithKline.
[b] "Total Expended Allowances" includes both expenditure by suppliers and expenditure by end users to directly import HFCs.

[c] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

MDI end users and suppliers expended approximately 78 percent of their allocated allowances on average between 2022 and 2025. HFC purchases made by MDI ASA holders were equivalent to about 81 percent of the application's total allocated level on average during the same period. In 2023, MDI end users purchased approximately 13 percent more HFCs by MTEVe than the application's allocated amount.

Finally, an ASA holder may sell or convey HFCs produced or imported by expending ASAs to another entity within the same application (application-specific purchaser). In these cases, holders are required to submit an HFC Sale or Conveyance Report for approval before the sale or conveyance can take place.[16] However, no such reports have been submitted to date.

[16] 40 CFR 84.21.

3. Source of HFCs in the U.S. Market

EPA has required entities to report data on HFC production, import, and export activity since 2022. Section 3 presents 2022-2025 data reported to EPA on U.S. HFC production, imports, and exports. Production and import values throughout this section—apart from Section 3.5—reflect HFCs produced or imported for consumptive use, which do not include HFCs produced or imported for transformation[17] or destruction. EPA is in the process of verifying reported production and import data for 2025, and the corresponding values in this section for 2025 are preliminary.

3.1. HFC Production and Import

In general, the proportion of HFCs that the United States produces domestically relative to amounts of HFCs the U.S. imports has remained stable from 2022 to 2025, on both an MT and MTEVe[18] basis. This consistency indicates that the United States continues to rely on both domestic production and imports to meet demand. However, the production and import of individual HFCs is evolving, as domestic producers appear to concentrate production on select HFCs, and as the U.S. demand shifts toward certain chemicals and blends. While the United States continues production of higher EV chemicals, including HFC-125, HFC-134a, and HFC-245fa, production of these chemicals has declined since 2022; conversely, production of lower EV chemicals like HFC-32 and HFC-152a has increased or remained consistent, despite the phasedown. There are also some HFCs the United States imports exclusively.

While the phasedown decreased imports and production of HFCs from 2022-2025, the proportion of HFCs produced domestically has remained consistent, deviating by less than five percent by MT and less than six percent by MTEVe (*see* Table 28 and Figure 8). The percentage the United States produces domestically by MT hovers around 70 percent whereas the percentage the United States produces domestically by MTEVe is about 60 percent. The slight difference between these percentages indicates that the United States producers tend to produce larger volumes of relatively lower EV chemicals.

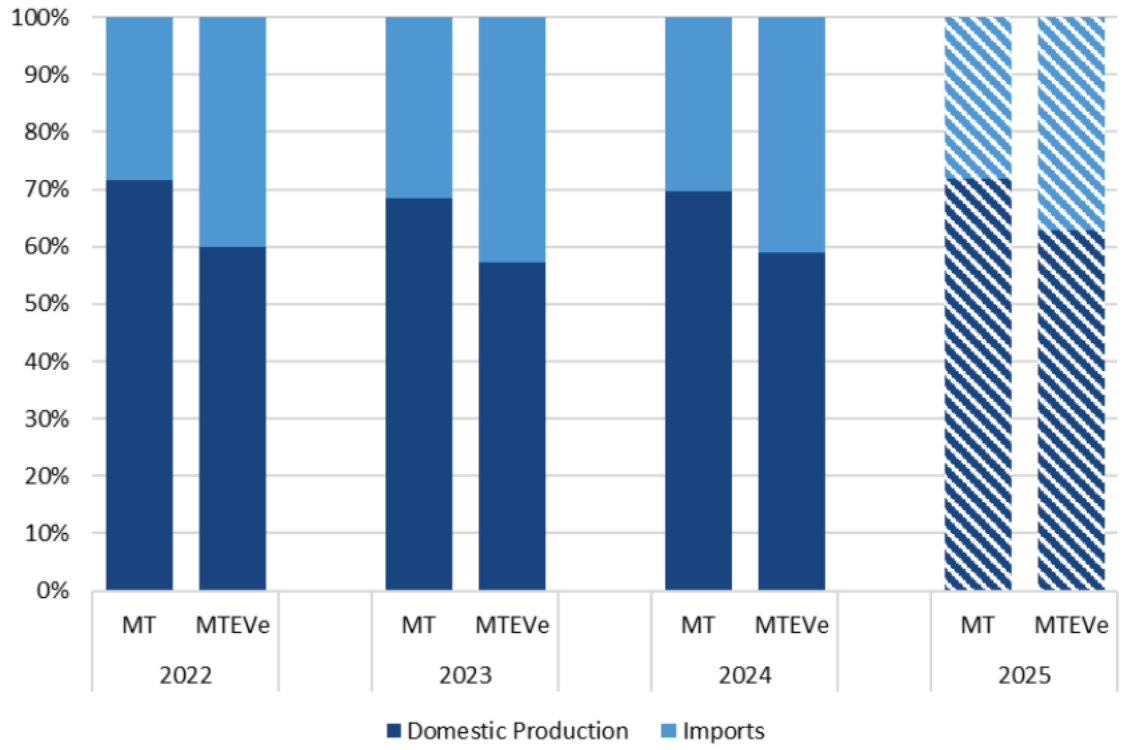
[17] Transform means to use and entirely consume (except for trace quantities) a regulated substance in the manufacture of other chemicals. A regulated substance that is use and entirely consumed (except for trace quantities) in the manufacture of another chemical is called a feedstock.
[18] A table of regulated HFCs and their corresponding exchange value is included in appendix C.

Table 28. Domestic Production and Import Totals, 2022-2025

Source	Unit	2022	2023	2024	*2025*[a]
Domestic Production[b]	MT	134,757	129,206	104,519	*111,172*
Imports[c]	MT	53,715	59,773	45,312	*43,543*
Total	**MT**	**188,472**	**188,979**	**149,830**	***154,715***
Domestic Production[b]	MTEVe	180,651,567	164,102,444	126,073,332	*134,994,382*
Imports[c]	MTEVe	120,988,021	122,386,890	87,533,560	*79,592,441*
Total	**MTEVe**	**301,639,588**	**286,489,335**	**213,606,892**	***214,586,823***

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*
[b] Values only include HFCs produced for consumptive uses.
[c] Values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.

Figure 8. Sources of Regulated HFCs for Consumptive Use, 2022-2025[a,b]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Values only reflect HFCs produced/imported for consumptive use and include HFCs imported as part of a blend.
[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

Table 29 compares the quantities of HFCs produced domestically and imported for consumptive use by regulated HFC, in MT, from 2022 to 2025. The breakdown of this domestic production versus imports by year and HFC is further illustrated in Figure 9. Again, 2025 data are unverified, so the data in the 2025 column in Table 29 and the percent changes described below should be considered preliminary. Additionally, as explained above, production and import values reflect only HFCs produced or imported for consumptive uses. For example, while the United States produces and/or imports HFC-245fa, HFC-152a, and HFC-41 for transformation, production and import of those chemicals for transformation is not included.

Between 2022 and 2025, the United States produced more than 80 percent of the HFC-134a and HFC-152a that entered the U.S. market. The total production and import of HFC-134a decreased by 33 percent, however, between 2024 and 2025 the production increased, while imports of HFC-134a decreased. This change drove up the percentage of HCF-134a produced domestically to almost 91 percent in 2025. Total production and import of HFC-152a for consumptive use has remained relatively consistent from 2022 to 2025, and the United States produced approximately 91 percent of HFC-152a domestically in 2025.

Changes in U.S. production capacity may have contributed to the observed shifts in domestic production of HFC-134a and HFC-152a. Despite the jump from 2024 to 2025, domestic production of HFC-134a declined by approximately 31 percent over 2022 to 2025, due in part to one producer converting a production line from HFC-134a to a hydrofluoroolefin (HFO). Another U.S. producer recently expanded their production capacity for HFC-152a, potentially signaling an increase in domestic HFC-152a production in the future.

In addition to HFC-134a and HFC-152a, HFC-125 and HFC-32 also make up a large share of HFCs that are produced or imported. For HFC-125, domestic production and imports have been roughly even, but the percentage produced domestically increased from 45 percent in 2022 to 60 percent in 2025. Over that period, the decline in HFC-125 imports (60 percent) was much steeper than the decline in domestic production (26 percent). Domestic production and imports have both increased for HFC-32, and as anticipated, demand continues to rise (*see* Figure 19). The United States started importing slightly more HFC-32 relative to domestic production from 2022 to 2025, and the percentage domestically produced dropped from 64 percent to 53 percent.

The United States produces and imports other HFCs in smaller quantities compared to HFC-134a, HFC-152a, HFC-125, and HFC-32. From 2022 to 2025, the United States produced the majority of HFC-227ea and HFC-245fa domestically. HFC-227ea production

and imports have stayed relatively consistent over the period, apart from 2024 imports, when the United States imported only 51 MT, compared to the 314 MT imported in 2023, and the 589 MT imported in 2025. Total HFC-245fa production and imports have declined significantly by 91 percent from 2022 to 2025, but the United States continues to produce more HFC-245fa than it imports; the percentage of HFC-245fa produced domestically was 93 percent in 2025. In the case of HFC-23, the United States produces some of the HFC-23 to be used for consumptive purposes, but imports account for the majority. In 2025, U.S. producers did not capture[19] any of the HFC-23 generated domestically for consumptive use, so imports accounted for all HFC-23 supplied for consumptive use.

The United States exclusively imported HFC-143a, HFC-236fa, HFC-365mfc, and HFC-43-10-mee from 2022 to 2025. For HFC-143a, the amount imported increased each year. HFC-143a remains a key component in blends such as R-404A and R-507, and there was a 126 percent increase from 2022 to 2025. Other notable trends over the period include shifts in the production and import of HFC-134, which the United States produced in 2022 and 2023 for consumptive use but not in 2024 or 2025, and the apparent cessation of HFC-365mfc imports after 2023. Only one entity imported HFC-365mfc since the phasedown began, where the chemical may have been used as a blowing agent in foams that are regulated under the 2023 Technology Transitions Rule.[20] The EV of HFC-365mfc is 794, whereas the manufacture and import compliance date for foams to meet a 150 GWP (functionally EV) was January 1, 2025. In other words, the sole importer of HFC-365mfc may have ceased imports simply due to its commercial nonviability.

Table 29. Sources of Regulated HFCs for Consumptive Use by Chemical (MT), 2022-2025[a]

Chemical	2022		2023		2024		*2025[b]*	
	Domestic Production	Imports	Domestic Production	Imports	Domestic Production	Imports	*Domestic Production*	*Imports*
HFC-125	19,217	23,931	19,199	23,652	15,637	13,928	*14,247*	*9,495*
HFC-134	516	6	327	3	-	1	-	*1*
HFC-134a	61,398	7,928	49,582	6,858	34,119	7,789	*42,137*	*4,343*
HFC-143a	-	1,954	-	2,104	-	3,068	-	*4,408*
HFC-152a	29,656	5,813	33,906	6,423	34,155	5,886	*28,910*	*3,002*
HFC-227ea	1,325	495	1,086	314	1,462	51	*1,425*	*589*
HFC-23	5	126	6	127	9	97	*0*	*86*

[19] In the United States, HFC-23 is generated as an unintended byproduct in the production of other chemicals. HFC-23 produced for consumptive use in the United States comes from the capture of this HFC-23 byproduct.
[20] 88 FR 73098 (October 24, 2023).

Chemical	2022		2023		2024		*2025[b]*	
	Domestic Production	Imports	Domestic Production	Imports	Domestic Production	Imports	*Domestic Production*	*Imports*
HFC-236ea	33	18	8	21	34	9	*16*	-
HFC-236fa	-	303	-	193	-	132	-	*231*
HFC-245fa	4,824	1,620	2,584	2,131	1,528	1,075	*536*	*40*
HFC-32	17,762	9,931	22,486	17,042	17,558	13,002	*23,884*	*21,130*
HFC-365mfc	-	1,110	-	442	-	-	-	-
HFC-41	22	38	22	20	17	20	*16*	*15*
HFC-43-10mee	-	444	-	443	-	256	-	*203*
Total	**134,757**	**53,715**	**129,206**	**59,773**	**104,519**	**45,312**	***111,172***	***43,543***

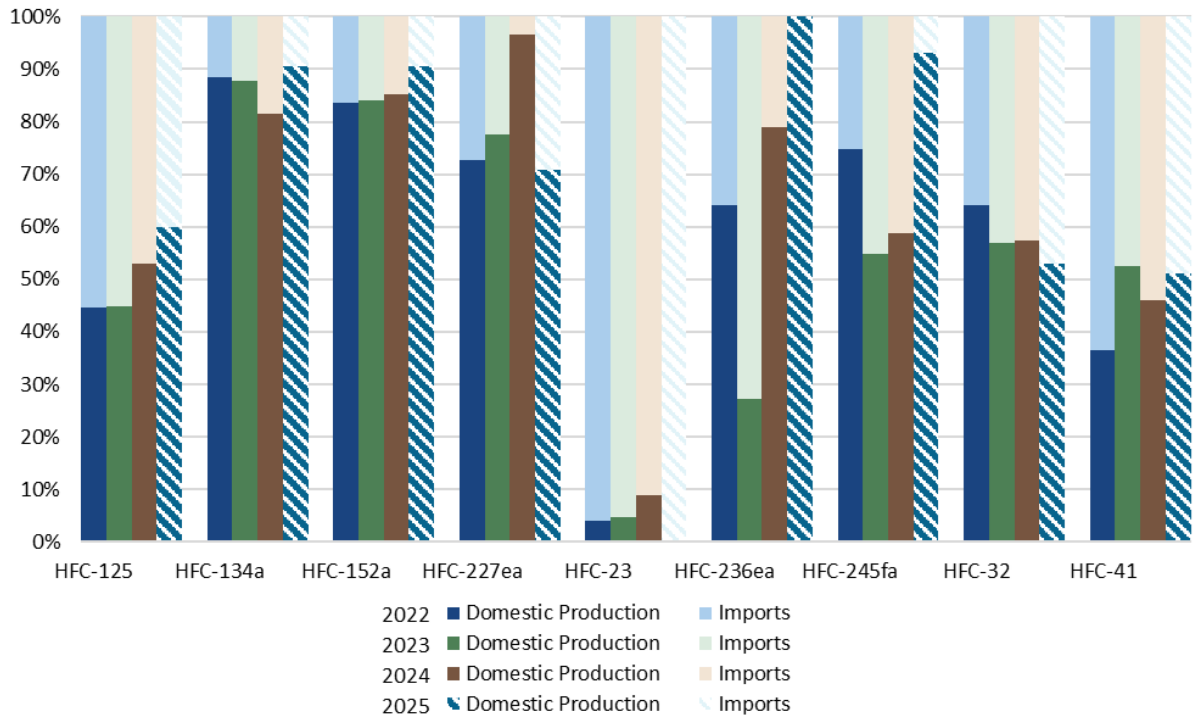
Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.

[a] Domestic production values only include HFCs produced for consumptive uses. Import values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.

[b] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

For each HFC that the United States produced until at least 2024, Figure 9 depicts the proportion produced domestically (shown in the darker shade) as compared to the proportion imported (shown in the lighter shade of the same hue). Each year is represented by a different color and goes chronologically from left to right, for each chemical. For example, the percentage of HFC-125 produced domestically increased from approximately 45 percent in 2022 and 2023 to roughly 60 percent in 2025. Another example: the United States produced no HFC-23 for consumptive use in 2025, so the 2025 bar representing HFC-23 production and imports is entirely imports.

Figure 9. Source of Regulated HFCs for Consumptive Use by Chemical (MT), 2022-2025[a,b]

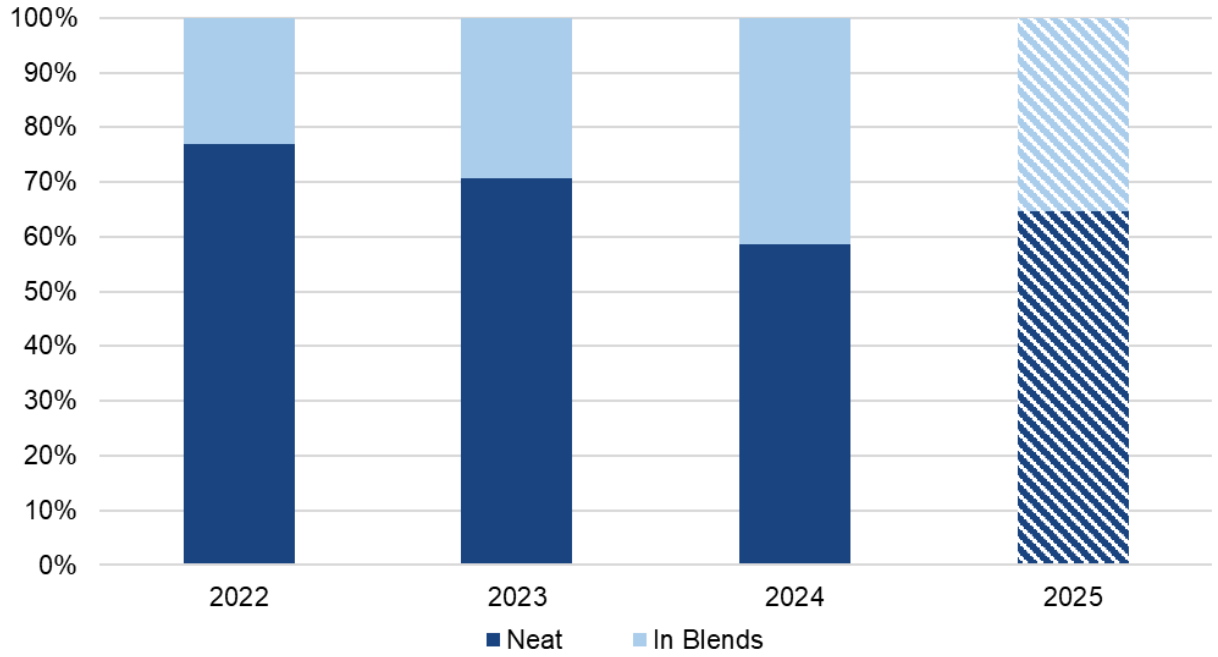


Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Values only reflect HFCs produced/imported for consumptive uses and include HFCs imported as part of a blend. HFC-365mfc, HFC-143a, HFC-236fa, and HFC-43-10mee were not produced domestically from 2022-2025 and therefore are excluded from the figure. HFC-134 was not produced domestically from 2024-2025 and was imported in very small quantities and thus was also excluded from the figure.
[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

3.2. HFCs Imported in Blends

The quantity of regulated substances imported as neat HFCs rather than as part of a blend has varied over time. Figure 10 shows that the proportion of HFCs imported for consumptive uses as part of a blend increased from 23 percent to 41 percent from 2022 to 2024, which may suggest a growing preference for importers to import pre-blended materials, as opposed to importing the HFC components to blend domestically. However, this percentage dropped slightly to 35 percent in 2025.

