ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 84

[EPA–HQ–OAR–2021–0643; FRL–8831–01–OAR]

Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons Under Subsection (i) the American Innovation and Manufacturing Act of 2020

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of proposed rulemaking and advance notice of proposed rulemaking.

SUMMARY: The U.S. Environmental Protection Agency is proposing to issue regulations to implement certain provisions of the American Innovation and Manufacturing Act, as enacted on December 27, 2020. This rulemaking proposes to: restrict the use of hydrofluorocarbons in specific sectors or subsectors in which they are used; establish a process for submitting technology transitions petitions; establish recordkeeping and reporting requirements; and address certain other elements related to the effective implementation of the American Innovation and Manufacturing Act. The proposed restrictions on the use of hydrofluorocarbons would, in part, address petitions granted on October 7, 2021, and September 19, 2022. The U.S. Environmental Protection Agency is also seeking advance information on certain topics that may be helpful to developing a future proposed rule including on restrictions on the use of hydrofluorocarbons for certain other sectors and subsectors and on a third-party auditing program to verify substances used in products.

DATES: Comments on this notice of proposed rulemaking must be received on or before January 30, 2023. Under the Paperwork Reduction Act (PRA), comments on the information collection provisions are best ensured of consideration if the Office of Management and Budget (OMB) receives a copy of your comments on or before January 17, 2023. The U.S. Environmental Protection Agency (EPA) will hold a virtual public hearing on December 30, 2022. The date, time, and other relevant information for the virtual public hearing will be available at *https://www.epa.gov/climate-hfcs-reduction.*

ADDRESSES: You may send comments, identified by docket identification number EPA–HQ–OAR–2021–0643, by any of the following methods:

- *Federal eRulemaking Portal: https://www.regulations.gov* (our preferred method). Follow the online instructions for submitting comments.
- *Mail:* U.S. Environmental Protection Agency, EPA Docket Center, Air and Radiation Docket, Mail Code 28221T, 1200 Pennsylvania Avenue NW, Washington, DC 20460.
- *Hand Delivery or Courier (by scheduled appointment only):* EPA Docket Center, WJC West Building, Room 3334, 1301 Constitution Avenue NW, Washington, DC 20004. The Docket Center's hours of operations are 8:30 a.m.–4:30 p.m., Monday–Friday (except Federal Holidays).

Instructions: All submissions received must include the Docket ID No. for this rulemaking. Comments received may be posted without change to *https://www.regulations.gov,* including any personal information provided. For information on EPA's Docket Center, please visit us online at *https://www.epa.gov/dockets.*

You may find the following suggestions helpful for preparing your comments: Direct your comments to specific sections of this proposed rulemaking and note where your comments may apply to future separate actions where possible; explain your views as clearly as possible; describe any assumptions that you used; provide any technical information or data you used that support your views; provide specific examples to illustrate your concerns; offer alternatives; and, make sure to submit your comments by the comment period deadline. Please provide any published studies or raw data supporting your position. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. EPA will generally not consider comments or comment contents located outside of the primary submission (*e.g.,* on the web, cloud, or other file sharing system).

Do not submit any information you consider to be Confidential Business Information (CBI) through *https://www.regulations.gov.* For submission of confidential comments, please work with the person listed in the **FOR FURTHER INFORMATION CONTACT** section. For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www.epa.gov/dockets/commenting-epa-dockets.*

FOR FURTHER INFORMATION CONTACT: Allison Cain, Stratospheric Protection Division, Office of Atmospheric Programs (Mail Code 6205A), Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460; telephone number: 202–564–1566; email address: *cain.allison@epa.gov.* You may also visit EPA's website at *https://www.epa.gov/climate-hfcs-reduction* for further information.

SUPPLEMENTARY INFORMATION: Throughout this document, whenever ''we,'' ''us,'' ''the Agency,'' or ''our'' is used, we mean EPA. Acronyms that are used in this rulemaking that may be helpful include:

AC—Air Conditioning
AHAM—Association of Home Appliance Manufacturers
AHRI—Air-Conditioning, Heating, and Refrigeration Institute
AIM Act—American Innovation and Manufacturing Act of 2020
ANSI—American National Standards Institute
ASHRAE—American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM—American Society for Testing and Materials
CAA—Clean Air Act
CARB—California Air Resources Board
CAS Reg. No.—Chemical Abstracts Service Registry Identification Number
CBI—Confidential Business Information
CBP—U.S. Customs and Border Protection
CDR—Chemical Data Reporting
CDX—Central Data Exchange
CFC—Chlorofluorocarbon
CO_2—Carbon Dioxide
DX—Direct Expansion
DOE—U.S. Department of Energy
EAV—Equivalent Annualized Value
ECHO—Enforcement and Compliance History Online
e-GGRT—Electronic Greenhouse Gas Reporting Tool
EIA—Environmental Investigation Agency
EPA—U.S. Environmental Protection Agency
EU—European Union
FR—**Federal Register**
GDP—Gross Domestic Product
GHG—Greenhouse Gas
GHGRP—Greenhouse Gas Reporting Program
GSHP—Ground-source Heat Pump
GVWR—Gross Vehicle Weight Rating
GWP—Global Warming Potential
HD—Heavy-duty
HC—Hydrocarbon
HCFC—Hydrochlorofluorocarbon
HCFO—Hydrochlorofluoroolefin
HCPA—Household and Commercial Products Association
HFC—Hydrofluorocarbon
HFO—Hydrofluoroolefin
HPWH—Heat Pump Water Heater
IAM—Integrated Assessment Model
IAPMO—International Association of Plumbing and Mechanical Officials
ICC—International Code Council
ICR—Information Collection Request
IPR—Industrial Process Refrigeration
IIAR—International Institute of Ammonia Refrigeration
IPCC—Intergovernmental Panel on Climate Change

IWG—Interagency Working Group on the Social Cost of Greenhouse Gases
LD—Light-duty
LFL—Lower Flammability Limit
MAC—Marginal Abatement Cost
MDPV—Medium-duty Passenger Vehicle
$MMTCO_2$ e—Million Metric Tons of Carbon Dioxide Equivalent
MVAC—Motor Vehicle Air Conditioning
MY—Model Year
NAA—National Aerosol Association
NAICS—North American Industry Classification System
NATA—National Air Toxics Assessment
NFPA —National Fire Protection Association
NRDC—Natural Resources Defense Council
OEM—Original Equipment Manufacturer
ODS—Ozone-depleting Substance
OMB—U.S. Office of Management and Budget
PRA—Paperwork Reduction Act
PTAC—Packaged Terminal Air Conditioner
PTHP—Packaged Terminal Heat Pump
PV—Present Value
RACHP—Refrigeration, Air Conditioning, and Heat Pumps
RFA—Regulatory Flexibility Act
RIA—Regulatory Impact Analysis
RTOC—Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee
SBREFA—Small Business Regulatory Enforcement Fairness Act
SC–HFCs—Social Costs of Hydrofluorocarbons
SNAP—Significant New Alternatives Policy
TEAP—Technology and Economic Assessment Panel
TLV–TWA—Threshold Limit Value-Time-Weighted Average
TRI—Toxics Release Inventory
TSD—Technical Support Document
UL—Underwriters Laboratories Inc
VRF—Variable Refrigerant Flow
WSHP—Water-source Heat Pump
WMO—World Meteorological Organization

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I. Executive Summary

A. What is the purpose of this proposed regulatory action?

The U.S. Environmental Protection Agency (EPA) is proposing regulations that would implement certain provisions of the American Innovation and Manufacturing Act of 2020, codified at 42 U.S.C. 7675 (AIM Act or the Act). The AIM Act authorizes EPA to address hydrofluorocarbons (HFCs) in three main ways: phasing down HFC production and consumption through an allowance allocation program; [1] promulgating certain regulations for purposes of maximizing reclamation and minimizing releases of HFCs and their substitutes from equipment; and facilitating sector-based transitions to next-generation technologies. This proposal focuses on the third area—facilitating the transition to next-generation technologies by restricting use of HFCs in the sectors or subsectors in which they are used.

Subsection (i) of the Act, entitled ''Technology Transitions,'' authorizes EPA, by rulemaking, to restrict the use of regulated substances (used interchangeably with ''HFCs'' in this document) in sectors or subsectors where the regulated substances are used.[2] The Act also includes provisions for the public to petition EPA to initiate such a rulemaking. On October 7, 2021, and September 19, 2022, EPA granted 12 petitions and partially granted one petition (hereby referred to as ''granted petitions'') requesting restrictions on the use of HFCs in various sectors and subsectors (86 FR 57141, October 14, 2021). The Act directs EPA to promulgate a final rule within two years after the date on which the Agency grants a petition. Thus, this proposed

[1] EPA has issued regulations establishing and codifying a framework for phasing down HFC production and consumption through an allowance allocation program, ''*Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act*'' (86 FR 55116, October 5, 2021). That rule is referred to as the ''Allocation Framework Rule'' throughout this document. EPA is currently undertaking a separate rulemaking to update certain aspects of that regulatory framework.

[2] The Act lists 18 saturated HFCs, and by reference any of their isomers not so listed, that are covered by the statute's provisions, referred to as ''regulated substances'' under the Act.

rulemaking, in part, addresses the granted petitions.

This proposed rulemaking further addresses the framework for how EPA intends to implement its authority to restrict the use of HFCs in sectors and subsectors where they are used. Additionally, it proposes provisions to support implementation of, compliance with, and enforcement of statutory and regulatory requirements under subsection (i) of the Act. To provide the public with additional information about this new program, this document also includes a description of how EPA intends to implement certain aspects of the program, such as the processing of petitions to restrict the use of HFCs in sectors and subsectors in which they are used under subsection (i) of the Act.

Lastly, EPA is seeking advance information on certain topics that may be helpful for developing a future proposed rule. Specifically, EPA is seeking advance information on the application of restrictions on the use of HFCs to heat pump water heaters and to certain retrofitted equipment in the refrigeration, air conditioning, and heat pump (RACHP) sector. EPA is also seeking advance information on a third-party auditing program to verify substances used in products. EPA does not intend to finalize an auditing program or restrictions on the use of HFCs for those sectors and subsectors on which it is seeking advance information as part of this rulemaking process. Accordingly, EPA does not intend to respond to any advance information received on the options discussed in these sections in any final rulemaking for this proposal.

B. What is the summary of this proposed regulatory action?

Technology transitions petitions: EPA is proposing the process for petitions submitted under subsection (i) of the AIM Act and describes how the Agency intends to evaluate petitions. EPA is proposing that petitions be submitted electronically with required minimum information. Upon receiving a petition, the Agency will consider, to the extent practicable, the factors listed in subsection (i)(4) of the AIM Act in making a determination to grant or deny the petition. Consistent with the Act, EPA also considered these factors to the extent practicable in establishing the restrictions on the use of HFCs in this proposed rulemaking.

Restrictions on the use of HFCs: EPA is proposing restrictions on the use of certain HFCs within new products in the following sectors and subsectors: refrigeration, air conditioning, and heat pumps; foam blowing; and aerosols. All proposed restrictions would occur in two stages; the manufacture or import of products would be prohibited by either 2025 or 2026, depending on the sector or subsector, followed a year later by a prohibition on the sale, distribution, offer for sale or distribution, export, and other activities pertaining to those products.

Enforcement and compliance: To support compliance with the proposed prohibitions on the use of HFCs with high global warming potentials (GWPs) in specific sectors and subsectors, EPA is proposing labeling, reporting, and recordkeeping requirements for products imported or manufactured using an HFC. The Agency is proposing to use the same reporting platform used in prior AIM Act rules and the Greenhouse Gas Reporting Program (GHGRP).[3]

C. What is the summary of the costs and benefits?

EPA is providing information on the costs and benefits of restricting use of HFCs consistent with this proposed rule. The analyses, presented in the *Costs and Environmental Impacts* technical support document (TSD) and in a regulatory impact analysis (RIA) addendum to the Allocation Framework RIA, are contained in the docket to this proposed rule. These analyses—as summarized below—highlight economic cost and benefits, including benefits from HFC consumption and emissions reductions. While significant, the benefits presented in this summary are considered incidental and secondary to the rule's statutory objective of facilitating the transition to next-generation technologies by restricting use of HFCs in the sectors or subsectors in which they are used.

Given that the provisions EPA is proposing concern HFCs, which are subject to the overall phasedown of production and consumption under the AIM Act, EPA relied on previous analyses conducted for the Allocation Framework Rule (86 FR 55116, October 5, 2021) and the proposed 2024 Allocation Rule, ''Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later Years'' 87 FR 66372, November 3, 2022) as a starting point for the assessment of costs and benefits of this rule. In this way, EPA analyzed the potential incremental impacts of the proposed rule, attributing benefits only insofar as they are additional to those already assessed in the Allocation Framework RIA and proposed 2024 Allocation Rule RIA addendum (collectively referred to as ''Allocation Rules'' in this discussion).

As detailed in the RIA addendum and the *Costs and Environmental Impacts* TSD, additional benefits of the proposed rule relative to the Allocation Rules may vary depending on the mix and timing of industry transitions made in order to achieve compliance in affected subsectors. In its analysis of the Allocation Rules, EPA estimated that regulated entities would adopt specific technology transition options to achieve compliance with the statutory allowance cap step-downs. Industry is already making many of these transitions, and we expect that achieving the allowance cap step-downs will require many of the same subsector-specific technology transitions that would also be required by this proposed rule. However, the rule may in some cases require regulated entities to further accelerate transitions in specific subsectors, relative to what EPA previously assumed in its analysis of the Allocation Rules. Conversely, entities in a discrete set of subsectors not covered by this proposed rule could conceivably forgo or delay adopting abatement options that were assumed to be undertaken to comply with the Allocation Rules.

Given this uncertainty, EPA analyzed two scenarios to represent the range of potential incremental impacts resulting from the proposed rule: a ''base case'' and ''high additionality case.'' Both scenarios use the results from the Allocation Rule as a starting point, and count benefits in terms of reductions of consumption and emissions only in cases where the proposed rule would result in additional reductions in HFC consumption. The ''base case'' represents a conservative assessment of benefits and assumes that any industry activity not necessary for compliance is excluded. In other words, the scenario excludes consumption reductions not covered by a GWP restriction in the proposed rule and not needed to reach the phasedown cap (so long as the phasedown caps are otherwise met through consumption reductions in subsectors that are covered by the proposed rule restrictions). By contrast, the ''high additionality case'' is a less conservative scenario and assumes that HFC consumption reduction activities not covered by the proposed rule would remain consistent with the Allocation

[3] The GHGRP requires reporting of greenhouse gas (GHG) data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide (CO_2) injection sites in the United States. The program generally requires reporting when emissions from covered sources are greater than 25,000 metric tons of CO_2e per year. Publicly available information includes facility names, addresses, and latitude/longitude information.

Rule reference scenario (*i.e.,* neither increase nor decrease in response to this proposed rule). Based on the results of these two scenarios, which are detailed further in the *Costs and Environmental Impacts* TSD and the RIA addendum, EPA estimates that additional emission reductions through 2050 would be 5 to 35 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) annually.[4] These emission reductions generally lag the anticipated incidental consumption reductions, which range from 735 to 1,121 $MMTCO_2e$ for 2025–2050 at an annual average of 28 to 43 $MMTCO_2e$.

Table 1 summarizes the reductions in both consumption and emissions as described in the RIA addendum. The table shows the incremental annual reductions—that is, the difference in reductions compared to the Allocation Rule reference scenario—from the proposed rule for selected years in the time period 2025–2050. Both the base case and high additionality case results show a net reduction in consumption and emissions on a cumulative basis through 2050. Emissions under the proposed rule would decrease compared to the business-as-usual estimates shown in the RIA, however they would not decrease as much as under the Allocation Rule reference scenario for certain model years. For these years, incremental emission reductions are therefore shown as negative numbers in the table. This effect is due to assumptions about the technological solutions used to comply with each rule. Specifically, the base case excludes actions not required by this proposed rule, such as improved leak reduction and enhanced recovery of HFCs, which are assumed to otherwise yield relatively rapid emission reductions. Since the Allocation Rule reference scenario includes those actions, incremental emission reductions in the base case accrue more slowly (and therefore are shown as negative in certain years) while still yielding a net reduction on a cumulative basis.

TABLE 1—INCREMENTAL CONSUMPTION AND EMISSION REDUCTIONS IN THE TECHNOLOGY TRANSITIONS RULE BASE CASE AND HIGH ADDITIONALITY CASE

Year	Incremental consumption reductions ($MMTCO_2e$)		Incremental emission reductions ($MMTCO_2e$)	
	Technology transitions rule base case	Technology transitions high additionality case	Technology transitions rule base case	Technology transitions high additionality case
2025	9	42	−52	8
2029	27	53	−13	34
2034	35	49	2	43
2036	34	42	−3	36
2040	21	29	27	40
2045	35	44	27	37
2050	37	46	30	38
Total (cumulative)	735	1121	134	903

As reflected in the RIA addendum, however, although the base case is a reasonable projection of the potential impacts of the proposed rule, there is reason to believe that it is a conservative one, and that the incremental emission reductions associated with this proposal could be far greater than reflected in the base case scenario. Previous regulatory programs to reduce chemical use in the affected industries show that regulated entities do not limit their response to the required compliance level; rather, regulated entities may take additional actions that transform industry practices for various reasons, including the anticipation of future restrictions, strengthening their competitive position, and supporting overall environmental goals. For example, U.S. production and consumption of ozone-depleting substances (ODS) during their phaseout was consistently below the limits established under the Montreal Protocol. For this reason, in the high additionality case we assumed certain abatement options not covered by the proposed rule—but which were assumed in the prior accounting of benefits for the Allocation Rules—continue to be undertaken. Based on the two scenarios, on a cumulative basis the rule is expected to yield incremental emission reductions ranging from 134 to 903 $MMTCO_2e$ through 2050 (respectively, about 3 percent and 20 percent of the total emissions over that same time period in the Allocations Rules analyses). In the RIA addendum, we estimate the present value of these incremental benefits to be between $5 billion and $51 billion in 2020 dollars.

EPA also estimates that the proposed rule would result in lower compliance costs relative to the Allocation Rules. These additional savings stem largely from assumed energy efficiency gains and lower cost refrigerants associated with the technological transitions necessary to meet the proposed requirements. The present value of these cumulative incremental savings from 2025–2050 is estimated to be between $2.2 billion and $4.2 billion, using a 7 percent discount rate, or between $5.1 billion and $8 billion, using a 3 percent discount rate (in 2020 dollars).

Table 2 summarizes key findings from the RIA addendum, including the incremental annual climate benefits, costs, and net benefits of the rule for selected years in the time period 2025–2050, with the climate benefits discounted at 3 percent, for the base case and high additionality case. The table also provides the present value (PV) and equivalent annualized value (EAV) of the annual costs under a 3% and 7% discount rate. We note that the climate benefits and net benefits findings were not used for decisional purposes in this proposed rule and are

[4] As noted in the Allocation Framework Rule, the exchange values provided in the AIM Act are numerically equivalent to the 100-year integrated global warming potentials provided in IPCC (2007). EPA provides values in CO_2e and notes here that the same values would be used if expressed in exchange value equivalents.

provided for informational and illustrative purposes only.

TABLE 2—SUMMARY OF ANNUAL INCREMENTAL CLIMATE BENEFITS, COSTS, AND NET BENEFITS OF THE TECHNOLOGY TRANSITIONS RULE BASE CASE AND HIGH ADDITIONALITY CASE SCENARIOS FOR THE 2025–2050 TIMEFRAME

[Millions of 2020$, discounted to 2022] [a b c d e]

Year	Base case			High additionality case		
	Incremental climate benefits (3%)	Annual costs (negative values are savings)	Net benefits (3% benefits, 3% or 7% costs) [e]	Incremental climate benefits (3%)	Annual costs (negative values are savings)	Net benefits (3% benefits, 3% or 7% Costs) [e]
2025	−$3,603	−$395	−$3,209	$546	$31	$515
2029	−1,043	50	−1,092	2,563	335	2,227
2034	141	−200	340	3,739	−77	3,816
2036	−404	−677	273	3,213	−635	3,848
2040	2,669	−848	3,516	3,928	−784	4,712
2045	2,946	−786	3,732	4,031	−717	4,748
2050	3,606	−817	4,422	4,677	−743	5,419

Discount rate	3%	3%	7%	3%	7%	3%	3%	7%	3%	7%
PV	$5,084	−$8,045	−$4,225	$13,130	$9,309	$51,145	−$5,140	−$2,190	$56,285	$53,335
EAV	$311	−$492	−$438	$803	$748	$3,126	−$314	−$227	$3,440	$3,353

[a] Benefits include only those related to climate. Climate benefits are based on changes in HFC emissions and are calculated using four different estimates of the SC–HFCs (model average at 2.5 percent, 3 percent, and 5 percent discount rates; 95th percentile at 3 percent discount rate). For purposes of this table, we show the effects associated with the model average at a 3 percent discount rate, but the Agency does not have a single central SC–HFC point estimate. We emphasize the importance and value of considering the benefits calculated using all four SC–HFC estimates. As discussed in Chapter 5 of the RIA addendum a consideration of climate effects calculated using discount rates below 3 percent, including 2 percent and lower, is also warranted when discounting intergenerational impacts.

[b] Rows may not appear to add correctly due to rounding.

[c] The annualized present value of costs and benefits are calculated as if they occur over a 26-year period from 2025 to 2050.

[d] The costs presented in this table are annual estimates.

[e] The PV for the 7% net benefits column is found by taking the difference between the PV of climate benefits at 3% and the PV of costs discounted at 7%. Due to the intergenerational nature of climate impacts the social rate of return to capital, estimated to be 7 percent in OMB's Circular A–4, is not appropriate for use in calculating PV of climate benefits.

Some of the information regarding projected impacts of the rule, including cost estimates and anticipated environmental impacts, was considered by EPA in its assessment of certain factors listed in subsection (i)(4) of the AIM Act.[5] The cost and benefit information relied upon by EPA in its consideration of the subsection (i)(4) factors is compiled in the *Costs and Environmental Impacts* TSD. As discussed in section VII.E, EPA chose to use certain cost and environmental benefit information that it had generated in conducting its RIA addendum in considering certain factors under subsection (i)(4), but we expect that in future rulemakings we may consider different types of information to address the (i)(4) factors. In assessing the (i)(4) factors for this proposed rule, as summarized in the *Costs and Environmental Impacts* TSD, EPA considered estimates of costs of the proposed action and estimates of cumulative consumption and emission reductions for 2025–2050 of 735 to 1,121 $MMTCO_2e$ and 134 to 903 $MMTCO_2e$, respectively, neither of which incorporate the social costs of HFCs (SC–HFCs).

Although EPA is using SC–HFCs for purposes of some of the analysis in the RIA addendum, this proposed action does not rely on those estimates of these costs as a record basis for the Agency action, and EPA would reach the proposed conclusions even in the absence of the social costs of HFCs.

Additional information on this analysis can be found in section X of this preamble and in the *Costs and Environmental Impacts* TSD and RIA addendum contained in the docket.

II. General Information

A. Does this action apply to me?

You may be potentially affected by this rule if you manufacture, import, export, package, sell or otherwise distribute products that use or are intended to use HFCs, such as refrigeration and air-conditioning (AC) systems, foams, and aerosols. You may also be potentially affected by this action if you produce, import, export, destroy, use as a feedstock, reclaim, package, or otherwise distribute HFCs. Potentially affected categories, by North American Industry Classification System (NAICS) code, are included in Table 3.

TABLE 3—NAICS CLASSIFICATION OF POTENTIALLY AFFECTED ENTITIES

NAICS code	NAICS industry description
238220	Plumbing, Heating, and Air-Conditioning Contractors.
311812	Commercial Bakeries.
321999	All Other Miscellaneous Wood Product Manufacturing.
322299	All Other Converted Paper Product Manufacturing.
324191	Petroleum Lubricating Oil and Grease Manufacturing.
324199	All Other Petroleum and Coal Products Manufacturing.
325199	All Other Basic Organic Chemical Manufacturing.
325211	Plastics Material and Resin Manufacturing.

[5] Subsection (i)(4) of the AIM Act contains a list of factors that the statute directs EPA to consider, to the extent practicable, when carrying out a rulemaking or making a determination to grant or deny a petition.

TABLE 3—NAICS CLASSIFICATION OF POTENTIALLY AFFECTED ENTITIES—Continued

NAICS code	NAICS industry description
325412	Pharmaceutical Preparation Manufacturing.
325414	Biological Product (except Diagnostic) Manufacturing.
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing.
326150	Urethane and Other Foam Product.
326299	All Other Rubber Product Manufacturing.
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing.
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers.
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing.
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.
333511	Industrial Mold Manufacturing.
333912	Air and Gas Compressor Manufacturing.
333999	All Other Miscellaneous General Purpose Machinery Manufacturing.
334419	Other Electronic Component Manufacturing.
335220	Major Household Appliance Manufacturing.
336120	Heavy Duty Truck Manufacturing.
336212	Truck Trailer Manufacturing.
336214	Travel Trailer and Camper Manufacturing.
3363	Motor Vehicle Parts Manufacturing.
3364	Aerospace Product and Parts Manufacturing.
336411	Aircraft Manufacturing.
336611	Ship Building and Repairing.
336612	Boat Building.
336992	Military Armored Vehicle, Tank, and Tank Component Manufacturing.
337214	Office Furniture (Except Wood) Manufacturing.
339112	Surgical and Medical Instrument Manufacturing.
339113	Surgical Appliance and Supplies Manufacturing.
339999	All Other Miscellaneous Manufacturing.
423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers.
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers.
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers.
423620	Household Appliances, Electric Housewares, and Consumer Electronics Merchant Wholesalers.
423690	Other Electronic Parts and Equipment Merchant Wholesalers.
423720	Plumbing and Heating Equipment and Supplies (Hydronics) Merchant Wholesalers.
423730	Warm Air Heating and Air-Conditioning Equipment and Supplies Merchant Wholesalers.
423740	Refrigeration Equipment and Supplies Merchant Wholesalers.
423830	Industrial Machinery and Equipment Merchant Wholesalers.
423840	Industrial Supplies Merchant Wholesalers.
423850	Service Establishment Equipment and Supplies Merchant Wholesalers.
423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers.
423990	Other Miscellaneous Durable Goods Merchant Wholesalers.
424690	Other Chemical and Allied Products Merchant Wholesalers.
424820	Wine and Distilled Alcoholic Beverage Merchant Wholesalers.
443142	Electronics Stores.
444190	Other Building Material Dealers.
445110	Supermarkets and Other Grocery (except Convenience) Stores.
445131	Convenience Retailers.
445298	All Other Specialty Food Retailers.
449210	Appliance Stores, Household-Type.
453998	All Other Miscellaneous Store Retailers (except Tobacco Stores).
45711	Gasoline Stations With Convenience Stores.
481111	Scheduled Passenger Air Transportation.
531120	Lessors of Nonresidential Buildings (except Miniwarehouses).
541330	Engineering Services.
541380	Testing Laboratories.
541512	Computer Systems Design Services.
541519	Other Computer Related Services.
541620	Environmental Consulting Services.
562111	Solid Waste Collection.
562211	Hazardous Waste Treatment and Disposal.
562920	Materials Recovery Facilities.
621498	All Other Outpatient Care Centers.
621999	All Other Miscellaneous Ambulatory Health Care Services.
72111	Hotels (Except Casino Hotels) and Motels.
72112	Casino Hotels.
72241	Drinking Places (Alcoholic Beverages).
722513	Limited-Service Restaurants.
722514	Cafeterias, Grill Buffets, and Buffets.
722515	Snack and Nonalcoholic Beverage Bars.
81119	Other Automotive Repair and Maintenance.
811219	Other Electronic and Precision Equipment Repair and Maintenance.
811412	Appliance Repair and Maintenance.
922160	Fire Protection.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA expects could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your entity may be regulated by this action, you should carefully examine the regulatory text at the end of this document. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

B. What is EPA's authority for taking this action?

On December 27, 2020, the AIM Act was enacted as section 103 in Division S, Innovation for the Environment, of the Consolidated Appropriations Act, 2021 (codified at 42 U.S.C. 7675). In subsection (k)(1)(A), the AIM Act provides EPA with the authority to promulgate necessary regulations to carry out EPA's functions under the Act, including its obligations to ensure that the Act's requirements are satisfied. Subsection (k)(1)(C) of the Act also provides that Clean Air Act (CAA) sections 113, 114, 304, and 307 apply to the AIM Act and any regulations EPA promulgates under the AIM Act as though the AIM Act were part of title VI of the CAA. Accordingly, this rulemaking is subject to CAA section 307(d) (see 42 U.S.C. 7607(d)(1)(I)) (CAA section 307(d) applies to ''promulgation or revision of regulations under subchapter VI of this chapter (relating to stratosphere and ozone protection)'').