Figure 10. Forms of HFCs Imported for Consumptive Use (MT), 2022-2025[a,b]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Values only reflect HFCs imported for consumptive uses.
[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

Table 30 and Figure 11 show that on a chemical-by-chemical basis, import patterns shifted the most for HFC-125 and HFC-227ea from 2022 to 2025, with respect to whether the HFC was imported neat or as part of a blend. In 2022, the United States imported approximately 77 percent of its HFC-125 as neat; this percentage dropped to 22 percent by 2024 but rose to 49 percent in 2025. In 2022 and 2023, the United States imported between 70-75 percent of neat HFC-227ea, and that figure rose to 100 percent in 2024 and 2025. The United States imports HFC-227ea in smaller quantities compared to other HFCs, so changes in the import of one particular blend, like R-458A in the case of HFC-227ea, has larger implications for the ratio of imported neat to imported in a blend. For other HFCs included in Table 30 and shown in Figure 11, the ratio of chemicals imported as neat, compared to imported as a component in a blend did not exhibit a coherent trend from 2022 to 2025. Large percentages of imported HFC-134a, HFC-143a, and HFC-152a as neat suggests that the United States continues to have demand for the neat HFCs themselves as well as for blending domestically.

Table 30. Forms of HFCs Imported for Consumptive Use by Chemical (MT), 2022-2025[a]

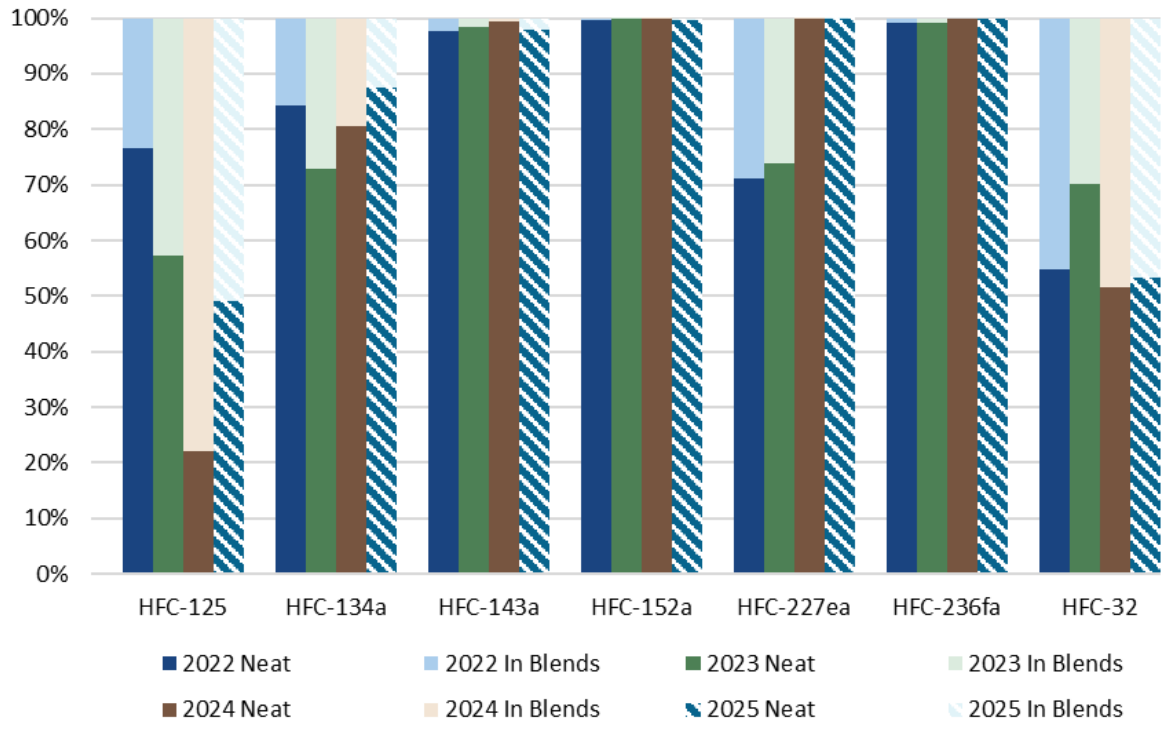
HFC	Year	Imported Neat	Imported in Blends	Total
HFC-125	2022	18,316	5,615	23,931
	2023	13,524	10,127	23,652
	2024	3,057	10,871	13,928
	2025[b]	*4,665*	*4,829*	*9,495*
HFC-134a	2022	6,684	1,243	7,928
	2023	4,996	1,863	6,858
	2024	6,278	1,511	7,789
	2025[b]	*3,798*	*546*	*4,343*
HFC-143a	2022	1,908	46	1,954
	2023	2,073	31	2,104
	2024	3,051	17	3,068
	2025[b]	*4,320*	*89*	*4,408*
HFC-152a	2022	5,793	19	5,813
	2023	6,408	15	6,423
	2024	5,877	9	5,886
	2025[b]	*2,995*	*8*	*3,002*
HFC-227ea	2022	351	143	495
	2023	233	82	314
	2024	51	0	51
	2025[b]	*588*	*1*	*589*
HFC-236fa	2022	300	3	303
	2023	192	2	193
	2024	132	-	132
	2025[b]	*231*	-	*231*
HFC-32	2022	5,444	4,486	9,931
	2023	11,938	5,104	17,042
	2024	6,691	6,311	13,002
	2025[b]	*11,254*	*9,875*	*21,130*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.

[a] Values only reflect HFCs imported for consumptive uses.

[b] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Figure 11. Forms of HFCs Imported for Consumptive Use by Chemical (MT), 2022-2025[a,b]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Values only include HFCs imported for consumptive uses. Only select regulated HFCs imported for consumptive use from 2022-2025 are included in the figure.
[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

3.3. Net Supply of HFCs

Table 31 summarizes domestic production, imports, and exports for each regulated HFC in the United States from 2022 to 2025, in MT. Including export data alongside domestic production and import data provides additional context on the yearly net flow of each HFC. EPA acknowledges there are other considerations for assessing the available supply of HFCs in a year which are not reflected in this table, such as quantities reclaimed or held in inventory.

Total exports of regulated HFCs in MT have fluctuated from 2022 to 2025, decreasing from approximately 28,260 MT to 20,760 MT from 2022 to 2023, and jumping back up to 26,282 MT in 2024, before declining slightly again in 2025 to 23,023 MT. Exports of HFC-245fa and HFC-134a have declined the most relative to 2022 exports, by 57 percent and 48 percent, respectively. In contrast, exports of HFC-32 increased by nearly 230 percent from 2022 to 2025. Exports of HFC-143a increased by about 82 percent and exports of HFC-125

increased by about 54 percent. Since the United States does not produce HFC-143a, these exports consist entirely of originally imported material.

The net supply of HFCs added to the market decreased from 2022 to 2025, for most HFCs, with two exceptions: HFC-143a and HFC-32. Imports of HFC-143a have increased steadily from 2022 to 2025 and production and imports of HFC-32 both increased over the same period, resulting in a net increase—despite the increase in exports for both. As the phasedown progresses and demand for certain HFCs changes, production, import, and export patterns will continue to shift to meet future HFC demand in the United States.

Table 31. United States HFC Production, Import, and Export (MT), 2022-2025

HFC	Year	Domestic Production[a]	Imports[a]	Exports[b]
HFC-125	2022	19,217	23,931	3,062
	2023	19,199	23,652	2,015
	2024	15,637	13,928	1,524
	2025[c]	*14,247*	*9,495*	*4,725*
HFC-134	2022	516	6	105
	2023	327	3	37
	2024	-	1	49
	2025[c]	-	*1*	*49*
HFC-134a	2022	61,398	7,928	17,235
	2023	49,582	6,858	11,375
	2024	34,119	7,789	15,323
	2025[c]	*42,137*	*4,343*	*8,992*
HFC-143a	2022	-	1,954	720
	2023	-	2,104	305
	2024	-	3,068	1,048
	2025[c]	-	*4,408*	*1,307*
HFC-152a	2022	29,656	5,813	3,768
	2023	33,906	6,423	3,893
	2024	34,155	5,886	3,486
	2025[c]	*28,910*	*3,002*	*2,594*
HFC-227ea	2022	1,325	495	1,472
	2023	1,086	314	1,037
	2024	1,462	51	1,581
	2025[c]	*1,425*	*589*	*1,671*
HFC-23	2022	5	126	27
	2023	6	127	48
	2024	9	97	52
	2025[c]	*0*	*86*	*38*

HFC	Year	Domestic Production[a]	Imports[a]	Exports[b]
HFC-236ea	2022	33	18	9
	2023	8	21	31
	2024	34	9	35
	2025[c]	*16*	-	*12*
HFC-236fa	2022	-	303	33
	2023	-	193	38
	2024	-	132	130
	2025[c]	-	*231*	*29*
HFC-245fa	2022	4,824	1,620	813
	2023	2,584	2,131	582
	2024	1,528	1,075	249
	2025[c]	*536*	*40*	*348*
HFC-32	2022	17,762	9,931	978
	2023	22,486	17,042	1,357
	2024	17,558	13,002	2,760
	2025[c]	*23,884*	*21,130*	*3,209*
HFC-365mfc	2022	-	1,110	0
	2023	-	442	-
	2024	-	-	-
	2025[c]	-	-	-
HFC-41	2022	22	38	16
	2023	22	20	34
	2024	17	20	29
	2025[c]	*16*	*15*	*26*
HFC-43-10mee	2022	-	444	26
	2023	-	443	9
	2024	-	256	16
	2025[c]	-	*203*	*23*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.

[a] Values for production and import only reflect HFCs produced/imported for consumptive uses and include HFCs imported as part of a blend.

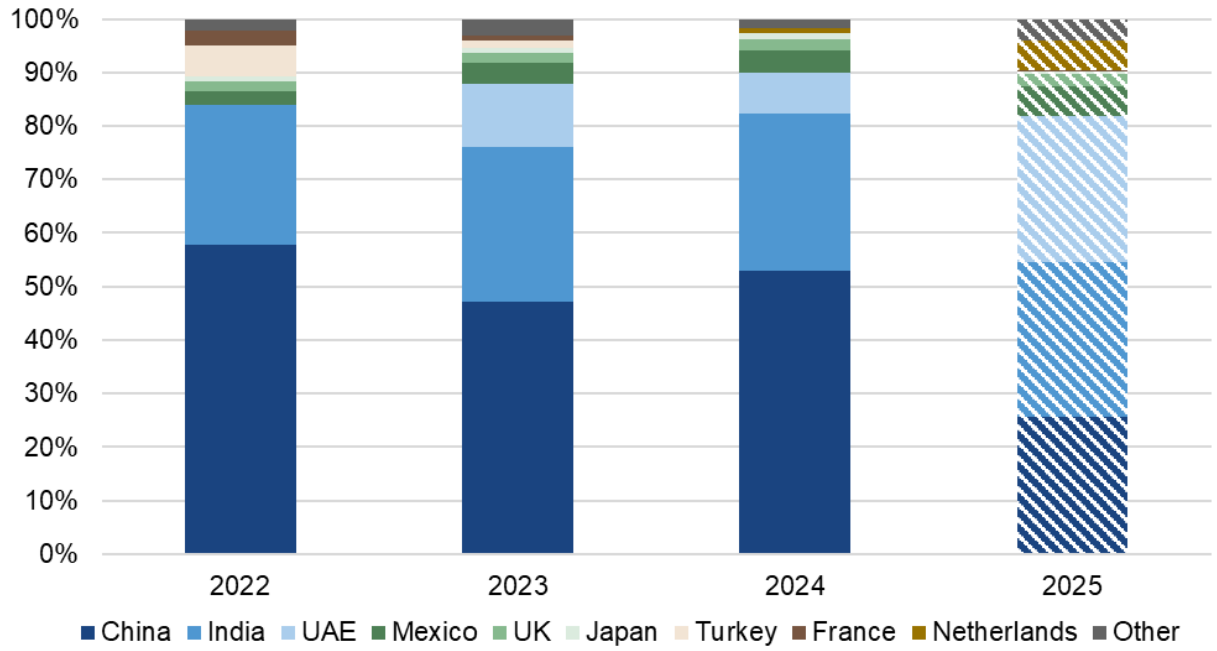
[b] Export values exclude transhipments

[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

3.4. HFC Imports by Source Country

For regulated HFCs imported into the United States for consumptive use, Figure 12 provides a summary of the percentage of total HFCs, in MT, imported from each source country in each year. Table 32 highlights the largest source countries of imported HFCs for consumptive use from 2022 to 2025 for each regulated HFC in MT. While imports have maintained a relatively stable share of the U.S. market for HFCs, primary source countries for each chemical have evolved over time.

Figure 12. Source of Regulated HFCs Imported for Consumptive Use into the United States (MT), 2022-2025[a,b]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Values only reflect HFCs imported for consumptive uses.
[b] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

From 2022 to 2024, China and India were the largest sources of HFC imports into the United States. While there were some fluctuations over this period, preliminary data from 2025 suggest larger shifts between 2024 to 2025 in U.S. HFC import sources. The shifts from 2024 to 2025 could be the result of a variety of actions, including: fluctuating overall duties and tariffs in addition to antidumping and countervailing duties placed on imports of HFCs from certain countries;[21] the United Arab Emirates (UAE) entering the production market in 2024 and growth of India's HFC production; and an increased demand for blends with lower EV components.

To clarify, only some countries have HFC production capabilities. Of the countries listed in Figure 12 and Table 32, EPA is aware that China, India, the UAE, Japan, South Korea, Germany, and France possessed HFC production capabilities at some point from 2022 to 2025. The United States imports from other countries that are not directly producing HFCs for a variety of reasons, as HFCs may be blended, purified, or repackaged in countries different from their original production. For example, although EPA is not aware of HFC

[21] A discussion of antidumping and countervailing duties can be found in the HFC Allocation Framework Rule, 86 FR 55116, 55170 (October 5, 2021).

production capacity in the United Kingdom (UK), the United States imports similar amounts of HFC-134a from the UK each year as they have a facility which purifies HFC-134a from technical grade to pharmaceutical grade.

Imports from China declined by about 50 percent from 2024 to 2025, primarily as the result of shifting from China to India as a source for HFC-134a and moving from China to the UAE as a source for HFC-125. Imports of neat HFC-32 from China started decreasing prior to 2025 but continued to drop from 2024 to 2025. Since China produces most HFCs, the United States continues to source key HFCs from China, including: HFC-143a, HFC-152a, HFC-227ea, HFC-23, HFC-236fa, HFC-245fa, and HFC-41. HFC-143a and HFC-236fa are not produced domestically, and imports are also the primary source of HFC-23 on the U.S. market. Even for some of these chemicals that were imported primarily from China, 2025 saw a shift away from China as the reported source country compared to 2024. The transition to the UAE and India as primary sources for HFC-32, HFC-125, and HFC-134a, as well as the smaller adjustments for chemicals like HFC-143a and HFC-245fa, demonstrate a trend to sourcing imported HFCs from other countries besides China.

The evolving global HFC production landscape has also likely impacted import patterns in the United States. EPA is aware that the UAE started producing HFC-32 in 2024. While the UAE became an important source of HFC-32 beginning in 2023, the country became a much more prominent source of HFC-125 in 2025 as both a neat chemical and as part of the blend R-410A, in addition to neat HFC-32. EPA is only aware of HFC-125 production in China, India, Japan, and the United States—therefore there is either a new production line or the HFC-125 was produced elsewhere. Further, India's HFC production has also continued to expand since 2022.

Finally, changes in the U.S. HFC import landscape may reflect rising demand for blends containing lower EV components, such as R-454B (*see* Figure 19). The increase in imports from the Netherlands in 2025 was driven primarily by R-454B.

Table 32. Top Two Countries of Import by HFC (MT), 2022-2025[a,b]

HFC	2022		2023		2024		*2025[b]*	
	Top Two Sources		Top Two Sources		Top Two Sources		*Top Two Sources*	
HFC-125	China (64%)	India (24%)	China (50%)	India (39%)	China (57%)	India (38%)	*UAE (56%)*	*India (38%)*
HFC-134	Mexico (56%)	Canada (44%)	Canada (64%)	Mexico (36%)	Mexico (100%)		*Mexico (100%)*	
HFC-134a	India (63%)	China (17%)	India (48%)	China (28%)	China (37%)	India (29%)	*India (50%)*	*UK (24%)*
HFC-143a	China (79%)	France (19%)	China (87%)	Mexico (8%)	China (>99%)	Canada (<1%)	*China (90%)*	*South Korea (8%)*
HFC-152a	China (98%)	Mexico (1%)	China (91%)	Mexico (5%)	China (98%)	Mexico (2%)	*China (99%)*	*Mexico (1%)*
HFC-227ea	China (82%)	France (13%)	China (81%)	France (8%)	China (76%)	Germany (18%)	*China (>99%)*	*Netherlands (<1%)*
HFC-23	China (86%)	Japan (13%)	China (88%)	Japan (10%)	China (90%)	Japan (5%)	*China (94%)*	*Israel (2%)*
HFC-236ea	China (97%)	South Korea (3%)	China (77%)	South Korea (23%)	China (93%)	South Korea (7%)	*NA*	
HFC-236fa	China (>99%)	Brazil (<1%)	China (>99%)	Canada (<1%)	China (>99%)	Mexico (<1%)	*China (99%)*	*India (1%)*
HFC-245fa	China (99%)	Mexico (1%)	China (98%)	Japan (2%)	China (99%)	Mexico (1%)	*China (82%)*	*Mexico (17%)*
HFC-32	China (48%)	India (34%)	UAE (41%)	India (27%)	India (45%)	UAE (26%)	*India (32%)*	*UAE (31%)*
HFC-365mfc	France (100%)		France (100%)		NA		*NA*	
HFC-41	China (97%)	Taiwan (1%)	China (97%)	Taiwan (1%)	China (97%)	Taiwan (1%)	*China (98%)*	*Taiwan (1%)*
HFC-43-10mee	Japan (100%)		Japan (100%)		Japan (100%)		*Japan (>99%)*	*Netherlands (<1%)*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.

[a] Values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.

[b] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

3.5. Reported Uses of Imported HFCs

The intended use of imported HFCs is indicated in reporting forms that importers must submit to EPA on a quarterly basis. The intended uses that importers can mark include in-house destruction, in-house transformation, transhipment, and "other." Table 33 shows the volume of HFCs imported, in MT, by reported intended use.

Table 33. Reported Uses of Imported HFCs (MT), 2022-2025

Reporting Year	Other (Non-ASA)	Other (ASA)	In-House Destruction	In-House Transformation	Transhipment
2022	53,168.6	598.6	73.9	8,460.5	0
2023	59,677.2	398.5	127.9	7,777.1	382.0
2024	45,285.4	720.6	109.8	5,078.5	606.4
2025[a]	*46,707.3*	*1,398.5*	*144.6*	*252.0*	*520.4*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 13, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Transhipment

A transhipment refers to the continuous shipment of a regulated substance, from a foreign country of origin through the United States or its territories, to a second foreign country of final destination, that does not enter U.S. commerce. A transhipment, as it moves through the United States and its territories, cannot be repackaged, sorted, or otherwise changed in condition. HFCs that are transshipped, imported for destruction, or imported for transformation do not require consumption allowance expenditure, but require either a nonobjection notice (destruction and transformation) or a notification to the Agency (transhipment).[22] The available data may shed some qualitative insight on shipping patterns and/or port availability as goods move through international waterways, air space, or main thoroughfares. However, the Agency is not opining, speculating, or otherwise interpreting the needs or business practices of entities that are not located in the United States and its territories.

Other Uses

Most of the rows in each report lists a category titled, "other." This category includes imports of bulk HFCs for uses that include, but are not limited to, charging and recharging HVACR equipment, blowing foam, and filling fire extinguishers. This category also includes

[22] Note that transhipment data included in the table above includes only shipments that were listed in the quarterly importer reports, and do not capture any transhipments that factually occurred, consistent with EPA's regulatory definition, but for which EPA received no notifications.

imports of HFCs for application-specific uses.[23] Separate columns in each row allow the reporter, after selecting "other," to indicate the quantity of kilograms imported using consumption allowances and ASAs. EPA summed these values by year, then multiplied the annual sums by their EVs to obtain the values in the table.

The reported uses of imported HFCs that fall under the "other" category of the quarterly reports indicate that non-ASA use accounted for approximately 99 percent of the combined sum between 2022 and 2023, (*i.e.*, ASA use when compared to the combined total for those years was no more than approximately 1.1 percent between 2022 and 2023). However, ASA use increased modestly in 2024, jumping to approximately 1.6 percent by volume. In 2024 (and through 2028), the overall cap for consumption allowances, including those issued for ASA end uses, decreased from 90 percent to 60 percent of the historical baseline. This means that even if the number of EPA-issued ASAs was static between 2022 and 2024, the use rate attributed to ASAs would increase, due to a decreasing overall consumption cap. In fact, the year-over-year trend between 2023 and 2024 is a clear example of this trend. EPA issued approximately 5.4 MMTEVe of ASAs in 2023, and 5.8 MMTEVe of ASAs in 2024.[24] The use rate of ASAs increased from less than 0.7 percent in 2023, to just under 1.6 percent in 2024. In 2025, EPA issued more than 9.3 MMTEVe of allowances to ASA end users with an identical overall consumption cap to that for 2024. The corresponding ASA use rate rose to more than 2.9 percent. This growth in use rate for ASAs is numerically reasonable, given the increase of EPA-issued ASAs in the two years. The Agency reiterates that overall 2025 data are still undergoing verification, and final values are subject to change. For calendar year 2026, EPA issued approximately 9.7 MMTEVe of allowances to ASA end users, and accordingly – the Agency expects the use rate on a MT basis to be similar to, or slightly higher than, the one for 2025.[25]

In-House Destruction

The overall trend between 2022 and 2025 indicates that imports for in-house destruction have increased over time. EPA reiterates that imports for in-house destruction do not require allowances for import, but they do require a non-objection notice and certain recordkeeping and reporting requirements. To the extent that imports for in-house

[23] For calendar year 2022, imports for application-specific use were also collated to an "Application-Specific End-Uses" category, and these imports were also included in the calculation.

[24] As discussed in Section 2.3. of this document, EPA allocates the full amount of allowances necessary to eligible ASA end users irrespective of the overall consumption cap. ASA end users can confer allowances to suppliers to produce or import on their behalf, or produce or import directly themselves.

[25] In addition to the approximately 9.7 MMTEVe of ASAs issued prior to the beginning of 2026, EPA also held back 1.0 MMTEVe as part of an MDI set-aside that was finalized in the 2025 Application-specific Allowance Review and Renewal Rule. There were no applicants, and the 1.0 MMTEVe allowances were distributed pro-rata to the general pool allowance holders for calendar year 2026 (91 FR 31450, May 27, 2026).

destruction require the Agency to issue a non-objection notice after a review for approvability, 2025 import data for in-house destruction is largely, if not wholly, accurate and complete.

The total universe of entities that are capable of overall imports-related logistics, processing, and proper regulatory reporting and recordkeeping for EPA and other federal government partner agencies, that are also capable of destroying HFCs in a manner consistent with the Agency's regulatory requirements is niche and finite. EPA does not have enough information at this time to opine on whether the volume of in-house destruction will increase as the phasedown progresses.

In-House Transformation

While 2025 data is still being verified, imports for in-house transformation of HFCs declined considerably, particularly between 2024 to 2025. It appears that the United States imported no HFC-152a for transformation in 2025, suggesting that either users of HFC-152a for transformation could more effectively source the chemical domestically or demand for this purpose has decreased. Thus, the lack of imports of HFC-152a for transformation in 2025 could be contributing to the large decline of in-house transformation seen between 2024 to 2025.

4. Production and Reporting Data

In Section 4, EPA provides information related to HFC production and other types of data reported to EPA under 40 CFR part 84, subpart A, including RACAs.

4.1. HFC Byproducts

HFCs are produced from feedstock by a series of chemical reactions. Along the synthesis pathway, chemicals other than the intended product, including HFCs, are also created. Some of the HFC byproducts can include regulated HFCs that are isomers of the 18 HFCs listed in the AIM Act. Generation of unintended byproducts is generally minimized where possible, as this reflects less efficient production of the intended products. However, there are potential operational tradeoffs that could affect byproduct generation rates. Resulting byproducts may be isolated, present as impurities in other chemicals, or otherwise released. Byproducts may also be used by the producer as an intermediate feedstock to manufacture another chemical or captured and sold for separate commercial uses.

As EPA noted in the Allocation Framework Rule, any regulated substances "created during the manufacturing process, either in quantities that are not insignificant or outside of [specifically] listed circumstances, would be considered 'production.'"[26] This would include byproducts that are unintentionally created, whether or not those amounts were then sold, distributed, or otherwise used. HFC producers are required to report in their one-time reports a "list of any coproducts, byproducts, or emissions from the production line that are other regulated substances."[27] EPA requires reporting on HFC-23 generation and information in relation to production of intended chemicals. The Agency is aware of HFC-23 by production at 10 U.S. facilities.[28] As data on EPA's HFC Data Hub show, most of these quantities are destroyed, small amounts are emitted, and small amounts are captured for consumptive use. Unintended byproducts were not specifically differentiated from other sources in this reporting, but, considering other available information, it is likely that the following regulated HFCs were byproducts associated with HFC production lines: HFC-23, HFC-143a, HFC-245cb, HFC-227ea, HFC-365mfc, HFC-152, HFC-236fa, HFC-41, HFC-152a, HFC-245fa, HFC-245eb, HFC-125, and HFC-134a. Limited data exist to distinguish reported production of HFCs from those produced as unintended byproducts. Byproduct creation and subsequent destruction of regulated HFCs (including HFC-23, HFC-41, HFC-143a, HFC-227ea, and HFC-125) has been reported by two companies.

[26] 86 FR 55143, 55116 (October 5, 2021).
[27] 40 CFR 84.31(b)(1)(v).
[28] See HFC-23 Emissions section of the HFC Data Hub. Available at https://www.epa.gov/hfcs/hfc-data-hub#hfc-23.

4.2. Isomers of Regulated HFCs

Isomers are chemicals with the same molecular formula but with a different arrangement of the constituent atoms. These differences in arrangement result in different properties. Certain isomers of regulated HFCs are more commercially viable and may be useful steps in particular chemical synthesis pathways. Other isomers may be unintentionally produced. While efforts are made to prioritize the intended isomer, varying degrees of isomer ratios may be produced and remain present in final products.

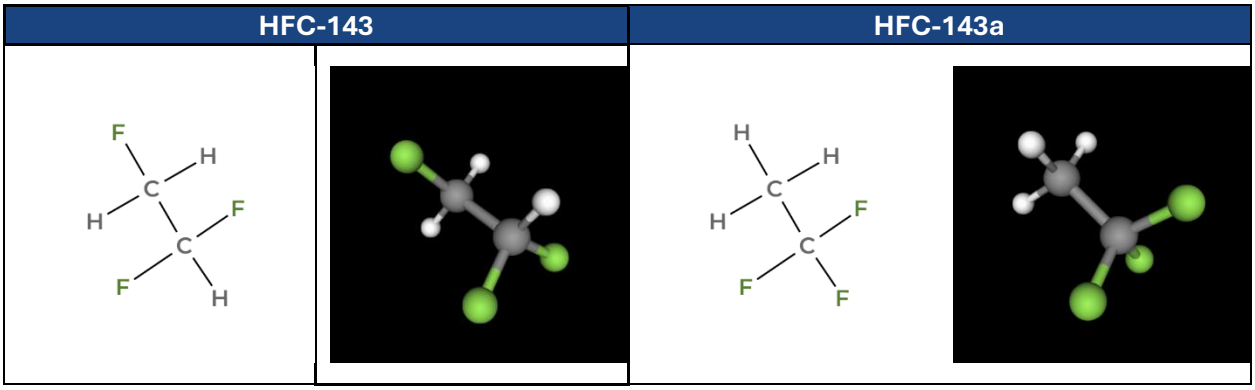
Table 34 and Figure 13 provide an illustrative comparison of the chemical properties of HFC-143 and HFC-143a, which are isomers of each other.

Table 34. Comparison in Chemical Properties of Two Isomers

Property	HFC-143	HFC-143a
Chemical formula	$CH_2F\ CHF_2$	$CH_3\ CF_3$
Exchange value	353	4,470
Boiling point (°C)	5	-47.2
Melting point (°C)	-75	-111.8

Source: PubChem, available at https://pubchem.ncbi.nlm.nih.gov/.

Figure 13. Comparison in Molecular Structure of Two Isomers



Source: Images generated through use of https://app.molview.com/.

EPA regulates all HFCs listed in the AIM Act and 40 CFR part 84.[29] The AIM Act lists multiple isomers of certain regulated HFCs (*e.g.*, HFC-143 and HFC-143a), but all other isomers of listed HFCs are regulated as well, even if they are not specifically listed. The Agency is aware that at least one company has produced one of these unlisted isomers for internal use in research and development. EPA is aware of other available data that would suggest that other unlisted isomers have also been created.[30] Isomers can be unintentionally

[29] Subsection (c))(1) of the AIM Act and Appendix A to 40 CFR part 84.
[30] Individual communication with companies.

created and be found in different products. EPA is aware that particular unlisted isomers have been identified as relevant to importation and commercial use.

EPA understands a total of 62 structural isomers of regulated substances could theoretically exist due to various arrangements of the atoms, as displayed in Table 35, though all may not be physically possible.

Table 35. Distribution of Potential Isomers by Regulated Substance

Name[a]	Chemical Formula	Number of Isomers
HFC-134	CHF_2CHF_2	2
HFC-143	CH_2FCHF_2	2
HFC-245fa	$CHF_2CH_2CF_3$	5
HFC-365mfc	$CF_3CH_2CF_2CH_3$	20
HFC-227ea	CF_3CHFCF_3	2
HFC-236cb	$CH_2FCF_2CF_3$	4
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	21
HFC-32	CH_2F_2	1
HFC-125	CHF_2CF_3	1
HFC-41	CH_3F	1
HFC-152	CH_2FCH_2F	2
HFC-23	CHF_3	1

Source: EPA input respective chemical formulas into https://www.cheminfo.org/Chemistry/Isomer_generator/index.html, a tool used to access MayGen, an open-source chemical structure generator based on the orderly graph generation method (https://github.com/MehmetAzizYirik/MAYGEN).

[a] Chemicals are in order listed in Appendix A to 40 CFR part 84. Only the first listed isomer for given chemical is included in this table.

4.3. Data on Requests for Additional Consumption Allowances (RACAs)

This section examines trends for RACAs between 2022 and 2025. These allowances function as refunds for verified exports of regulated HFCs, where the consumption allowances may be credited to an entity that the submitting reporter specifies.

Table 36 shows the share of MT and MTEVe listed on RACA reports for which the company submitting the report (*i.e.*, the company that exported the material) differed from the company listed as having originally produced or imported the HFCs for each row of the report.

Table 36. RACAs with Different Source Company than Report Submitter (MT and MTEVe), 2022-2025

Reporting Year	Different Report Submitter than Original Producer or Importer?	Total MT (Total MTEVe)	Percentage of Total MT (Percentage of Total MTEVe)
2022	No	19,298 (27,381,120)	94% (89%)

	Yes	1,301 (3,351,817)	6% (11%)
2023	No	17,074 (25,002,028)	82% (81%)
	Yes	3,779 (5,992,214)	18% (19%)
2024	No	18,563 (26,400,121)	70% (67%)
	Yes	7,852 (13,276,229)	30% (33%)
2025[a]	*No*	*18,051 (29,955,074)*	*73% (69%)*
	Yes	*6,761 (13,192,972)*	*27% (31%)*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report, but given that RACAs require Agency approval, RACA data for calendar year 2025 is largely, if not wholly, accurate and complete.*

To generate the table, EPA gathered data from all RACA reports (submitted between 2022 to 2025) into a single table which consisted of data elements such as: the reporter, allowance recipient, reporting year, the HFC producer or importer, the HFC type or blend, the country of export, the date the material was exported, and the quantity of the material, etc. For Table 36, EPA compared the submitter of the RACA report to the listed HFC Producer or Importer, to see if there was a different report submitter than the original producer or importer. EPA examined the MT of all HFC types that were listed.

EPA summed these values by year and multiplied by their exchange values to obtain the MTEVe in the table.

Most reporters who submit RACAs are the same entities that originally produced or imported the exported material. Between 2022 and 2025, there has been a steady increase in the number of cases in which the reporter differs from the original producer or importer of the exported material. This trend could be in part due to the phasedown schedule and the associated tightening of overall supply. For example, some companies may have purchased HFCs domestically and then exported them abroad. In the past, those companies, or their suppliers, may not have needed allowances in return for HFC exports. The supplier or exporter of those regulated HFCs may now seek additional consumption allowances to satisfy the evolving landscape of overall HFC demand.

Table 37 shows the share of MT and MTEVe of HFCs listed in RACA reports for which the company submitting the report (the company that exported the material) differed from the company receiving the allowances associated with the report.

Table 37. RACAs with Different Allowance Recipient than Report Submitter (MT and MTEVe), 2022-2025

Reporting Year	Different Report Submitter than Allowance Recipient?	Total MT (Total MTEVe)	Percentage of Total MT (Percentage of Total MTEVe)

2022	No	20,016 (28,904,085)	97% (94%)
	Yes	583 (1,828,852)	3% (6%)
2023	No	20,487 (29,814,265)	98% (96%)
	Yes	366 (1,179,977)	2% (4%)
2024	No	25,313 (36,171,210)	96% (91%)
	Yes	1,102 (3,505,140)	4% (9%)
2025[a]	*No*	*23,680 (39,522,103)*	*95% (92%)*
	Yes	*1,132 (3,625,944)*	*5% (8%)*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report, but given that RACAs require Agency approval, RACA data for calendar year 2025 is largely, if not wholly, accurate and complete.*

Following an identical MT and MTEVe summation method as in Table 36, EPA compared the data elements from RACA reports to obtain the weight (MT) and the corresponding MTEVe in Table 37 but focused on identifying whether the entity submitting the RACA was the same as the recipient receiving the allowances.