The AIM Act authorizes EPA to address HFCs by providing new authorities in three main areas: phasing down the production and consumption of listed HFCs; managing these HFCs and their substitutes; and facilitating the transition to next-generation technologies by restricting use of these HFCs in the sector or subsectors in which they are used. This rulemaking focuses on the third area: the transition to next-generation technologies by restricting use of these HFCs in the sector or subsectors in which they are used.

Subsection (i) of the AIM Act, ''Technology Transitions,'' provides that ''the Administrator may by rule restrict, fully, partially, or on a graduated schedule, the use of a regulated substance in the sector or subsector in which the regulated substance is used.'' 42 U.S.C. 7675(i)(1). The Act lists 18 saturated HFCs, and by reference any of their isomers not so listed, that are covered by the statute's provisions, referred to as ''regulated substances'' under the Act.[6] (42 U.S.C. 7675(c)(1)). EPA is also authorized to designate additional substances that meet certain criteria as regulated substances (42 U.S.C. 7675(c)(3)). EPA has not so designated any additional substances, and the list of 18 regulated substances can also be found in appendix A of 40 CFR part 84. Through this rule, EPA is proposing to restrict the use of certain HFCs, whether neat or used in a blend, in specific sectors or subsectors, based on EPA's consideration of the factors listed in (i)(4) of the AIM Act.

A rulemaking restricting the use of regulated substances in sectors or subsectors can be initiated by EPA on its own accord, or a person may petition EPA to promulgate such a rule. Specifically, subsection (i)(3)(A) states, ''A person may petition the Administrator to promulgate a rule under subsection (i)(1) for the restriction on use of a regulated substance in a sector or subsector.'' Where the Agency grants such a petition submitted under subsection (i), the statute requires that ''the Administrator shall promulgate a final rule not later than 2 years after the date on which the Administrator grants the petition.'' (42 U.S.C. 7675(i)(3)(C)(ii)). Thus, EPA is addressing the granted petitions under subsection (i) in this proposed action.

Furthermore, prior to proposing a rule, subsection (i)(2)(A) directs EPA to consider negotiating with stakeholders in the sector or subsector subject to the potential rule in accordance with negotiated rulemaking procedures established under subchapter III of chapter 5 of title 5, United States Code (commonly known as the ''Negotiated Rulemaking Act of 1990''). A brief discussion on EPA's consideration of using negotiated rulemaking procedures and its decision not to negotiate with stakeholders prior to this proposal can be found in section VI.B of this preamble.

In addition to proposing HFC use restrictions, this proposal includes measures designed to assist with enforcement and to help ensure compliance with those use restrictions, including recordkeeping, reporting, and labeling requirements. The proposed reporting requirements are also intended to inform EPA of market dynamics and the transitions that are occurring in those sectors and subsectors addressed by this rulemaking. EPA notes that subsection (k)(1)(C) of the AIM Act states that section 114 of the CAA applies to the AIM Act and rules promulgated under it as if the AIM Act were included in title VI of the CAA. Thus, section 114 of the CAA, which provides authority to the EPA Administrator to require recordkeeping and reporting in carrying out provisions of the CAA, also applies to and supports this rulemaking.

[6] As noted previously in this document, ''regulated substance'' and ''HFC'' are used interchangeably in this document.

III. Background

A. What are HFCs?

HFCs are anthropogenic[7] fluorinated chemicals that have no known natural sources. HFCs are used in a variety of applications such as refrigeration and air conditioning, foam blowing agents, solvents, aerosols, and fire suppression. HFCs are potent greenhouse gases (GHGs) with 100-year GWPs (a measure of the relative climatic impact of a GHG) that can be hundreds to thousands of times more potent than carbon dioxide (CO_2).

HFC use and emissions[8] have been growing worldwide due to the global phaseout of ODS under the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol) and the increasing use of refrigeration and air-conditioning equipment globally. HFC emissions had previously been projected to increase substantially over the next several decades. In 2016, in Kigali, Rwanda, countries agreed to adopt an amendment to the Montreal Protocol, known as the Kigali Amendment, which provides for a global phasedown of the production and consumption of HFCs. Global adherence to the Kigali Amendment would substantially reduce future emissions, leading to a peaking of HFC emissions before 2040.[9] [10]

Atmospheric observations of most currently measured HFCs confirm their abundances are increasing at

[7] While the overwhelming majority of HFC production is intentional, EPA is aware that HFC–23 can be a byproduct associated with the production of other chemicals, including but not limited to hydrochlorofluorocarbon (HCFC)-22.

[8] World Meteorological Organization (WMO), Scientific Assessment of Ozone Depletion: 2018, World Meteorological Organization, Global Ozone Research and Monitoring Project—Report No. 58, 588 pp., Geneva, Switzerland, 2018. Available at: *https://ozone.unep.org/sites/default/files/2019-05/SAP-2018-Assessment-report.pdf.*

[9] Ibid.

[10] A recent study estimated that global compliance with the Kigali Amendment is expected to lower 2050 annual emissions by 3.0–4.4 Million Metric Tons of Carbon Dioxide Equivalent ($MMTCO_2e$). Guus J.M. Velders et al. Projections of hydrofluorocarbon (HFC) emissions and the resulting global warming based on recent trends in observed abundances and current policies. Atmos. Chem. Phys., 22, 6087–6101, 2022. Available at: *https://doi.org/10.5194/acp-22-6087-2022.*

accelerating rates. Total emissions of HFCs increased by 23 percent from 2012 to 2016 and the four most abundant HFCs in the atmosphere, in GWP-weighted terms, are HFC–134a, HFC–125, HFC–23, and HFC–143a.[11]

In 2016, HFCs excluding HFC–23 accounted for a radiative forcing of 0.025 W/m^2. This is a 36 percent increase in total radiative forcing due to HFCs relative to 2012. This radiative forcing was projected to increase by an order of magnitude to 0.25 W/m^2 by 2050. If the Kigali Amendment were to be fully implemented, it would be expected to reduce the future radiative forcing due to HFCs (excluding HFC–23) to 0.13 W/m^2 in 2050 which is a reduction of about 50 percent compared to the radiative forcing projected in the business-as-usual scenario of uncontrolled HFCs.[12]

The 18 HFCs listed as regulated substances by the AIM Act are the most commonly used HFCs and have high impacts as measured by the quantity of each substance emitted multiplied by their respective GWPs.[13] These 18 HFCs are all saturated, meaning they have only single bonds between their atoms and therefore have longer atmospheric lifetimes.

In the United States, HFCs are used primarily in refrigeration and air-conditioning equipment in homes, commercial buildings, and industrial operations (~75 percent of total HFC use in 2018) and in air conditioning in vehicles and refrigerated transport (~8 percent). Smaller amounts are used in foam products (~11 percent), aerosols (~4 percent), fire protection systems (~1 percent), and solvents (~1 percent).[14]

EPA estimated in the Allocation Framework Rule that phasing down HFC production and consumption according to the schedule provided in the AIM Act will avoid cumulative consumption of 3,152 million metric tons of exchange value equivalent (MMTEVe) of HFCs in the United States for the years 2022 through 2036 (86 FR 55116, October 5, 2021). That estimate included both consumption as defined in § 84.3—*i.e.,* with respect to a regulated substance, bulk production plus bulk imports minus bulk exports—and, although not requiring AIM Act allowances, the amount in imported products containing a regulated substance, for the abatement options necessary to meet the HFC cap. Annual avoided consumption was estimated at 42 $MMTCO_2e$ in 2022 and 282 $MMTCO_2e$ in 2036. In order to calculate the climate benefits associated with consumption abatement, the consumption changes were expressed in terms of emissions reductions. EPA estimated that for the years 2022–2050 that action will avoid emissions of 4,560 $MMTCO_2e$ of HFCs in the United States. The annual avoided emissions are estimated at 22 $MMTCO_2e$ in the year 2022 and 171 $MMTCO_2e$ in 2036. More information regarding these estimates is provided in the Allocation Framework RIA in the docket.

B. How do HFCs affect public health and welfare?

Elevated concentrations of GHGs including HFCs have been warming the planet, leading to changes in the Earth's climate including changes in the frequency and intensity of heat waves, precipitation, and extreme weather events; rising seas; and retreating snow and ice. The changes taking place in the atmosphere are a result of the well-documented buildup of GHGs due to human activities and are changing the climate at a pace and in a way that threatens human health, society, and the natural environment. In this section, EPA is providing some scientific background on climate change to offer additional context for this rulemaking and to help the public understand the environmental impacts of GHGs such as HFCs.

Extensive additional information on climate change is available in the scientific assessments and EPA documents that are briefly described in this section, as well as in the technical and scientific information supporting them. One of those documents is EPA's 2009 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under section 202(a) of the Clean Air Act (CAA) (74 FR 66496, December 15, 2009).[15] In the 2009 Endangerment Finding, the Administrator found under section 202(a) of the CAA that elevated atmospheric concentrations of six key well-mixed GHGs—CO_2, methane (CH_4), nitrous oxide (N_2O), HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—''may reasonably be anticipated to endanger the public health and welfare of current and future generations'' (74 FR 66523, December 15, 2009). The 2009 Endangerment Finding, together with the extensive scientific and technical evidence in the supporting record, documented that climate change caused by human emissions of GHGs (including HFCs) threatens the public health of the population of the United States. It explained that by raising average temperatures, climate change increases the likelihood of heat waves, which are associated with increased deaths and illnesses (74 FR 66497, December 15, 2009). It noted that while climate change also increases the likelihood of reductions in cold-related mortality, evidence indicates that the increases in heat mortality will be larger than the decreases in cold mortality in the United States (74 FR 66525, December 15, 2009). The 2009 Endangerment Finding further explained that compared with a future without climate change, climate change is expected to increase tropospheric ozone pollution over broad areas of the United States, including in the largest metropolitan areas with the worst tropospheric ozone problems, and thereby increase the risk of adverse effects on public health (74 FR 66525, December 15, 2009). Climate change is also expected to cause more intense hurricanes and more frequent and intense storms of other types and heavy precipitation, with impacts on other areas of public health, such as the potential for increased deaths, injuries, infectious and waterborne diseases, and stress-related disorders (74 FR 66525, December 15, 2009). Children, the elderly, and the poor are among the most vulnerable to these climate-related health effects (74 FR 66498, December 15, 2009).

The 2009 Endangerment Finding also documented, together with the extensive scientific and technical evidence in the supporting record, that climate change touches nearly every aspect of public welfare[16] in the United

[11] WMO, 2018.

[12] Ibid.

[13] The AIM Act uses exchange values which are numerically equivalent to the 100-year GWP of the chemical as given in the Errata to Table 2.14 of the IPCC's 2007 Fourth Assessment Report (AR4).

[14] Calculations based on EPA's Vintaging Model, which estimates the annual chemical emissions from industry sectors that historically used ODS, including refrigeration and air conditioning, foam blowing agents, solvents, aerosols, and fire suppression. The model uses information on the market size and growth for each end use, as well as a history and projections of the market transition from ODS to substitutes. The model tracks emissions of annual ''vintages'' of new equipment that enter into operation by incorporating information on estimates of the quantity of equipment or products sold, serviced, and retired or converted each year, and the quantity of the compound required to manufacture, charge, and/or maintain the equipment. Additional information on these estimates is available in U.S. EPA, April 2016. EPA Report EPA–430–R–16–002. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014. Available at: *https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2014.*

[15] In describing these 2009 Findings in this proposal, EPA is neither reopening nor revisiting them.

[16] The CAA states in section 302(h) that ''[a]ll language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife,

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States with resulting economic costs, including: changes in water supply and quality due to changes in drought and extreme rainfall events; increased risk of storm surge and flooding in coastal areas and land loss due to inundation; increases in peak electricity demand and risks to electricity infrastructure; and the potential for significant agricultural disruptions and crop failures (though offset to some extent by carbon fertilization). These impacts are also global and may exacerbate problems outside the United States that raise humanitarian, trade, and national security issues for the United States (74 FR 66530, December 15, 2009).

In 2016, the Administrator similarly issued Endangerment and Cause or Contribute Findings for greenhouse gas emissions from aircraft under section 231(a)(2)(A) of the CAA (81 FR 54422, August 15, 2016).[17] In the 2016 Endangerment Finding, the Administrator found that the body of scientific evidence amassed in the record for the 2009 Endangerment Finding compellingly supported a similar endangerment finding under CAA section 231(a)(2)(A) and also found that the science assessments released between the 2009 and the 2016 Findings ''strengthen and further support the judgment that GHGs in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future generations'' (81 FR 54424, August 15, 2016).

Since the 2016 Endangerment Finding, the climate has continued to change, with new records being set for several climate indicators such as global average surface temperatures, greenhouse gas concentrations, and sea level rise. Additionally, major scientific assessments continue to be released that further improve our understanding of the climate system and the impacts that GHGs have on public health and welfare both for current and future generations. According to the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report, ''it is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.'' [18] These updated observations and projections document the rapid rate of current and future climate change both globally and in the United States.[19] [20] [21] [22]

C. How is EPA evaluating environmental justice?

EPA provides the following discussion of the Agency's assessment of environmental justice impacts in relationship to this proposal. This analysis is intended to provide the public with information on the potential environmental justice impacts of this action, if finalized as proposed, and to comply with executive orders. This analysis was not used for purposes of EPA's consideration of the statutory factors under AIM Act subsection (i)(4). Executive Order 12898 (59 FR 7629, February 16, 1994) and Executive Order 14008 (86 FR 7619, January 27, 2021) establish federal executive policy on environmental justice. Executive Order 12898's main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on people of color and low-income populations in the United States. EPA defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.[23] Meaningful involvement means that: (1) potentially affected populations have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence the regulatory Agency's decision; (3) the concerns of all participants involved will be considered in the decision-making process; and (4) the rule-writers and decision-makers seek out and facilitate the involvement of those potentially affected.[24] The term ''disproportionate impacts'' refers to differences in impacts or risks that are extensive enough that they may merit Agency action. In general, the determination of whether there is a disproportionate impact that may merit Agency action is ultimately a policy judgment which, while informed by analysis, is the responsibility of the decision-maker. The terms ''difference'' or ''differential'' indicate an analytically discernible distinction in impacts or risks across population groups. It is the role of the analyst to assess and present differences in anticipated impacts across population groups of concern for both the baseline and proposed regulatory options, using the best available information (both quantitative and qualitative) to inform the decision-maker and the public.[25]

A regulatory action may involve potential environmental justice concerns if it could: (1) create new disproportionate impacts on people of color, low-income populations, and/or indigenous peoples; (2) exacerbate existing disproportionate impacts on people of color, low-income populations, and/or indigenous peoples; or (3) present opportunities to address existing disproportionate impacts on people of color, low-income populations, and/or indigenous peoples through the action under development.

Executive Order 14008 calls on agencies to make achieving environmental justice part of their missions ''by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-

weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants.'' 42 U.S.C. 7602(h).

[17] In describing these 2016 Findings in this proposal, EPA is neither reopening nor revisiting them.

[18] IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Pe´an, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press: 4.

[19] USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018. Available at: *https://nca2018.globalchange.gov.*

[20] IPCC, 2021.

[21] National Academies of Sciences, Engineering, and Medicine, 2019. Climate Change and Ecosystems. Washington, DC: The National Academies Press. Available at: *https://doi.org/10.17226/25504.*

[22] NOAA National Centers for Environmental Information, State of the Climate: Global Climate Report for Annual 2020, published online January 2021. Available at: *https://www.ncdc.noaa.gov/sotc/global/202013.*

[23] See, *e.g.,* Environmental Protection Agency. ''*Environmental Justice.*'' Available at: *https://www.epa.gov/environmentaljustice.*

[24] The criteria for meaningful involvement are contained in EPA's May 2015 document ''*Guidance on Considering Environmental Justice During the Development of an Action.*'' Environmental Protection Agency, 17 Feb. 2017. Available at: *https://www.epa.gov/environmentaljustice/guidance-considering-environmental-justice-during-development-action.*

[25] The definitions and criteria for ''disproportionate impacts,'' ''difference,'' and ''differential'' are contained in EPA's June 2016 document ''Technical Guidance for Assessing Environmental Justice in Regulatory Analysis.'' Available at: *https://www.epa.gov/environmentaljustice/technical-guidance-assessing-environmental-justice-regulatory-analysis.*

related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.'' Executive Order 14008 further declares a policy ''to secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and under-investment in housing, transportation, water and wastewater infrastructure, and health care.''

In addition, the Presidential Memorandum on Modernizing Regulatory Review calls for procedures to ''take into account the distributional consequences of regulations, including as part of a quantitative or qualitative analysis of the costs and benefits of regulations, to ensure that regulatory initiatives appropriately benefit, and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities.'' [26] EPA also released its June 2016 ''Technical Guidance for Assessing Environmental Justice in Regulatory Analysis'' (2016 Technical Guidance) to provide recommendations that encourage analysts to conduct the highest quality analysis feasible, recognizing that data limitations, time and resource constraints, and analytic challenges will vary by media and circumstance.[27]

The Allocation Framework Rule, among other things, established the framework for the United States' phasedown of HFCs, which will achieve significant benefits by reducing production and consumption of certain chemicals with high GWPs. In that rulemaking, EPA described the environmental justice analysis conducted in support of the rule and summarized the public health and welfare effects of GHG emissions (including HFCs), including information that certain parts of the population may be especially vulnerable to climate change risks based on their characteristics or circumstances, including the poor, the elderly, the very young, those already in poor health, the disabled, those living alone, and/or indigenous populations dependent on one or limited resources due to factors including but not limited to geography, access, and mobility. Potential impacts of climate change raise environmental justice issues. Low-income communities, for example, can be especially vulnerable to climate change impacts because they tend to have more limited capacity to bear the costs of adaptation and are more dependent on climate-sensitive resources such as local water and food supplies. In corollary, some communities of color, specifically populations defined jointly by both ethnic/racial characteristics and geographic location, may be uniquely vulnerable to climate change health impacts in the United States.

Many of the environmental justice implications of this proposed rule are similar to those addressed at length in the RIA [28] developed for the Allocation Framework Rule. The analysis of potential environmental justice concerns for the Allocation Framework Rule focused mainly on characterizing baseline emissions of air toxics that are also associated with chemical feedstock use for HFC production. As detailed in the RIA for the Allocation Framework Rule, the phasedown of high-GWP HFCs in the United States will reduce GHG emissions, thereby reducing damages associated with climate change that would have been associated with those emissions. Similar to the Allocation Framework Rule, EPA expects that this proposed rule would reduce GHG emissions, which would benefit populations that may be especially vulnerable to damages associated with climate change. We also expect that the restriction on use of certain HFCs will increase the production of HFC substitutes. However, there continues to be significant uncertainty about how the transition to lower-GWP substitutes and market trends independent of this proposed rulemaking could affect production of predominant HFC substitutes, such as hydrocarbons, ammonia (R–717), and hydrofluoroolefins (HFOs), at individual facilities and how those changes in production could affect associated air pollutant emissions, particularly in communities that are disproportionately burdened by air pollution. Some predominant HFC substitutes, such as HFOs, use the same chemicals used in the manufacture of HFCs as feedstocks in their production or release the same chemicals as byproducts, potentially raising concerns about local exposure. Due to the limitations of the current data, we cannot make conclusions about the impact this proposed rule may have on individuals or specific communities near facilities producing HFC substitutes. For the purpose of environmental justice, however, it is important to understand the characteristics of the communities surrounding these facilities to better ensure that future actions, as more information becomes available, can improve outcomes.

EPA's 2016 Technical Guidance does not prescribe or recommend a specific approach or methodology for conducting an environmental justice analysis, though a key consideration is consistency with the assumptions underlying other parts of the regulatory analysis when evaluating the baseline and regulatory options. Therefore, for this proposed rule, EPA followed the format used for the Allocation Framework RIA to analyze the demographic characteristics and baseline exposure of the communities near facilities producing HFC substitutes. The complete analysis is described in the RIA addendum developed for this proposed rule, which is available in the docket. EPA relied on public data from the Toxics Release Inventory (TRI),[29] GHGRP, Chemical Data Reporting (CDR) Program,[30] EJScreen (an environmental justice mapping and screening tool developed by EPA), Enforcement and Compliance History Online (ECHO), Census data, and information provided by industry stakeholders to identify the facilities. In addition, Air Toxics Screening Assessment (AirToxScreen, formerly National Air Toxics Assessment (NATA)) data from 2017 (the most recent year available) for census tracts within and outside of a 1-, 3-, 5-, and 10-mile distance were used to approximate the cumulative baseline cancer and respiratory risk due to air toxics exposure for communities near the production facilities.

[26] Presidential Memorandum on Modernizing Regulatory Review, January 20, 2021. Available at: *https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/modernizing-regulatory-review/*.

[27] Technical Guidance for Assessing Environmental Justice in Regulatory Analysis, June 2016. Available at: *https://www.epa.gov/sites/default/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf*.

[28] The RIA for the Allocation Framework Rule is available in the docket for that rulemaking at: *https://www.regulations.gov/document/EPA-HQ-OAR-2021-0044-0227*.

[29] TRI tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. U.S. facilities in different industry sectors must report annually how much of each chemical is released to the environment and/or managed through recycling, energy recovery, and treatment. Facilities submit a TRI Form R for each TRI-listed chemical it manufactures, processes, or otherwise uses in quantities above the reporting threshold.

[30] The CDR program, under the Toxic Substances Control Act, requires manufacturers (including importers) to provide EPA with information on the production and use of chemicals in commerce. Under the CDR rule, EPA collects information on the types, quantities, and uses of chemical substances produced domestically and imported into the United States. The information is collected every four years from manufacturers of certain chemicals in commerce generally when production volumes are 25,000 pounds or greater for a specific reporting year.[30]

With the restriction on use of certain HFCs, EPA anticipates that the production of HFC substitutes will increase. Accordingly, for the environmental justice analysis for this proposed rule, EPA identified 14 facilities producing predominant HFC substitutes that may be impacted by this proposed rule and where production changes may impact nearby communities. The relatively small number of facilities that may be affected by this rule enabled EPA to assemble a uniquely granular assessment of the characteristics of the facilities and the communities where they are located. Overall, this proposed rule would reduce GHG emissions, which would benefit populations that may be especially vulnerable to damages associated with climate change. However, the manner in which producers transition from high-GWP HFCs could drive changes in future risk for communities living near facilities that produce HFC substitutes, to the extent the use of toxic feedstocks, byproducts, or catalysts changes, and those chemicals are released into the environment with adverse local effects.

The environmental justice analysis, which examines racial and economic demographic and health risk information, found heterogeneity in community characteristics around individual facilities. The analysis showed that individuals identified as African American or Black and as Hispanic with respect to race live in proximity to the identified facilities compared with the national average or the rural areas national average. Importantly, the comparison to the rural area national average is more striking, because so many of the facilities are rural. While median income is not significantly different for the communities near the facilities (slightly lower than the national average but slightly above or equal to the rural median income), there are more very low-income households in these communities. Additionally, total cancer risk and total respiratory risk is higher than either the rural national average or the overall national average in communities near the facilities. The analysis shows that the risks are higher for those within the 1-mile average radius and decrease at the 3-mile, 5-mile, and 10-mile radii.

EPA notes that the averages may obfuscate potentially large differences in the community characteristics surrounding individual production facilities. Analysis of the demographic characteristics and AirToxScreen data for the 14 facilities identified shows that there are significant differences in the communities near these facilities. The racial, ethnic, and income results are varied but, in almost all cases, total cancer risk and total respiratory risk are higher for the communities in proximity to the sites than to the appropriate (rural or overall) average when compared with the national or state results.

Additionally, some facilities are in communities that are quite different from the aggregate results discussed in this section above. The aggregate results show that the communities near the facilities identified tend to have slightly fewer neighboring individuals identified as White, and more identified as African American or Black and as Hispanic with respect to race, in several cases. In several cases, however, the communities near specific facilities have higher percentages of White individuals than either the state or national averages. This is true for the facilities in San Dimas, CA; Sibley, LA; El Dorado, AR; Gregory, and Manvel, TX, along with those in Iowa, Illinois, and West Virginia.

EPA is including a demonstration of a microsimulation approach in the RIA addendum to analyze the proximity of communities to potentially affected facilities. Microsimulation is a technique relying upon advanced statistics and data science to combine disparate survey and geospatial data. It has long been used in a variety of economic and social science research and has been used before by EPA (in the context of understanding the implications of underground storage tank impacts on groundwater). Recent advances in data science and computational power have increased the availability of microsimulation for applications such as environmental justice analysis. The demonstration analysis included in the RIA addendum contributes to understanding communities that may warrant further environmental justice analysis.

EPA seeks comment and further discussion of the use of microsimulation approaches and techniques for regulatory impact analysis and other program activities. Among other things, EPA seeks information on what microsimulation tools are appropriate for better understanding the burdens faced by communities, and in what circumstances. The demonstration analysis presented in the RIA addendum uses a dataset of ''synthetic households'' based on geospatial data combined through microsimulation techniques with information from the U.S. Decennial Census and the American Communities Survey (ACS). EPA requests comment on other surveys or other geospatial datasets should be the focus of EPA efforts to combine with the ACS and/or Decennial Census data; how microsimulation tools supplement other EPA tools for understanding demographics, multiple burdens facing communities, and assessing the impact of EPA programs; and how microsimulation and other techniques to use current survey information can be used to identify data gaps which might be filled with refinements or improvements to existing survey tools.

In considering potential additional analysis for a final rule based on this proposal, EPA is also considering assessing the estimated exposure of the communities near the identified facilities to toxics using the Risk Screening Environmental Index Geographic Microdata (RSEI–GM). The Agency seeks comment on whether this additional analysis would be useful and what additional insight it might provide for the environmental justice analysis.

EPA noted in the Allocation Framework Rule, and reiterates here, that it is not clear the extent to which these baseline risks are directly related to potential future HFC substitute production, but some feedstocks, catalysts, and byproducts are toxic, particularly with respect to potential carcinogenicity (*e.g.,* carbon tetrachloride). All HFC substitute production facilities are near other industrial facilities that could contribute to the cumulative AirToxScreen cancer and respiratory risk, and, at this time, it is not clear how emissions related to HFC substitute production compare to other chemical production at the same or nearby facilities. Because of the limited information regarding where substitutes will be produced and what other factors might affect production and emissions at those locations, it's unclear to what extent this rule may affect baseline risks from hazardous air toxics for communities living near HFC substitute production facilities.

Additionally, as mentioned in this section above, emissions from facilities producing fluorinated and non-fluorinated substitutes may also be affected by the phasedown of HFCs. For the forthcoming proposed 2024 Allocation Rule, EPA is updating the environmental justice analysis that was previously conducted for the Allocation Framework RIA to help determine how the implementation of the HFC phasedown may affect production and emissions at facilities that produce HFCs. EPA is following the analytical approach used in the Allocation Framework RIA to provide an update to the characterization of community demographics near HFC production facilities using updated data on the total

number of TRI facilities near HFC production facilities and the cancer and respiratory risks to surrounding communities. More information will be provided in conjunction with that proposed rule, which the Agency anticipates publishing later this year.

EPA seeks input on the environmental justice analysis contained in the RIA addendum for this proposed rule, as well as broader input on other health and environmental risks the Agency should assess. To support the development of comments, EPA is seeking data or analysis to identify whether it is reasonable to expect net increases in emissions and, if so, how we might isolate the impacts of this program (*i.e.,* effects resulting from the transition to lower-GWP substitutes or some other factor) in a manner that would enable the Agency to conduct a more nuanced analysis of changes in releases associated with chemical feedstocks and byproducts for HFC substitutes, given the inherent uncertainty regarding where, and in what quantities, substitutes will be produced.

EPA is also taking comment on whether there are other authorities that would allow for the reporting of emissions tied to HFC substitute production. This could complement the emissions reporting and/or monitoring requirements in the proposed 2024 HFC Allocation Rule for HFC production facilities. Emissions monitoring and/or reporting provides communities with greater transparency and allows EPA to better evaluate potential environmental justice impacts over time. For more discussion of that proposal, see 87 FR 66372 (November 3, 2022). Finally, EPA is seeking comment in order to aid our efforts to understand further cumulative impacts and how they might be addressed. Since the updated environmental justice analysis and proposed reporting requirement are focused on chemical stressors, the Agency is requesting additional information on how both the chemical and non-chemical stressors associated with the HFC phasedown can alter the cumulative impacts experienced by communities surrounding HFC production facilities, how the Agency can share this information with the public, and whether and how the Agency can assess and measure cumulative impacts in the context of the HFC phasedown.

IV. What factors will be considered for evaluating a petition?

In making a determination to grant or deny a petition, subsection (i)(4) of the AIM Act requires EPA to consider, to the extent practicable:

- The best available data;
- The availability of substitutes for use of the regulated substance that is the subject of the rulemaking or petition, as applicable, in a sector or subsector, taking into account technological achievability, commercial demands, affordability for residential and small business consumers, safety, consumer costs, building codes, appliance efficiency standards, contractor training costs, and other relevant factors, including the quantities of regulated substances available from reclaiming, prior production, or prior import;
- Overall economic costs and environmental impacts, as compared to historical trends; and
- The remaining phase-down period for regulated substances under the final rule issued under subsection (e)(3) of the AIM Act, if applicable.

These factors under subsection (i)(4) of the AIM Act were considered in the process of making a determination on the granted petitions, and will be the factors that EPA considers in evaluating future petitions. A discussion on how EPA interprets these factors and how they were considered in this proposed rulemaking is in section VII.E of the preamble.

V. What is the petition process under the technology transitions program?

Subsection (i)(3) of the AIM Act states that a person may petition EPA to promulgate a rule to restrict the use of a regulated substance in a sector or subsector in accordance with the Agency's authority to issue such a rule under subsection (i)(1) of the AIM Act. If EPA receives a petition under subsection (i)(3), the AIM Act states that ''[t]he Administrator shall grant or deny a petition . . . not later than 180 days after the date of receipt of the petition'' (42 U.S.C. 7675(i)(3)(B)) and make the petition available to the public no later than 30 days after receiving the petition (42 U.S.C. 7675(i)(3)(C)(iii)). For petitions that are denied, EPA must publish in the **Federal Register** an explanation of the denial (42 U.S.C. 7675(i)(3)(C)(i)). If EPA grants a petition, the statute requires EPA to promulgate a final rule not later than two years from the date the Agency grants the petition (42 U.S.C. 7675(i)(3)(C)(ii)).

This section describes the proposed process for submitting a petition under subsection (i) to the Agency, which includes direction on how technology transition provisions should be submitted to EPA; the necessary content of petitions; and how EPA will respond once petitions are received.

Subsection (i)(3)(A) of the AIM Act explicitly states that ''a person may petition the Administrator to promulgate a rule under [subsection (i)(1) of the AIM Act] for the restriction on use of a regulated substance in a sector or subsector, which shall include a request that the Administrator negotiate with stakeholders. . .''. EPA views ''person'' for the purpose of a technology transitions petition submittal as having the same meaning as how the term is defined in 40 CFR 84.3 (the definition established in the Allocation Framework Rule); that is, to mean ''any individual or legal entity, including an individual, corporation, partnership, association, state, municipality, political subdivision of a state, Indian tribe; any agency, department, or instrumentality of the United States; and any officer, agent, or employee thereof.'' Using this definition in 40 CFR 84.3 for purposes of petition submittal under subsection (i) would ensure consistency of how this term is used across these two regulatory programs developed under the AIM Act. This definition of ''person'' also captures the Agency's intended meaning of this term for purposes of the technology transitions program. Therefore, any person who fits the Allocation Framework Rule definition may submit a technology transitions petition to EPA. We further note that the plain text of subsection (i)(3)(A) also limits this provision to requests for restrictions on the use of a regulated substance in a sector or subsector. Other types of requests—such as exemptions from existing or anticipated restrictions—are therefore not properly presented under the (i)(3)(A) petition process, although parties are always welcome to communicate to the Agency informally, to provide comments on a proposed rule that considers such restrictions on use, or to generally petition for rulemaking under the Administrative Procedures Act.

All the petitions considered in this rulemaking were submitted to EPA electronically. EPA is proposing to require future petitions to also be submitted electronically. The Agency's preferred method is for petitions to be submitted to the email address: *HFCpetitions@epa.gov.* A link to this address is available on EPA's web page at: *https://www.epa.gov/climate-hfcs-reduction/technology-transition-petitions-under-aim-act.* Petitions can also be submitted electronically through an EPA electronic reporting system. For instructions on how to submit a petition through an EPA electronic reporting system, please contact the individual

listed in the **FOR FURTHER INFORMATION CONTACT** section of the preamble.

A. What is required to be included in a technology transitions petition?

EPA is proposing to require standard content to be included in a technology transitions petition, which would assist petitioners in preparing their petitions and also enhance EPA's ability to review and respond to them promptly. Under this proposal, in order to qualify for a grant, a technology transitions petition would need to include the elements described in the following paragraphs. We are seeking comment on these proposed elements of a petition submission under AIM Act subsection (i).

EPA is proposing that petitions must indicate either a GWP limit or the specific name(s) of the regulated substance(s) (including whether there are specific blend(s) that use the regulated substance(s), if the petition seeks a restriction on use of the regulated substance(s) in specific blends) to be restricted and their GWPs. Under this proposal, petitioners specifying specific regulated substances should use as the GWP the exchange values for the regulated HFCs listed in subsection (c) of the AIM Act and codified as appendix A to 40 CFR part 84.[31] For blends containing regulated substances, petitioners should identify all components of the blend using the composition-identifying designation as listed in American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 34–2019 [32] (*e.g.,* HFC–134a, HFO–1234ze(E)). If blends are not listed in ASHRAE Standard 34, petitioners should provide the nominal composition of the blend, specifying all components with the ASHRAE Standard 34 designation for the components. If the components or substances are not listed in ASHRAE Standard 34, petitioners should provide the chemical name, the applicable CAS Registry Number, and the chemical formula and structure (*e.g.,* $CHF{=}C{=}CF_2$ rather than C_3F_3H) for the components not listed in ASHRAE Standard 34. EPA intends to maintain a list of commonly used blends containing HFCs and the GWPs of those blends at EPA's Technology Transitions web page. Nevertheless, EPA is also proposing a process to determine the GWP of blends containing regulated substances for purposes of this rulemaking, using the following hierarchy. For the regulated substances used in the blend, and as previously noted, the petitioner would use as the GWP the exchange value provided in subsection (c) of the AIM Act and codified as appendix A to 40 CFR part 84. EPA is proposing to use the 100-year GWP values from the IPCC's Fourth Assessment Report (AR4) for all substances or components of blends, which for HFC regulated substances is numerically equal to the exchange values provided in subsection (c), which are listed in AR4. EPA is proposing to use AR4 100-year GWPs wherever possible given the exchange values are numerically the same and because EPA considers such an approach to be less complicated. For hydrocarbons (HCs) listed in Table 2–15 of AR4, EPA is proposing to use the net GWP value. For substances for which no GWP is provided in AR4, EPA is proposing to use the 100-year GWP listed in World Meteorological Organization (WMO) 2018.[33] For any substance listed in neither of these sources, EPA is proposing to use the GWP of the substance in Table A–1 to 40 CFR part 98, as it exists on a specified date, such as the date this rule is published in the **Federal Register** as a final rule, if such substance is specifically listed in that table. EPA is aware of two potential substances that might be included as components of blends containing regulated substances that are not listed in these three sources, trans-dichloroethylene (HCO–1130(E)) and HCFO–1224yd(Z) and is proposing to set these GWPs to be five [34] and one,[35] respectively, for purposes of this rulemaking. For any other substance not listed in the above three source documents, EPA is proposing that the default GWPs as shown in Table A–1 to 40 CFR part 98, as it exists on a specified date, such as the date this rule is published in the **Federal Register** as a final rule, shall be used. In the event that the hierarchy outlined in this section does not provide a GWP (*i.e.,* the substance in question is not listed in the three documents, is not one of the two for which EPA is proposing GWPs, is not listed in Table A–1 to 40 CFR part 98 and does not fit within any of the default GWPs provided in Table A–1 to 40 CFR part 98), EPA is proposing to use a GWP of zero. In any case where a GWP value is preceded with a less than (<), very less than (<<), greater than (>), approximately (~), or similar symbol in the source document which is used to determine the GWP, EPA is proposing that the value shown shall be used. As such, petitioners should provide GWP values of the components of a blend based on the hierarchy proposed in this section. The GWP of a blend would then be calculated as the sum of the nominal composition (in mass proportions) of each component multiplied by the GWP of each component.

EPA is proposing that petitioners must indicate the sector or subsector for which restrictions on use of the regulated substance would apply. EPA is proposing definitions for ''sectors'' and ''subsectors'' in section VII.A of this preamble that generally reflect how these terms are historically used and EPA's understanding of sectors and subsectors where HFCs are currently or can be used. However, EPA is not limiting sectors or subsectors to a specific list, recognizing there may be additional uses of HFCs today or that may be developed in the future, and thus additional sectors or subsectors for which it could be appropriate to restrict use.

EPA is proposing that petitions must include a date that the requested restrictions would go into effect and information concerning why the date or dates is appropriate. Petitioners should recognize that subsection (i)(6) of the AIM Act restricts the effective date of rules promulgated under subsection (i) to no earlier than one year after the date of the final rule.

Before proposing a rule for the use of a regulated substance for a sector or subsector under subsection (i)(1), subsection (i)(2)(A) directs EPA to consider negotiating with stakeholders in accordance with the Negotiated Rulemaking Act of 1990 (*i.e.,* negotiated rulemaking procedure). Subsection (i)(3)(A) requires petitioners to ''include a request that the Administrator negotiate with stakeholders in accordance with paragraph (2)(A)'' (42 U.S.C. 7675(i)(3)(A)). Therefore, EPA is proposing that petitioners include such a request in their petition. However, we are seeking comment on whether, in the alternative, it is reasonable for EPA to interpret the petition process under subsection (i)(3) as requiring petitioners to *address* whether EPA use the negotiated rulemaking procedure, rather than requiring them to affirmatively request that the Agency pursue negotiated rulemaking. Most petitions received to date by the Agency complied with the statute's requirement to request that EPA use negotiated

[31] EPA noted in section III.A of this preamble that the exchange values for the regulated HFCs listed in subsection (c) of the AIM Act are numerically identical to the 100-year GWPs of each substance, as given in the Errata to Table 2.14 of the IPCC's Fourth Assessment Report (AR4) and Annexes A, C, and F of the Montreal Protocol. Available at: *https://www.ipcc.ch/site/assets/uploads/2018/05/ar4-wg1-errata.pdf.*

[32] Hereafter referred to as ASHRAE Standard 34.

[33] WMO, 2018.

[34] 81 FR 32244 (May 23, 2016).

[35] 84 FR 64766 (November 25, 2019).

rulemaking; however, those petitioners unanimously expressed a preference that EPA *not* use this procedure in promulgating its restrictions. Allowing petitioners to express their views as to whether EPA should engage in negotiated rulemaking for a subsection (i) rulemaking, as opposed to requiring them to request something they may disagree with, provides more value to EPA as we consider, per subsection (i)(2)(A), whether to use the negotiated rulemaking procedure before proposing a restriction under subsection (i). Otherwise, EPA could be misled as to the petitioners' views and could elect to use the negotiated rulemaking procedure when no stakeholder sought that outcome. The unwarranted use of time and resources to undergo that procedure could be counterproductive to meeting the statutory deadlines to complete a final rule. Regardless of whether we finalize a requirement that petitioners affirmatively request negotiated rulemaking or whether we finalize a requirement that petitioners address negotiated rulemaking, EPA proposes that petitioners must provide an explanation of their position on the use of the negotiated rulemaking procedure and any considerations that would either support use of a negotiated rulemaking process or disfavor it. If a petition is granted, EPA intends to consider the petitioner's statement on negotiated rulemaking as it determines whether to use the procedure.

Lastly, EPA is proposing to require petitioners to submit, to the extent practicable, information related to the ''Factors for Determination'' listed in subsection (i)(4) of the AIM Act to facilitate EPA's review of the petition.[36] Given the relatively short 180-day statutory timeframe for EPA to grant or deny a petition, this proposed requirement would ensure that information is available to EPA at the start of its review, to the extent the petitioner has relevant available information. This proposed requirement would clarify that EPA may deny a petition where no information had been provided that would allow the Agency to act on the petition.

Petitioners must, to the extent practicable, provide best available data on substitutes that could be used in lieu of the petitioned substance(s), addressing the subfactors (*e.g.,* technological achievability, safety, commercial demands, etc.) that may affect the availability of those substitutes. Other information submitted by petitioner could include estimates of the economic costs and environmental impacts. In particular, providing EPA with a sense of the scale of impacts (*e.g.,* whether the suggested restriction would have a significant environmental impact, or whether the suggested restriction would be likely to impose costs or savings on regulated entities or consumers) using quantitative, accurate data to support that assessment will be more likely to result in a timely, well-reasoned response to the petitioner's request.

B. What happens after a petition is submitted?

Subsection (i)(3)(C)(iii) instructs EPA to make petitions publicly available within 30 days after EPA receives the petition. As stated in another Agency action (see ''*Notice of Data Availability Relevant to Petition Submissions Under the American Innovation and Manufacturing Act of 2020,*'' 86 FR 28099 (May 25, 2021)), EPA intends to continue to post technology transitions petitions at *www.regulations.gov,* in Docket ID No. EPA–HQ–OAR–2021–0289, as well as on the Agency's website at *https://www.epa.gov/climate-hfcs-reduction/technology-transition-petitions-under-aim-act.* Making the petitions available allows the public to provide additional data and relevant material to aid in EPA's evaluation of petitions, based on the factors specified in subsection (i) of the AIM Act.

In accordance with the statutory directive, EPA intends to act on petitions no later than 180 days after the date of receipt of the petition. EPA notes that a petition granted under subsection (i) of the AIM Act does not necessarily mean the Agency will propose or finalize requirements identical to a petition's request. Rather, granting a petition means that the requested restriction contained in a granted petition warrants further consideration through rulemaking. During the rulemaking process, EPA will determine what restrictions on the use of HFCs to propose and finalize based on multiple considerations, including its consideration of the ''Factors for Determination'' listed in subsection (i)(4) to the extent practicable. This approach provides interested stakeholders with the opportunity to review and comment on a regulatory proposal restricting the use of HFCs prior to restrictions going into effect.

C. Can I revise or resubmit my petition?

As stated in section V.B of this preamble, receipt of a completed petition received by EPA triggers two statutory deadlines: the posting of the petition within 30 days of receipt and the granting or denying the of petition within 180 days of receipt. Because there is little purpose in EPA continuing to take action on the original petition when the petitioner has revised (*i.e.,* makes edits to an original request) or resubmitted (*i.e.,* makes edits to an original request and presents it as a new petition) it, EPA's view is that a petition revision or resubmittal made by petitioners is typically intended to supersede or replace the original petition and would thus restart these timelines. However, depending on the timing of the resubmission and the nature of the revision and the request, EPA may be able to act more quickly on a revised or resubmitted petition, for example, if the Agency had already developed familiarity with the request through its consideration of the original petition. Therefore, EPA intends to address petition revisions and resubmittals on a case-by-case basis. If petitioners do not intend for their submission to supersede or replace their original petition, rather revising or resubmitting their petition, they should instead submit supplemental or clarifying information regarding their petitions to the docket created for additional information and material related to petitions under consideration. In making a determination to grant or deny petitions, EPA plans to consider relevant and timely information provided in this docket, as the Agency did with the petitions in this rulemaking, including information provided by petitioners and from other stakeholders, for those petitions under review. Once a petition is granted or denied, any revised or resubmitted petitions will likely be treated as a new petition.

VI. How is EPA considering negotiated rulemaking?

In this section, EPA is providing a summary of the AIM Act's directive to consider negotiating with stakeholders prior to proposing a rule under subsection (i) of the Act. This section also provides information regarding how EPA intends to consider negotiating with stakeholders for future rulemakings, based on EPA's consideration to use negotiating rulemaking procedures prior to this proposal.

A. Summary of the AIM Act's Directive on Negotiated Rulemaking

Prior to proposing a rule, subsection (i)(2)(A) of the Act directs EPA to consider negotiating with stakeholders in the sector or subsector subject to the potential rule in accordance with

[36] Section VII.E of this preamble provides information on EPA's interpretation of these factors for this proposed action.

negotiated rulemaking procedures established under subchapter III of chapter 5 of title 5, United States Code (commonly known as the ''Negotiated Rulemaking Act of 1990''). If EPA makes a determination to use the negotiated rulemaking procedures, subsection (i)(2)(B) requires that EPA, to the extent practicable, give priority to completing that rulemaking over completing rulemakings under subsection (i) that are not using that procedure. For additional information on negotiated rulemaking procedures, see subchapter III of chapter 5 of title 5, United States Code. If EPA does not use the negotiated rulemaking process, subsection (i)(2)(C) requires the Agency to publish an explanation of the decision to not use that procedure before commencement of the rulemaking process.

B. How does EPA intend to consider negotiating with stakeholders under the AIM Act?

Prior to this proposed rulemaking, EPA issued a document informing the public of the Agency's consideration of using the negotiated rulemaking procedure and the Agency's decision to not use these procedures for this proposed rulemaking (86 FR 74080, December 29, 2021). The Agency found that using negotiated rulemakings was not in the best interest of the public in the document and thus decided not to use negotiated rulemaking. In making this decision, EPA considered information provided by the petitions, including statements made by petitioners on the use of negotiated rulemaking procedures, and information provided by other stakeholders on the petitions. Further, the Negotiated Rulemaking Act of 1990, 5 U.S.C. 563, provides seven criteria that the head of an agency should consider when determining whether a negotiated rulemaking is in the public interest. EPA believes these criteria are informative for purposes of making a determination under AIM Act subsection (i) of whether to use the procedures set out in the Negotiated Rulemaking Act for proposed rulemakings and, therefore, also considered these criteria in its decision.

Going forward, EPA intends to use a similar process in making its determination on whether to use negotiated rulemaking procedures for any rulemaking being considered under subsection (i) in response to granted petitions. This includes reviewing the petitions themselves and statements from petitioners on the use of negotiated rulemaking procedures, considering information provided by stakeholders commenting on petitions, and considering the seven criteria listed in the Negotiated Rulemaking Act of 1990, 5 U.S.C. 563, that the head of an agency should consider when determining whether a negotiated rulemaking is in the public's interest. For rulemakings initiated by EPA (*i.e.,* not in response to granted petitions), EPA anticipates that our review would focus on just these seven criteria.

Furthermore, where appropriate, EPA will also take into account recent Agency actions and decisions related to restrictions on the use of HFCs in sectors and subsectors for its consideration on using negotiated rulemaking procedures. For example, EPA received four petitions that were not included in the Agency's consideration of using negotiated rulemaking procedures for petitions granted on October 7, 2021.[37] However, these petitions requested restrictions on the use of HFCs in the same sectors and subsectors covered by petitions granted on October 7, 2021, for which EPA made a determination not to use negotiated rulemaking. Subsection (i)(2)(A) states that, ''[b]efore proposing a rule for a sector or subsector under paragraph (1), the Administrator shall consider negotiating with stakeholders in the sector or subsector subject to the potential rule. . .'' EPA will not issue a separate notice to consider using negotiated rulemaking for these four petitions because these petitions were received well ahead of this proposed action, and the requested restrictions are in the same sectors and subsectors contained in petitions granted on October 7, 2021, for which the Agency considered using negotiated rulemaking procedures and decided not to use them. Nothing in these four petitions caused EPA to reconsider that decision. Therefore, it is unnecessary for the Agency to reconsider whether to use negotiated rulemaking procedures for this rulemaking. EPA encourages future petitioners to consider petitions under review or recently granted before submitting a new petition and to consider submitting information to the docket for an existing petition in lieu of submitting a new petition on the same uses of HFCs that are already under consideration by the Agency.

[37] These petitions were received from AHRI and IIAR and are discussed in section VII.D.2 of this preamble. Copies of these petitions are located at *www.regulations.gov,* under Docket ID No. EPA–HQ–OAR–2021–0289, or at *https://www.epa.gov/climate-hfcs-reduction/technology-transition-petitions-under-aim-act.*

VII. What is EPA's proposed action concerning restrictions on the use of HFCs?

This section details the Agency's proposal for restricting HFCs in accordance with the granted petitions, including: defining terms that are new to 40 CFR part 84; presenting two approaches for the form that prohibitions could take; describing the proposed applicability of the prohibitions; providing EPA's interpretation and application of the ''Factors for Determination'' contained in subsection (i)(4) of the AIM Act; and listing the specific restrictions on the use of HFCs by sector and subsector.

A. What definitions is EPA proposing to implement subsection (i)?

The Allocation Framework Rule established regulatory definitions at 40 CFR part 84, subpart A to implement the framework and begin the regulatory phasedown of HFCs under the AIM Act. To maintain consistency, except as otherwise explained in this rulemaking, EPA intends to use terms in this rulemaking, and in the new subpart B which is to be established by this rule, as they were defined in the Allocation Framework Rule. Thus, for terms not defined in this subpart but that are defined in 40 CFR 84.3, the definitions in 40 CFR 84.3 shall apply. A few terms (export, exporter, and importer) currently exist in 40 CFR 84.3 in the context of bulk regulated substances. EPA is proposing subpart B definitions for those terms that would clarify how those terms apply to regulated substances that are used by or contained in products under subpart B. Other than that proposed change, these proposed definitions would mirror the text in the 40 CFR 84.3 definitions of export, exporter, and importer. As EPA explained in the Allocation Framework Rule, whether products using or containing HFCs are admitted into or exiting from a foreign-trade zone or other duty deferral program under U.S. Customs and Border Protection (CBP) regulations does not affect whether they are being imported or exported for purposes of part 84. *See* 86 FR 55133 (October 5, 2021) (discussing definitions of export and import under 40 CFR 84.3).

EPA is also proposing to establish definitions for new terms that are applicable only under 40 CFR part 84, subpart B and do not have a counterpart in the definitions under 40 CFR part 84, subpart A. These terms are: blend containing a regulated substance, manufacture, product, regulated product, retrofit, sector, subsector,

substitute, and use. The definitions that EPA is proposing to include in 84.52 for application to 40 CFR part 84, subpart B are as follows:

Blend containing a regulated substance. EPA is proposing to establish restrictions on the use of HFCs, whether neat or used in a blend. Blends containing a regulated substance are used in multiple sectors and subsectors including refrigeration, air conditioning and heat pump, foam blowing, and fire suppression. EPA is proposing to define this term as ''any mixture that contains one or more regulated substances used in a sector or subsector.'' EPA would consider any quantity of a regulated substance within a mixture to qualify the mixture as a ''blend containing a regulated substance.''

EPA is not proposing that a blend that uses one or more regulated substances is itself a regulated substance. Rather, the Agency is proposing use restrictions on the regulated substance(s) used in certain blends, such that the use restriction on the regulated substance(s) would also affect use of that blend. Most HFCs used in the sectors and subsectors addressed by this proposed rule are components of blends that contain other HFCs, HFOs, and hydrocarbons. As discussed in section V.A of this preamble, where the proportion of a regulated substance multiplied by its GWP, along with the proportion of the other components multiplied by their respective GWPs, causes the blend to exceed the GWP limit, the use of that HFC in that blend would be prohibited.

Export. For purposes of subpart B, EPA is proposing to define this term to mean the transport of a regulated product from inside the United States or its territories to persons outside the United States or its territories, excluding United States military bases and ships for onboard use.

Exporter. For purposes of subpart B, EPA is proposing to define this term to mean the person who contracts to sell any regulated product for export or transfers a regulated product to an affiliate in another country.

Importer. For purposes of subpart B, EPA is proposing to define this term to mean any person who imports any regulated product into the United States. Importer includes the person primarily liable for the payment of any duties on the merchandise or an authorized agent acting on his or her behalf. The term also includes:

(1) The consignee;

(2) The importer of record;

(3) The actual owner; or

(4) The transferee, if the right to withdraw merchandise from a bonded warehouse has been transferred.

This proposed definition of importer, specifically paragraphs (3) and (4), would more closely align with the definition of ''importer'' at 19 CFR 101.1. Though the definition would vary in non-substantive ways from that in subpart A of 40 CFR part 84, no difference in interpretation between subparts is intended.

Manufacture. EPA is proposing to define this term as to complete a product's manufacturing and assembly processes such that it is ready for initial sale, distribution, or operation. For equipment that is assembled and charged in the field, manufacture means to complete the circuit holding the regulated substance, charge with a full charge, and otherwise make functional for use for its intended purpose.

This proposed definition is intended to apply similarly to how this term is applied in certain other use restrictions under title VI of the CAA and 40 CFR part 82. Because those restrictions bear certain similarities to restrictions proposed in this document, EPA is drawing on its past experience in implementing those provisions in this proposal, including for the definition of ''manufacture.'' EPA established restrictions on products, including appliances, foams, and aerosols under section 610 of the CAA (Nonessential Products Bans). EPA also established use prohibitions under section 605(a) of the CAA that addressed the use of certain ODS as a refrigerant in the manufacture of new appliances, including field charged appliances. *See e.g.,* 40 CFR 82.15(g)(4)(i), 40 CFR 82.15(g)(5)(i); *see also* 85 FR 15267 (March 17, 2020) (describing the use restriction and when a field charged appliance is manufactured). The proposed definition of manufacture in this rulemaking is intended to address both products that are manufactured at a factory, including factory-charged appliances, and the assembly of field charged appliances. It is also intended to address field-charged equipment beyond appliances in the RACHP sector to include fire suppression equipment or other equipment that is assembled and charged on-site.

Appliances used in commercial refrigeration, such as large chillers and industrial process refrigeration (IPR), typically involve more complex installation processes, which may require custom built parts, and typically are manufactured on-site (or field charged). Consistent with EPA's view of the term ''manufacture'' in its prior experience under title VI of the CAA and its implementing regulations, appliances such as these that are field charged or have the refrigerant circuit completed on-site are manufactured at the point when installation of all the components and other parts are completed, and the appliance is fully charged with refrigerant and able to operate (*see, e.g.,* 85 FR 15267, (March 17, 2020)).

EPA is seeking comment on whether it should expand the definition for ''manufacture'' to include the manufacturing process, prior to the completion of the product containing or manufactured with a regulated substance or blend using a regulated substance.