Most reporters submitting RACAs are the same entities which are receiving the allowances from those RACAs across all years examined. The percentage of allowances (MTEVe) and weight (MT) of HFCs being granted from accepted RACAs remains somewhat consistent across all years. The consistency of this trend is likely explained by longstanding business practices and agreements, where one entity supplies necessary HFCs to another for a very specific international end use, with the mutual understanding or contractual agreement that any granted RACAs would be returned to the supplier in order to sustain their business relationship.

Table 38 shows the share of HFCs, in MT and MTEVe, reported as exported on RACA reports that came from pre-2022 inventory.

Table 38. Pre-2022 Inventory Listed on RACA Reports (MT and MTEVe), 2022-2025

Reporting Year	Did the first material listed come from pre-2022 stocks?	Total MT (Total MTEVe)	Percentage of Total MT (Percentage of Total MTEVe)
2022	No	1,816 (4,761,041)	96% (95%)
	Yes	78 (232,875)	4% (5%)
2023	No	4,654 (8,304,314)	100% (100%)
	Yes	6 (32,648)	0% (0%)
2024	No	10,454 (18,130,240)	92% (82%)
	Yes	923 (4,060,546)	8% (18%)
2025[a]	*No*	*9,416 (15,739,385)*	*88% (74%)*
	Yes	*1,256 (5,611,879)*	*12% (26%)*

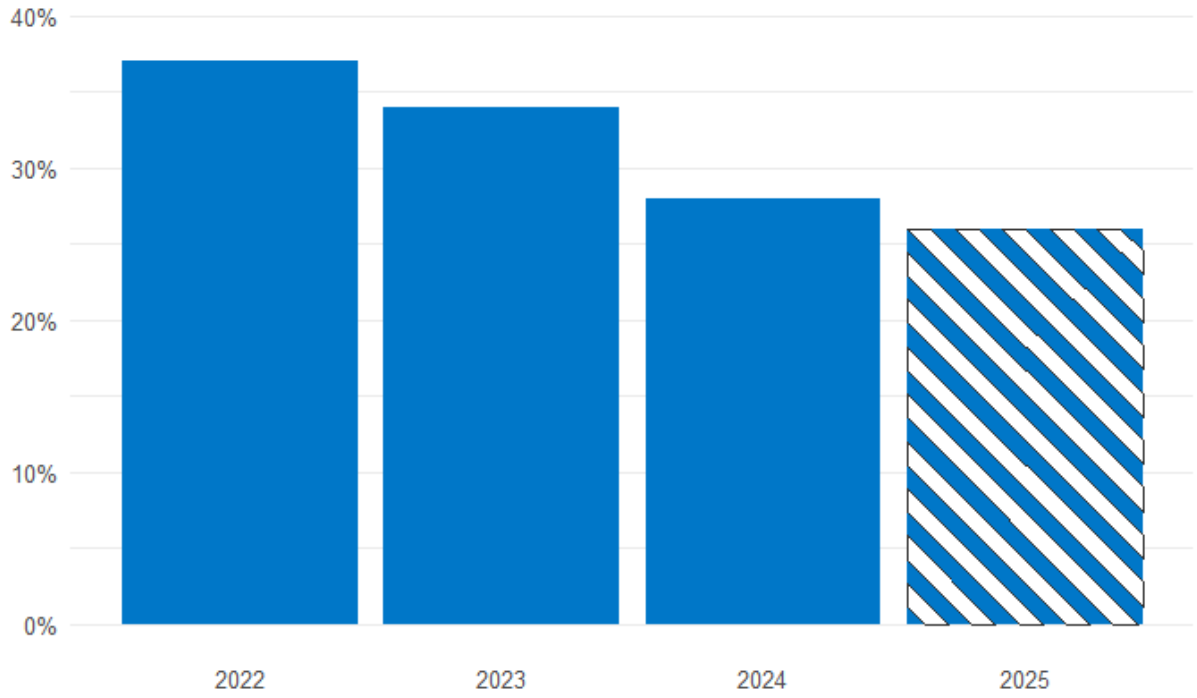
Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.
[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report, but given that RACAs require Agency approval, RACA data for calendar year 2025 is largely, if not wholly, accurate and complete.*

From the RACA reports that were submitted between 2022 to 2025, EPA examined the date of purchase of the HFCs to assess whether the source of HFCs came from pre-2022 stocks. Following an identical methodology as above, the Agency calculated the weight (MT) and corresponding MTEVe for pre-2022 and post-2022 HFCs that were exported. Note that this table only includes metrics where the date of purchase was explicitly provided on the submitted RACA reports, (*i.e.*, not all RACAs that were submitted and granted by EPA are included in Table 38).

The data shows that over time, more pre-2022 stock inventory on an MTEVe basis are exported now than in the earlier years of the phasedown. This trend, with respect to the underlying sources of pre-2022 HFC stock, is one that EPA has previously explored in detail in the 2024 Allocation Rule. Specifically, the net supply of regulated HFCs increased by 150 percent between 2020 and 2021. During this same timeframe, imports increased by more than 215 percent. This information indicates there was significant evidence of stockpiling and companies who produced, imported, or received such HFCs may now be exporting them. Entities may be exporting higher EVe HFCs that were acquired pre-2022 in order to import regulated HFCs that more closely align with the market's current needs, particularly as the phasedown schedule progresses.

Figure 14 shows the percentage of reports that were rejected during the first round of EPA review from 2022 to 2025.

Figure 14. Rejection Rate for RACA Reports in the First Round of Review, 2022-2025[a]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.
[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report, but given that RACAs require Agency approval, RACA data for calendar year 2025 is largely, if not wholly, accurate and complete.*

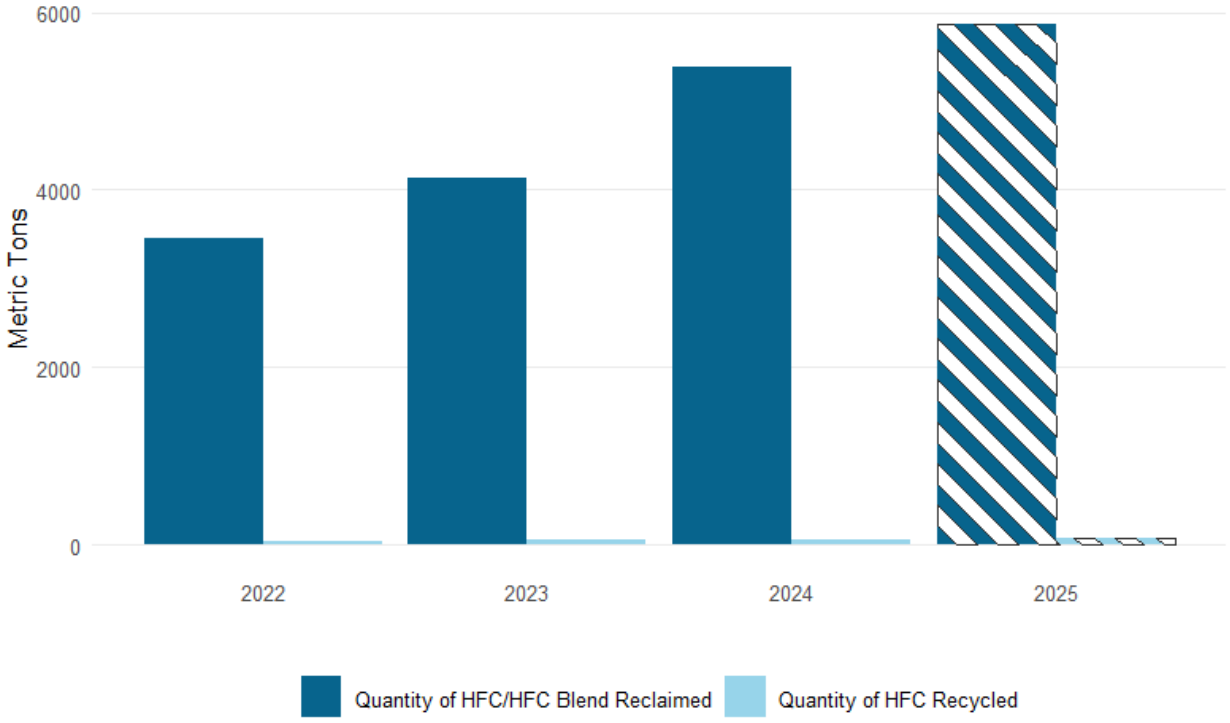
EPA examined all RACA reports and tallied the number of times that RACAs were being rejected and revised. There has been a general decrease in the rejection rate for RACA reports in the first round of review, as reporters are becoming more familiar with the RACA report submittal process. As of 2025, however, roughly one in every four RACA reports are still being rejected on the first round of review.

4.4. Reclamation and Fire Suppression Recycling

Figure 15 shows the total quantity of HFCs reported as reclaimed and recycled for fire suppression by calendar year.[31]

[31] The amounts presented in Figure 22 for "Quantity of HFC/HFC Blend Reclaimed" differ slightly from the quantity of reclaimed HFCs used as refrigerants shown on EPA's "Summary of Refrigerant Reclamation Trends" webpage. See https://www.epa.gov/section608/summary-refrigerant-reclamation-trends for more information.

Figure 15. Total Reclamation and Fire Suppression Recycling (MT), 2022-2025[a]



Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.
[a] *Calendar year 2025 data, indicated by bars with diagonal lines, are preliminary and undergoing verification as of the finalization of this report.*

Under 40 CFR 84.31(j)(1),[32] HFC fire suppressant recyclers must report their activity to EPA on a quarterly basis. HFC reclaimers, who mostly service HVACR customers, must provide quarterly activity data to EPA under 40 CFR 84.31(i)(2).[33]

Figure 15, above, shows two patterns in this reported data. First, the number of MTs of reclaimed HFCs and HFC fire suppressants recycled have both increased over time. Second, the reclamation activity dwarfs fire suppressant recycling in each year.

These figures could slightly underestimate annual fire suppressant recycling activity. This is because some reporters likely reclaim HFCs, but then later sell those reclaimed HFCs to customers that will use them for fire suppression. Reclaimers often do not know the exact end use of the HFCs at the time they reclaim them.

[32] See https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-84#p-84.31(j)(1).
[33] See https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-84#p-84.31(i)(2).

5. Data on Projected HFC Demand and Market Penetration

5.1. Projected Demand for HFCs

Section 5 of this report shares the latest projections of HFC demand through 2050 from EPA's Vintaging Model (VM).[34] EPA uses projections of HFC demand to inform rulemakings, including assessing market responses, costs, and benefits of regulations under the AIM Act. The VM is a bottom-up model named for its inventory of the in-use stocks and emissions from annual 'vintages' of new equipment containing ozone-depleting substances (ODS) and ODS substitutes that enter into service in the United States. The VM then tracks the new and existing equipment containing ODS and substitutes, including HFCs, and models the chemical demand using estimates of the quantity of equipment or products sold, serviced, and retired each year, and the amount of chemicals required to manufacture or maintain the equipment. EPA regularly updates the VM to incorporate up-to-date market information, including equipment stock estimates, leak rates, and sector transitions.[35] The Agency is including in this report its current assumptions for transition rates and market penetration of various technologies in Table 39 and its current assumptions for leak rates, recovery rates, and amounts of refrigerant recovered in Appendix B. The model version used for this report includes all updates documented in the economic and environmental impacts memo included with the 2026 Technology Transitions Reconsideration Rule.[36] It also includes additional updates to subsectors not directly affected by that rulemaking to reflect updated information regarding market growth and equipment sales, based on newly available data.[37]

The VM includes most, but not all sectors and end uses for HFCs. The sectors modeled in the VM include foam blowing, fire suppression, aerosols, sterilization, solvents, and

[34] U.S. EPA. (Last Updated Sep. 23, 2025). EPA's Vintaging Model of ODS Substitutes: https://www.epa.gov/ozone-layer-protection/epas-vintaging-model-ods-substitutes.

[35] For example, in the context of the 2026 Technology Transitions Reconsideration Rule, EPA incorporated updated information related to technology adoption and characteristics gathered from a combination of stakeholder comments and literature review. These updates were documented in Analysis of Economic and Environmental Impacts, Phasedown of Hydrofluorocarbons: Reconsideration of Certain Regulatory Requirements Promulgated Under the Technology Transitions Provisions of the American Innovation and Manufacturing Act of 2020 (Docket ID EPA-HQ-OAR-2025-0005-0520). EPA's assumptions on market shares and related subsector-level data have also been presented in the HFC Allocation Framework Rule Regulatory Impact Analysis (RIA) and associated RIA Addenda prepared under other AIM Act regulations.

[36] 91 FR 31284 (May 26, 2026).

[37] For example, updated assumptions regarding historic and projected growth of residential air conditioning appliances have been incorporated into the version of the model used for this report based on the most recent shipment data from AHRI, available at: https://www.ahrinet.org/analytics/statistics.

refrigeration and air conditioning. Each of these broad sectors is further subdivided into more specific applications and end uses.

The etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector are examples of end uses using HFCs that are not currently included in the VM.[38] Although this analysis does not model projected demand for these end uses, EPA has previously published projections for HFC-23, HFC-32, and HFC-41 demand in semiconductor applications using data reported to EPA and other sources; these projections are available in the technical support document to the 2025 Application-Specific Allowances Review and Renewal Rule.[39]

All projections of demand in this section represent demand for HFCs both for initial charge of new equipment and the service and maintenance of existing equipment through its end of useful life. In addition, demand in these projections represents total demand, regardless of how demand may be met (*i.e.*, through virgin, recovered, or reclaimed HFCs), if the HFCs are produced domestically, or if the HFCs are produced elsewhere and imported within equipment and products. We note that there is significant uncertainty regarding many of the factors driving these projections. A summary of key uncertainties and limitations is provided in Section 5.4.

Demand for HFCs can be met through a combination of domestic production, bulk imports, reuse and reclamation of used refrigerants, drawdown of bulk chemical stockpiles, and import of pre-charged equipment. While the VM explicitly models end use demand, it does not model how that demand is supplied.

HFCs not included in the VM, but that the United States has reported production and/or import of from 2022 to 2025, are HFC-41, HFC-134, and HFC-236ea. The VM does model outputs for HFC-245fa and HFC-365mfc, but these chemicals are not pictured in Figures 16 through 21, because projected demand in the United States is zero over the 2025-2050 period.[40]

Figures 16 and 17 show projected demand for individual (or neat) HFCs and blends containing HFCs in both MMTEVe and MT. As explained above, these projections reflect total demand, which includes demand that could be met by reclaimed material, existing

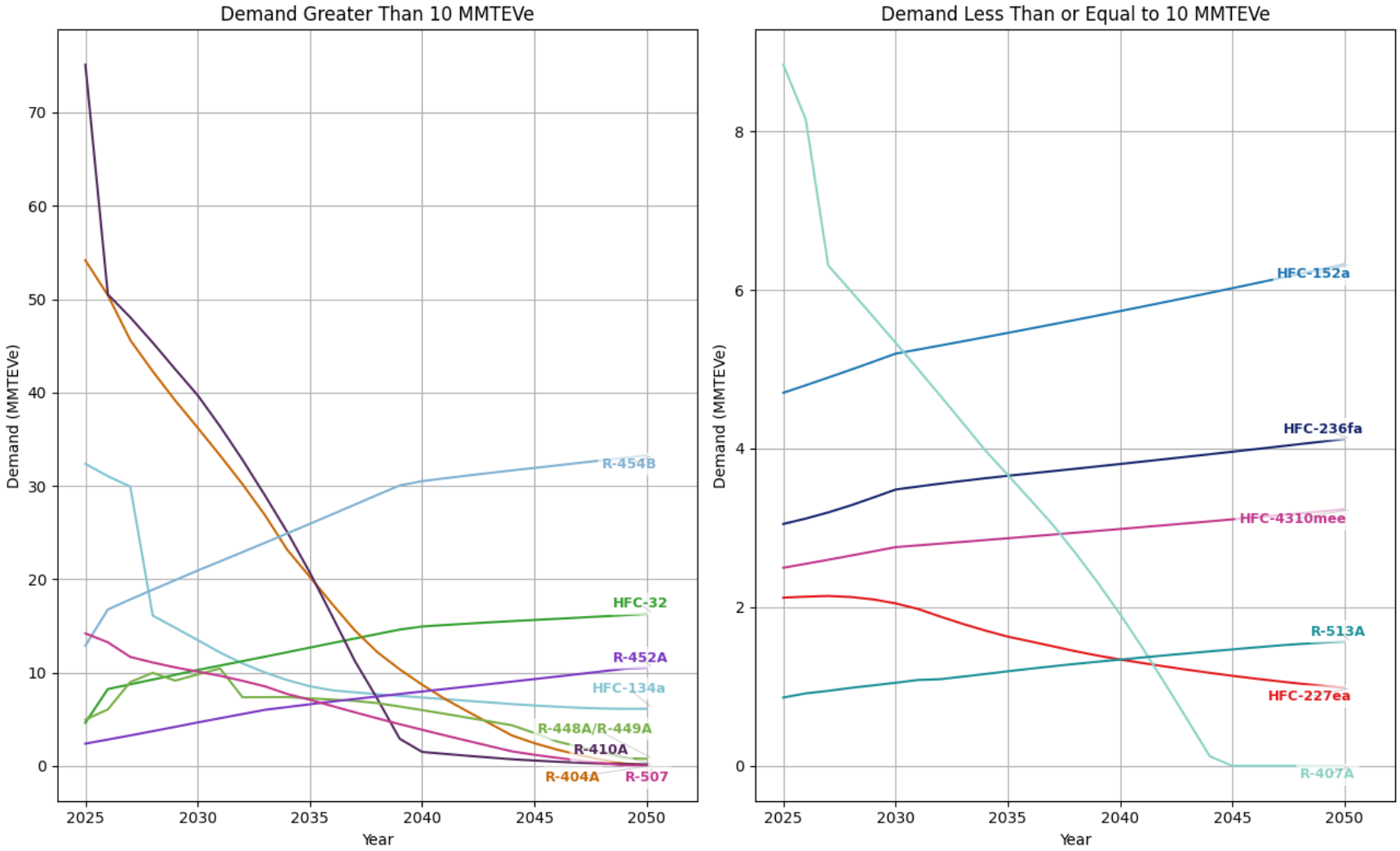
[38] Other applications using HFCs that are not explicitly included in the VM are cryogenic refrigeration, heat-pump water heaters or heat-pump clothes dryers, and magnesium melting and casting.
[39] U.S. EPA. *Review of Applications in the American Innovation and Manufacturing (AIM) Act Subsection (e)(4)(B)(4). Final Rule – Phasedown of Hydrofluorocarbons: Review and Renewal of Eligibility for Application-specific Allowances*: https://www.regulations.gov/document/EPA-HQ-OAR-2024-0196-0034.
[40] For the purposes of the VM, EPA assumes that all HFC-245fa was used in the production of foams and has since been replaced by alternatives by 2025. EPA does not assume any use of HFC-365mfc in the United States as a blowing agent in foams in the 2025-2050 period.

inventories, or pre-charged equipment—not just demand for newly produced and imported material. Tables displaying projected values in more detail for 2030, 2040, and 2050 are included in Appendix A.