Product. EPA is proposing to define this term as ''an item or category of items manufactured from raw or recycled materials which is used to perform a function or task. The term product includes, but is not limited to: equipment, appliances, components, subcomponents, foams, foam blowing systems (*e.g.,* pre-blended polyols), fire suppression systems or devices, aerosols, pressurized dispensers, and wipes.'' This definition is based on the definition of the term ''product'' in regulations established under title VI of the CAA in 40 CFR part 82 subparts C and E. EPA's view of what constitutes a product for purposes of use restrictions under subsection (i) mirrors its view under those provisions. Maintaining the same definition will provide clarity for the regulated community, as many are already familiar with the existing definitions in part 82. One difference from the part 82 definition is the proposed addition of two examples: fire suppression systems and foam blowing systems. There had been confusion during the ODS phaseout whether these systems were a product or a bulk substance. For example, some aircraft lavatory fire suppression systems consist of trash containers equipped with a fire extinguisher, a discrete product that automatically discharges the extinguishant in the event of a fire, whereas more integrated fire suppression systems use a reservoir of gas in a detachable cylinder and piping to discharge into the protected space. EPA is proposing to clarify that the self-contained systems would be considered products, while system cylinders independent of the system would continue to be considered bulk. Polyol foam blowing systems consist of two cylinders, one of which contains the foam material and the other containing a blowing agent such as an HFC. The cylinder containing an HFC is not considered a bulk gas as the two are sold together and used as a single system.

Regulated product. EPA is proposing to define this term as ''any product in the sectors or subsectors identified in § 84.56 that contains or was manufactured with a regulated substance or a blend that contains a regulated substance, including products intended to be used with a regulated substance, or that is otherwise subject to the prohibitions of this subpart.'' EPA intends for this definition to broadly cover all products that use HFCs, whether they are high-GWP HFCs that are prohibited or lower-GWP HFCs that are subject to labeling and reporting provisions.

Retrofit. The AIM Act defines ''retrofit'' as ''to upgrade existing equipment where the regulated substance is changed, which—(i) includes the conversion of equipment to achieve system compatibility; and (ii) may include changes in lubricants, gaskets, filters, driers, valves, o-rings, or equipment components for that purpose.'' EPA is proposing to adopt the definition contained in subsection (i)(7)(A) of the AIM Act with the addition of examples of equipment. The definition in the AIM Act is similar to, but broader than EPA's definition of retrofit that was codified in 40 CFR part 82, subpart F. The AIM Act definition refers to ''regulated substance'' and ''equipment'' whereas the regulatory definition in Part 82 refers to ''refrigerant'' and ''appliances.'' As such, in this context, EPA finds it reasonable to interpret this term as applying not just to refrigeration and air-conditioning appliances, but all equipment that uses a regulated substance. EPA is proposing to add a non-inclusive list of examples—such as air conditioning and refrigeration, fire suppression, and foam blowing equipment—recognizing that petitioners may seek, or EPA may establish, restrictions on other types of equipment using HFCs in the future.

Sector. EPA is proposing to define this term as ''a broad category of applications including but not limited to: refrigeration, air conditioning and heat pumps; foam blowing; aerosols; chemical manufacturing; cleaning solvents; fire suppression and explosion protection; and semiconductor manufacturing.'' These categorizations and groupings would be similar to how the term ''sector'' is used in other contexts, such as EPA's Significant New Alternatives Policy (SNAP) Program, the Montreal Protocol Parties' Technology and Economic Assessment Panel (TEAP), the statutory language, and EPA's Vintaging Model. Entities potentially subject to rulemakings proposed under subsection (i) of the AIM Act are often the same entities affected by CAA title VI, including the CAA section 612 SNAP program, and may be familiar with the way EPA traditionally categorizes and groups sectors in that context. Moreover, TEAP is a globally recognized advisory body to the Montreal Protocol Parties, which provides technical information related to alternative technologies that use HFCs in sectors and subsectors. Entities with a global market presence and other stakeholders may be familiar with how TEAP defines sectors, and EPA's proposed definition of sector would be relatable to their understanding of the term.

Subsector. EPA is proposing to define this term as ''processes, classes of applications, or specific uses that are related to one another within a single sector or subsector.'' Where appropriate, each sector can be subdivided into different subsectors which more narrowly highlights how the HFC is used. Entities potentially subject to rulemakings proposed under subsection (i) of the AIM Act are often the same entities affected by CAA title VI, including the CAA section 612 SNAP program and may be familiar with the way EPA categorizes and groups sectors and subsectors, in that context. Therefore, EPA is proposing that the term ''subsectors'' include the concepts of ''end-uses'' and ''applications'' under the SNAP Program (40 CFR 82.172). An example subsector is cold storage warehouses under the refrigeration, air conditioning and heat pump sector. Another example is the integral skin polyurethane subsector under foams.

Substitute. EPA is proposing to define this term as ''any substance, product, or alternative manufacturing process, whether existing or new, that is used, or intended for use, in a sector or subsector with a lower global warming potential than the regulated substance, whether neat or used in a blend, to which a use restriction would apply.'' Under this proposed definition, substitutes would include regulated substances (*e.g.,* HFC–32 used in lieu of R–410A in commercial unitary AC), blends containing regulated substances (*e.g.,* R–454B used in lieu of R–410A in residential unitary AC), blends that do not use a regulated substance (*e.g.,* R–441A used in lieu of R–410A in window ACs), alternative substances (*e.g.,* HFOs, hydrocarbons, R–717, and R–744 (CO_2)), and not-in-kind technologies (*e.g.,* finger-pump bottles in lieu of aerosol cans, or vacuum panels in lieu of foam insulation).

Use. EPA is proposing to define this term as ''for any person to take any action with or to a regulated substance, regardless of whether the regulated substance is in bulk, contained within a product, or otherwise, except for the destruction of a regulated substance. Actions include, but are not limited to, the utilization, deployment, sale, distribution, discharge, incorporation, transformation, or other manipulation.''

EPA welcomes comment on these proposed definitions. EPA acknowledges that historical contexts may not fully capture all the ways that regulated substances are being used and is seeking comment on additional sectors and subsectors where regulated substances are used that would fit under this regulatory program.

B. How is EPA proposing to restrict the use of HFCs in the sector or subsector in which the HFCs are used?

Subsection (i) authorizes EPA to by rule restrict, fully, partially, or on a graduated schedule, the use of a regulated substance in the sector or subsector in which the regulated substance is used. The provision grants EPA authority to fashion restrictions on the use of regulated substances in the sectors that use those substances and does not specify a particular approach as to how restrictions must be structured but lists a number of considerations EPA is to factor in, to the extent practicable, when promulgating restrictions. EPA is considering two possible approaches to structuring those restrictions in this proposal but recognizes that other approaches could be considered in the future that would also fit within the authority granted by this statutory provision.

In considering the two approaches, we have taken into account the statutory text, feasibility, consistency with similar programs being implemented in the states and internationally, impacts on the regulated community and on innovation, efficiency of implementation, and other factors. Subsection (i)(4)'s ''Factors for Determination'' provides factors that EPA is to consider ''[i]n carrying out a rulemaking'' under subsection (i)(1). As a general matter, we interpret subsection (i)(1) to apply where EPA is deciding *whether* to impose a restriction on the use of a regulated substance in a sector or subsector and *what* that restriction should be (*e.g.,* a full restriction or a partial restriction and on what timeframe). However, we also think the factors listed in subsection (i)(4) are informative in our consideration of how to structure restrictions, as some approaches may provide advantages with respect to some of the factors listed in subsection (i)(4) over others.

We also note that while subsection (i)(1) identifies that EPA may restrict the use of a regulated substance ''in the sector or subsector in which the regulated substance is used,'' we think that, given EPA's authority to issue partial restrictions, the provision allows EPA to establish restrictions for particular uses of HFCs, such as products or applications, and that such restrictions do not need to apply uniformly across entire sectors or subsectors. Interpreting EPA's authority in this manner allows the Agency to tailor restrictions in accordance with the best available data and to consider relevant differences in, for example, the availability of substitutes with respect to technological achievability or affordability. For example, EPA is proposing restrictions for HFCs used in chillers for comfort cooling. However, chillers for comfort cooling with evaporating temperatures less than −58 °F are not included in this proposal due to limits in lower-GWP technology to meet the proposed restriction at this time.

The two approaches to structuring subsection (i) restrictions that we are considering at this time were identified in the subsection (i) petitions granted by the Agency to date. They are: (1) to set GWP limits for HFCs used within a sector or one or more subsectors; and (2) to restrict specific HFCs, whether neat or used in a blend, by sector or one or more subsectors.[38] For purposes of the restrictions proposed in this document, which largely respond to the subsection (i) petitions granted to date by the Administrator, we propose to primarily employ the GWP limit approach, with some exceptions where we think the specific-listing approach is more appropriate. We seek comment on both approaches and have provided sufficient information in this proposal and the docket to allow the Agency to finalize restrictions using either approach.[39]

GWP Limit Approach

This proposed approach would restrict the use of HFCs by establishing GWP limits for HFCs used in each sector or subsector, whether neat or used in a blend. By establishing GWP limits, only HFCs with GWPs below the proposed limit or HFCs used in blends with GWPs below the proposed limit for a particular sector or subsector could be used in that sector or subsector. If used neat, HFCs with GWPs at or above the GWP limit would be prohibited from use in that sector or subsector. If the HFC is used in a blend in the sector or subsector, compliance with the GWP limit would be determined based on the GWP of the blend. Blends containing an HFC with GWPs at or above the GWP limit would be prohibited from use in that sector or subsector.

For HFCs used in a blend, EPA is proposing that the GWP of the blend would be calculated to incorporate all components of the blend, whether an HFC, HFO, HC or other constituent, using the 100-year integrated AR4 values. We note that the 100-year integrated GWP values in Table 2.15 of AR4 for the HFCs are equivalent to the exchange values listed in the AIM Act and thus what we plan to use here without change. For further details about determining the GWP of compounds that are not listed in AR4, see section V.A of this preamble.

In most cases it is the specific HFC and the proportion of that HFC within the blend that determines the GWP of the blend as a whole. Under this proposal, EPA is not restricting the use of all HFC blends. For instance, if a GWP limit of 150 is established for regulated substances used in a particular sector or subsector, HFC–134a, which has a GWP of 1,430, could not be used. However, R–451A, which is a blend of HFC–134a and HFO–1234yf, has a GWP of 146 and could be used in a sector or subsector with a GWP limit of 150. This approach would allow for the continued use of an HFC with a GWP above the limit EPA establishes when it is used in a blend with a GWP below the limit. There may be certain characteristics associated with a higher-GWP HFC that makes use of that substance in a blend particularly advantageous, such as reducing flammability. Making available substitutes that would not otherwise be available under an approach that did not permit the use of higher-GWP HFCs, even when in a lower-GWP blend, would achieve beneficial environmental impacts sooner, smooth the transition, and support innovation. This approach is consistent with the approach used by other governments including the European Union (EU). EPA notes that this approach would not change in any way the calculation established under 40 CFR part 84, subpart A for determining the quantity of production and consumption allowances required for regulated substances used in blends.

Even where petitions have asked EPA to restrict specific regulated substances or blends containing an HFC in various sectors and subsectors, EPA can translate those requests into restrictions using the GWP limit approach. EPA would select GWP limits that would, in effect, prohibit the use of named HFCs (neat) and named blends in the specified sector. For example, in its granted petition, Natural Resources Defense Council et. al. (NRDC) requested that the Agency restrict the use of R–507A (GWP 3,990), R–404A (GWP 3,920), R–428A (GWP 3,610), R–422C (GWP 3,390), R–434A (GWP 3,250), HFC–227ea (GWP 3,220), R–421B (GWP 3,190), R–422A (GWP 3,140), R–407B (GWP 2,800), and R–422D (GWP 2,730) for new remote condensing units. In this example, EPA's starting point for considering a GWP limit for new remote condensing units would be 2,730, to include within the prohibition the blend with the lowest GWP among those in the petition. EPA then would use the considerations laid out in subsection (i)(4) to determine the appropriate GWP limit restriction that would also account for available substitutes in the remote condensing unit subsector; by definition, that proposed GWP limit would prohibit (or fully restrict) the specific named HFCs and blends containing HFCs requested by the petitioner.

One benefit of the GWP limit approach is that the regulatory certainty it would provide would encourage the continued development and implementation of HFC substitutes with lower GWPs. Under this approach, companies would be free to innovate so long as the substitute did not exceed the GWP limit. Where EPA has established a GWP limit for a particular sector or subsector, based on available and technologically achievable substitutes, new HFCs or blends containing an HFC used in that sector or subsector would need to meet that threshold. This approach would also provide a more efficient and streamlined process for companies to employ these lower-GWP substitutes for new uses, because the existing restrictions would make clear permissible uses. A substance-specific listing approach could create hesitancy to innovate because it would be less clear whether EPA might restrict a particular blend containing an HFC *after* a company had already invested resources in developing it for a particular use. By establishing GWP limits, this program would foster

[38] The restrictions on the use of an HFC under subsection (i) of the AIM Act proposed in this rulemaking are intended to complement and not conflict with existing restrictions established through other authorities. Other authorities would still apply.

[39] EPA provides a summary of sectors and subsectors affected by the proposed action, along with the proposed restriction in the form of GWP limits for most subsectors in section VII.F.2 of this preamble. The docket contains a list of specific substances that EPA is proposing to restrict should EPA finalize a specific listing approach to establish use restrictions rather than a GWP limit approach.

innovation to next-generation substitutes.

Perhaps recognizing these same advantages, other governments undertaking programs to restrict HFCs have embraced this approach, including the state of California, Canada, and EU member countries. Many of the granted petitions including those submitted by environmental advocates, industry trade associations, and state governments, demonstrated broad support for using GWP limits. Furthermore, many of the businesses in the potentially affected sectors or subsectors are familiar with this approach already and may already comply with GWP limits in certain markets. Therefore, EPA's use of the GWP limit approach, which is familiar to companies operating in other jurisdictions, could potentially support innovation, transition, and compliance.

Specific Listing Approach

The second approach EPA is considering would be to list specifically restricted HFCs and blends containing HFCs by sector or subsector. Using the NRDC petition example described previously, under this approach EPA would prohibit the use of the ten blends contained in the petition (R–507A, R–404A, R–428A, R–422C, R–434A, HFC–227ea, R–421B, R–422A, R–407B, and R–422D) in new remote condensing units. The NRDC petition appears to be based on the SNAP Program's use of acceptable, acceptable subject to use conditions, and unacceptable lists and requests restrictions that would be equivalent to the changes of status in SNAP Rules 20 and 21 which were partially vacated and remanded to the Agency (80 FR 42870, July 20, 2015 and 81 FR 86778, December 1, 2016, respectively).[40]

While EPA's experience implementing the SNAP program under section 612 of the CAA provides some insight into the advisability of using a substance specific listing approach to structure restrictions under subsection (i), EPA recognizes that Congress provided separate authority under subsection (i) of the AIM Act. Section 612(c) of the CAA requires EPA to promulgate rules making it unlawful to replace ODS with any substitute that it determines may present adverse effects to human health or the environment where it has identified an alternative that (1) reduces the overall risk to human health and the environment and (2) is currently or potentially available. Section 612(c) further requires EPA to ''publish a list of (A) the substitutes prohibited under this subsection for specific uses and (B) the safe alternatives identified under this subsection for particular specific uses.'' Under SNAP, EPA evaluates substances that can be used as alternatives based on a number of criteria and accordingly lists them as acceptable, unacceptable, acceptable subject to use conditions, acceptable subject to narrowed use limits, or pending. See 40 CFR 82.180(a)(7) (listing criteria for review) and 40 CFR 82.180(b) (describing types of listing decisions). EPA has considered more than 450 alternatives for eight industry sectors and more than 40 end-uses since 1994.[41]

Based on EPA's experience with using the substance-specific lists to establish use conditions or narrowed use limits under SNAP, we anticipate that using substance-specific lists to communicate the restrictions established under subsection (i) could be unwieldy and less advantageous. We note that in contrast to section 612(c) of the CAA, subsection (i)(1) does not expressly mention publication of a list for substances that are restricted. Moreover, the substance-specific approach could present the challenge of needing to continually update the list of HFCs and blends containing an HFC as they are introduced. For example, if EPA has already restricted one particular use of an HFC in a blend for a given use, a company could reformulate the blend slightly, even *increasing* the high-GWP HFC component, and start using it for that same use. EPA would then need to initiate a rulemaking to restrict that new HFC formulation for that use, even though it was clear from the outset that lower-GWP alternatives already existed.

However, we acknowledge that the substance-specific listing approach may be simpler to implement in some instances, particularly when there are only one or a few regulated substances used or restricted in a specific sector or subsector. Listing these restricted substances explicitly would provide specificity to the regulated community as to exactly what is prohibited. It also allows anyone to compare the regulated substance used to the list of restricted substances and know whether the product is in compliance, avoiding the intermediate step of determining the GWP of the HFC or blend containing an HFC before knowing whether that particular substance meets the established limit.

This approach may also be preferable when substitutes continue to be in development. It may be beneficial to allow additional time before establishing a GWP limit while still restricting those substances that have the highest environmental impact. This approach would allow for the adoption of multiple transitional substitutes and allow for the development of additional substitutes.

We think both approaches could also be used in combination, with some subsectors having a GWP limit and others where specific substances are restricted. We note that petitions granted under subsection (i) requested restrictions using both of these approaches, and one possible approach for the final rule would be to establish, if appropriate, the type of restriction (GWP limit or substance-specific) requested in the petitions for that particular subsector. For example, most petitions regarding the RACHP subsectors requested GWP limit restrictions. EPA suspects that this may be due to the number of HFCs and blends containing an HFC used in those subsectors. However, in some cases not all petitioners were in agreement on the structure of the restriction. For example, some petitions regarding the cold storage warehouse subsector requested that EPA establish a GWP limit of 150 while others requested EPA to prohibit the use of listed HFCs and blends containing an HFC.

The Agency is proposing to establish restrictions on the use of HFCs by establishing GWP limits by sector or subsector in most instances. As discussed further in section VII.F.3.e of this preamble, EPA is proposing to restrict specific HFCs, whether neat or used in a blend, in some instances where the situation making the substance specific listing approach is advantageous. EPA is seeking comment on the GWP limit approach, the specific listing approach, other possible regulatory models that the Agency should consider, and a combination of approaches either for this proposed rule or for future rulemakings under subsection (i) of the AIM Act.

C. Applicability

The AIM Act provides that the Administrator may by rule restrict,

[40] After a court challenge, the D.C. Circuit partially vacated the SNAP 2015 Rule ''to the extent it requires manufacturers to replace HFCs with a substitute substance,'' and remanded to EPA for further proceedings. *Mexichem Fluor, Inc.* v. *EPA,* 866 F.3d 451, 464 (D.C. Cir. 2017) (''*Mexichem I*''). However, the court upheld EPA's decisions in that rule to change the listings for certain HFCs in certain SNAP end-uses from acceptable to unacceptable as being reasonable and not arbitrary and capricious. *Id.* at 462–64. The same court later issued a similar partial vacatur for portions of the SNAP 2016 Rule. *See Mexichem Fluor, Inc.* v. *EPA,* 760 Fed. Appx. 6 (Mem) (per curiam) (D.C. Cir. 2019) (''*Mexichem II*'').

[41] As noted in section VII.A of this preamble, there is significant overlap between the sectors and subsectors identified in this proposal and how sectors and ''end-uses'' are categorized under the SNAP program.

fully, partially, or on a graduated schedule, the use of a regulated substance in the sector or subsector in which the regulated substance is used. HFCs are used in a wide variety of applications, including refrigeration and air conditioning, foam blowing agents, solvents, aerosols, and fire suppression. In these applications, HFCs are often used as a refrigerant, foam blowing agent, and fire suppression agent or may be contained and used within a product. HFCs can also be used in processes such as solvent cleaning, blowing open cell foam, semiconductor manufacturing, or chemical usage.

The AIM Act does not define ''use.'' The dictionary definitions for that term include ''to put into action or service'' [42] and ''to take, hold, or deploy (something) as a means of accomplishing a purpose or achieving a result; employ.'' [43] For several reasons, we think ''use,'' in the context of subsection (i)(1), was intended to include actions taken with respect to regulated substances that occur at the market or industry level, such as manufacture, distribution, sale, offer for sale—*i.e.,* to cover the presence of HFCs in products and processes in the U.S. market as a way of addressing their use in sectors and subsectors.

First, subsection (i) grants EPA authority to restrict the use of a regulated substance ''in the sector or subsector in which the regulated substance is used.'' While sectors and subsectors are not defined in the AIM Act, those terms suggest groupings or categories of related activity at an industry level, and as discussed in section VII.A of this preamble, EPA is proposing definitions for ''sectors'' and ''subsectors'' that are consistent with historical usage of those terms in other programs—grouping together similar or related industrial or market uses in distinct sectors, for example, refrigeration and air conditioning, or foam blowing, or aerosols. ''Use of a regulated substance in the sector or subsector in which the regulated substance is used'' indicates that the grant of authority under subsection (i) was intended to cover a *sector or subsector's use* of a regulated substance, and that use certainly covers the inclusion of a regulated substance in a product [44] to achieve a particular purpose or the employment of a regulated substance in a process, as those are prototypical uses for sectors that are most likely to be using regulated substances, such as the inclusion of an HFC as a refrigerant in a refrigerator or air conditioner for cooling purposes.

Second, because subsection (i) and the subsection (i)(4) factors are focused on broad, sector-level information, it is reasonable to interpret ''use'' broadly, in a way that would reach uses on a sector-level basis. The subsection is titled ''Technology Transitions,'' and in subsection (i)(4), the Act directs EPA to consider certain factors, to the extent practicable, in issuing a rulemaking or making a determination to grant or deny a petition regarding use restrictions. The factors listed under subsection (i)(4) task the Agency with examining information relevant to industry-level sectors or subsectors that would inform consideration of the feasibility and advisability of a transition away from the use of a regulated substance in that sector or subsector, as well as consideration of whether that transition should be full, partial, or on a graduated schedule. For example, in subsection (i)(4)(B), the Act directs EPA to factor in ''the availability of substitutes for use of the regulated substance that is the subject of the rulemaking or petition, as applicable, in a sector or subsector, taking into account technological achievability, commercial demands, safety, consumer costs, building codes, appliance efficiency standards, contractor training costs, and other relevant factors, including quantities of regulated substances available from reclaiming, prior production, or prior import.'' The various subfactors in (i)(4)(B) help EPA to determine whether there are adequate available substitutes for a regulated substance that a sector or subsector could use, indicating feasibility, readiness, advisability, and degree of a sector or subsector transition away from the regulated substances in use. Similarly, the other factors in (i)(4)—to use best available data, to consider overall economic costs and environmental impacts, as compared to historical trends, and to consider the remaining phasedown period for regulated substances under the phasedown rule issued under subsection (e), if applicable—also fit with this understanding of EPA's task: to determine whether, when, and to what degree it is appropriate to establish a use restriction to facilitate the transition away from the use of regulated substances in a sector or subsector.

Third, Congress provided EPA authority to issue restrictions that are full, partial, or on a graduated schedule. Fully restricting the use of a regulated substance in the sector or subsector in which it is used, by its terms, implies a full transition away from the use of that regulated substance in the given sector or subsector. We therefore understand the term ''use'' to be broad enough to achieve a full transition. In order to effectuate a full transition, we would have to be able to address all the aspects where the regulated substance is present in that sector or subsector of the market. There may be situations where a restriction is best targeted at points in the life cycle or market chain of the regulated substance that are subsequent to the incorporation of the regulated substance in a product or process, as well as points in the chain that are proximate to ultimate use. Thus, we interpret the term ''use'' as being broad enough to reach points such as transport or offer for sale.

EPA therefore proposes to interpret use of a regulated substance in the sector or subsector for purposes of subsection (i) as ''for any person to take any action with or to a regulated substance, regardless of whether the regulated substance is in bulk, contained within a product, or otherwise, except for the destruction of a regulated substance. Actions include, but are not limited to, the utilization, deployment, sale, distribution, discharge, incorporation, transformation, or other manipulation.'' EPA's proposed definition of ''use'' covers all of the links on the chain representing how regulated substances would be introduced, incorporated into products or processes, circulated, and made available in the U.S. market. To the extent EPA has determined, considering the (i)(4) factors, such as the availability of substitutes, that it is appropriate and possible to fully restrict the use of an HFC in a particular sector or subsector, we think that restriction must be able to extend across all the points in the chain. For example, if stakeholders submit a petition to EPA asserting that the Agency should fully restrict use of a certain HFC or HFCs over a certain GWP in motor vehicle air conditioning (MVAC), and EPA agrees such restriction is appropriate, based on consideration of the (i)(4) factors to the extent practicable, we interpret subsection (i) to authorize the restriction of such use of HFCs in every part of the market chain. A narrower interpretation could hamper EPA's ability to

[42] Merriam-Webster. Available at: *https://www.merriam-webster.com/dictionary/use.*

[43] *Lexico.com.* Available at: *https://www.lexico.com/en/definition/use.*

[44] Similarly, subsection (i)'s authority extends to regulated substances contained in a blend and the use of that regulated substance within a blend by the sector or subsector in a product or process to achieve a particular purpose. In order to address the regulated substance within a blend, it may be appropriate to establish requirements that apply to use of the blend, although the blend itself is not a regulated substance.

effectively implement a full restriction on HFC use in a sector or subsector. For example, if EPA were to define ''use'' as only the manufacture of a product containing an HFC but not sale of that product, then the manufacture of a MVAC system with the restricted HFC would be prohibited, because the air conditioning sector would be restricted from that ''use'' of the HFC. Sale of MVAC systems manufactured with the restricted HFC would not be considered part of the sector's ''use'' of an HFC and would therefore be permissible, either because the unit had been imported or because it had made it to store shelves, despite a restriction on its manufacture. This would circumvent the intended full transition of the MVAC subsector away from use of HFC. Covering all points in the chain of ''use in the sector or subsector'' ensures that the use restrictions we establish achieve their intended purpose. However, even though EPA's proposed definition of ''use'' is broad in order to facilitate a full transition to HFC substitutes where appropriate, that does not mean that in every instance the restrictions promulgated under subsection (i) will exercise that full authority. In many cases, including in this proposed action, EPA may issue partial restrictions that target only certain uses.

The AIM Act also provides EPA other authorities to issue certain regulations for the purpose of maximizing reclamation and minimizing release of regulated substances from equipment and to ensure the safety of technicians and consumers.[45] We have not yet established regulations under those provisions and therefore do not intend to apply our authority under (i) to actions associated with steps in the disposal or reclamation chain such as recovery, recycling, and reclamation of a regulated substance at this point.

We also do not intend that this rule apply to the ordinary utilization or operation of a regulated product by an ultimate consumer. Given that this is the outset of the phasedown of HFCs, there is an opportunity to efficiently achieve significant emission reductions by limiting the introduction of new products to the U.S. market and restricting the circulation of those products (*e.g.,* sale and distribution) before they reach the ultimate consumer. We therefore are proposing restrictions on the manufacture, import, export, sale, and distribution of products, rather than on restricting ongoing, ordinary operation and utilization by ultimate consumers.[46]

Further, in this rule, EPA is not proposing to apply the requirements established through this rulemaking to certain applications of HFCs eligible for application-specific allowances under 40 CFR 84.13. Under subsection (i)(7)(B)(i) of the AIM Act, a rule promulgated under subsection (i) ''shall not apply to . . . an essential use under clause (i) or (iv) of subsection (e)(4)(B)'' of the AIM Act, ''including any use for which the production or consumption of the regulated substance is extended under clause (v)(II) of that subsection'' of the Act. Subsection (e)(4)(B)(iv) lists six applications which are to ''receive the full quantity of allowances necessary, based on projected, current, and historical trends'' for the five-year period after enactment of the AIM Act. EPA has codified these six applications at 40 CFR 84.13 and established a framework for allocation of allowances for these application-specific needs. Under the implementing regulations at 40 CFR 84.13, the following applications are currently eligible to receive application-specific allowances for calendar years through 2025: (1) as a propellant in metered dose inhalers; (2) in the manufacture of defense sprays; (3) in the manufacture of structural composite preformed polyurethane foam for marine use and trailer use; (4) in the etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector; (5) for mission-critical military end uses; and (6) for onboard aerospace fire suppression. Therefore, EPA is not proposing to apply the requirements under this rulemaking to these uses of HFCs in these six specific applications at this time, since they are currently receiving application-specific allowances under 40 CFR 84.13. This aspect of the proposal is reflected in the proposed exemption in section 84.58. Further, EPA has not at this point designated any essential uses under subsection (e)(4)(B)(i). If EPA makes such a designation in the future, EPA would consider at that point how to ensure consistency with subsection (i)(7)(B)(i).

1. Which uses is EPA proposing to restrict in this proposal?

Under the proposed definition of ''use'' EPA would be exercising its authority under subsection (i) to cover a broad chain of activities associated with regulated products. In this rule, EPA's proposed restrictions on that broad chain of activities are designed to apply only at certain points in this chain, consistent with the direction that EPA ''may by rule restrict, fully, partially, or on a graduated schedule.'' With respect to the specific sector and subsector restrictions proposed in this document, EPA proposes to adopt a uniform understanding of when the restrictions would begin to apply and explains in this section how the commencement of EPA's restrictions would apply to both regulated products manufactured in the United States and imported regulated products.

For purposes of this rule, EPA is proposing restrictions on newly manufactured products (and the subsequent sale, distribution, export, and offer for sale or distribution of those products) and is not proposing to apply the specific use restrictions that are the subject of this action to existing products or equipment and used products or equipment, except as to the import of existing or used products or equipment. For additional discussion regarding products for export, see section VII.C.2 of this preamble. For additional discussion regarding existing products or equipment, see section VII.C.3 of this preamble.

We think the most efficient and effective way to encourage transition from the use of these HFCs is to restrict the incorporation of HFCs into products entering the U.S. market for the first time. This restriction would primarily be borne by original equipment manufacturers (OEMs) and importers of products, as these are the entities that introduce products into the U.S. market. Given that this is the first rulemaking under subsection (i), and there are many products that are currently being manufactured or imported using HFCs and blends containing HFCs (or are intended to use HFCs and blends containing HFCs) in the sectors and subsectors for which EPA is proposing restrictions, the use restrictions in this proposed rule are intended to only apply to the manufacture and import of regulated products and the subsequent sale, distribution, export, and offer for sale or distribution of those products.

[45] As explained in the Allocation Framework Rule that in the context of allocating and expending allowances, EPA interprets the word ''consume'' as the verb form of the defined term ''consumption.'' *See* 86 FR 55122, n. 7 Oct. 5, 2021); see also definition of ''consumption'' in subsection (b)(3) of the AIM Act and 40 CFR 84.3. The distinct term ''consumer'' is not defined in the AIM Act. In the context of subsection (i) of the AIM Act, we understand and are using the term ''consumer'' in a more general way, consistent with its everyday dictionary meaning, for example to refer to a person who purchases goods or services for personal use or the ultimate consumer of a product.

[46] We note, however, that in some cases the ultimate consumer may have purchased a product where the first incorporation of the regulated substance occurs when the product is in the ultimate consumer's ownership, and in those cases that incorporation would be covered by the proposed requirements.

EPA is proposing that the compliance date for the restrictions on the sale, distribution, or export of a regulated product be one year after the compliance date for the prohibition on production and import. Most of the proposed restrictions on the manufacture and import of products using HFCs have a proposed compliance date of January 1, 2025. As such, restrictions on the sale and distribution of those products would be January 1, 2026. Providing one year to sell existing inventory should be sufficient given that compliance date would be more than two years from the date of the final rule and many manufacturers are anticipating this action. EPA prefers a time-limited period during which products can continue to be sold over an approach that indefinitely exempts the sale of existing inventory. Having a date certain for the sale and distribution of regulated products facilitates enforcement of the manufacturing and import restriction. Manufacturers, importers, and distributors can avoid stranding inventory by promptly beginning their transitions. EPA welcomes comment on the effect of a one-year sell through, including the potential for stranding inventory or disadvantaging entities that have completed their transitions.

As noted, for the most part, EPA is designing its restrictions to apply to newly manufactured products and equipment rather than existing or used products and equipment (both addressed below). However, EPA is proposing to restrict the import of existing and used products that do not meet the proposed GWP limits or other restrictions. EPA does not interpret the AIM Act's restriction on EPA's authority to regulate equipment in existence in the sector or subsector prior to December 27, 2020, as applying to imports of equipment that was manufactured prior to that date but was not imported until after that date (see section VII.C.3 of this preamble for additional discussion). EPA is electing to apply its GWP limit restrictions or other restrictions to imports of existing and used products and equipment because failing to prohibit the import of these products could have the effect of undermining the transition from higher-GWP HFCs in the sectors and subsectors that are the subject of this proposal. Permitting the import of existing and used products that did not meet the proposed restrictions could shift market share away from domestically manufactured products that use conforming lower-GWP HFCs or substitutes, towards imported products that continue to use higher-GWP HFCs. The goal of restricting the use of regulated substances (*i.e.,* higher-GWP HFCs) in the named sectors and subsectors would be undermined if those sectors and subsectors simply shifted use to imported existing or used products containing higher-GWP HFCs. EPA is seeking comment on its proposal to apply restrictions on the use of HFCs to the import of existing and used products.

The AIM Act defines ''import'' as ''to land on, bring into, or introduce into, or attempt to land on, bring into, or introduce into, any place subject to the jurisdiction of the United States, regardless of whether that landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the United States,'' and we have proposed to codify that definition into our subpart B regulations. We note that this statutory definition contains no threshold volume of business an entity would need to undertake in order to qualify as an importer. As such, EPA intends its proposed restrictions to cover any importation of regulated products. The Agency's intention is to cover the activities of importers bringing large shipments of products or equipment into the country, as well as activities of entities bringing smaller groups of regulated products into the country (*e.g.,* driving a truckload of air conditioning units across the Canadian or Mexican border for sale in the United States).

As discussed above, because EPA proposes to interpret ''use'' to include activities in the market chain involving regulated products that occur subsequent to manufacture or import, the proposed use restrictions would also apply to any person who sells, distributes, offers for sale or distribution, makes available for sale or distribution, or exports any regulated product in the sectors or subsectors controlled under subsection (i). Applying the restriction in this way ensures that the goal of restricting the use of regulated substances in the sectors or subsectors in which the regulated substances are used can be achieved, because the sector and subsector's use of the regulated substance is present in all these aspects of the market chain, and EPA's intention in this proposal is to restrict use across that chain. Therefore, even if a manufacturer or importer improperly introduces a regulated product that does not meet the proposed restriction into the U.S. market, distributors and retailers offering that product for sale, including online retailers, are also restricted from covered activities related to that product. The intent of the proposed restriction is to remove products that do not meet the proposed limits from circulation in the U.S. market.

However, EPA is proposing not to apply its GWP limit restrictions or other restrictions to the sale or distribution, or offer for sale or distribution, of used products. By used products, we mean products that have been in the ownership of an ultimate consumer and have experienced ordinary operation or utilization by an ultimate consumer. Some regulated products, such as air-conditioning and refrigerated appliances, are often conveyed with the sale of a building and could not reasonably be excluded from that conveyance. Other regulated products may be incorporated into a larger good, such as an MVAC in a motor vehicle, which may be sold multiple times during the useful life of the good. Restricting the sale of used products or equipment that use HFCs likely would significantly decrease the value of those goods and impact the market for used products (*e.g.,* trading in a used motor vehicle during the purchase of a new one). Extending the proposed restriction to the sale of used products could have overall detrimental environmental effects, by requiring consumers to discard products or equipment before the end of the product's useful life, and could negatively impact affordability for consumers by eliminating options to purchase used products. EPA typically has not restricted the sale of used products containing ODS and proposes to maintain a similar approach for this rule. We note that our proposed exemption for the sale or distribution, or offer for sale or distribution, of used products is intended to cover both individuals selling products they have used (*e.g.,* an appliance they have owned and used for a period of time) as well as entities that do volume business in used products (*e.g.,* stores selling second-hand goods or car-dealerships selling pre-owned vehicles). However, this used products exemption is not intended to cover entities that purchase products that are subject to the proposed restrictions on manufacture and import, hold those products for a period of time, and then re-sell the products. We have accordingly specified that products must have experienced ordinary operation or utilization by an ultimate consumer for a period of time in order to qualify for the proposed used product exemption.

2. Would the proposed use restrictions also apply to products that are manufactured for export?

As discussed above, EPA interprets a sector or subsector's ''use'' to cover not only manufacture and import of a regulated product, but also the subsequent activities in the market chain related to regulated products. Specifically, we interpret export to be included in the meaning of ''use.'' Where EPA has determined, consistent with consideration of the factors listed in subsection (i)(4), that it is appropriate to restrict the use of HFCs, we believe it would be reasonable for restrictions on domestically manufactured products intended for the U.S. market to apply equally to domestically manufactured products intended for export. Applying the proposed restrictions to all domestically manufactured regulated products treats materially similar uses of HFCs in the same manner. Including exports as one of the activities subject to the proposed rule's prohibitions would prevent the limited supply of HFCs in the United States from being exported in products that could use substitutes. A company cannot file for a request for additional consumption allowances based on the export of a product containing regulated substances; requests for additional consumption allowances are limited to the export of bulk HFCs. 40 CFR 84.17. As with products manufactured for domestic use, one intent of this regulation is to ensure that sectors and subsectors that are currently using HFCs and that are well-positioned, per EPA's determination under the (i)(4) factors, to transition to substitutes, actually make that transition, leaving more of the limited supply of HFCs for those sectors and subsectors that currently cannot use substitutes. In addition, including exports as a prohibited activity also supports global efforts to address HFC uses in light of the Kigali Amendment, and could be welcomed by countries that have or intend to also restrict the use of HFCs in a similar manner.

3. Would restrictions apply to existing equipment?

Under subsection (i)(7)(B)(ii) of the Act, ''a rule promulgated under this subsection shall not apply to, . . . except for a retrofit application, equipment in existence in a sector or subsector before the date of enactment of this Act.'' 42 U.S.C. 7675(i)(7)(B)(ii). As such, EPA's proposed restrictions would not apply to the sale or distribution, or offer for sale or distribution, or export of any equipment that was in existence in the sector or subsector prior to December 27, 2020, the date on which the AIM Act was enacted.

EPA is codifying the statutory exemption for equipment in existence in a sector or subsector prior to December 27, 2020, into the proposed regulations. We propose that modifications, servicing, or repairs to equipment in existence prior to December 27, 2020, would not be considered ''manufacture'' under this proposed rule, and that these actions with respect to existing equipment would therefore not change the status of whether this equipment ''existed'' prior to December 27, 2020, and render such equipment subject to the proposed restrictions. Subsection (i)(7)(B)(ii) of the Act refers to *equipment* in existence before December 27, 2020. ''Equipment'' could encompass not just a product or appliance, but also components or parts of that product or appliance. Even if a person were to service, repair, or replace parts of a product or appliance, other parts of that equipment would still have been in existence prior to December 27, 2020, and would arguably be outside the scope of EPA's regulatory authority under subsection (i)(7)(B)(ii). In limited cases, where every part of a piece of equipment had been altered or replaced after December 27, 2020, such equipment would fall outside the statutory and regulatory exemption. In addition, under the AIM Act subsection (i)(7)(B)(ii), EPA retains authority to apply its restrictions to ''retrofit applications,'' where existing equipment is upgraded by changing the regulated substance used. See AIM Act subsection (i)(7)(A). The Act specifies that ''retrofit'' is where upgrades are made to existing equipment where the regulated substance is changed and which ''(i) include the conversion of equipment to achieve system compatibility and (ii) may include changes in lubricants, gaskets, filters, driers, valves, o-rings, or equipment components for that purpose.'' EPA is not at this time proposing provisions addressing retrofits.

EPA interprets subsection (i)(7)(B)(ii)'s limit on authority to regulate existing equipment to be applicable to equipment that existed before December 27, 2020, but is proposing that equipment be in the United States to qualify for that exception. Subsection (i)(7)(B)(ii) provides an exception for ''equipment in existence *in a sector or subsector* before December 27, 2020,'' (emphasis added) which EPA is proposing to interpret as a sector or subsector in the United States. In general, where those terms appear in the AIM Act, EPA understands them to mean the domestic sector or subsector, not the sector or subsector as it exists, operates, and functions in another country. For example, in assessing the availability of substitutes in a sector or subsector under subsection (i)(4)(B), EPA is proposing to, in general, analyze the various subfactors—consumer costs, building codes, appliance efficiency standards, contractor training costs—vis a vis the domestic impacted sector or subsector.[47] Therefore, EPA is proposing that a product that was manufactured in another country and existed prior to December 27, 2020, but was not imported to the United States until after that date is not subject to subsection (i)(7)(B)'s limitation, because until it is imported into the United States, it is not ''in existence in the sector or subsector.'' EPA therefore proposes that its prohibitions on import would apply to all regulated products imported after the effective date of the rule, even if those products existed in another country prior to December 27, 2020.

4. Effective and Compliance Dates of Rules Promulgated Under Subsection (i)

Subsection (i)(6) of the AIM Act states that ''[n]o rule under this subsection may take effect before the date that is 1 year after the date on which the Administrator promulgates the applicable rule under this subsection.'' EPA interprets this provision as applying to the establishment of restrictions on use of HFCs under subsection (i)(1) of the Act. Therefore, EPA is proposing compliance dates for the proposed restrictions on the manufacture and import of regulated products that are at least one year from the date the rule is promulgated, in accordance with this statutory provision. Factors that may affect these compliance dates include the timing for availability of substitutes, the HFC phasedown schedule, and other factors such as building code updates.

The proposed provisions that are focused on program administration and petitions processing (*i.e.,* § 84.64), do not include a delayed compliance date, so EPA proposes that those provisions come into effect 30 days after publication of the final rule in the **Federal Register**. This approach is based on an interpretation that (i)(6) does not apply to those provisions because ''applicable rules'' in (i)(6) are

[47] EPA is examining international information for some of the analyses, such as research from international organizations about technological achievability, because such information has relevance for the sector or subsector in the United States.

limited to rules that apply use restrictions under (i)(1). As a practical matter, the regulated industry to which a use restriction rule is being applied may need a full year to come into compliance with that restriction. While a petitioner may need some amount of time to collect the information this action proposes to impose, we think 30 days is a reasonable timeframe in which to do so. EPA is soliciting comment on this interpretation and is also soliciting comment on whether it should instead interpret subsection (i)(6) to apply to the other provisions under subsection (i) and provide at least a year to come into compliance with those provisions as well.

D. How is EPA proposing to address restrictions on the use of HFCs requested in petitions granted?

EPA is addressing three sets of petitions in this proposed action: the 11 petitions granted or partially granted on October 7, 2021; additional petitions submitted by the Air-Conditioning, Heating and Refrigeration Institute (AHRI) which updated previously submitted petitions; and two petitions granted by EPA on September 19, 2022. EPA is addressing these granted petitions in a single rulemaking rather than through separate proposals. In some instances, particularly where the petitioned sectors and subsectors overlap, responding through a single rulemaking allows for a complete analysis in a single location. Consistent with EPA's authority under subsection (i)(1) of the AIM Act, EPA is also proposing restrictions on the use of HFCs in certain sectors and subsectors that were not included in petitions received by the Agency to date.

1. Petitions Granted on October 7, 2021

On October 7, 2021, EPA granted ten petitions and partially granted one petition under subsection (i) of the AIM Act (86 FR 57141, October 14, 2021). Copies of petitions granted (including the full list of petitioners and co-petitioners), a detailed summary of each petition, and EPA's rationale for granting these petitions are available under Docket ID EPA–OAR–2021–0643. Five of the granted petitions specifically requested that EPA replicate, in varying degrees, certain restrictions on use of HFCs based on the changes of status contained in EPA's SNAP Rules 20 and 21. These five petitions were received from the Natural Resources Defense Council et al. (hereby, ''NRDC''); DuPont (two petitions); American Chemistry Council's Center for the Polyurethanes Industry (hereby, ''CPI''); and the Household & Consumer Product Association and National Aerosol Association (hereby, ''HCPA''). These petitions requested restrictions on the use of specific HFCs or blends containing HFCs in refrigeration, air conditioning, and heat pump, foams, and aerosols sectors.[48] Another five petitions requested that EPA establish GWP limits for HFCs used in certain stationary AC and/or refrigeration subsectors. These petitions were received from the Environmental Investigation Agency et al. (hereby, ''EIA''), AHRI (two petitions), Association of Home Appliance Manufacturers (hereby, ''AHAM''), and International Institute of Ammonia Refrigeration et al. (hereby, ''IIAR''). The one partially granted petition, submitted by California Air Resources Board et al. (hereby, ''CARB''), requested two types of restrictions: (1) certain restrictions on the use of HFCs contained in EPA's SNAP Rules 20 and 21 in the RACHP, foams, and aerosols sectors and (2) restrictions on the use of HFCs based on GWP limits in certain stationary AC and refrigeration subsectors. CARB also requested EPA regulations should not limit states' ability to further limit or phase out the use of HFCs in their jurisdictions.

2. How is EPA proposing to address additional petitions that cover similar sectors and subsectors?

EPA received two additional petitions from AHRI on August 19, 2021, and October 12, 2021. The first petition requested that EPA establish transition dates for ''New Refrigeration Equipment'' [49] for certain commercial refrigeration subsectors listed, along with the associated maximum GWP. AHRI requested that the transition dates be at least two years after the adoption of safety standards and building codes.[50] AHRI's second petition in this category requested that EPA establish transition dates for ''New Refrigeration Equipment'' for specific chiller applications listed, along with the associated maximum GWP.

EPA is treating these two AHRI petitions as addenda to their October 7, 2021, granted petitions, and not as separate petitions, since the subsectors listed in these petitions are contained in the granted AHRI petitions and AHRI refers to these as further steps in the transition for these uses. The main difference between the requested action in these two petitions and the granted petitions is the lower GWP limits with later compliance dates. Since EPA is considers these two petitions as addenda to petitions granted on October 7, 2021, this proposed rulemaking addresses these requests.

3. Petitions Granted on September 19, 2022

On September 19, 2022, EPA granted two additional petitions that requested EPA establish restrictions on the use of HFCs in certain commercial refrigeration subsectors based on GWP limits. These petitions were received from AHRI and IIAR and covered similar commercial refrigeration subsectors contained in petitions granted on October 7, 2021. One difference to note is that both the AHRI and IIAR petitions requested restrictions on the use of HFCs for equipment types beyond what was covered in many of the petitions granted on October 7, 2021 (*i.e.,* all equipment with refrigerant charge capacities less than 200 pounds) in listed subsectors. EPA granted these petitions based on its consideration of the (i)(4) factors in light of the information then available. Given the Agency was already developing this proposed rulemaking which addresses restrictions the use of HFCs in the sector and subsectors contained in these newer petitions, recognizing the extensive overlap with the petitions granted on October 7, 2021, and in an effort streamline rulemakings, EPA is addressing these newer petitions in this proposal, as well. Copies of the AHRI and IIAR petitions can be found in the docket for this proposal.

E. Subsection (i)(4) Factors for Determination

Subsection (i)(4) of the AIM Act directs EPA to factor in, to the extent practicable, a number of considerations in evaluating petitions and in carrying

[48] EPA notes that while these petitioners requested that EPA establish restrictions on the use of HFCs by restricting specific HFCs or blends containing HFCs, it does not necessarily mean that these petitioners preferred this restriction format over establishing restrictions on the use of HFCs by establishing GWP limits. EPA believes that these petitioners requested restrictions on the use of specific HFCs and blends containing HFCs in this way to replicate the format presented in SNAP Rules 20 and 21.

[49] AHRI suggests a definition for ''New Refrigeration Equipment'' as follows: equipment built with new components and equates to a nominal compressor capacity increase across the refrigeration appliance or an increase of the CO_2 equivalent of the refrigerant in the refrigeration appliance. Under this suggested definition, the replacement of components in Existing Refrigeration Systems would be permissible if the nominal compressor capacity is not increased across the refrigeration appliance or the CO_2 equivalent of the refrigerant in the refrigeration appliance is not increased.

[50] A discussion on the status of safety standards and building codes that may impact compliance dates is in section VII.E of this preamble.

out a rulemaking. EPA is not proposing regulatory text regarding these factors at this point; however, this section provides a summary of how the Agency interprets the (i)(4) factors and how EPA considered them for the current proposal. EPA's consideration of the (i)(4) factors served as the basis for the restrictions the Agency is proposing for each sector and subsector covered by this proposal (for additional discussion see section VII.F.1 of this preamble).

1. How is EPA considering best available data?

Subsection (i)(4)(A) of the AIM Act directs the Agency to use, to the extent practicable, the best available data in making a determination to grant or deny a petition or when carrying out a rulemaking under subsection (i). In this context, EPA interprets the reference to best available data as an instruction with respect to the other factors under (i)(4) rather than as an independent factor. EPA notes best available data may not always mean the latest data. For example, the latest data may benefit from peer review. This should not be interpreted as meaning EPA would only consider best available data to be peer-reviewed data, but that peer review is one consideration that could inform our understanding of what is the best available data in particular situations.

The best available data that the Agency is considering for this proposal includes, but is not limited to, the following: SNAP program listing decisions; Montreal Protocol reports by TEAP and its Technical Options Committees, and Temporary Subsidiary Bodies (*e.g.,* Task Forces); [51] TSDs from states with HFC restrictions; [52] information from other federal agencies and departments (*e.g.,* Department of Energy); proceedings from technical conferences; and journal articles. For some of the factors and subfactors, EPA developed TSDs that provide information from these sources and others that EPA believes to be the best available data. Furthermore, EPA is considering information provided to the Agency from industry, trade associations, environmental non-governmental organizations, academia, standard-setting bodies, petitioners, stakeholder meetings that the Agency hosted, and other sources in response to EPA making the petitions publicly available through Docket ID No. EPA–HQ–OAR–2021–0289, to the extent that we think such information represented best available data. EPA welcomes comment on these and other sources that the Agency should consider concerning the (i)(4) factors.

2. How is EPA considering the availability of substitutes?

Subsection (i)(4)(B) of the AIM Act directs EPA to factor in, to the extent practicable, the availability of substitutes for use of the regulated substance that is the subject of the rulemaking or petition, as applicable, in a sector or subsector. Several factors inform the availability of substitutes for use in sectors and subsectors, based on the statutory language in subsection (i)(4)(B). As part of EPA's consideration of availability of substitutes, the AIM Act directs us to take into account, to the extent practicable, the following subfactors: technological achievability, commercial demands, affordability for residential and small business consumers, safety, consumer costs, building codes, appliance efficiency standards, contractor training costs, and other relevant factors, including the quantities of regulated substances available from reclaiming, prior production, or prior import.

EPA is not proposing definitions for each of these subfactors but is providing an interpretation of how consideration of the subfactors relates to the consideration of the availability of substitutes. EPA is considering the (i)(4)(B) subfactors collectively, with no one subfactor solely governing the restrictions proposed for any sector or subsector. EPA is not required to weigh all subfactors equally when considering the availability of substitutes. Subsection (i)(4) directs the Agency to consider the factors listed in (i)(4), including availability of substitutes, ''to the extent practicable.'' EPA interprets this phrase to extend to its consideration of the subfactors in (i)(4)(B), given that these subfactors are to be taken into account in considering the availability of substitutes ''to the extent practicable.'' Furthermore, not all the subfactors in (i)(4)(B) may be applicable to each sector or subsector. For example, appliance efficiency standards would not be applicable to aerosols. Similarly, it may not be practicable to consider some subfactors in some situations; for example, there may not be sufficient available data regarding a specific subfactor. Likewise, EPA anticipates that in most situations, no single subfactor will be dispositive of its consideration of the availability of substitutes under subsection (i)(4)(B). For this proposal, the Agency's consideration of the availability of substitutes took into account, to the extent practicable, the relevant subfactors using the best available data. Additional information on some of these subfactors is available in the docket.

Lower-GWP HFCs and substitute substances and technologies that can be used in place of higher-GWP HFCs have been the subject of evaluation for decades. EPA, state and foreign governments, industry standards organizations, and international advisory panels have long been identifying and assessing substances that can be used in lieu of higher-GWP HFCs and their predecessors, often for uses within the sectors and subsectors subject to this proposal. EPA has therefore drawn upon information generated by these efforts in considering the subsection (i)(4) factors in the context of this proposal, and in particular, in considering the availability of substitutes under subsection (i)(4)(B). While these entities have evaluated substitutes for HFCs in other contexts, the information generated by these efforts provides a useful starting point. For example, in the SNAP program under section 612 of the Clean Air Act, EPA identifies and evaluates substitutes for ODS in certain industrial sectors, including refrigeration, air conditioning, and heat pumps (RACHP); aerosols; and foams. To a very large extent, HFCs are used in the same sectors and subsectors as where ODS historically have been used. Under SNAP, EPA evaluates acceptability of substitutes for ODS based primarily on the potential human health and environmental risks, relative to other substances used for the same purpose. In so doing, EPA assesses atmospheric effects such as ozone depletion potential and global warming potential, exposure assessments, toxicity data, flammability, and other environmental impacts. This assessment could take a wide range of forms, such as a theoretical evaluation of the properties of the substitute, a computer simulation of the substitute's performance in the sector or subsector, lab-scale (table-top) evaluations of the substitute, or equipment tests under various conditions. These assessments under SNAP are relevant to some of the subsection (i)(4) factors, particularly with respect to safety (and the resultant impact on availability of a substitute under (i)(4)(B)) and environmental impacts. We have therefore considered SNAP assessments and listings of acceptable substances in our

[51] The Technical Economic Assessment Panel is an advisory body to the parties to the Montreal Protocol and is recognized as a premier global technical body; reports available at: *https://ozone.unep.org/science/assessment/teap.*

[52] An example is CARB's Initial Statement of Reasons and Standardized Regulatory Impact Assessment (SRIA) report. Available at: *https://ww2.arb.ca.gov/rulemaking/2020/hfc2020.*

consideration of the (i)(4) factors and establishment of use restrictions under subsection (i).

Further, manufacturers and formulators submit substitutes to EPA for evaluation under SNAP which can lead to the substitute being added to the list of acceptable substances. EPA believes that if a manufacturer has submitted a substance for evaluation under SNAP, it would be reasonable to consider that as a possible indication that the substitute is technologically achievable for a given sector and that there is commercial demand for it. In addition, a substitute listed by EPA as acceptable for a given end-use under SNAP would most likely have been submitted by industry only if the submitter felt that the substitute was possibly technologically achievable and that there could be a market for such substitute.