In general, the figures show declining demand for blends and neat HFCs with higher EVs, such as R-410A, R-404A, and HFC-134a, that require more allowances to produce or import. However, we anticipate the demand for these substances will persist, due to the long life cycles of the equipment they are used in, and continued servicing needs through the end of the equipment's useful life. For example, demand for R-410A declines sharply based on the Technology Transitions Rule restrictions for residential and light commercial air conditioning and heat pumps starting in 2025.[41] Demand then continues to drop, albeit more gradually as servicing demand for legacy equipment slows down. By contrast, demand is projected to increase or remain stable for blends and neat HFCs with comparatively lower EVs including R-454B, HFC-32, and HFC-152a. For these substances, demand from both new and existing equipment and products is expected to continue through 2050. EPA notes that figures include only demand for neat HFCs and blends containing HFCs. The projections below do not include demand for non-HFC alternatives that may see significant increases in usage over the same period, such as R-744 (CO_2) and R-290.

[41] EPA's Technology Transitions regulations, under the authority of the AIM Act, facilitate transitions to next-generation technologies by restricting the use of HFCs in specific sectors and subsectors. Specifically, projections are based on the restrictions under the Technology Transitions provisions, as amended by the 2026 Technology Transitions Reconsideration Rule (91 FR 31284, May 26, 2026).

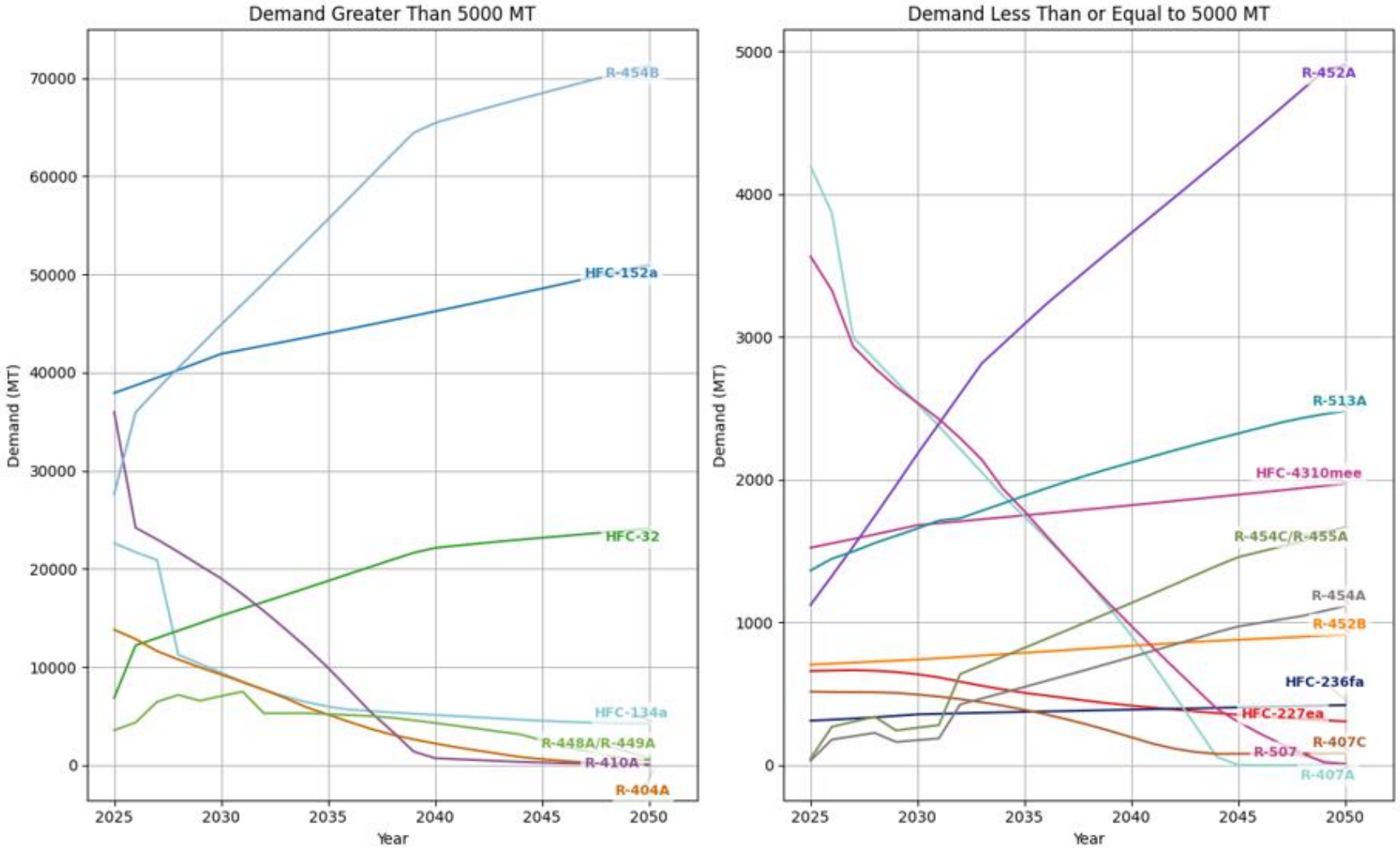
Figure 16. Neat HFCs and Blends Demand Projections (MMTEVe), 2025-2050[a]



Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

[a] To increase the legibility of the projections, the left-hand side graph shows neat HFCs and blends for which projected demand, at any point between 2025-2050, exceeds 10 MMTEVe. The right-hand side graph shows neat HFCs and blends for which projected demand remains less than 10 MMTEVe.

Figure 17. Neat HFCs and Blends Demand Projections (MT), 2025-2050[a]

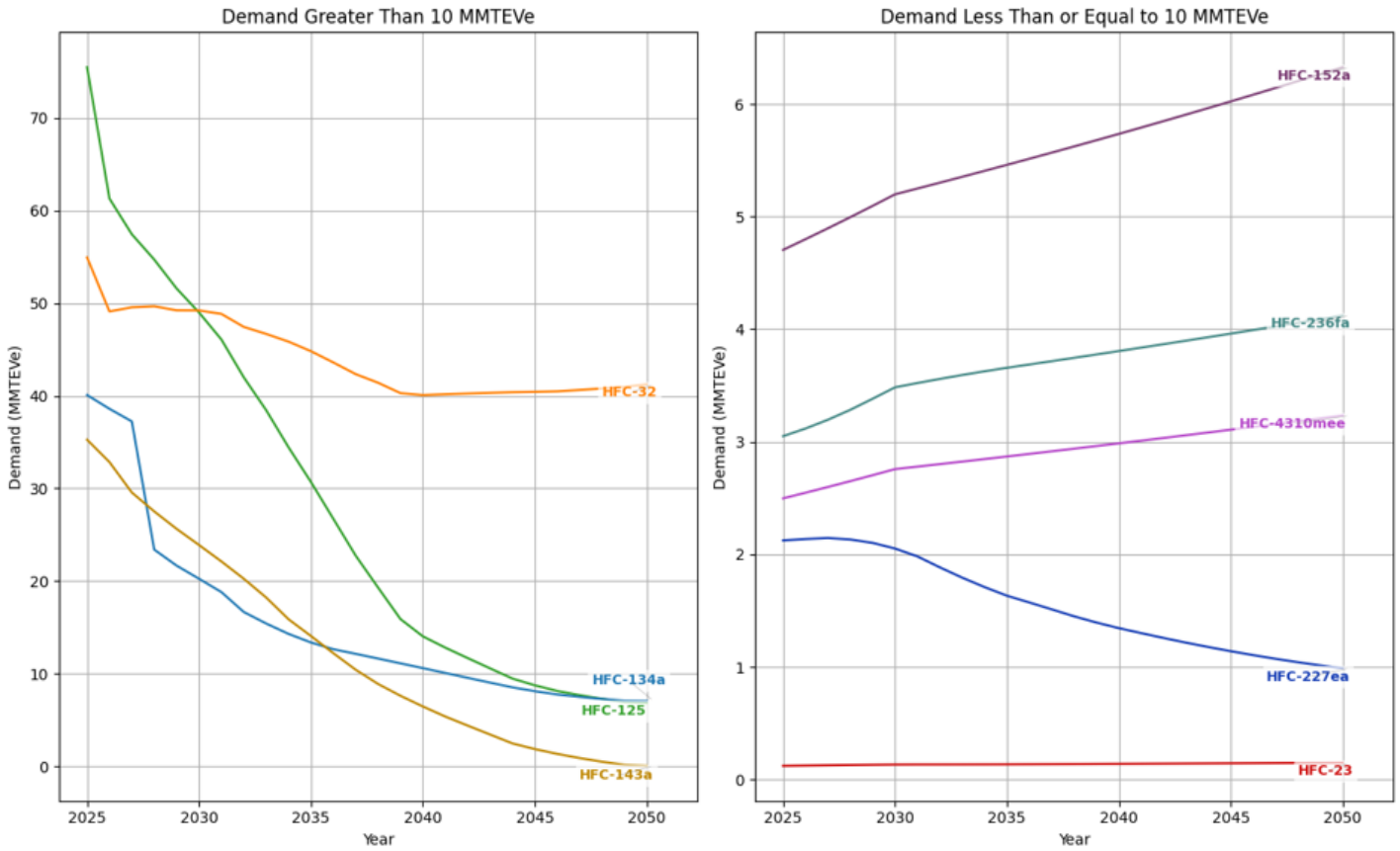


Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

[a] To increase the legibility of the projections, the left-hand side graph shows neat HFCs and blends for which projected demand, at any point between 2025-2050, exceeds 3,000 MT. The right-hand side graph shows neat HFCs and blends for which projected demand remains less than 3,000 MT.

Figures 18 and 19 show projected HFC demand on an individual chemical basis in MMTEVe and MT, and values are inclusive of HFCs that are part of blends. Also, like Figures 16 and 17 above, projections in Figures 18 and 19 are reflective of total demand. For example, the HFC-32 component in R-454B is reflected in projected demand for HFC-32. Tables displaying projected values in more detail for 2030, 2040, and 2050 are included in Appendix A.

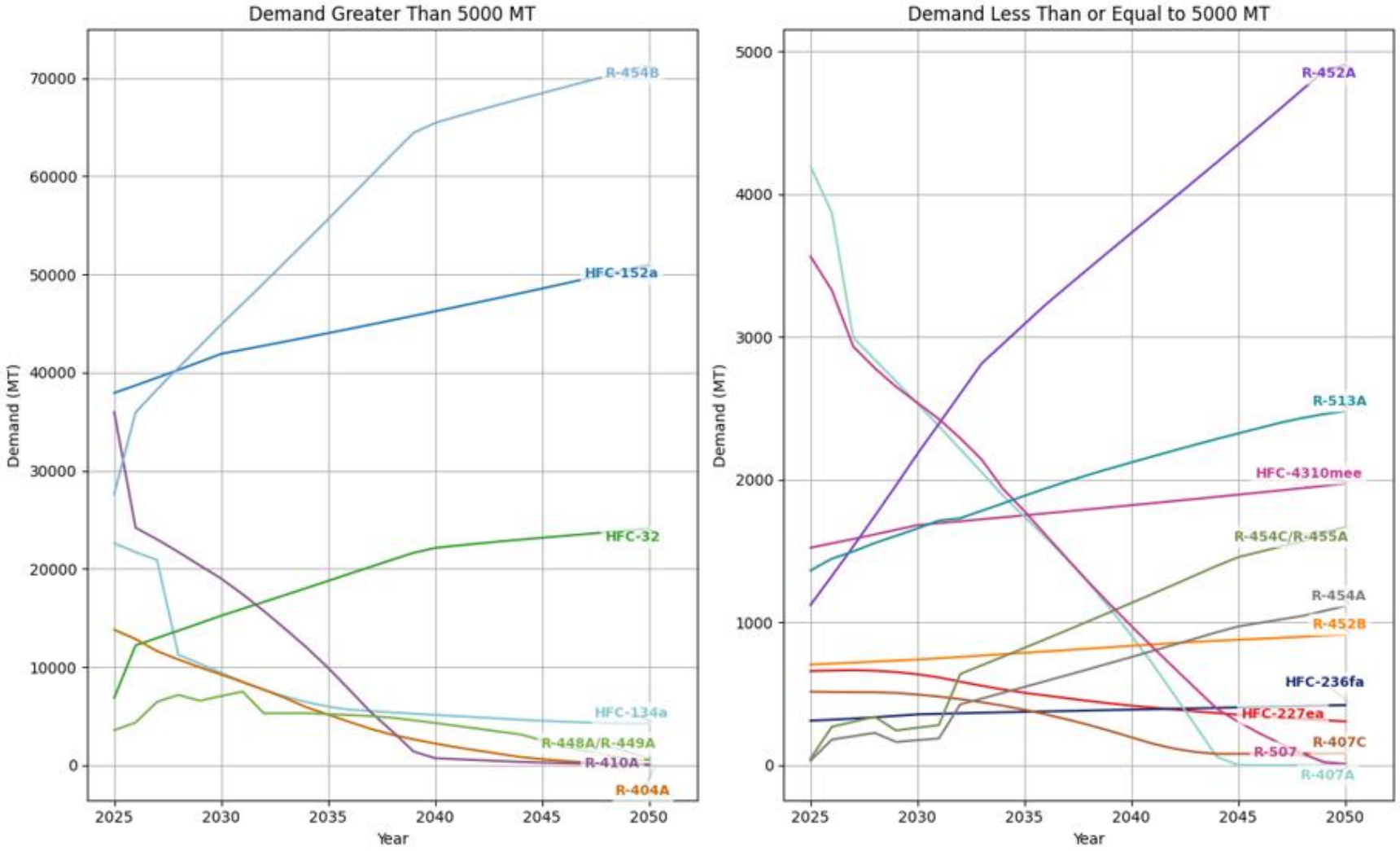
Figure 18. HFC Demand Projections (MMTEVe), 2025-2050[a]



Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

[a] To increase the legibility of the projections, the left-hand side graph shows HFCs for which demand, at any point between 2025-2050, exceeds 10 MMTEVe. The right-hand side graph shows HFCs for which demand remains less than 10 MMTEVe.