In this proposal, EPA has also considered the work undertaken by the TEAP. The TEAP analyzes and presents technical information and recommendations when specifically requested by parties to the Montreal Protocol. It does not evaluate policy issues and does not recommend policy. Such information is related to, among other things, substitutes that may replace the substances controlled under the Protocol and alternative technologies that may be used without adverse impact on the ozone layer and climate. The TEAP assesses the technical and economic feasibility of substitutes for sectors and subsectors that use HFCs and publishes various technical reports through different technical committees, such as the Refrigeration, Air Conditioning, and Heat Pumps Technical Options Committee.[53] In TEAP's evaluation of HFC substitutes, subfactors such as technological achievability and affordability have been considered to some extent. For this proposal, EPA considered technical and economic information from the TEAP's 2018 Quadrennial Assessment Report and the recent 2022 Progress Report, including the response to ''*Decision XXXIII/5—Continued provision of information on energy-efficient and low-global-warming-potential technologies*'' found in Volume 3 of the Progress Report.[54] [55] [56]

EPA also considered materials developed by or submitted to state and foreign governments with requirements that restrict the use of HFCs. Many of these jurisdictions highlight available substitutes that can be used for regulated substances that are the subject of this proposed rulemaking. This is not an exhaustive list of sources that EPA could use in the future to consider the availability of substitutes. Section VII.E.1 of this preamble describes additional sources of information that the Agency considers to be best available data. For future Agency actions under the technology transitions program, EPA would likely again consider information from these sources to assess availability of substitutes but notes that the Agency may augment or omit sources where appropriate to be consistent with the Agency's interpretation of subsection (i)(4)(A).

In this proposal, EPA is identifying substitutes [57] for use of regulated substances in specific sectors or subsectors by reviewing information from several of these sources, which the Agency considers to be best available data. EPA compiled a non-exhaustive list of substitutes available that informed the GWP limit or restriction that EPA is proposing. See *American Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: List of Substitutes,* referred to in this preamble as the ''List of Substitutes TSD.'' That TSD and list were developed after considering, to the extent practicable, the (i)(4)(B) subfactors, as discussed below and in the other TSDs available in the docket. Substitutes for regulated substances have been identified in this list as available for the sectors and subsectors for which EPA is proposing restrictions.

EPA notes that some of the substitutes EPA lists as available for a sector or subsector may not be available uniformly throughout the United States and/or be subject to state or local regulations, including building codes (see section VII.E.2.d of this preamble). The AIM Act directs EPA to factor in, to the extent practicable, the availability of substitutes but does not limit our consideration to only those substitutes that can be used without restrictions, including state or local regulations. EPA is also considering research and development both in the United States and in other countries, which may indicate the availability of substitutes for use in the near or long term. EPA notes that the list of substitutes in the docket, in isolation, does not represent EPA's complete analysis of the availability of substitutes.

The rest of this section provides information on EPA's interpretation of the subfactors that subsection (i)(4)(B) directs EPA to take into account, to the extent practicable, in assessing the availability of substitutes.

a. Commercial Demands and Technological Achievability

Two of the separate subfactors that subsection (i)(4)(B) directs EPA, to the extent practicable, to take into account in its consideration of availability of substitutes are commercial demands and technological achievability. This section provides information on how the Agency views each term on its own, their potential impact on availability of substitutes, and their interconnectedness.

EPA views commercial demands as interest from OEMs and product manufacturers to use substitutes in products for ultimate sale or distribution. An OEM's interest in using a substitute is tied to their ability to meet consumer needs. One method to determine commercial demands is to assess what types of products in a sector or subsector are for sale and what regulated substances or substitutes are being used. Another means for assessing commercial demands is to review the information companies provide including but not limited to information concerning planned releases of products or equipment using substitutes.

EPA views technological achievability as the ability for a substitute to perform its intended function in a sector or subsector. For example, technological achievability can be demonstrated through a substitute's compliance with or listing by standard setting bodies such as ASHRAE or the Underwriters Laboratories (UL) or use through testing and demonstration labs and projects.

EPA is providing additional information in the TSD *American*

[53] The TEAP 2018 Quadrennial Assessment Report includes sections for each of the Technical Options Committees (TOC): Flexible and Rigid Foams TOC, Halons TOC, Methyl Bromide TOC, Medical and Chemicals TOC, and Refrigeration, Air Conditioning and Heat Pumps TOC. Available at: *https://ozone.unep.org/science/assessment/teap.*

[54] In accordance with Article 6 of the Montreal Protocol, every four years the parties request assessments from various advisory bodies, including the TEAP's quadrennial assessment of the sectors and subsectors covered by the petitions. Under Decision XXVIII/2 the TEAP is also instructed to review HFC substitutes every five years. The parties also routinely request reports considering transitions and/or related topics (*e.g.,* commercial fisheries, energy efficiency for the refrigeration and air conditioning sector).

[55] TEAP 2022 Progress Report (May 2022) and 2018 Quadrennial Assessment Report. Available at: *https://ozone.unep.org/science/assessment/teap.*

[56] Volume 3: Decision XXXIII/5—Continued provision of information on energy-efficient and low-global-warming-potential technologies, Technological and Economic Assessment Panel, United Nations Environment Programme (UNEP), May 2022. Available at: *https://ozone.unep.org/system/files/documents/TEAP-EETF-report-may-2022.pdf.*

[57] Inclusion of a substitute, either in the preamble or the docket, is for informative purposes only and is not intended as an EPA endorsement or recommendation.

Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: Technological Achievability and Commercial Demands, referred to in this preamble as the ''Commercial Demands and Technological Achievability TSD''; this TSD supports the Agency's consideration of the commercial demands and technological achievability subfactors and is available in the docket. The Commercial Demands and Technological Achievability TSD identifies information on products using substitutes that are commercially available (*i.e.,* products for sale), or where manufacturers indicate they soon will be available, by sector and subsector. EPA views commercial availability of products using substitutes as an indication of both commercial demand and technological achievability. In other words, a product using an available substitute in a market means that the particular substitute is technologically achievable and that there is a commercial demand for that substitute. The Agency relied on a range of sources and considered where products are already available as well as where products are expected to be available given their use in other countries and/or manufacturer announcements. These sources include, but are not limited to, publicly available data such as information on ENERGY STAR products, company websites, SNAP listings, news articles, market reports, and communication with industry experts. EPA also considers information that was provided to relevant state bodies as informative when considering whether a technology is achievable or in commercial demand for the purposes of evaluating available substitutes in their respective rulemakings. Another source for considering technological achievability and commercial demand is the information provided by petitioners.[58] EPA notes that the Agency did not attempt to consider all versions and models of all products or equipment in every sector or subsector.

EPA is not limiting its consideration of commercial demands and technological achievability to a specific geographic region since products may be introduced in a few markets first. The information provided in this proposed rule and the Commercial Demands and Technological Achievability TSD available in the docket are based on the best available data and were considered to the extent practicable.

EPA is seeking comment on the Agency's interpretation of commercial demand and technological achievability and their potential impact on availability of substitutes.

b. Consumer Costs and Affordability for Residential and Small Business Consumers

Subsection (i)(4)(B) directs EPA, to the extent practicable, to take into account consumer costs and affordability for residential and small business consumers, among other subfactors, in its consideration of availability of substitutes. For this proposed action, which is targeted at restricting the use of HFCs in products by certain sectors and subsectors, EPA is considering these two subfactors together. EPA views residential and small business consumers as a subset of consumers at large, and any estimated costs to consumers because of proposed use restrictions includes costs to these groups. Most small businesses and most consumers, including residential consumers, would be downstream of the actions that would be taken in response to the proposed restrictions. Upstream users would include manufacturers who could be introducing new products that conform with the proposed restrictions, while most small businesses, such as installers and service technicians, would be further downstream of such actions, as would most consumers, including residential customers.

EPA evaluated the impacts of the rule on small business consumers in affected sectors and found that the vast majority of affected small businesses will experience zero or positive net impacts due to the reduced costs of substitute chemicals as compared to HFCs. EPA also expects the impacts on service technicians to be minimal because the transitions to different refrigerants required by this proposed rule are already occurring in many of the subsectors addressed due to compliance with other regulations being implemented in some states. Although not affecting the entire United States, the advantages of having products that can be sold nationally and comply with regulations in export markets has led many manufacturers to begin the transition to HFC alternatives. Further, several corporations have established internal sustainability goals and as part of those efforts they are addressing the HFC used in their businesses and products. Additional information on potential impacts of the proposed rule on small businesses can be found in the Small Business Regulatory Enforcement Fairness Act (SBREFA) [59] screening analysis located in the docket for this rulemaking.

One factor that affects affordability for residential and small business consumers is up-front capital costs for new equipment. Compared to large businesses, both groups may be less likely to be able to afford high up-front capital costs that, for some subsectors, may ease the transitions. Such costs, however, do not have to be borne immediately by either residential or small business consumers. This rule does not propose that equipment be retired by any specific date, nor are estimates of emission reductions associated with these proposed restrictions predicated on the assumption that equipment would be retired prematurely. Additionally, HVAC services generally comprise only a small fraction of income for residential consumers.

We expect that under the HFC phasedown, access to HFCs, both newly manufactured and reclaimed, will continue far into the future particularly given that the AIM Act directs EPA to phase down and not to phase out HFC production and consumption. There already exists a network of reclaimers who offer reclaimed HFCs that can be used to service existing equipment for its full useful life. EPA notes that reclaimed chlorofluorocarbons (CFCs) and hydrofluorocarbons (HCFCs) remain available in the United States for servicing equipment that was designed, sold, installed, and may today still be operated by residential consumers and small businesses throughout the United States. Furthermore, as explained in this section below, we find that overall, the proposed rule is expected to provide net savings to the economy, which may in turn be passed on to small businesses and residential consumers.

For this proposal, which covers a wide range of sectors and subsectors, EPA has prepared a *Costs and Environmental Impacts* TSD summarizing some analytical results—including the expected costs and negative costs (*i.e.,* savings) to industry associated with transitions—that we factored in, in our consideration of these subfactors. Specifically, the *Costs and Environmental Impacts* TSD summarizes the increase in costs, or the savings, to industry associated with transitioning from a regulated substance to a substitute. EPA believes that the best way to analyze consumer costs and affordability is to look not at the cost of a product using a substitute, but rather at expected changes in costs resulting

[59] *Economic Impact Screening Analysis for Restrictions on the Use of Hydrofluorocarbons under Subsection (i) of the American Innovation and Manufacturing Act,* available in the docket.

from the transition. Hence, this discussion (and the *Costs and Environmental Impacts* TSD) refers to the cost of a regulated product with a substance that complies with the proposed restriction compared to that same product using a prohibited substance. For example, for the residential and light commercial air conditioning and heat pump subsector, the costs of manufacturing units that use lower-GWP substances or blends (*e.g.,* R–454B), and maintaining the operation of that equipment, compared to those costs for a baseline unit (*e.g.,* one that uses R–410A including the operation and maintenance of that unit), are used to generate an approximate accounting of the full cost (or potential savings) of the transition. To the extent available, energy efficiency changes, which can result in savings to, or costs borne by, the consumer, were factored into the transition scenarios analyzed. EPA notes that the *Costs and Environmental Impacts* TSD analysis indicates that the substitute used could be more or less expensive than the regulated substance currently or recently used. However, we note that the cost of using a regulated substance or substitute generally represents only a small fraction of the total cost of the product.[60] Even a large change in the cost of the substance that is realized as a result of the transition (*i.e.,* from using a regulated substance to using a substitute) would therefore not usually have a significant impact on the overall cost of the product. Further, given that many substitutes are engineered to perform in a similar manner as the regulated substance (*e.g.,* R–513A, R–452B, and R–454B are designed to perform like HFC–134a, R–404A, and R–410A, respectively), the equipment to use them would typically not need extensive redesign and would be expected to have a similar cost and similar performance with either the regulated substance or the substitute.

Data to develop the cost estimates summarized in the *Costs and Environmental Impacts* TSD were derived from a variety of information sources including technical literature and experts, and EPA also provides additional details regarding the data used in the RIA addendum and its accompanying appendices and references cited. The cost factors were applied to develop transition scenarios, consistent with this proposed rule, using EPA's Vintaging Model and, the resulting costs and abatement were used in a similar manner as the Marginal Abatement Cost (MAC) analysis explained in the Allocation Framework RIA.

It is likely the costs for HFCs will increase given the phasedown of HFC production and consumption mandated in the AIM Act and the global HFC phasedown under the Kigali Amendment to the Montreal Protocol. The Agency is aware of some price increases to date. However, EPA notes that for the RACHP sector, the cost of refrigerant is less than one percent of the entire cost of the system, and the highest costs come from raw materials such as copper, steel, and aluminum that are used to make the equipment.[61] In most cases, with newer, more efficient refrigerants, less refrigerant is necessary in the finished product. This can decrease the amount of copper, steel, and aluminum necessary for the product since it decreases the amount of raw material needed to create heat transfer elements in the equipment. The most recent increases in the price of HFCs are not included in this analysis, and the savings from using less raw materials and improved energy efficiency are only applied where literature supporting such claims was found. Thus, estimated costs of these proposed restrictions (as presented in the *Costs and Environmental Impacts* TSD) are conservative, and the net savings would likely be higher than estimated. Further, the costs of substitutes are likewise not modeled as changing over time. Although some substitutes are modeled as being more costly than HFCs today, the experience with the ODS phaseout has been that prices generally decline as production increases, as more producers negotiate licensing agreements for certain chemicals, and as patents expire. For example, EPA compiled a memo in the docket which provides a non-exhaustive list of several announcements that have been made regarding the initiation or updating of production plants for various substitutes.[62] Here again, estimated costs, as presented in the *Costs and Environmental Impacts* TSD, are conservative. EPA will continue to monitor these markets to determine whether updates to our analysis are appropriate. As such, we request comment on information regarding up-to-date costs of HFCs and substitutes, and the energy-efficiency implications when applied to equipment in the subsectors addressed in this proposed rule, to help inform our analysis of costs.

EPA has previously analyzed ''consumer costs'' in relation to ''compliance costs'' and found very little difference in these.[63] EPA performed this analysis, placed in the docket, as Congress was considering the AIM Act in 2019. Part of the reason for this is that energy efficiency changes of equipment when switching from a regulated substance to a substitute, where available, are included in our estimates of compliance costs. These costs (or savings) would likely not affect the installer or service technician, but would be considered a consumer cost, as it is the consumer who would be affected by this change in energy efficiency through a higher or lower electric bill. The consumer could be a residential consumer or a small business consumer, for instance a restaurant buying a new air conditioning unit.

Another cost that can be assumed to be a cost to consumers is the possible mark-up costs of chemicals sold to the consumer, for example as part of a bill for servicing or repairing an air conditioner where additional refrigerant was needed. Compared to the regulated substance, the substitute could be more or less expensive, and hence the mark-up costs could be more or less than that of the regulated substance. EPA incorporated this cost to consumers in a previous analysis of the HFC phasedown as stipulated in the AIM Act that Congress was considering in 2019. In that analysis, the costs to consumers were approximately $0 to $200 million less than the compliance costs, depending on the compliance step-down year (2020, 2024, 2029, and 2034 were analyzed). Compared to the total cumulative costs or savings estimated, these differences represented no more than a 20 percent difference, and in all cases were decreases in total costs or increases in total savings. Therefore, our cost estimates take into account consumer costs and affordability for residential and small business consumers insomuch as the estimated costs are likely conservative, and the savings to consumers would be greater.

EPA also analyzed whether the proposed action could have a significant

[60] U.S. Department of Energy (DOE), Technical Support Document: Energy Efficiency Program for Consumer Products: Residential Central Air Conditioners and Heat Pumps, December 2016. Available at: *https://www.regulations.gov/document?D=EERE-2014-BT-STD-0048-0098.*

[61] *Consumer Cost Impacts of the U.S. Ratification of the Kigali Amendment,* JMS Consulting in partnership with INFORUM, November 2018. Available in the docket.

[62] See memo in the docket that presents company announcements of increased production of lower-GWP substitutes. This memo is for informational purposes and does not represent endorsement by the Agency. EPA further notes that this memo is a non-exhaustive sampling of announcements; there may be other companies announcing increased production of lower-GWP substitutes.

[63] See ''*American Innovation and Manufacturing Act of 2019: Compliance and Consumer Cost Estimates*'' document in the docket.

economic impact on a substantial number of small business consumers. The analysis found that approximately 162 of the 51,047 potentially affected small businesses could incur costs in excess of one percent of annual sales and that approximately 110 small businesses could incur costs in excess of three percent of annual sales. Based on this analysis, we do not anticipate a broad, significant economic impact on small businesses as a result of this proposal.

EPA is seeking comment on the Agency's interpretation of consumer costs and affordability for small business and residential consumers and their potential impact on availability of substitutes.

c. Safety

Subsection (i)(4)(B) directs EPA, to the extent practicable, to take into account safety in its consideration of availability of substitutes. As part of EPA's consideration of safety, EPA is providing additional information in the TSD *American Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: Safety,* referred to in this preamble as the ''Safety TSD''; this TSD supports the Agency's consideration of the safety subfactor and is available in the docket. EPA is reviewing information on flammability and toxicity as well as the ability of substitutes to meet relevant industry safety standards. In our interpretation of best available data, we are evaluating information from recognized industrial sources, including standard-setting bodies, the SNAP program, international technical committees, and information from petitions. Safety information on substitutes may impact the availability of substitutes for use in a particular sector or subsector, for example, if there are restrictions on the use of a substance in local building codes and/or regulatory requirements. Industry acceptance of substitutes that are compliant with safety standards may also be an indication of safety and, therefore, impact the use of a particular substitute.

EPA does not believe that taking into account safety in its consideration of the availability of substitutes is intended to limit substitutes to only those that are risk free. EPA has noted under the SNAP program that the Agency does not require substitutes to be risk free (59 FR 13044, March 18, 1994). Many industry standards are designed to mitigate risk and allow for the safe use of flammable, toxic, or high-pressure substitutes. EPA therefore understands the direction to take into account safety, to the extent practicable, as encompassing consideration of information on the risks associated with the substitute as well as other information that concerns risk mitigation.

EPA has considered the listings under the SNAP program in its assessment of the availability of substitutes in this proposed rule. The SNAP program, in making decisions to list a substitute as acceptable or unacceptable, considers whether a substitute presents human health and environmental risks that are lower than or comparable to overall risks from other substitutes that are currently or potentially available. Under this comparative risk evaluation, the human health risks analyzed include safety, and in particular, flammability, toxicity, exposure to workers, consumers, and the general population of chemicals with direct toxicity; and exposure of the general population to increased ground-level ozone. Under the SNAP program, EPA makes decisions that are informed by its overall understanding of the environmental and human health impacts. EPA can list substitutes as ''acceptable subject to use conditions,'' indicating that a substitute is acceptable only if used in a certain way. Use conditions can include, but are not limited to, warning labels, charge limits, unique fittings for servicing of equipment, and restrictions on where a substitute is used (*e.g.,* normally unoccupied spaces). EPA can also list substitutes as ''acceptable subject to narrowed use limits,'' indicating that a substitute may be used only within certain specialized applications within a sector and end-use and may not be used for other applications within an end-use or sector. EPA lists a substitute as acceptable subject to narrowed use limits because of a lack of available substitutes within the specialized application. Under the acceptable for narrowed use limits category, users of a restricted substitute within the narrowed use limits category must make a reasonable effort to ascertain that other substitutes or alternatives are not technically feasible for reasons of performance or safety. Users are expected to undertake a thorough technical investigation of alternatives to the otherwise restricted substitute. Although users are not required to report the results of their investigations to EPA, users must document these results and retain them in their files for the purpose of demonstrating compliance.

In its evaluation of the safety subfactor under subsection (i)(4)(B), EPA is also considering the safety group classification of refrigerants as designated by the ASHRAE Standard 34. This standard assigns to a refrigerant, including those that could be used under EPA's proposed restrictions, a safety group classification consisting of two to three alphanumeric characters (*e.g.,* A2L or B1). The initial capital letter indicates the toxicity, and the numeral and trailing letter, if any, denotes the flammability. Under this standard, Class A refrigerants are those for which toxicity has not been identified at concentrations less than or equal to 400 parts per million (ppm) by volume, based on data used to determine threshold limit value-time-weighted average (TLV–TWA) or consistent indices. Class B signifies refrigerants for which there is evidence of toxicity at concentrations below 400 ppm by volume, based on data used to determine TLV–TWA or consistent indices. However, some refrigerants that are listed under the B (higher toxicity) classification of ASHRAE 34 have been used safely and effectively for many years. For example, after the CFC phaseout, several companies offered comfort cooling chillers using HCFC–123, and at least one has since transitioned to R–514A in part of its product line. These systems generally have low leak rates, are located away from building occupants in limited-access areas (*e.g.,* mechanical rooms) with secured entrances, and utilize refrigerant sensors and alarms to alert operators of leaks. Building codes further reduce risks for example by requiring mechanical ventilation to the outdoor space where such systems are placed.

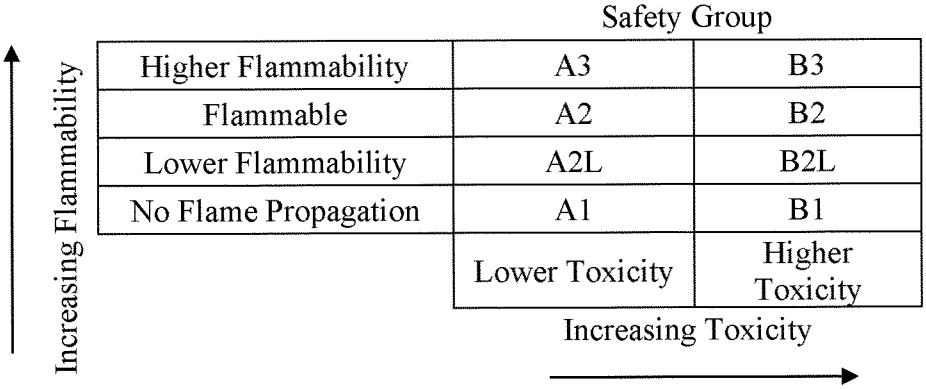
The standard also assigns refrigerants a flammability classification of 1, 2, 2L, or 3. Tests for flammability are conducted in accordance with American Society for Testing and Materials (ASTM) E681 using a spark ignition source at 140 °F (60 °C) and 14.7 psia (101.3 kPa) [64]. The flammability classification ''1'' is given to refrigerants that, when tested, show no flame propagation. The flammability classification ''2'' is given to refrigerants that, when tested, exhibit flame propagation, have a heat of combustion less than 19,000 kJ/kg (8,169 Btu/lb), and have a lower flammability limit (LFL) greater than 0.10 kg/m^3. The flammability classification ''2L'' is given to refrigerants that, when tested, exhibit flame propagation, have a heat of combustion less than 19,000 kJ/kg (8,169 BTU/lb), have an LFL greater than 0.10 kg/m^3, and have a maximum

[64] ASHRAE, 2019. *ANSI/ASHRAE Standard 34–2019: Designation and Safety Classification of Refrigerants.*

burning velocity of 10 cm/s or lower when tested in dry air at 73.4 °F (23.0 °C) and 14.7 psi (101.3 kPa). The flammability classification ''3'' is given to refrigerants that, when tested, exhibit flame propagation and that either have a heat of combustion of 19,000 kJ/kg (8,169 BTU/lb) or greater or have an LFL of 0.10 kg/m^3 or lower.

For flammability classifications, refrigerant blends are designated based on the worst case of formulation for flammability and the worst case of fractionation for flammability determined for the blend.

Figure 1. Refrigerant Safety Group Classification



Information on the ASHRAE classification of each substitute identified by EPA for this proposal and additional information on EPA's consideration of safety are available in the Safety TSD in the docket. EPA is seeking comment on the Agency's interpretation of safety and its potential impact on availability of substitutes and the effect of switching to substitutes on worker and consumer safety in the subsectors affected by this proposed action.

d. Building Codes

Subsection (i)(4)(B) directs EPA, to the extent practicable, to take into account building codes in its consideration of availability of substitutes. For certain types of equipment, especially in the RACHP sector, building codes may inform which substances can be used or may prescribe additional requirements before a specific substance can be used, thereby impacting availability of substitutes for particular sectors and subsectors. This section summarizes EPA's understanding of building code development across the nation generally and how model building codes are developed and adopted into local building codes. EPA is considering this information, to the extent practicable, to evaluate how building codes may affect the availability of substitutes to regulated substances. EPA is providing additional information in the TSD *American Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: Building Codes,* referred to in this preamble as the ''Building Codes TSD''; this TSD supports the Agency's consideration of the building codes subfactor and is available in the docket.

Building codes are established at the subnational level and can differ greatly across jurisdictions. Some states develop their own building codes and determine the frequency with which they are updated. Other states adopt (and sometimes amend) ''model'' building codes that are written by code-setting organizations. Code-setting organizations include the International Association of Plumbing and Mechanical Officials (IAPMO), the International Code Council (ICC), and the National Fire Protection Association (NFPA). Many states allow local governments to set their own building codes, provided they comply with the minimum standards established under state building codes. Both state and local building codes are periodically reevaluated and updated. The Agency did not review changes to every jurisdiction's building codes as EPA does not view that as practicable.

Model building codes, which serve as the basis for many state and local building codes, incorporate a range of industry standards that establish specific requirements for building performance or design. Several of these standards are directly relevant to the availability of substitutes in the RACHP sector. For this proposed action, EPA is considering, to the extent practicable, updates to industry standards and if those updates may be incorporated into model building codes that will allow the future use of products that use substitutes. EPA also is considering whether current building codes permit the installation and use of products using substitutes.

Model codes are typically updated on a three-year cycle, and most model building codes were last updated in 2021; the next scheduled updates are for 2024. Several proposed changes in the current code development cycle (*i.e.,* for the 2024 codes) could enhance the availability of HFC substitutes under model building codes in future years. For example, ICC, an international developer of model codes, standards, and building safety solutions, approved fourteen code changes that affect the availability of A2L refrigerants for the RACHP sector. These code changes, which will go into effect in 2024, are consistent with updated industry standards that allow the use of substitutes identified in this proposed rulemaking; however, state and local building code agencies do not automatically adopt updates to the model codes. As a result, there may be delays between when the model codes are updated and when the updated codes are adopted by state and local agencies.

Information from stakeholders, including petitioners, indicates that building codes are being updated both as part of the cyclical review and off cycle that would allow for the use of additional HFC substitutes. For example, several states such as Oregon, California, and Colorado have recently made, or are considering making, changes to their codes that would effectively incorporate updated industry standards as reflected in the model code changes that occurred in 2021. Updated codes may require automatic refrigerant leak detection systems, circulating fans, and labeling and handling instructions

for flammable refrigerants in certain applications and installations.

Given that building codes can vary greatly throughout the United States and that many of the most relevant building codes have either been updated recently or are likely to be updated in the near future, EPA's consideration of building codes is limited to model building codes. Additional information on EPA's consideration of building codes can be found in the Building Codes TSD in the docket. EPA is seeking comment on to what extent EPA can take into account building codes recognizing that they vary based on local circumstance.

e. Appliance Efficiency Standards

As part of the Agency's consideration of the availability of substitutes as directed by subsection (i)(4)(B), EPA is taking into account, to the extent practicable, the appliance efficiency standards that are applicable to products in the affected sectors and subsectors. The Agency consulted with U.S. Department of Energy (DOE) regarding relevant minimum energy efficiency standards and the timing for any planned changes to the current standards.[65] DOE, through its Building Technologies Office and Appliance and Equipment Standards Program, sets minimum energy efficiency standards for more than 60 different products, including appliances and equipment used in homes, businesses, and elsewhere. Several of these categories are within the RACHP sector and may use HFCs that are covered in this proposed action. Among product categories relevant to this action are consumer products (*e.g.,* refrigerators, freezers, and room air conditioners) and commercial and industrial products (*e.g.,* automatic commercial ice machines, vending machines, walk-in coolers, and walk-in freezers).[66] EPA is providing additional information in the memo *American Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: Appliance Efficiency Standards,* referred to in this preamble as the ''Appliance Efficiency Standards memo''; this memo supports the Agency's consideration of the appliance efficiency standards subfactor and is available in the docket.