Figure 19. HFC Demand Projections (MT), 2025-2050[a]



Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

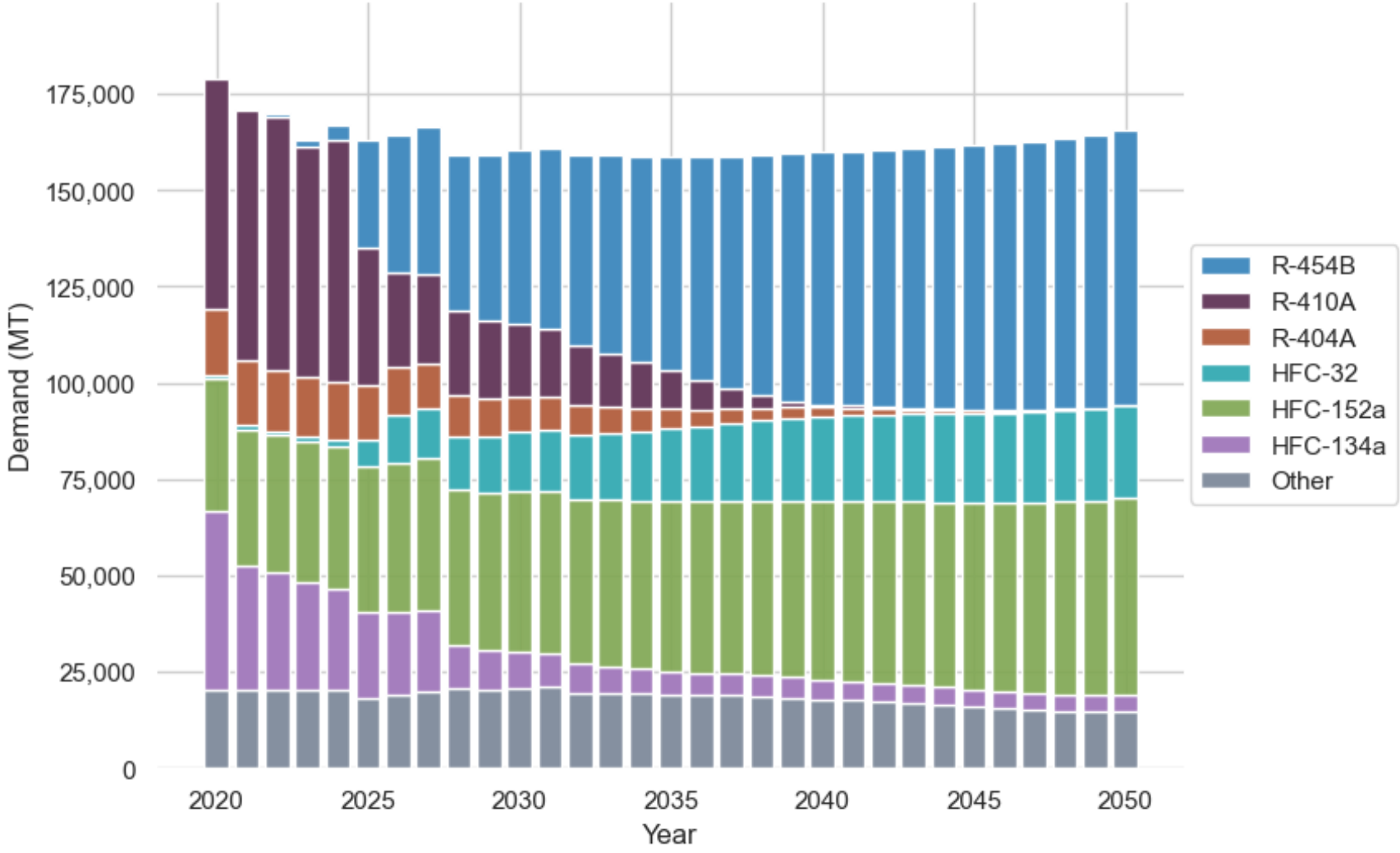
[a] To increase the legibility of the projections, the left-hand side graph shows HFCs for which demand, at any point between 2025-2050, exceeds 25,000 MT. The right-hand side graph shows HFCs for which demand remains less than 25,000 MT.

For neat HFCs and blends, Figures 20 and 21 display cumulative projected demand in MT and MMTEVE, respectively. Commonly used HFCs and blends are disaggregated, and the remaining chemicals are captured in the "Other" category. Total demand in these figures includes demand that could be met by reused and reclaimed material, in addition to virgin.

In Figure 20, the initial decline in total demand through 2028 stems from EPA's assumption that the charge size for R-454B and HFC-32 in residential and light commercial air conditioning equipment is smaller compared to the charge size for R-410A equipment. Thus, EPA predicts that as R-454B and HFC-32 will replace R-410A in that sub-sector over time, demand on a pure MT basis will decrease slightly. The gradual increase in total demand through 2050 reflects macroeconomic trends over time (*e.g.*, population growth) and the corresponding increase in equipment requiring HFCs and alternatives. Apart from these small fluctuations, demand in MT remains relatively consistent over the period of analysis, and lower EV blends and chemicals like R-454B, HFC-32, and HFC-152a make up a larger share of the market as the phasedown progresses.

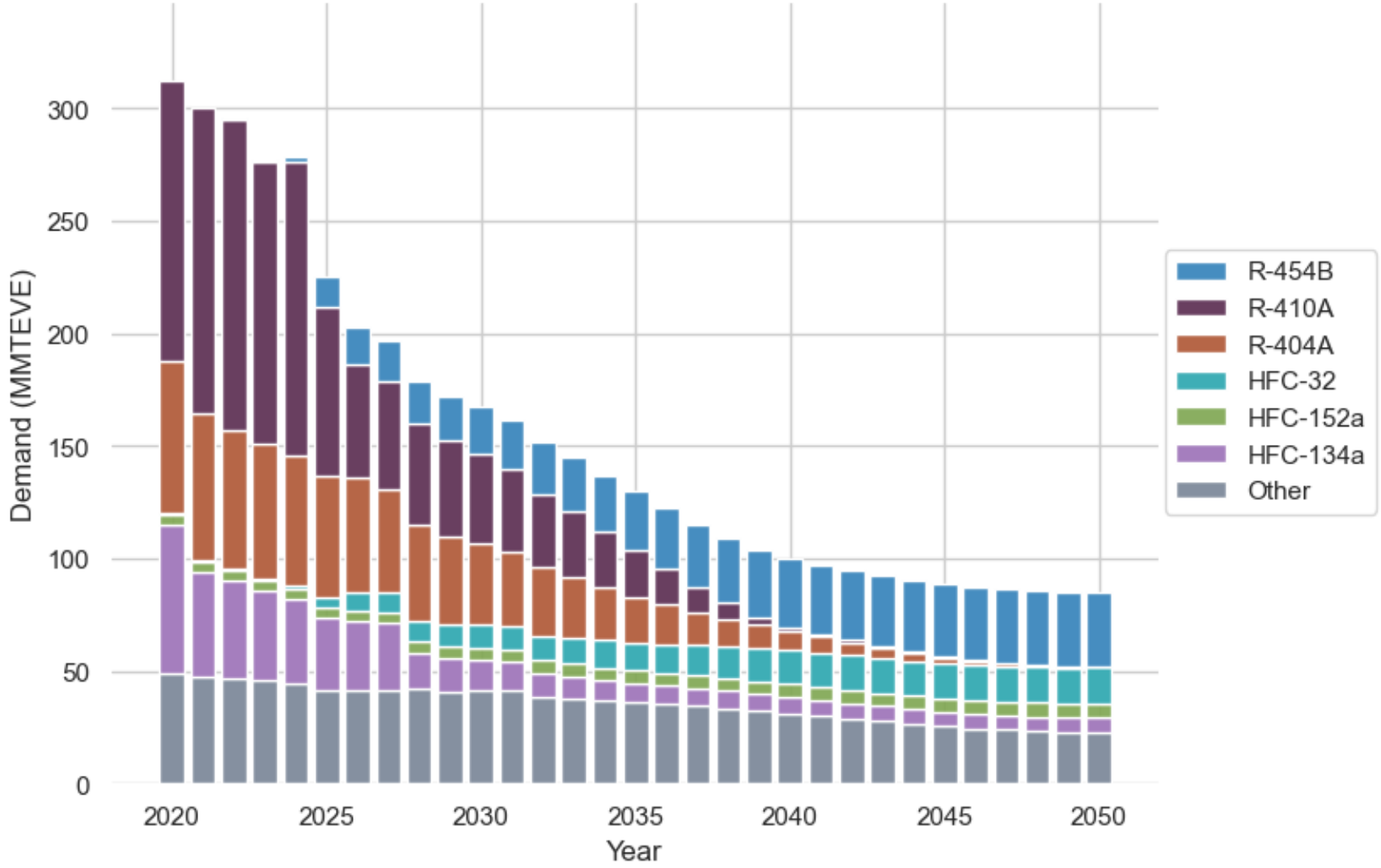
Figure 21 shows total demand in MMTEVe, decreasing steadily over time. Residual demand for R-410A and R-404A continues to constitute a significant portion of total demand in MMTEVe through 2035 despite accounting for a much smaller percentage of the market on an MT basis, as shown in Figure 20.

Figure 20. Projected Demand of Neat HFCs and Blends (MT), 2025-2050



Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Figure 21. Projected Demand of Neat HFCs and Blends (MMTEVe), 2025-2050



Source: U.S. EPA. (2026). EPA Vintaging Model. Version VM IO file_v5.1_4.23.2026.

5.2. Market Penetration of HFCs and Alternatives

The projections for HFCs both neat and contained in blends described in Section 5.1 rely heavily on EPA's assumptions regarding rates of transition and the market penetration of various HFCs and HFC alternatives over time (*see* Table 39).

Table 39 shows EPA's predicted market share for HFCs and alternatives over time, by end use and product category for 2020, 2025, and 2030. Percentages in table represent share of total, non-EVe weighted demand required for new units or products by year. The values therefore do not reflect additional demand associated with the servicing of legacy equipment. Many of the trends in the table are assumed to be driven by the Technology Transitions provisions.[42] For instance, demand for R-410A in new stationary air conditioning units falls dramatically between 2020 and 2025, while demand for R-454B and R-32 rises significantly over the same period. Other trends are based on general market shifts in response to the AIM Act, EPA's Significant New Alternatives Policy (SNAP) Rules, and other factors. For example, significant market shifts away from HFC-227ea and HFC-125 are assumed to have occurred in the fire suppression sector, even though these uses are not restricted by the Technology Transitions provisions.

Market share assumptions are informed by publicly available data, stakeholder consultation, and expert judgement regarding likely transitions in response to regulations.

Table 39. Market Penetration of HFCs and Alternatives as Share of Total Demand for New Units/Products, by Year[a]

Sector	End Use Category	Chemical/Blend Name	2020	2025	2030
Aerosols	Aerosols: Consumer and Technical	HFC-134a	20%	17%	0.0%
		HFC-152a	71%	71%	71%
		HFO-1234ze	8%	11%	11%
		Other non-fluorinated[b]	1%	1%	18%
	Aerosols: MDIs[c]	HFC-134a	86%	86%	86%
		HFC-227ea	14%	14%	14%
Fire Suppression	Fire Extinguishing: Total Flooding Agents	Carbon Dioxide	7%	6%	6%
		FK-5-1-12	35%	57%	57%
		HFC-125	7%	1%	1%
		HFC-227ea	19%	2%	2%
		HFC-23	0.2%	0.2%	0.2%
		Halon-1301	0.7%	0.2%	0.2%

[42] Specifically, assumptions are based on the restrictions under the Technology Transitions provisions, as amended by the 2026 Reconsideration Rule (91 FR 31284, May 26, 2026).

Sector	End Use Category	Chemical/Blend Name	2020	2025	2030
		Inert Gas	27%	29%	29%
		Water	4%	4%	4%
	Fire Extinguishing: Streaming Agents	HCFC Blend B	3%	3%	3%
		HFC-236fa	2%	2%	2%
		Halon-1211	6%	4%	4%
		Other non-fluorinated	89%	91%	91%
Foams	Foams: Closed Cell	HCFO-1233zd	11%	14%	14%
		HFC-134a	11%	0.0%	0.0%
		HFC-152a	2%	2%	2%
		HFC-245fa	2%	0.0%	0.0%
		HFO-1234ze	7%	11%	12%
		HFO-1336mzz	8%	9%	10%
		Methyl Formate	0.2%	0.1%	0.1%
		Other non-fluorinated[b]	46%	50%	48%
		R-498	10%	12%	13%
		R-744	2%	2%	2%
	Foams: Open Cell	HCFO-1233zd	0.6%	0.3%	0.0%
		HFC-152a	0.2%	0.2%	0.2%
		HFO-1234ze	0.4%	0.3%	0.4%
		HFO-1336mzz	0.2%	0.5%	0.8%
		Other non-fluorinated[b]	2%	1%	2%
		R-744	0.6%	0.6%	0.6%
		Water	96%	97%	96%
Refrigeration and Air Conditioning	Commercial Refrigeration	HFC-134a	5%	4%	0.0%
		Other non-fluorinated[b]	0.2%	0.3%	0.8%
		R-290	2%	4%	4%
		R-404A	37%	13%	0.0%
		R-407A/R-407F[d]	19%	24%	0.0%
		R-410A	2%	0.8%	0.0%
		R-448/449A[d]	17%	31%	47%
		R-450A	1%	0.0%	0.0%
		R-454A	0.0%	0.5%	2%
		R-454C/R-455A[d]	0.0%	0.8%	2%
		R-507	7%	5%	0.0%
		R-513A	1%	0.0%	0.6%
		R-744	9%	17%	43%
		HFC-134a	77%	0.0%	0.0%

Sector	End Use Category	Chemical/Blend Name	2020	2025	2030
	Domestic Refrigeration	R-600a	23%	100%	100%
	Industrial Refrigeration	HCFO-1233zd	4%	4%	4%
		HFC-134a	29%	7%	0.0%
		Other non-fluorinated[b]	11%	69%	86%
		R-404A	28%	7%	0.0%
		R-410A	14%	4%	0.0%
		R-454B	0.0%	3%	5%
		R-507	9%	2%	0.0%
		R-513A	0.0%	0.1%	0.1%
		R-514A	4%	4%	4%
	Mobile Air-Conditioning	HFC-134a	21%	6%	5%
		HFO-1234yf	79%	94%	94%
		R-407C	0.2%	0.3%	0.3%
	Stationary Air-Conditioning	HCFO-1233zd	3%	3%	3%
		HFC-134a	16%	0.0%	0.0%
		HFC-32	5%	21%	24%
		HFO-1234ze	0.0%	22%	21%
		R-407C	29%	0.0%	0.0%
		R-410A	43%	3%	0.0%
		R-452B	0.0%	4%	4%
		R-454B	0.0%	35%	38%
		R-513A	0.0%	7%	7%
		R-514A	3%	3%	3%
		R-515B	0.0%	0.9%	0.8%
	Transport Refrigeration	HFC-134a	21%	4%	4%
		HFO-1234yf	0.0%	1%	2%
		R-404A	59%	0.0%	0.0%
		R-407C	0.6%	0.6%	0.6%
		R-410A	1%	0.7%	0.7%
		R-452A	2%	81%	80%
		R-507	16%	0.0%	0.0%
		R-513A	0.0%	8%	8%
		R-744	0.5%	4%	5%

[a] Percentages in table represent share of total demand (non-EVe weighted) required for new units or products by year as opposed to demand for the servicing of existing equipment. For example, total refrigerant charge for new domestic refrigerators purchased and installed in 2020 is estimated to have been met by 23% R-600a (isobutane) and 77% HFC-134a.

[b] Category includes non-fluorinated alternatives which may differ significantly depending on end use category. For example, includes ammonia used in industrial refrigeration and cyclopentane used as a blowing agent for certain foams.

[c] MDI Aerosols category represents only the segment of the market that uses HFC-based propellants. EPA has not estimated market shares for alternatives such as dry powder and aqueous mist (soft mist) inhalers for the purposes of this table, but notes that this share has been estimated at approximately 35 percent of the U.S. MDIs market in a previous study.[43]
[d] For chemicals listed together, percentages reflect their predicted market penetration collectively.

5.3. Projected Virgin HFC Demand and Statutory Phasedown Limits

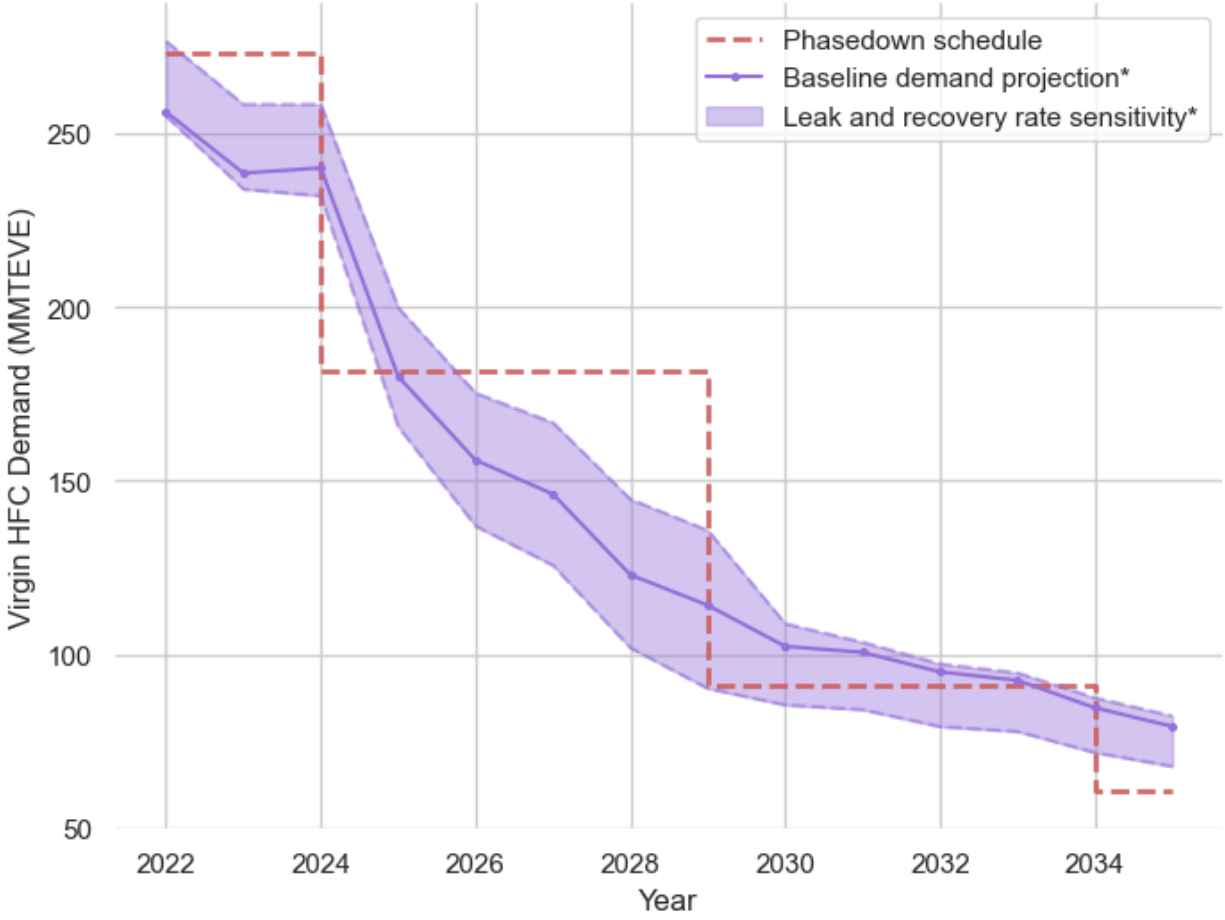
Figure 22 shows projected HFC demand overlaid with the statutory phasedown limits for consumption. The baseline scenario for this projection assumes compliance with EPA's Technology Transitions Rule restrictions but as discussed below does not necessarily reflect all transitions or other measures that may be taken to keep import and production of virgin HFCs below the statutory caps.[44]

For all years where projected demand exceeds the statutory caps, the market is expected to undertake additional measures, such as: use of lower EV alternatives than those EPA assumes as compliant options for current or future restrictions; transitions to additional technology options that may not yet be commercially available but may be in later years; reliance on stockpiled bulk HFCs from previous years; additional recovery and re-use; improved leak detection and repair practices; and forgoing or delaying the repair and recharging of existing HFC systems. For example, while the figure below projects demand levels that exceed the compliance cap in 2024-2025, actual consumption of HFCs in the U.S. in both years remained in compliance with the AIM Act phasedown limits. Thus, to the extent the market did indeed face demand over-and-above the compliance cap over the 2024-2025 period as indicated by the projection below, the shortfall may have been met through reliance on stockpiled material from previous years, import of pre-charged equipment, or other measures.