The DOE Appliance and Equipment Standards Program regularly develops and updates test procedures and appliance efficiency standards. Future revisions to existing appliance efficiency standards could impact what substitutes can be used in regulated products in specific sectors and subsectors. Therefore, EPA is consulting with DOE so both agencies are aware of the schedules for these separate but related actions. EPA has identified a list of applicable standards in relevant sectors and subsectors and which standards may be undergoing current revision in the Appliance Efficiency Standards memo. We understand that for redesign and testing of equipment, industry prefers that DOE and EPA regulations are synchronized where possible. Given DOE and EPA operate under separate mandates, that may not always be possible, but sharing information early can reduce inconsistencies such that, to the extent possible, the refrigerants used to set performance standards will be available under the technology transitions program. EPA also recognizes the potential to greatly increase climate protection by both reducing the GWP of substances used in the relevant applications (*e.g.,* construction foams, appliances foams, and refrigerants) covered by this action in the sectors and subsectors we are addressing and supporting energy efficiency in such applications.

EPA is seeking comment on to what extent the Agency should consider current and future minimum energy efficiency standards in taking into account appliance efficiency standards in the context of subsection (i)(4)(B). EPA further solicits information on the opportunities to further climate protection by supporting energy efficiency at the same time we are restricting the use of HFCs.

f. Contractor Training Costs

As part of the Agency's consideration of the availability of substitutes as directed by subsection (i)(4)(B), EPA is taking into account, to the extent practicable, available information on contractor training costs, including training related to substitutes for relevant sectors and subsectors (*e.g.,* certain RACHP, foam blowing, and fire suppression subsectors). EPA obtained some contractor training and exam cost data through a review of publicly available literature and from industry trade and training associations in these sectors as well as information submitted to EPA in petitions under subsection (i). EPA notes that it would not be feasible to obtain information and data on all available training programs and exams and our review represents an assessment to the extent practicable of information in relevant sectors and subsectors for contractor training costs. Some substitutes, including but not limited to flammable (A3 or B3), lower flammability (A2L or B2L), higher toxicity (B1, B2L, B2, or B3) refrigerants, and other substitutes with unique or different issues such as those operating at higher pressures than HFCs, may require specialized or additional training, knowledge, or expertise to ensure their safe handling and use. To the extent practicable, the Agency is considering the cost of trainings to contractors for handling products and equipment containing substitutes for HFCs or blends containing HFCs substitutes.

Manufacturers and trade organizations often provide training and certification beyond what is required under the regulations implementing sections 608 and 609 of the CAA for installing and servicing equipment in conjunction with the release of new equipment. This is not a new practice; however, as the transition to lower-GWP refrigerants continues, more technicians are expected to work with A2L and A3 refrigerants, and a variety of training and education resources are anticipated to include the incorporation of A2L and A3 refrigerants into existing curriculum. There are already courses, trainings, and conferences that focus on lower-GWP refrigerants available among product categories and across the country. Costs of trainings may be dependent on several factors, such as the organization providing the study materials, how the exam is administered, and the location.[67]

In the foam blowing and aerosols sectors, certain applications may require safety training. In particular, the Occupational Safety and Health Administration (OSHA) requires that contractors providing *in situ* installation of spray foams, foam insulation, and aerosols receive health and safety training regarding the hazards of working in confined spaces and procedures to avoid injury from fall hazards. OSHA issued a standard reflected in 29 CFR 1926 Subpart AA—Confined Spaces in Construction, which requires that employers provide employees free training to ensure that the employee understands the hazards of working in a confined space. Additional trainings and exams are

[65] For additional information, please refer to the U.S. Department of Energy's Appliance and Equipment Standards Program available at: *www.energy.gov/eere/buildings/appliance-and-equipment-standards-program.*

[66] For additional information and a complete list of products, please refer to the U.S. Department of Energy's website available at: *www.energy.gov/eere/buildings/standards-and-test-procedures.*

[67] In some cases, continued RACHP education may be required at the state level as a part of a state licensing requirement; training on using flammable refrigerants may be incorporated to fulfill this requirement.

available beyond the basic required safety training and may vary in costs depending on the level and amount of training a contractor obtains.

EPA is seeking comment on our consideration of contractor training costs in the context of subsection (i)(4)(B) in the sectors and subsectors covered in this proposed action.

g. Quantities of Regulated Substances Available From Reclaiming, Prior Production, or Prior Import

As part of the Agency's consideration of the availability of substitutes as directed by subsection (i)(4)(B), EPA is taking into account, to the extent practicable, information on quantities of HFCs from reclamation and stockpiles of previously produced or imported HFCs. EPA is providing additional information in the TSD *American Innovation and Manufacturing Act of 2020—Subsection (i)(4) Factors for Determination: Quantities Available from Reclaiming, Prior Production, or Prior Import;* this TSD supports the Agency's consideration of the quantities available from reclaiming, prior production, or prior import subfactor and is available in the docket HFCs available from stockpiles or reclamation can smooth transitions to alternative technologies and ensure that existing equipment can continue to be serviced. The Agency knows from its experience under the ODS phaseout the important role reclamation in particular plays by providing an ongoing supply of material. This is true not only for the RACHP sector but a similar approach is also used for the fire suppression sector. Some companies choose to stockpile substances and use them to smooth transition. EPA cannot estimate how much material will be stockpiled for a particular sector or subsector or by a particular company; however, the Agency can consider this approach as a general matter.

Information that EPA is considering includes HFC reclamation data submitted annually in accordance with the Clean Air Act section 608 reclamation program, codified at 40 CFR part 82, subpart F; reclamation, production, and import data reported under 40 CFR part 84, subpart A; [68] data gathered to support development of the AIM Act subsection (e) regulations contained in the docket for the 40 CFR part 84, subpart A rules; [69] and data reported to the GHGRP under subparts OO and QQ.

EPA is seeking comment on the likely quantities of regulated substances available from reclaiming and stockpiling and how that may be factored into the availability of substitutes in the sectors and subsectors covered in this proposed action. In addition, EPA is interested in information on stockpiles of used HFCs that do not require reclamation (*e.g.,* same ownership) that may also be stored by companies and how those stockpiles may be used.

3. How is EPA considering overall economic costs and environmental impacts, as compared to historical trends?

Subsection (i)(4)(C) directs the Agency to factor in, to the extent practicable, overall economic costs and environmental impacts, as compared to historical trends. The Act does not prescribe how EPA should carry out its consideration of this factor, nor does the statute clearly delineate what is meant by the phrase ''as compared to historical trends.'' In light of the ambiguity, we interpret the language of (i)(4)(C) as purposefully accommodating of many different types and degrees of analysis of economic costs and environmental impacts (including costs and impacts that may be difficult to quantify) in part because the nature of EPA's action when applying this provision can differ greatly depending on the circumstances.

Subsection (i)(4)(C) applies both to EPA's action on subsection (i) petitions and to EPA's rulemakings under subsection (i). Subsection (i) requires EPA to grant or deny petitions within 180 days of receipt, a time period that inherently limits the scope and depth of any potential analysis under subsection (i)(4)(C). EPA's timeframe for promulgating a rule subject to a granted petition is two years from the date of a petition grant, and in undertaking a rulemaking, whether by negotiated rulemaking or not, EPA will undoubtedly perform more in-depth analysis of economic costs and environmental impacts than we would in the more abbreviated statutory period allotted for petition decisions. As worded, particularly read in light of subsection (i)(4)'s acknowledgement that consideration of some factors will be limited by practicability (*i.e.,* ''to the extent practicable''), the provision has flexibility to permit EPA to tailor its consideration of this factor accordingly.

We note also that subsection (i)(4)(C) would apply to cases where EPA is considering a broad swath of restrictions—such as this proposed action, which if finalized would cover more than 40 sectors and subsectors—as well as cases where EPA is contemplating a much more limited set of restrictions—potentially for only one sector or subsector. There may be instances, then, where it is appropriate for EPA to prepare detailed analyses such those in the *Costs and Environmental Impacts* TSD, but also times when new analyses of similar detail would be unnecessary or inappropriate. As discussed in this section, EPA considered several different sources of information when factoring in subsection (i)(4)(C) to EPA's consideration of potential use restrictions. This information included but was not limited to the *Costs and Environmental Impacts* TSD, information previously developed by EPA concerning HFCs and transitions, our experience with the ODS program, industry reports, information developed by the TEAP, the Montreal Protocol's Science Assessments, and other research.

It is also not clear from the plain language of the statute what information EPA should consider when thinking about ''historical trends,'' and how EPA should ''compare'' ''overall'' economic cost and environmental impact information about newly contemplated restrictions to those trends. Here too we think the ambiguity of these phrases accommodates consideration of a variety of information and comparisons depending on the circumstances and the available information.

In undertaking this proposed action, EPA does not yet have historical overall economic cost and environmental impact trends for previous use restrictions, or transitions from HFCs to substitutes, under subsection (i) to compare with the overall economic costs and environmental impacts of the contemplated restrictions. However, we think it is practicable and reasonable to in part interpret our obligation to factor in the considerations under subsection (i)(4)(C) for this proposal by looking at the overall economic costs and the anticipated environmental impacts of our proposed restrictions as compared to a scenario where historical trends had continued into the future, that is, a projection of ''business as usual'' conditions. For purposes of this proposal, we think a reasonable reading of that scenario is conditions that would occur if only the Allocation Framework Rule and the proposed 2024 Allocation Rule were in effect, and the analysis in

[68] In addition to quarterly data, under 40 CFR 84.31, HFC producers, importers, exporters, application-specific allowance holders, reclaimers, and fire suppressant recyclers must annually report the quantity of each regulated substance held in inventory as of December 31 of each year. As this information becomes available in future, it can inform EPA's consideration of this factor.

[69] Available at *www.regulations.gov,* in Docket ID No. EPA–HQ–OAR–2021–0044.

the *Costs and Environmental Impacts* TSD therefore uses as a baseline what would occur absent these proposed restrictions. As noted, we do not think subsection (i)(4)(C) requires a specific type of analysis, like the one EPA has conducted for purposes of this *Costs and Environmental Impacts* TSD, and we anticipate that the Agency could consider this (i)(4) factor using a different type of analysis in the future.

Additionally, as this is the first set of proposed restrictions under subsection (i) and, if finalized, would result in the first requirements under the AIM Act to transition away from certain regulated substances in certain sectors and subsectors, we also think information about impacts to costs from historical comparable technology transitions in similar contexts is appropriate. As noted elsewhere, HFCs are used mainly in the same sectors and subsectors where ODS were used. EPA therefore has considered the overall economic costs and environmental impacts of actions taken under the CAA title VI regulations on ODS in a memo [70] available in the docket.

EPA acknowledges that the ODS phaseout and transitions away from HFCs as a result of use restrictions each have their own unique regulatory features and technological transitions at play, potentially leading to different overall economic impacts and environmental benefits. The memo discussing the costs and environmental impacts of the ODS phaseout is included as supplemental information and as a relevant benchmark, as the transition to HFC substitutes will impact many of the same industries and entail—in some cases—similar technological shifts. This same information has been made available by EPA previously.

One key historical trend observed during the ODS phaseout, and that may be relevant to similar technology transitions for HFCs during the HFC phasedown, is that technology transitions did not necessarily drive up the cost of products to the consumer or hurt the performance of products. A clear example of this was discussed in a 2018 report of the TEAP.[71] From 1972 through 2015, household refrigerators sold in the United States underwent several design changes in response to regulations requiring transition away from ODS refrigerant, ODS-containing insulation foam, and increases in energy efficiency. Over that time, the average capacity of refrigerators sold in the United States also grew to accommodate consumer preferences. Even as refrigerators became larger, more energy efficient, and transitioned away from use of ODS, the average price fell in real dollars. Consumers not only benefitted from the lower initial purchase price, but the greater energy efficiency also reduced consumers' electricity costs. This example, and a similar trend seen in household unitary AC units, are discussed in more detail in the EPA report *American Innovation and Manufacturing Act of 2019: Compliance and Consumer Cost Estimates,* which can be found in the docket.

As described in the memo that summarizes the costs of the ODS phaseout,[72] the most comprehensive analysis was in a 1999 peer-reviewed report to Congress. In that report, we summarized the costs of the allowance allocation and reductions for CFCs, HCFCs, halons, and methyl chloroform to be $18 billion (7 percent discount rate) to $56 billion (2 percent discount rate) in 1990 dollars.[73] It was also noted that the transition to more energy efficient air conditioning using alternatives to HCFC–22 could lower this cost by $16.8 billion in 1990 dollars.[74] As opposed to this net cost, the *Costs and Environmental Impacts* TSD indicates that the transitions envisioned would yield a net savings through 2050 of $4.2 billion (7 percent discount rate) to $8 billion (3 percent discount rate) in compliance costs.

The primary goal of the ODS phaseout was to protect the ozone layer in accordance with title VI of the CAA and the Montreal Protocol, whereas the primary purpose of this proposed rule is to restrict the use of high-GWP HFCs, making the benefits difficult to compare. However, the phaseout of ODS also provided global warming benefits, as most ODS are also high-GWP greenhouse gases, as indicated by the exchange values for the ODS that are listed in subsection (e)(1)(D) of the AIM Act.[75] Although such benefits have not been calculated specifically for the United States (though as one of the largest producers and consumers of ODS it is possible to make certain assumptions), the benefits can be significant given the high GWPs of the most common ODS.

Other sources of information the Agency has available for our consideration include industry commissioned studies (see for example JMS Consulting in partnership with INFORUM),[76] journal articles, and reports provided to the Montreal Protocol from the SAP and the TEAP.

EPA is soliciting comment on its interpretations of subsection (i)(4)(C) and its consideration of economic costs and environmental impacts, as compared to historical trends, in the context of this proposed rulemaking.

4. How is EPA considering the remaining phase-down period for regulated substances under the final rule issued under subsection (e)(3) of the AIM Act?

Subsection (i)(4)(D) directs the Agency to factor in, to the extent practicable, the remaining phasedown period for regulated substances under the final rule issued under subsection (e)(3) of the AIM Act, if applicable. Accordingly, for this proposal, EPA notes that we are at the beginning stages of the overall HFC phasedown, having promulgated the Allocation Framework Rule (86 FR 55116, October 5, 2021) in 2021. In that rule, EPA established the allocation program under subsection (e) of the AIM Act, which is codified at 40 CFR part 84, subpart A. One of the key provisions under subsection (e) requires EPA to phase down the consumption and production of the statutorily listed HFCs on an exchange value-weighted basis according to the schedule listed in the table in subsection (e)(2)(C) of the AIM Act. The quantity of allowances available for allocation for each calendar year decreases over time according to the statutory phasedown schedule.

EPA views this proposed action on restricting the use of HFCs in specific sectors and subsectors as supportive of the overall phasedown schedule. While this rule is being promulgated under a separate statutory provision under the AIM Act, the proposed restrictions on the use of HFCs in sectors and subsectors is expected to have a complementary effect on meeting the HFC phasedown schedule by facilitating necessary transitions to lower-GWP substitutes.

[70] See ''*Overview of CFC and HCFC Phaseout*'' document in the docket.

[71] Decision XXIX/10 Task Force Report on Issues Related to Energy Efficiency while Phasing Down Hydrofluorocarbons, Technical and Economic Assessment Panel, UNEP, May 2018. Available at: *https://ozone.unep.org/sites/default/files/2019-04/TEAP_DecisionXXIX-10_Task_Force_EE_May2018.pdf.*

[72] *Consumer Cost Impacts of the U.S. Ratification of the Kigali Amendment,* JMS Consulting in partnership with INFORUM, November 2018. Available in the docket.

[73] Approximately $36 billion and $111 billion, respectively, in 2020 dollars.

[74] Approximately $33.3 billion in 2020 dollars.

[75] Velders, Guus JM, et al. ''The importance of the Montreal Protocol in protecting climate.'' *Proceedings of the National Academy of Sciences* 104.12 (2007): 4814–4819.

[76] *Consumer Cost Impacts of the U.S. Ratification of the Kigali Amendment,* JMS Consulting in partnership with INFORUM, November 2018. Available in the docket.

Imposing restrictions on the use of HFCs, and considering the timing of those restrictions, is expected to play a role in reducing the demand for HFCs as well as support innovation. The production and consumption caps established by the AIM Act follow a stepwise reduction schedule, and EPA anticipates new substitutes and technologies will continue to emerge as the reductions in the production and consumption caps continue. If EPA is aware of information indicating that certain sectors and subsectors are well positioned to transition to new substitutes and technologies, then proposing restrictions on the use of HFCs in those sectors and subsectors would be consistent with subsection (i) and, if finalized, such restrictions could also support the overall production and consumption phasedown. Similarly, the Agency notes that title VI of the CAA provided for prohibitions on the sale or distribution in interstate commerce of certain products under section 610 and for additional restrictions on use of certain ODS under section 605(a). These restrictions were supportive of the ODS phaseout. For example, most of the nonessential products bans under section 610 were established at the very beginning of the ODS phaseout program—ahead of the overall CFC phaseout by a few years and ahead of the HCFC final phaseout by a few decades. By banning the use of certain ODS where substitutes were available, early transitions accrued additional environmental benefits and supported the overall economy-wide transition by removing uses of controlled substances that were no longer necessary. At the time, in discussing some of the statutory criteria to be considered in determining whether a product was nonessential, EPA noted that ''where substitutes are readily available, the use of controlled substances could be considered nonessential even in a product that is extremely important.'' (58 FR 4768, January 15, 1993).

EPA seeks comment on the relationship between the overall HFC phasedown and this action being proposed under subsection (i).

F. For which sectors and subsectors is EPA proposing to establish restrictions on the use of HFCs and blends containing HFCs?

1. How did EPA determine the degree of the proposed restrictions for each sector and subsector?

AIM Act subsection (i)(1) grants EPA authority to restrict by rule the use of a regulated substance in the sector or subsector in which the regulated substance is used, and these restrictions may be exercised ''fully, partially, or on a graduated schedule.'' In determining the degree of the proposed restrictions—*e.g.,* level, how partially or fully to restrict the use, and on what schedule—EPA looked to the factors in subsection (i)(4). Specifically, we interpret subsection (i)(4) as directing EPA to balance a number of factors in establishing the level of the contemplated use restriction, and we describe in this section the guiding principles and methodology EPA employed in our consideration of those factors in developing the restrictions proposed in this action. In short, EPA selected the degree of restriction for each sector or subsector by weighing the following considerations: maximizing environmental benefit while ensuring adequate availability of substitutes (as informed by the (i)(4)(B) subfactors) and with consideration of how this proposal comports with the overall economic costs and environmental benefits compared to historical trends. With respect to all of our information and analysis we strive to use best available data. We are also mindful of the HFC phasedown schedule in ensuring that the proposed use restrictions would not interfere with, and instead would support, that schedule.

As noted in section VII.B of this preamble, EPA is proposing restrictions on the use of HFCs by, for the most part, setting GWP limits. In that section, EPA highlights the benefits of using GWP limits, including achieving environmental benefits, smoothing the transition from higher-GWP substances, supporting innovation, providing regulatory certainty, and harmonizing with approaches taken by other governments in establishing similar requirements. However, we note that if EPA were to finalize use restrictions under a substance-specific approach, the same principles and methodology employed here would apply equally, as the GWP limits for each sector and subsector can be translated to restrict specific regulated substances and blends used in the named sectors and subsectors.

Because this proposed rulemaking was requested by numerous stakeholders, representing a broad range of interests (regulated industry, environmental and public health organizations, and state and local governments), EPA considered the requested use restrictions in the petitions—either in the form of GWP limits or specific substances to be restricted—as a starting point for the level of our proposed restrictions. In some cases, petitioners provided information about substitutes that are already in use or would soon be ready to be in use in the affected sectors and subsectors and attested to the achievability (technologically, regulatory, economic, and otherwise) of certain substitutes. The substitutes discussed in the petitions and supporting information typically had lower GWPs, and thus reduced adverse impacts on climate, compared to the regulated substances for which a use restriction was requested. Many of the petitioners are the entities (or trade associations representing those entities) developing substitutes or manufacturing products using substitutes. As such, they are in many instances well-positioned and incentivized to gather and have access to information regarding many of the factors in subsection (i)(4), including the best available data on many if not most of the subfactors in subsection (i)(4)(B).

In addition, the impetus for this proposed rulemaking, in part, is to address the granted petitions requesting restrictions on the use of HFCs in certain sectors and subsectors. Therefore, the requested restrictions, including specific substances or GWP limits and the available substitutes, are a natural starting point for the Agency's inquiry.

Subsection (i)(4) requires that EPA take into account, to the extent practicable, the factors described in section VII.E of this preamble. In following this statutory directive, EPA is considering the (i)(4) factors collectively, with no single (i)(4) factor (or subfactor) driving the proposed restrictions for any sector or subsector. Collective consideration of the (i)(4) factors is consistent with the statutory text, which directs EPA to account for all the factors, to the extent practicable, in carrying out a rulemaking under subsection (i), and which does not state that one factor should carry more weight than the others. Further, accounting for the (i)(4) factors together enables EPA to take a holistic approach in facilitating transition to substitute technology, one that considers the availability of substitutes, overall economic costs and environmental impacts, as compared to historical trends, and the HFC phasedown schedule codified by the Allocation Framework Rule.

To that end, our approach to selecting the level and timing of each proposed use restriction for the sectors and subsectors in this proposed action was to balance the factors provided in (i)(4): again, to maximize environmental benefit while ensuring adequate availability of substitutes (as informed by the (i)(4)(B) subfactors) and with

consideration of how this proposal comports with the overall economic costs and environmental benefits compared to historical trends. With respect to all of our information and analysis we strive to use best available data. We are also mindful of the HFC phasedown schedule in ensuring that the proposed use restrictions would not interfere with, and instead would support, that schedule. We are cognizant that the phasedown schedule could carry more significance as a factor in future rulemakings under subsection (i) when EPA is further along in the HFC phasedown.

The direction in subsection (i)(4)(C) to factor in overall economic costs and environmental impacts as compared to historical trends does not have a clear meaning in the context of selecting the degree of a restriction for a given sector or subsector. The provision's focus on an ''overall'' comparison makes direct application of this factor in setting a level of restriction for a specific sector or subsector less practicable. However, we think subsection (i)(4)(C)'s focus on ''economic costs'' and ''environmental impacts'' still provides direction to the Agency that cost and environmental considerations are relevant factors for EPA to consider in setting the level of a use restriction under subsection (i), and we address how EPA did so in the following paragraphs.

For this proposal, in factoring in environmental impacts, our aim was to propose GWP limits for each sector or subsector at a level that was as low as we thought supportable while considering the other primary considerations under subsection (i), specifically, availability of substitutes and cost. We think it is reasonable to prioritize maximizing the climate change benefits of restricting the regulated substances that are the focus of this proposed rule, given that these impacts are and have been one of the central concerns with the use of HFCs. We also note that much of the information relied upon in our analysis of available substitutes comes from EPA's SNAP program, which evaluates and identifies as ''acceptable'' those substances that reduce overall risk to human health and the environment, as well as the TEAP reports which speak to human health and environmental considerations, the granted petitions, and information from state and foreign government regulations. Therefore, in selecting the proposed levels of restrictions for each sector and subsector, we attempted to set the GWP limit at the lowest level that will provide a sufficient range of substitutes for applications within a subsector. In addition, EPA is proposing four GWP limits across all the sectors and subsectors—*i.e.,* 0 GWP, 150 GWP, 300 GWP, and 700 GWP. This approach has a number of advantages over a methodology that tightly tailors the GWP limit for each subsector to the specific GWPs of the currently identified available substitutes for a particular sector or subsector. Establishing limits at these regular intervals (*e.g.,* applying a 300 GWP limit for multiple subsectors, rather than GWP limits of 237, 258, and 290 based on the particular substitutes currently available in specific subsectors) avoids minor discrepancies in calculating GWP, promotes development of new variations on substitutes that are still within the permissible range, and enhances ease of implementation of the restrictions for regulated parties, consumers, and enforcement.

As noted in section VII.E.2 of this preamble, EPA developed a non-exhaustive list of substitutes that can be used in lieu of the regulated substances that EPA is proposing to restrict for each sector and subsector subject to this proposal. We also note that, relevant to the direction in (i)(4)(C)'s direction to factor in, to the extent practicable, overall environmental impacts as compared to historical trends, we anticipate that the proposed use restrictions would achieve an average annual additional [77] emission reduction of 5 to 54 $MMTCO_2e$, and an average annual additional consumption reduction of 28 to 49 $MMTCO_2e$, from 2025 through 2050. See *Costs and Environmental Impacts* TSD.

To ensure adequate availability of substitutes, we looked at a range of information relevant to the subfactors provided in subsection (i)(4)(B) from a variety of sources (see section VII.E.1 of this preamble). In general, where we were able to identify multiple substitutes that could be used in a sector or subsector (taking into consideration the various (i)(4)(B) subfactors to the extent practicable), that weighed in favor of prohibiting the use of certain HFCs and blends that use HFCs that had GWPs above the level of the available substitutes in a sector or subsector. In the following sections, we provide detailed information regarding the availability of substitutes for each sector and subsector.

Our methodology for setting the levels of the proposed use restrictions also factored in considerations of cost, both in identifying availability of substitutes and in assessing overall costs of the levels of the proposed restrictions. First, some of the subfactors in subsection (i)(4)(B) for the Agency to take into account when determining ''availability'' are explicitly or implicitly related to cost (*e.g.,* consumer costs). Subfactors that explicitly relate to cost include commercial demands (there would be no demand for a substitute that caused a product to be so costly as to be unmarketable), consumer costs, affordability for residential and small business consumers, and contractor training costs. Other subfactors that are not explicitly related to cost contain implicit considerations of cost. For example, a company generally would not invest in demonstrating that use of a substitute is technologically achievable in a sector or subsector if the use of that substitute was so cost prohibitive that it would never actually be adopted. The Agency factored in these cost subfactors to the extent practicable when considering availability of substitutes.

Second, subsection (i)(4)(C) also specifically directs EPA to factor in, to the extent practicable, overall economic costs as compared to historical trends, and as discussed above, the Agency has considered numerous sources of information as we developed this proposal. With respect to the proposed restrictions in this action, to inform our consideration of overall economic costs as compared to historical trends, we propose to look to our findings in the *Costs and Environmental Impacts* TSD summarizing the economic cost of the proposed restrictions. As discussed in that TSD, we anticipate that the incremental economic cost of the proposed restrictions would result in a savings to the regulated industry, *i.e.,* that complying with the proposed use restrictions and transitioning from higher-GWP regulated substances to lower GWP substitutes would, on the whole, reduce costs for industry. For additional information, see the *Costs and Environmental Impacts* TSD provided in the docket.

We take comment on these guiding principles and methodology to establishing use restrictions under subsection (i) and on our application of this methodology in the proposed restrictions for each sector and subsector in this action.

2. Summary of Proposed Restrictions on the Use of HFCs

Table 4 lists the sectors and subsectors for which EPA is proposing to establish restrictions, the type of restriction, and the proposed compliance date. For each sector and

[77] These reductions would be in addition to the consumption reductions from the Allocation Framework Rules.

subsector, sections VII.F.3 through VII.F.5 of this preamble provide a description of the sector or subsector, a summary of information from granted petitions, and discussion on EPA's proposed use restriction.