While the projection does not provide sensitivity bounds for all such uncertainties, it does provide an illustrative upper- and lower-bound sensitivity for assumed leak rates and recovery/reuse rates, in particular.[45]

[43] UNEP. (2022). Medical and Chemical Technical Options Committee (MTOC). *2022 Assessment Report*. Available online at: https://ozone.unep.org/system/files/documents/MCTOC-Assessment-Report-2022.pdf.
[44] Codified at 40 CFR part 84, subpart B: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-84/subpart-B/section-84.54. Projections also account for amendments contained in the 2026 Technology Transitions Reconsideration Rule (84 FR 31284, May 26, 2026).
[45] Specifically, the lower-bound demand line represents a scenario with 50 percent lower refrigeration, air conditioning, and heat pump (RACHP) equipment leak rates than baseline assumptions, and the upper-bound demand line represents a scenario with 100 percent lower recovery/reuse rates than baseline assumptions. EPA is sharing its underlying baseline assumptions for leak rates and recovery/reuse rates in Appendix B.

Figure 22. Projected Virgin HFC Demand and Phasedown Schedule (MMTEVe), 2022-2035



Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VMO IO file_v5.1_4.23.2026.
* Baseline demand projection assumes compliance with Technology Transitions provisions (as amended by the 2026 Technology Transitions Reconsideration Rule) based on technology uptake assumptions detailed in Section 5.2 and equipment leak rate and recovery/reuse rates as detailed in appendix B. Lower bound demand line represents a scenario with 50% lower RACHP equipment leak rates than baseline assumptions, and the upper bound demand line represents a scenario with 100% lower recovery/reuse rates than baseline assumptions.

5.4. Key Uncertainties and Limitations

EPA notes that there is significant uncertainty regarding its projections of HFC demand. As discussed above, demand for HFCs can be met through a combination of domestic production, bulk imports, reuse and reclamation of used refrigerants, drawdown of bulk chemical stockpiles, and import of pre-charged equipment. In addition, demand for HFCs depends on rates of transition and technology choices for new equipment for various subsectors, as well as demand for servicing due to losses from existing equipment. Many of these factors are uncertain due to limited data and/or insight into market behavior.

Thus, overall demand for HFCs may be higher or lower than the projections included in this report.

A summary of key sources of uncertainty associated with the projections above and EPA's VM more broadly is provided below.

Share of pre-charged equipment

EPA's projections reflect the demand for HFCs in equipment used in the United States, regardless of whether equipment is pre-charged overseas prior to being imported or charged using domestically produced or imported HFCs. Since demand for HFCs contained in pre-charged equipment (*e.g.*, aerosol cans, small refrigeration and air conditioning appliances, closed-cell foam either attached to an appliance or not) does not count as U.S. consumption under the AIM Act, not all demand reflected in Figure 22 may require domestic consumption allowances.

At the same time, EPA's projections do not reflect demand for U.S.-produced HFCs used to charge equipment that is subsequently exported for use overseas. Since domestically-produced HFCs used to charge equipment that is subsequently exported for use overseas does count against U.S. consumption under the AIM Act, EPA's projection of HFC demand as depicted in Figure 22 may also be excluding some demand that would require domestic consumption allowances.

The share of pre-charged equipment that is imported versus exported is uncertain; however, EPA expects that overall, the United States is a net importer of pre-charged equipment and products.[46] As a result, EPA expects that a portion of the demand shown in Figure 22 that needs to be met by new HFC consumption is on net lower than shown. However, manufacturing patterns have changed since the U.S. phasedown began and EPA is unsure to what extent imports of pre-charged equipment can meet future HFC demand or where exactly these imports may come from. Furthermore, although imports of pre-charged equipment do not count toward the phasedown caps, servicing this equipment in the United States will impact service-related demand for HFCs. This contributes additional uncertainty to assessing the net effect of pre-charged equipment imports on HFC demand.

EPA does not currently have data on the precise share of equipment that is imported pre-charged or charged domestically and subsequently exported. The amount of HFCs inside pre-charged products or foams that is imported to the United States does not require allowances for domestic importers and producers, and such imports are expected to

[46] See, for instance, *Regulatory Impact Analysis Addendum: Impact of the Technology Transitions Rule*: https://www.regulations.gov/document/EPA-HQ-OAR-2021-0643-0227.

account for some of the predicted demand shown in the projection in this report. Importers of pre-charged equipment and products in certain sectors are reporting information under the Technology Transitions provisions, and EPA expects to review that data for the purposes of refining its projections in the future.

Stockpiles of bulk HFCs

Based on reported data, there is a significant inventory of HFCs that is carried over year to year.[47] While new production and import are limited by the number of allowances issued in a given year, material that was previously produced or imported can be used at any time.[48] This inventory is available to support some of the demand for regulated HFCs, *e.g.*, in years where projected demand is higher than the amount of consumption authorized by the AIM Act. Reported data shows these amounts have generally declined from 380.3 MMTEVe at the end of 2022, to 348.5 MMTEVe at the end of 2023, to 286.8 MMTEVe at the end of 2024, to 278.5 MMTEVe at the end of 2025. The use of such stockpiles is entirely at the discretion of market actors, so there is uncertainty on whether and when the inventory may be used and whether the HFCs in inventory will be the right type of HFCs to meet future demand.

Leak rates and recovery/reuse

Demand for virgin HFCs may be higher or lower than reflected in EPA's projections due to significant uncertainty regarding leak and recovery/reuse rates. These rates are important factors for EPA's demand projections associated with servicing legacy equipment, which is likely on average to require higher-EV chemicals than new equipment. Recovery/reuse rates have a significant impact on demand for the RACHP and Fire Suppression sectors in particular, where 1) emissions of the working fluid are typically replaced, thus contributing to a portion of the overall demand projected in this report, and 2) recovery/reuse can significantly offset the need for newly manufactured material.

Baseline assumptions for leak rates and recovery/reuse rates are provided in Appendix B (tables B1 and B2) and are consistent with leak and recovery rates used in previous EPA analyses and reports, including the RIA accompanying the Allocation Framework Rule. EPA's data on these factors is limited, and individual users of the equipment and servicing technicians generally do not report on them. Even where overall leak rates of a company or industry group are available, the granularity of such data is not at the level needed for modeling demand by individual HFC.

[47] Allowance holders are required to report how much inventory they possess at the end of each calendar year.

[48] Provided that use is consistent with the Technology Transitions provisions and any other use restrictions that may apply.

EPA further notes that the model used for these projections simplistically assumes that recovered refrigerant may be reused in subsequent years to offset demand for virgin refrigerant *only* within the same end use. In reality, EPA expects that recovered refrigerant is somewhat interchangeable across end uses (*e.g.*, R-410A reclaimed from a chiller in a commercial building could be used to meet demand in legacy residential air conditioning systems). Likewise, refrigerant may be recovered, reclaimed, and then used to reconstitute other refrigerants to meet demand in separate end uses (*e.g.*, the constituents HFC-125 and HFC-32 recovered from R-410A air conditioning units at disposal could be reclaimed and, when combined with reclaimed HFC-134a and HFOs in specific amounts, reused in R-448A/R-449A for commercial refrigeration).

Units sold and market uptake of new technologies

EPA has provided its underlying assumptions regarding the market share of HFC- and HFC-alternative-containing equipment by end use category in Section 5.2 above (Table 39). Market share of various technologies may be driven by factors including consumer preferences for particular chemicals or blends, changes in domestic and global production capabilities, and the commercial viability and uptake rates of new technologies and alternatives. To this last point, especially for 2030, projections may not be reflective of likely alternatives that are still early in the testing or commercial development process but may be more widely marketed in the coming years. For example, HFC-152a and/or HFO-1234ze(E) will likely receive U.S Food and Drug Administration (FDA) approval for use in MDIs and may make up a significant share of the market by 2030, despite not being reflected in the tables and projections above. Another key uncertainty in the data is the fact that projections do not account for potential future regulatory changes.

We note that rates of transition to alternative technologies that are more or less accelerated than these assumptions would result in demand for HFCs (on an EV basis) that differs from the projections included in this report. Data on the precise number of units sold and installed in a given year varies from one end use to the next but is generally limited, as individual companies generally do not publish specific numbers. While some industry groups will collect data to provide an overall market projection, these most often will not indicate the proportion of use by different chemicals. Thus, these inputs to the modeling performed for this analysis—while using the best available data—are uncertain.

6. Conclusion

Since 2022, regulated entities have reported data to EPA under the HFC Allocation Program. This report includes data and analysis on various aspects of the program, including allowance usage, allowance transfers, domestic production, sources of imports, and more. Similarly, this report includes EPA's latest projections on HFC demand through 2050 as well as some of the underlying assumptions used to develop those projections.

As noted throughout the report, stakeholders may visit the HFC Data Hub on EPA's website to view additional data on HFC production and consumption, such as detailed allowance usage by entity, bulk imports by country of export and port of entry, and end-of-year inventory.[49]

Our objective is to improve program transparency and ensure that the Agency has access to the latest available information. EPA welcomes stakeholders' review of the information contained in this report and additional insights on the data presented.

[49] The HFC Data Hub (including the Expanded HFC Data webpage) is available online at https://www.epa.gov/hfcs/hfc-data-hub.

Appendix A: Data Corresponding to Report Figures

Appendix A provides raw data associated with the figures presented in this report. Each table in Appendix A is numbered to correspond with the applicable figure (*e.g.*, the appendix table associated with Figure 1 is labeled Table A1). Note that the underlying data for the figures presented in Section 2.2 are not listed here and can be found as spreadsheets in the docket for this notice.

Table A1. Annual Calculated HFC Production Relative to the Phasedown Limit (MMTEVe)

Year	Production (40 CFR Part 98)	Production (AIM Act)	Phasedown Limit
2019	234		
2020	228		
2021	188		
2022		180.4	344.3
2023		163.8	344.3
2024		125.7	229.5
2025[a]		*134.5*	229.5
2026			229.5
2027			229.5
2028			229.5
2029			114.8
2030			114.8
2031			114.8
2032			114.8
2033			114.8
2034			76.5
2035			76.5
2036 onwards			57.4

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A2. Annual Calculated HFC Consumption Relative to the Phasedown Limit (MMTEVe)

Year	Net Supply (40 CFR Part 98)	Consumption (AIM Act)	Phasedown Limit
2019	314		
2020	309		
2021	461		
2022		255.4	273.5
2023		255.3	273.5
2024		171.8	181.5

Year	Net Supply (40 CFR Part 98)	Consumption (AIM Act)	Phasedown Limit
2025[a]		*170.1*	181.5
2026			181.5
2027			181.5
2028			181.5
2029			90.8
2030			90.8
2031			90.8
2032			90.8
2033			90.8
2034			60.5
2035			60.5
2036 onwards			45.4

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A3. ASAs Unused by ASA Holders vs. Suppliers (all applications), 2022-2025[a]

Year	End Users' Unused Allowances[b]	Suppliers' Unused Allowances[b]	Total Expended Allowances[c]	Adjustments[d]
2022	962,170.6	224,464.3	2,305,198.4	0
2023	886,637.1	265,850.6	2,111,523.8	-10,861.5
2024	1,026,929.3	324,077.8	2,222,709.1	-820.0
2025[e]	*352,716.8*	*318,385.5*	*2,545,260.9*	*3,018.4*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] Data does not include allowance activity for defense sprays or mission-critical military end uses. Allowances for MDIs include consumption allowances allocated to GlaxoSmithKline. The sum of each row represents the total number of ASAs allocated to all applications in the listed year.

[b] Includes allowances that are unexpended or unconferred by the end of year.

[c] Excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023. Includes both expenditure by suppliers and expenditure by end users to directly import HFCs.

[d] Allowance adjustments reflect activity other than allowance expenditure, including withholdings from administrative consequences, pro rata distributions, allowance transfer offsets, and additional consumption allowances received from RACAs. A negative value reflects activity that increased available allowances (*e.g.*, pro rata distributions of consumption allowances, RACAs), and a positive value reflects activity that reduced available allowances (*e.g.*, ASAs withheld for administrative consequences, transfer offsets).

[e] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A4. ASA Expenditures and Reported Purchases (all applications), 2022-2025[a]

Year	Total Unexpended Allowances (MTEVe)	Total Expended Allowances (MTEVe)[b]	Total Purchases (w/ and w/o allowances) (MTEVe)
2022	1,186,634.9	2,305,198.4	2,254,168.9
2023	1,152,487.7	2,122,523.8	2,471,619.9
2024	1,351,007.1	2,222,709.1	2,092,207.1

2025[c]	*671,102.3*	*2,545,260.9*	*2,547,412.4*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] Data does not include activity for defense sprays or mission-critical military end uses. Allowances for MDIs include consumption allowances allocated to GlaxoSmithKline.
[b] Excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023. Includes both expenditure by suppliers and expenditure by end users to directly import HFCs.
[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A5. Semiconductor Allowances Unused by ASA Holders vs. Suppliers, 2022-2025[a]

Year	End Users' Unused Allowances[b]	Suppliers' Unused Allowances[b]	Total Expended Allowances[c]	Adjustments[d]
2022	623,937.2	196,088.4	760,651.6	0
2023	738,057.4	466.3	1,160,099.0	0
2024	550,114.1	315,412.7	964,816.9	0
2025[e]	*166,828.0*	*281,860.5*	*1,014,294.4*	*3,179.4*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] The sum of each row represents the total number of ASAs allocated to the semiconductor application in the listed year.
[b] Includes allowances that are unexpended or unconferred by the end of year.
[c] Excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023.
[d] Allowance adjustments reflect activity other than allowance expenditure, including withholdings from administrative consequences, pro rata distributions, allowance transfer offsets, and additional consumption allowances received from RACAs. A negative value reflects activity that increased available allowances (*e.g.*, pro rata distributions of consumption allowances, RACAs), and a positive value reflects activity that reduced available allowances (*e.g.*, ASAs withheld for administrative consequences, transfer offsets).
[e] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A6. Semiconductor Allowance Expenditures and Reported Purchases, 2022-2025

Year	Total Unexpended Allowances (MTEVe)	Total Expended Allowances (MTEVe)[a]	Total Purchases (w/ and w/o allowances) (MTEVe)
2022	820,025.6	760,651.6	1,225,598.2
2023	738,523.7	1,160,099.0	984,013.7
2024	865,526.8	964,816.9	1,008,969.3
2025[b]	*448,688.5*	*1,014,294.4*	*971,165.6*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.
[a] Excludes shipments of HFCs imported without the requisite number of ASAs in 2022 and 2023.
[b] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A7. MDI Allowance Expenditures and Reported Purchases, 2022-2025[a]

Year	Total Unexpended Allowances (MTEVe)	Total Expended Allowances (MTEVe)[b]	Total Purchases (w/ and w/o allowances) (MTEVe)
2022	321,605.6	1,449,434.9	986,361.4

Year	Total Unexpended Allowances (MTEVe)	Total Expended Allowances (MTEVe)[b]	Total Purchases (w/ and w/o allowances) (MTEVe)
2023	394,798.2	888,881.8	1,436,565.6
2024	457,292.9	1,191,552.2	1,038,191.5
2025[c]	*200,969.1*	*1,481,667.0*	*1,568,275.4*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 17, 2026.

[a] Allowances include consumption allowances allocated to GlaxoSmithKline.

[b] Includes both expenditure by suppliers and expenditure by end users to directly import HFCs.

[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A8. Sources of Regulated HFCs for Consumptive Use, 2022-2025

Source	Share of Quantity in MT (%)				Share of Quantity in MTEVe (%)			
	2022	2023	2024	*2025[a]*	2022	2023	2024	*2025[a]*
Domestic Production[b]	71%	68%	70%	*72%*	60%	57%	59%	*63%*
Imports[c]	29%	32%	30%	*28%*	40%	43%	41%	*37%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

[b] Values only include HFCs produced for consumptive uses.

[c] Values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.

Table A9. Sources of Regulated HFCs for Consumptive Use by Chemical (%), 2022-2025

HFC	Reporting Year	Domestic Production[a,b]	Imports[a,c]
HFC-125	2022	45%	55%
	2023	45%	55%
	2024	53%	47%
	2025[d]	*60%*	*40%*
HFC-134	2022	99%	1%
	2023	99%	1%
	2024	0%	100%
	2025[d]	*0%*	*100%*
HFC-134a	2022	89%	11%
	2023	88%	12%
	2024	81%	19%
	2025[d]	*91%*	*9%*
HFC-143a	2022	0%	100%
	2023	0%	100%
	2024	0%	100%
	2025[d]	*0%*	*100%*
HFC-152a	2022	84%	16%
	2023	84%	16%
	2024	85%	15%

HFC	Reporting Year	Domestic Production[a,b]	Imports[a,c]
	2025[d]	*91%*	*9%*
HFC-227ea	2022	73%	27%
	2023	78%	22%
	2024	97%	3%
	2025[d]	*71%*	*29%*
HFC-23	2022	4%	96%
	2023	5%	95%
	2024	9%	91%
	2025[d]	*0%*	*100%*
HFC-236ea	2022	64%	36%
	2023	27%	73%
	2024	79%	21%
	2025[d]	*100%*	*0%*
HFC-236fa	2022	0%	100%
	2023	0%	100%
	2024	0%	100%
	2025[d]	*0%*	*100%*
HFC-245fa	2022	75%	25%
	2023	55%	45%
	2024	59%	41%
	2025[d]	*93%*	*7%*
HFC-32	2022	64%	36%
	2023	57%	43%
	2024	57%	43%
	2025[d]	*53%*	*47%*
HFC-365mfc	2022	0%	100%
	2023	0%	100%
	2024	N/A	N/A
	2025[d]	*N/A*	*N/A*
HFC-41	2022	36%	64%
	2023	53%	47%
	2024	46%	54%
	2025[d]	*52%*	*48%*
HFC-43-10mee	2022	0%	100%
	2023	0%	100%
	2024	0%	100%
	2025[d]	*0%*	*100%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
N/A = Not Applicable.
[a] Share of quantity in kilograms.
[b] Values only include HFCs produced for consumptive uses.
[c] Values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.

[d] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A10. Forms of HFCs Imported for Consumptive Use (%), 2022-2025[a,b]

Year	Imported Neat	Imported in Blends
2022	77%	23%
2023	71%	29%
2024	59%	41%
2025[c]	*65%*	*35%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Share of quantity in kilograms.
[b] Values only reflect HFCs imported for consumptive uses.
[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A11. Forms of HFCs Imported for Consumptive Use by Chemical (%), 2022-2025[a,b]

HFC	Year	Imported Neat	Imported in Blends
HFC-125	2022	77%	23%
	2023	57%	43%
	2024	22%	78%
	2025[c]	*49%*	*51%*
HFC-134a	2022	84%	16%
	2023	73%	27%
	2024	81%	19%
	2025[c]	*87%*	*13%*
HFC-143a	2022	98%	2%
	2023	99%	1%
	2024	99%	1%
	2025[c]	*98%*	*2%*
HFC-152a	2022	100%	0%
	2023	100%	0%
	2024	100%	0%
	2025[c]	*100%*	*0%*
HFC-227ea	2022	71%	29%
	2023	74%	26%
	2024	100%	0%
	2025[c]	*100%*	*0%*
HFC-236fa	2022	99%	1%
	2023	99%	1%
	2024	100%	0%
	2025[c]	*100%*	*0%*
HFC-32	2022	55%	45%
	2023	70%	30%
	2024	51%	49%

HFC	Year	Imported Neat	Imported in Blends
	2025[c]	*53%*	*47%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Share of quantity in kilograms.
[b] Values only include HFCs imported for consumptive uses. Only select regulated HFCs imported for consumptive use from 2022-2025 are included in the table.
[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A12. Source of Regulated HFCs Imported for Consumptive Use into the United States (%), 2022-2025[a,b]

Source Country	2022	2023	2024	*2025[c]*
China	58%	47%	53%	*26%*
India	26%	29%	29%	*29%*
UAE	0%	12%	8%	*27%*
Mexico	3%	4%	4%	*5%*
UK	2%	2%	2%	*2%*
Japan	1%	1%	1%	*1%*
Turkey	6%	1%	0%	*0%*
France	3%	1%	0%	*0%*
Other	2%	3%	3%	*10%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed March 31, 2026.
[a] Share of quantity in kilograms.
[b] Values are inclusive of HFCs imported as part of a blend and only include HFCs imported for consumptive uses.
[c] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A14. Rejection Rate for RACA Reports in the First Round of Review, 2022-2025

Reporting Year	Rejection Rate of First Submission
2022	37%
2023	34%
2024	28%
2025[a]	*26%*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.
[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report, but given that RACAs require Agency approval, RACA data for calendar year 2025 is largely, if not wholly, accurate and complete.*

Table A15. Total Reclamation and Fire Suppression Recycling (MT), 2022-2025

Reporting Year	Quantity of HFC Recycled for Fire Suppression (MT)	Quantity of HFC/HFC Blend Reclaimed (MT)
2022	41.5	3,458.1
2023	48.3	4,126.7
2024	63.6	5,376.4
2025[a]	*76.7*	*5,869.8*

Source: U.S. EPA. (2026). *ODS Tracking System Data*. Accessed April 15, 2026.

[a] *Calendar year 2025 data, indicated by italicized font, are preliminary and undergoing verification as of the finalization of this report.*

Table A16. Neat HFCs and Blends Demand Projections (MMTEVe), 2030-2050

HFC/HFC Blend	2030 (MMTEVe)	2040 (MMTEVe)	2050 (MMTEVe)
HFC-125	0.48	0.37	0.25
HFC-134a	13.49	7.34	6.13
HFC-152a	5.20	5.73	6.33
HFC-227ea	2.05	1.34	0.98
HFC-23	0.13	0.14	0.15
HFC-236fa	3.48	3.81	4.12
HFC-245fa	-	-	-
HFC-32	10.29	14.95	16.28
HFC-365mfc	-	-	-
HFC-43-10mee	2.76	2.99	3.23
R-404A	36.24	8.71	0.11
R-407A	5.34	1.91	0.00
R-407C	0.88	0.34	0.15
R-407F	0.03	0.03	0.00
R-410A	39.72	1.51	0.16
R-448A/R-449A	9.81	5.99	0.77
R-450A	0.00	0.00	0.00
R-452A	4.67	7.98	10.50
R-452B	0.52	0.58	0.64
R-454A	0.04	0.18	0.27
R-454B	20.94	30.51	33.28
R-454C/R-455A	0.04	0.17	0.24
R-507	10.12	3.88	0.03
R-513A	1.05	1.34	1.57
R-515B	0.05	0.06	0.06

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Table A17. Neat HFCs and Blends Demand Projections (MT), 2030-2050

HFC/HFC Blend	2030 (MT)	2040 (MT)	2050 (MT)
HFC-125	137.94	106.67	72.84
HFC-134a	9,433.83	5,133.77	4,286.10
HFC-152a	41,916.11	46,242.28	51,016.16
HFC-227ea	636.02	416.13	305.27
HFC-23	9.05	9.46	10.10
HFC-236fa	355.09	387.95	420.13
HFC-245fa	-	-	-
HFC-32	15,242.75	22,142.70	24,120.04
HFC-365mfc	-	-	-
HFC-43-10mee	1,681.30	1,820.75	1,971.77
R-404A	9,241.19	2,222.02	26.78
R-407A	2,532.29	907.67	0.00
R-407C	493.95	194.33	81.99
R-407F	17.74	16.06	0.00
R-410A	19,026.48	724.03	78.20
R-448A/R-449A[a]	7,050.63	4,307.79	549.74
R-450A	3.11	0.00	0.00
R-452A	2,180.71	3,729.21	4,907.79
R-452B	739.00	835.28	913.32
R-454A	174.26	756.91	1,114.43
R-454B	44,897.18	65,432.35	71,372.50
R-454C/R-455A[a]	261.40	1,135.37	1,671.64
R-507	2,538.41	974.77	6.88
R-513A	1,657.99	2,120.48	2,479.38
R-515B	158.72	192.91	214.03

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

[a] Reflects combined demand for chemicals used in the same applications.

Table A18. HFC Demand Projections (MMTEVe), 2030-2050

HFC/HFC Blend	2030 (MMTEVe)	2040 (MMTEVe)	2050 (MMTEVe)
HFC-125	48.99	14.04	6.87
HFC-134a	20.26	10.61	7.08
HFC-143a	23.90	6.47	0.07
HFC-152a	5.20	5.73	6.33
HFC-227ea	2.05	1.34	0.99
HFC-23	0.13	0.14	0.15
HFC-236fa	3.48	3.81	4.12
HFC-245fa	-	-	-
HFC-32	49.21	40.08	41.25
HFC-365mfc	-	-	-
HFC-43-10mee	2.76	2.99	3.23

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Table A19. HFC Demand Projections (MT), 2030-2050

HFC/HFC Blend	2030 (MT)	2040 (MT)	2050 (MT)
HFC-125	19,261.39	5,705.25	3,246.55
HFC-134a	13,430.46	7,616.54	5,549.09
HFC-143a	6,074.62	1,642.83	17.37
HFC-152a	41,916.11	46,242.28	51,016.16
HFC-227ea	650.15	433.30	324.32
HFC-23	9.05	9.46	10.10
HFC-236fa	355.09	387.95	420.13
HFC-245fa	-	-	-
HFC-32	58,950.09	70,383.72	75,388.96
HFC-365mfc	-	-	-
HFC-43-10mee	1,681.30	1,820.75	1,971.77

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Table A20. Projected Demand of Neat HFCs and Blends (MT), 2030-2050

HFC/HFC Blend	2030 (MT)	2040 (MT)	2050 (MT)
R-454B	44,897.18	65,432.35	71,372.50
R-410A	19,026.48	724.03	78.20
R-404A	9,241.19	2,222.02	26.78
HFC-32	15,242.75	22,142.70	24,120.04
HFC-152a	41,916.11	46,242.28	51,016.16
HFC-134a	9,433.83	5,133.77	4,286.10
Other	20,627.61	17,911.74	14,719.31

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Table A21. Projected Demand of Neat HFCs and Blends (MMTEVe), 2030-2050

HFC/HFC Blend	2030 (MT)	2040 (MT)	2050 (MT)
R-454B	20.94	30.51	33.28
R-410A	39.72	1.51	0.16
R-404A	36.24	8.71	0.11
HFC-32	10.29	14.95	16.28
HFC-152a	5.20	5.73	6.33
HFC-134a	13.49	7.34	6.13
Other	41.45	31.11	22.96

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Table A22. Projected Virgin HFC Demand (MMTEVe), 2022-2035

2022	2023	2024	2025	2026	2027	2028
256	239	240	180	156	146	123
2029	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
114	102	101	95	92	85	79

Source: U.S. EPA. (2026). *EPA Vintaging Model*. Version VM IO file_v5.1_4.23.2026.

Appendix B: Assumptions for Projected HFC Demand

Appendix B includes underlying baseline assumptions for EPA's HFC demand projections presented in Section 5, specifically for the refrigeration and air conditioning sector.

Table B1. Assumed Leak Rates from Key Subsectors

Subsector	Leak Rate[a]
Chillers	0.0207
Cold Storage	0.0877
Commercial Unitary Air Conditioners	0.0385
Dehumidifiers	0.0050
Displacement Chillers	0.0067
Ice Makers	0.0146
Industrial Process Refrigeration	0.0441
Mini-Splits	0.0300
Mobile Air Conditioning	0.0930
Refrigerated Appliances	0.0016
Retail Food	0.1673
Transport Refrigeration	0.1926
Water-Source, Ground-Source and Unitary Heat Pumps; Packaged Terminal Air Conditioners and Heat Pumps	0.0238
Window Units	0.0016

[a] Leak rate is the rate at which an appliance is losing refrigerant. The leak rate is expressed in terms of the percentage of the appliance's full charge that would be lost over a 12-month period If the current rate of loss were to continue over that period.

Table B2. Assumed Refrigerant Recovery Rate from Key Subsectors, 2030-2050

Subsector	Recovery Rate[a]
Chillers	0.8745
Cold Storage	0.8923
Commercial Unitary Air Conditioners	0.7644
Dehumidifiers	0.5000
Displacement Chillers	0.8920
Ice Makers	0.4795
Industrial Process Refrigeration	0.8948
Mini-Splits	0.3500
Mobile Air Conditioning	0.5426
Refrigerated Appliances	0.5667
Retail Food	0.7855
Transport Refrigeration	0.7320
Water-Source, Ground-Source and Unitary Heat Pumps; Packaged Terminal Air Conditioners and Heat Pumps	0.5528
Window Units	0.5000

[a] Recovery rate is the average rate of chemical recovered from equipment after decommissioning.

Table B3. Assumed Refrigerant Recovery[a] from Key Subsectors (kg), 2030-2050

Subsector	Chemicals	2030	2040	2050
Chillers	HCFC-22	206,905	-	-
	HCFC-123	809,917	851,336	-
	HFC-134a	1,640,698	1,964,652	239,822
	R-513A	-	-	910,293
	R-514A	-	-	447,437
	HCFO-1233zd(E)	-	-	447,437
	HFO-1234ze(E)	-	-	910,293
Cold Storage	HCFC-22	478,702	-	-
	R-404A	441,102	371,173	-
	R-507A	146,531	123,364	-
	999[b]	251	2,981	27,061
	R-744 (CO_2)	-	1,143	7,730
	R-407F	-	4,730	20,106
Commercial Unitary Air Conditioners	HFC-32	-	173,387	479,942
	R-410A	1,531,327	448,476	-
	R-454B	-	1,109,675	1,701,614
	R-407C	7,452	2,329	-
Dehumidifiers	HFC-32	-	154,336	166,225
	HFC-134a	148,282	-	-
	R-410A	18,974	-	-
	R-454B	-	17,148	18,469
Displacement Chillers	HFC-32	-	-	659,396
	HFC-134a	5,118,689	-	-
	R-410A	204,748	2,363,853	-
	R-454B	-	-	3,133,046
	R-513A	-	-	46,623
	R-515B	-	-	128,258
	HFO-1234ze(E)	-	-	2,284,542
	R-407C	932,739	4,202,406	-
	R-452B	-	-	640,084
Ice Makers	HFC-134a	74,578	-	-
	R-290	-	9,741	10,549
	R-404A	138,245	-	-
	R-410A	63,391	-	-
	R-448A/R-449A[c]	-	165,604	179,339
Industrial Process Refrigeration	HCFC-22	2,685,002	-	-
	HCFC-123	308,737	395,209	-
	HFC-134a	755,409	1,549,182	429,918
	R-404A	114,630	1,522,019	434,303
	R-410A	49,044.44	754,921	215,414
	R-454B	-	-	150,025
	R-507A	34,389	456,606	130,291
	R-513A	-	-	7,221

Subsector	Chemicals	2030	2040	2050
	R-514A	-	-	252,951
	999[b]	-	-	4,100,637
	HCFO-1233zd(E)	-	-	252,951
	R-744 (CO_2)	-	-	14,443
Mini-Splits	HFC-32	-	194,848	326,559
	R-410A	150,402	-	-
	R-454B	-	194,848	326,559
Mobile Air Conditioning	HFC-134a	5,985,037	391,132	410,594
	HFO-1234yf	42,591	6,225,619	6,850,335
	R-407C	14,994	17,004	18,415
Refrigerated Appliances	HFC-134a	911,271	-	-
	999[b]	-	463,160	495,631
Retail Food	HFC-134a	92,596	73,237	-
	R-290	54,813	123,408	133,644
	R-404A	1,914,781	608,330	-
	R-450A	58,611	-	-
	R-507A	204,652	169,444	-
	R-513A	59,192	-	-
	999[b]	-	7,995	8,658
	R-744 (CO_2)	2,772	588,207	5,132,119
	R-407A	667,441	911,757	-
	R-448A/R-449A[c]	16,095	1,145,918	2,006
	R-404A/R-507[c]	568,062	317,575	-
	R-454A	-	-	222,447
	R-454C/R-455A[c]	-	-	333,671
Transport Refrigeration	HCFC-22	82,114	-	-
	HFC-134a	85,287	27,162	32,411
	R-404A	219,959	98,907	759
	R-410A	4,369	4,465	5,443
	R-507A	12,116	98,206	-
	R-513A	-	47,319	62,847
	HFO-1234yf	-	7,887	10,475
	R-744 (CO_2)	-	23,660	31,424
	R-407C	1,679	4,137	4,570
	R-452A	4,165	301,929	576,407
Water-Source, Ground-Source and Unitary Heat Pumps; Packaged Terminal Air Conditioners and Heat Pumps	HFC-32	-	80,845	171,873
	HFC-134a	27,537	32,569	-
	R-410A	197,583	84,297	-
	R-454B	-	80,845	171,873
	R-407C	41,305	48,854	-
Window Units	HFC-32	463,736	717,085	771,946
	R-410A	1,159,339	-	-

[a] Assumed refrigerant recovery is the projected amount of gas, in kilograms, which can be recovered from a decommissioned piece of equipment at the end of life. This does not necessarily assume that all recovered gas is reclaimed.

[b] The model used does not track all non-fluorinated refrigerants in all subsectors. Where 999 is used, it implies ammonia (R-717), carbon dioxide (R-744), or various hydrocarbons, depending on the subsector.
[c] For chemicals listed together, assumed refrigerant recovery is aggregated across both chemicals.

Appendix C: Regulated HFCs and Exchange Values

Table C1. Regulated HFCs and Exchange Values[a]

HFC	Exchange Value
HFC-134	1100
HFC-134a	1430
HFC-143	353
HFC-245fa	1030
HFC-365mfc	794
HFC-227ea	3220
HFC-236cb	1340
HFC-236ea	1370
HFC-236fa	9810
HFC-245ca	693
HFC-43-10mee	1640
HFC-32	675
HFC-125	3500
HFC-143a	4470
HFC-41	92
HFC-152	53
HFC-152a	124
HFC-23	14800

[a] This table can be found in Appendix A to 40 CFR part 84.