TABLE 4–PROPOSED HFC RESTRICTIONS AND COMPLIANCE DATES BY SUBSECTOR

Sectors and subsectors	Proposed GWP limit or prohibited substance	Compliance date
Refrigeration, Air Conditioning, and Heat Pump		
Industrial process refrigeration systems with refrigerant charge capacities of 200 pounds or greater.	150	January 1, 2025.
Industrial process refrigeration systems with refrigerant charge capacities less than 200 pounds.	300	January 1, 2025.
Industrial process refrigeration, high temperature side of cascade systems.	300	January 1, 2025.
Retail food refrigeration—stand-alone units	150	January 1, 2025.
Retail food refrigeration—refrigerated food processing and dispensing equipment.	150	January 1, 2025.
Retail food refrigeration—supermarket systems with refrigerant charge capacities of 200 pounds or greater.	150	January 1, 2025.
Retail food refrigeration—supermarket systems with refrigerant charge capacities less than 200 pounds charge.	300	January 1, 2025.
Retail food refrigeration—supermarket systems, high temperature side of cascade system.	300	January 1, 2025.
Retail food refrigeration—remote condensing units with refrigerant charge capacities of 200 pounds or greater.	150	January 1, 2025.
Retail food refrigeration—remote condensing units with refrigerant charge capacities less than 200 pounds.	300	January 1, 2025.
Vending machines	150	January 1, 2025.
Cold storage warehouse systems with refrigerant charge capacities of 200 pounds or greater.	150	January 1, 2025.
Cold storage warehouse systems with refrigerant charge capacities less than 200 pounds.	300	January 1, 2025.
Cold storage warehouse—high temperature side of cascade system.	300	January 1, 2025.
Ice rinks	150	January 1, 2025.
Automatic commercial ice machines—self-contained with refrigerant charge capacities of 500 grams or lower.	150	January 1, 2025.
Automatic commercial ice machines—self-contained with refrigerant charge capacities more than 500 grams.	R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B, R–407A, R–410A, R–442A, R–417C, R–407F, R–437A, R–407C, RS–24 (2004 formulation), HFC–134a.	January 1, 2025.
Automatic commercial ice machines—remote	R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B.	January 1, 2025.
Transport refrigeration—intermodal containers	700	January 1, 2025.
Transport refrigeration—road systems	R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B.	January 1, 2025.
Transport refrigeration—marine systems	R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B.	January 1, 2025.
Residential refrigeration systems	150	January 1, 2025.
Chillers—industrial process refrigeration	700	January 1, 2025.
Chillers—comfort cooling	700	January 1, 2025.
Residential and light commercial air conditioning and heat pump systems.	700	January 1, 2025.
Residential and light commercial air conditioning—variable refrigerant flow systems.	700	January 1, 2026.
Residential dehumidifiers	700	January 1, 2025.
Motor vehicle air conditioning—light-duty Passenger Vehicles.	150	Model year 2025.
Motor vehicle air conditioning—medium-duty passenger vehicles.	150	Model year 2026.
Motor vehicle air conditioning—heavy-duty pick-up trucks	150	Model year 2026.
Motor vehicle air conditioning—Complete heavy-duty vans	150	Model year 2026.

TABLE 4–PROPOSED HFC RESTRICTIONS AND COMPLIANCE DATES BY SUBSECTOR—Continued

Sectors and subsectors	Proposed GWP limit or prohibited substance	Compliance date
Motor vehicle air conditioning—Nonroad vehicles	150	Model year 2026.
Foam blowing		
Polystyrene—extruded boardstock and billet	150	January 1, 2025.
Rigid polyurethane and polyisocyanurate laminated boardstock.	0	January 1, 2025.
Rigid polyurethane—slabstock and other	150	January 1, 2025.
Rigid polyurethane—appliance foam	150	January 1, 2025.
Rigid polyurethane—commercial refrigeration and sandwich panels.	150	January 1, 2025.
Rigid polyurethane—marine flotation foam*	150	January 1, 2025.
Rigid polyurethane—low pressure, two-component spray foam.	150	January 1, 2025.
Rigid polyurethane—high-pressure two-component spray foam.	150	January 1, 2025.
Rigid polyurethane—one-component foam sealants	150	January 1, 2025.
Flexible polyurethane	0	January 1, 2025.
Integral skin polyurethane	0	January 1, 2025.
Polystyrene—extruded sheet	0	January 1, 2025.
Polyolefin	0	January 1, 2025.
Phenolic insulation board and bunstock	150	January 1, 2025.
Aerosols		
Aerosol products*	150	January 1, 2025.

* As described in greater detail in section VII.C of this preamble, EPA is proposing an exemption for certain applications as long as they are receiving application-specific allowances under subsection (e)(4)(B) of the Act, including: as a propellant in metered dose inhalers; in the manufacture of defense sprays; and in the manufacture of structural composite preformed polyurethane foam for marine use and trailer use.

3. Refrigeration, Air Conditioning, and Heat Pump

Subsectors in the RACHP sector typically use a refrigerant in a vapor compression cycle to cool and/or dehumidify a substance or space, like a refrigerator cabinet, room, office building, or warehouse. Based on EPA's consideration of the factors listed in subsection (i)(4) of the AIM Act, as discussed in section VII.E of this preamble, EPA is proposing the restrictions on the use of HFCs in the following subsectors:

a. Industrial Process Refrigeration (IPR)

Background on Industrial Process Refrigeration

''Industrial process refrigeration'' systems are used to cool process streams at a specific location in manufacturing and other forms of industrial processes and applications used in, for example, the chemical production, pharmaceutical, petrochemical, and manufacturing industries. This also includes appliances used directly in the generation of electricity and for large scale cooling of heat sources such as data centers and data servers. Specialized refrigerated laboratory equipment, such as that used in the pharmaceutical industry, may fall under this subsector if it operates at temperatures above −62 °C (−80 °F)—that is, it is not very low temperature refrigeration equipment.

IPR systems are complex, customized systems that are directly linked to the industrial process, meaning the refrigerant leaving the condenser and metering device is delivered directly to the heat source before returning to the compressor. Where one appliance is used for both IPR and other applications, it is considered an IPR system if 50 percent or more of its operating capacity is used for IPR. Such IPR appliances could be cooling a room or building in which the industrial process is located, for instance if 50 percent or more of its capacity is to cool manufacturing or other processing lines within the room or building. Cooling or IPR that involves using a chiller, *i.e.,* to circulate a secondary fluid to the point at which heat is removed from the process, or to cool a room or building as explained in this section, is regulated as a chiller (see section VII.F.3.h of this preamble below). IPR not using a chiller is regulated as IPR equipment and is discussed here.

Many food products require refrigeration during the production process. EPA is considering the application of refrigerating equipment used during the production of food and beverages to fall under ''industrial process refrigeration'' except where using a chiller. In other words, if the food production process requires cooling and that cooling is done directly by a refrigerant, either at the point where cooling is required or to cool a room or building in which the cooling is required, for purposes of this proposed rule we consider the equipment to fall under the IPR subsector; whereas if a chiller is used to cool a secondary fluid (*e.g.,* water) which is used to provide the required cooling, we consider the appliance as part of the chiller subsector. The IPR subsector would include all equipment and operations that use a refrigerant to make and prepare food that is not immediately available for sale (or supply, if the product is not ''sold'') to the ultimate consumer and would require shipping or delivering it, possibly through intermediate points, to the point where such sale would occur. The IPR subsector could include facilities where food is processed and packaged by the food producer. An example could be a meat processor that prepares and packages individual cuts of meat within a single facility or building while maintaining the required temperatures within that facility or building. Although such facilities may be designed in a fashion similar to a cold storage warehouse, the fact that items are being processed by the food producer indicates that the application falls in the IPR subsector. However, if a

food producer operates a refrigerated storage area solely for the holding of already packaged products, and possibly packing such products in larger containers or bundles for shipment, that application would fall under the cold storage warehouse subsector.

Another example of an IPR system is a ''blast cooler'' or ''blast freezer.'' In this context ''blast cooler'' or ''blast freezer'' refers to a type of equipment in which cold air is supplied and circulated rapidly to a food product, generally to quickly cool or freeze a product before damage or spoilage can occur. This is the same description as the Agency has previously used for this equipment. (See 80 FR 42901, July 20, 2015). Such equipment might be used as part of a food production line in an industrial setting. They also can be placed separately at public facilities including hospitals, schools, restaurants, and supermarkets. These public facilities might use the blast chiller on products that they will store for later use after they receive products from a vendor or that they cook or prepare as part of their operations. Such units might also be placed near entranceways to cold storage warehouses, for instance to receive food shipped refrigerated at one temperature and bring it down to a lower temperature for storage.

IPR systems typically have large refrigerant charge to satisfy the significant cooling demands throughout the facility. Historically, facilities have commonly used R–717, hydrocarbons, CFCs, HCFCs and HFCs including but not limited to R–12, R–22, R–404A, R–507, and R–134a.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Industrial Process Refrigeration

EPA granted six petitions that requested restrictions on the use of HFCs and blends containing HFCs for IPR equipment excluding chillers, which were submitted by EIA, CARB, IIAR (two petitions), and AHRI (two petitions). All petitioners separated chillers used for IPR into a different category.

EIA's and CARB's petitions requested that EPA establish a GWP limit of 150 for HFCs used in new IPR equipment by January 1, 2025. CARB requested that the GWP limit apply to IPR equipment containing more than 50 pounds of refrigerant.

IIAR submitted two petitions regarding new IPR equipment. One of IIAR's petitions requested that EPA establish a GWP limit of 150 for HFCs used in new IPR equipment with refrigerant charge capacities greater than 50 pounds by January 1, 2022. In a subsequent petition, IIAR requested a GWP limit of 150 for new IPR equipment with refrigerant charge capacities greater than 200 pounds, by January 1, 2026. In this second petition, IIAR also requested that EPA establishes a GWP limit of 300 for new IPR equipment with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems by January 1, 2026.

AHRI also submitted two petitions regarding IPR equipment. One of AHRI's petitions requested that EPA establish a GWP limit of 300 for HFCs used in new IPR equipment by January 1, 2026,[78] but requested that medical, scientific, and research applications be exempted. Another AHRI petition requested that EPA establish a GWP limit of 150 for new equipment in IPR with refrigerant charge capacities greater than 200 pounds by January 1, 2026. For new IPR equipment with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems, AHRI requested a GWP limit of 300 by January 1, 2026.

Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for industrial process refrigeration?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 150 or greater in IPR systems with refrigerant charge capacities greater than 200 pounds beginning January 1, 2025. For IPR systems with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems, EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 300 or greater, beginning January 1, 2025. These proposed GWP limits would apply to new equipment used in IPR other than chillers used for IPR. Chillers used for IPR are discussed in section VII.F.3.h of this preamble.

A cascade system is a design option which consists of two independent refrigeration systems that share a common cascade heat exchanger. They are often employed in applications when the required temperature is very low. Each system of a cascade system uses a different refrigerant that is most suitable for the given temperature range. High temperature systems, or the ''high temperature side,'' have typically used HFCs as a refrigerant; however, it is technologically achievable and has become more common to use R–717 in the high temperature side. For low temperature systems, or the ''low temperature side,'' low boiling refrigerants such as R–744 and R–508B can be used. Considerations for the choice of refrigerant on the high or low temperature side of the cascade systems are influenced by many factors including, but not limited to, a refrigerant's toxicity and flammability, its temperature glide, and its suitability to lower temperature applications. In our consideration of safety and building codes under subsection (i)(4)(B), EPA understands that use of flammable or toxic refrigerants, such as R–717, on the high temperature side of a cascade may be limited in certain circumstances (*e.g.,* in areas that are heavily populated based on building codes and/or standards). Therefore, EPA is proposing a higher GWP limit of 300 for HFCs used in the high temperature side of cascade systems to expand the refrigerant options that can comply with local building codes and industry safety standards. EPA is proposing a GWP limit of 150 for HFCs used in the low temperature side of cascade systems based on its consideration of the (i)(4) factors, noting in particular that there are a number of substitutes available that can meet this proposed limit for this part of the cascade system.

Similarly, EPA is proposing to establish two different GWP limits for equipment used in IPR, based on the refrigerant charge capacity of the system. This distinction is consistent with information provided by certain petitioners and EPA's understanding of technical challenges that these smaller capacity systems currently face. Specifically, for smaller-footprint applications, the use of A2Ls (lower flammability refrigerants) is limited due to safety standards ANSI/ASHRAE Standard 15–2019 and UL 60335–2–89.[79] [80] The two standards, which are used to update building codes, set charge limits to under 200 pounds for

[78] The AHRI petition submitted on April 13, 2021, available at *www.regulations.gov* in Docket ID No, EPA–HQ–OAR–2021–0289, requested a 1,500 GWP limit with a compliance date of January 1, 2024, for new IPR equipment. The AHRI petition received by EPA on August 19, 2021, requested a 300 GWP limit with a compliance date of January 1, 2026. As EPA explains in section VII.D.2 of this preamble, EPA is treating AHRI's August 19, 2021, petition as an addendum to their April 13, 2021, petition.

[79] ASHRAE. (2019). *ANSI/ASHRAE Standard 15–2019: Safety Standard for Refrigeration Systems.*

[80] UL Standard. (2021). Household and Similar Electrical Appliances—Safety—Part 2–89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor (Standard 60335–2–89, Edition 2).

applications in smaller floor areas.[81] For example, if an application subject to these standards required 100 pounds charge in a 1,000 square foot area, A2L refrigerants would not be permitted. The proposed higher GWP limit of 300 GWP for smaller refrigerant charge systems would enable the use of a wider set of available substitutes to manage safety (in particular, flammability and toxicity), efficiency, capacity, temperature glide, and other performance factors. Systems with larger refrigerant charge capacities *i.e.* greater than 200 pounds charge) are expected to be less space-constrained, so system designers can accommodate a narrower set of lower-GWP substitutes below 150 GWP, as demonstrated by the widespread use and commercial demands of lower-GWP substitutes in these systems. Therefore, EPA is proposing a lower GWP limit of 150 for HFCs used in new equipment with refrigerant charge greater than 200 pounds.

For its consideration of availability of substitutes under subsection (i)(4)(B), EPA identified several substitutes[82] which are available in place of the higher-GWP substances that EPA is proposing to prohibit. These available substitutes include HCFO–1224yd(Z) (GWP 1), R–717 (GWP 0), R–1270 (GWP 2), R–290 (GWP 3), R–600 (GWP 4), HCFO–1233zd(E) (GWP 3.7), R–471A (GWP 139), R–454C (GWP 146), and, for smaller capacity systems, and R–454A (GWP 237). EPA is aware of a statement by one stakeholder that R–717 and hydrocarbons (R–600, R–1270, R–290) are 90–95 percent of the market share for IPR systems in 2019, indicating the technological achievability and commercial demands of systems using available substitutes.[83]

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in IPR systems with refrigerant charge capacities greater than 200 pounds, and a GWP limit of 300 or greater for HFCs and blends containing HFCs used in IPR systems with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems. EPA is considering whether a GWP limit lower than the proposed limit of 300 would be appropriate for systems with smaller refrigerant charge capacities (*i.e.,* less than 200 pounds). Accordingly, EPA seeks comment on other technical and design challenges that exist for such systems to use refrigerants with GWPs less than 150, and strategies that can be employed to mitigate these challenges.

b. Retail Food Refrigeration and Vending Machines

Background on Retail Food Refrigeration and Vending Machines

Retail food refrigeration is characterized by storing and displaying, generally for sale, food and beverages at different temperatures for different products (*e.g.,* chilled and frozen food). The designs and refrigerating capacities of such equipment vary widely.

Vending machines are a type of self-contained system used to sell a variety of products, including cold drinks in cans or bottles, ice cream, milk, cold drinks in cups, and perishable food items (*e.g.,* fruit, prepared sandwiches). Hot beverages may also be provided via a heat-pump or through recycled waste heat from the refrigeration cycle, particularly for dual hot/cold beverage vending machines. Vending machines are a subset of commercial refrigeration that EPA is considering as a separate subsector due to differences in where such equipment is placed and the additional mechanical and electronic components required to accept payment, provide the selected product, and prevent theft or damage from vandalism.

Retail food refrigeration is composed of four main categories of equipment, and EPA is treating these categories as separate subsectors under the technology transitions program: stand-alone equipment; refrigerated food processing and dispensing equipment; remote condensing units; and supermarket systems, the latter often in designs referred to as multiplex or centralized refrigeration systems. Stand-alone units in retail food refrigeration (hereafter, ''stand-alone units'') consist of refrigerators, freezers, and reach-in coolers (either open or with doors) where all refrigeration components are integrated and, for the smallest types, the refrigeration circuit is entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation. Under the technology transitions program, EPA intends to distinguish medium-temperature stand-alone units from low-temperature stand-alone units. Medium-temperature stand-alone units maintain a temperature above 32 °F (0 °C). Most are typically designed to maintain products at temperatures roughly between 32 °F (0 °C) and 41 °F (5 °C). Low-temperature stand-alone units designed to maintain products at temperatures roughly between −40 °F (−40 °C) and 32 °F (0 °C) (*i.e.,* freezers). Today, HFC–134a is the most commonly used refrigerant in self-contained systems, with R–404A also commonly used in low temperature applications (*e.g.,* freezers, ice machines) and some high-capacity systems.

With respect to the second category of equipment to be included under retail food refrigeration, refrigerated food processing and dispensing equipment, the Agency considers equipment designed to make or process cold food and beverages that are dispensed via a nozzle, including soft-serve ice cream machines, ''slushy'' iced beverage dispensers, and soft-drink dispensers, to be a separate subsector from stand-alone units. Refrigerated food processing and dispensing equipment dispenses and often processes a variety of food and beverage products. For instance, some such equipment processes the product by combining ingredients, mixing, and preparing the food at the proper temperature, while others function mainly as a holding tank to deliver the product at the desired temperature or to deliver chilled ingredients for the processing, mixing, and preparation. Some may use a refrigerant in a heat pump or utilize waste heat from the cooling system to provide hot beverages. Some may also provide heating functions to melt or dislodge ice or for sanitation purposes. This equipment can be self-contained or can be connected via piping to a dedicated condensing unit located elsewhere. Equipment within this subsector category include but are not limited to equipment used to make: chilled and frozen beverages (carbonated and uncarbonated, alcoholic and nonalcoholic); frozen custards, gelato, ice cream, Italian ice, sorbets and yogurts; milkshakes, ''slushies'' and smoothies; and whipped cream.

[81] The specific charge size limit depends on flammability characteristics of each A2L refrigerant, the volume of the room housing the system, the system design, and other parameters.

[82] EPA notes for all substitutes identified in section VII.F of this preamble, not every substitute listed is necessarily available across all U.S. markets. For example, in some cases, substitutes may be technologically and economically viable and may be in use in international markets but may be unavailable in specific U.S. market for other reasons such as building code restrictions. The lists of ''available'' substitutes therefore includes some substances which may only be ''potentially available'' in some areas. EPA also notes that not all of the identified substitutes are listed as acceptable under the SNAP program. See section VII.E.2 of this preamble for a discussion on availability of substitutes.

[83] Air-Conditioning, Heating, & Refrigeration Institute (AHRI). 2019. AHRI Letter Responding to CARB's Request for Input and Clarifications Following the August 6, 2019, Public Meeting for Industrial Process Refrigeration and Transport Refrigeration Equipment. Available in the docket.

Historically, refrigerated food processing and dispensing equipment relied on ODS refrigerants, including CFC–12 and HCFC–22. In response to the phaseout of ODS under the Clean Air Act and the Montreal Protocol, refrigerated food processing and dispensing equipment adopted HFC–134a and R–404A in medium- and low-temperature applications, respectively. Both HFC–134a and R–404A are potent GHGs with GWPs of 1,430 and 3,920, respectively.

With respect to the third category of equipment to be included under retail food refrigeration, remote condensing units exhibit refrigerating capacities ranging typically from 1 kW to 20 kW (0.3 to 5.7 refrigeration tons). They are composed of one (and sometimes two) compressor(s), one condenser, and one receiver assembled into a single unit, which is normally located external to the sales area. This equipment is connected to one or more nearby evaporator(s) used to cool food and beverages stored in display cases and/or walk-in storage rooms. Remote condensing units are commonly installed in convenience stores and specialty shops such as bakeries and butcher shops. Remote condensing units historically used the ODS HCFC–22. While many HCFC–22 systems remain in use today, newly manufactured systems primarily use R–404A or HFC–134a. Other blends that use HFCs—including R–407A, R–407C, R–407F, and R–507A—are also in use.

With respect to the fourth category of equipment to be included under retail food refrigeration, typical supermarket systems are known as multiplex or centralized systems. They operate with racks of compressors installed in a machinery room; different compressors turn on to match the refrigeration load necessary to maintain temperatures. Two main design classifications are used: direct and indirect systems. In a direct system, the refrigerant circulates from the machinery room to the sales area, where it evaporates in display-case heat exchangers, and then returns in vapor phase to the suction headers of the compressor racks. The supermarket walk-in cold rooms are often integrated into the system and cooled similarly, but another option is to provide a dedicated condensing unit for a given storage room.

Indirect supermarket designs include secondary loop systems and cascade refrigeration.[84] Indirect systems use a chiller or other refrigeration system to cool a secondary fluid that is then circulated throughout the store to the cases. Compact chiller versions of an indirect system rely on a lineup of 10–20 units, each using small charge sizes. As the refrigeration load changes, more or fewer of the chillers are active. Compact chillers are used in a secondary loop system whereby the chillers cool a secondary fluid that is then circulated throughout the store to the display cases. Each compact chiller is an independent unit with its own refrigerant charge, reducing the potential volume of refrigerant that could be released from leaks or catastrophic failures. Despite the term ''chiller'' used in the above examples, these systems would be regulated as supermarket systems under this proposed rule.

Another type of supermarket design, often referred to as a distributed refrigeration system, uses an array of separate compressor racks located near the display cases rather than having a central compressor rack system. Each of these smaller racks handles a portion of the supermarket load, with 5–10 such systems in a store.

Supermarket rack systems historically used CFC–12, R–502, HCFC–22, and other blends containing HCFCs in a centralized design. While many of these systems remain in use, some have been retrofitted to replace the ODS refrigerant with a blend that uses an HFC (*e.g.,* R–404A, R–422A, R–422B, R–422D, R–427A, R–438A, and R–507A). For newly manufactured systems, refrigerant blends containing HFCs (*e.g.,* R–404A, R–507A, R–407A, R–407C, and R–407F) dominate the market.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Retail Food Refrigeration and Vending Machines

EPA granted seven petitions that requested restrictions on the use of HFCs for retail food refrigeration and/or vending machines. These petitions were submitted by NRDC, CARB, IIAR (two petitions), EIA, and AHRI (two petitions).

NRDC and CARB individually petitioned EPA to restrict specific substances for new equipment used in the following subsectors (specific substances are in parenthesis):

- ''Stand-alone low-temperature units'' (HFC–227ea, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–44 (2003 formulation))
- ''Stand-alone medium-temperature units with a compressor capacity equal to or greater than 2,200 btu/hour and stand-alone medium-temperature units containing a flooded evaporator'' (FOR12A, FOR12B, HFC–134a, HFC–227ea, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, THR–03))
- ''Stand-alone medium-temperature units with a compressor capacity below 2,200 btu/hour and not containing a flooded evaporator'' (FOR12A, FOR12B, HFC–134a, HFC–227ea, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, THR–03))
- ''Remote condensing units'' (HFC–227ea, R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, R–507A)
- ''Retail food refrigeration—refrigerated food processing and dispensing equipment'' (HFC–227ea, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–44 (2003 formulation),
- ''Supermarket systems'' (HFC–227ea, R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, R–507A) and
- ''Vending machines'' (FOR12A, FOR12B, HFC–134a, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–410A, R–410B, R–417A, R–421A, R–422B, R–422C, R–422D, R–426A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), SP34E).

Both petitioners also requested that EPA restrict the use of specific substances used for retrofitted equipment in:

- ''Supermarket systems'' (R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, R–507A)
- ''Remote condensing units'' (R–404A, R–407B, R–421B, R–422A, R–422C, R–422D, R–428A, R–434A, R–507A)

[84] See section VII.F.3.a of this preamble for a description of cascade systems.

- ''Stand-alone units'' (R–404A, R–507A)
- ''Vending machines'' (R–404A, R–507A)

NRDC requested that EPA establish a January 1, 2023, compliance date for restrictions in all of these subsectors. CARB's petition further included a request to establish a GWP limit of 150 for HFCs used in new retail food refrigeration equipment [85] with charge sizes greater than 50 pounds but did not specify a compliance date.

IIAR submitted two petitions for certain applications with ''retail food refrigeration.'' One petition requested that EPA establish a GWP limit of 150 for retail food refrigeration by January 1, 2022. In another granted petition, IIAR requested that EPA establish a GWP limit of 150 for new retail food refrigeration equipment with refrigerant charge capacities greater than 200 pounds and a GWP limit of 300 for new retail food refrigeration equipment with refrigerant charge capacities less than or equal to 200 pounds, by January 1, 2026. IIAR also requested that a GWP limit of 300 be established for the high temperature side of cascade systems by January 1, 2026.

EIA's petition requested that EPA establish a GWP limit of 150 for HFCs used in new supermarket systems with refrigerant charge sizes greater than 50 pounds by January 1, 2023, or one year following finalization of rulemaking.

Lastly, EPA granted two petitions from AHRI. One petition asked for restrictions on the use of HFCs used in ''standalone/self-contained refrigeration systems'' and ''remote refrigeration systems.'' [86] Specifically, AHRI requested that EPA establish a GWP limit of 300 for new ''standalone/self-contained refrigeration systems'' and a GWP limit of 300 for new ''remote refrigeration systems'' by January 1, 2026. AHRI's petition also requested that ''medical, scientific and research applications'' be exempted. AHRI's second granted petition requested that EPA establish a GWP limit of 150 for new supermarket systems and remote condensing units with refrigerant charge capacities greater than 200 pounds, and a GWP limit of 300 for the same equipment with refrigerant charge capacities less than or equal to 200 pounds by January 1, 2026. AHRI also requested a GWP limit of 300 for the high temperature side of cascade systems. This petition also requested that EPA establish a GWP limit of 150 for new stand-alone and refrigerated food processing and dispensing equipment by January 1, 2026.

Additional information, including the relevant petitions, is available in the docket. What restrictions on the use of HFCs is EPA proposing for new retail food refrigeration—stand-alone units?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs that have a GWP of 150 or greater beginning January 1, 2025, in retail food refrigeration—stand-alone units. This proposed GWP limit would apply to new equipment used in retail food refrigeration—stand-alone units, irrespective of compressor capacity or evaporator design.

For new equipment, several substitutes are available in place of the HFCs and blends containing HFCs that EPA is proposing to restrict, which informed EPA's consideration of the availability of substitutes. These include R–744 (GWP 1), R–290 (GWP 3), R–600a (GWP <1), and R–441A (GWP 3). In addition to these substitutes' lower GWP, some of these substitutes also offer additional environmental benefits via increased energy efficiency. For example, several sources show that R–290 offers significant efficiency benefits as compared to traditional higher-GWP refrigerants used for commercial refrigeration. Studies have shown that energy use can be reduced between 21 and 34 percent, depending on operating conditions, for commercial refrigeration systems utilizing R–290 instead of R–404A.[87] [88] [89] One company claimed that equipment using R–290 as the refrigerant consumed between 11 and 63 percent, depending on the model, when compared to an equivalent model using HFC–134a [90] ''without sacrificing quality.'' [91]

Furthermore, use of R–290 and other lower-GWP refrigerants has increased over the past seven years in various stand-alone equipment types, indicating that use of substitutes is technologically achievable and that there is commercial demand for equipment that use substitutes. EPA is also aware of several available low and medium temperature units using substitutes such as R–290 and R–600a. Commercial demands for equipment types that use R–290, based on EPA's research,[92] include reach-in refrigerators and freezers, beverage coolers, and food service equipment and types of equipment that use R–744 include beverage coolers and vending machines.

EPA also notes that several states have banned the use of higher-GWP refrigerants in stand-alone units. The states/commonwealths of California, Colorado, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, Virginia, Vermont, and Washington all have legal restrictions on the use of HFCs and HFC blends in stand-alone equipment, and, depending on the state, these restrictions went into effect at various times between the years 2020 through 2022. Stand-alone equipment using lower-GWP substitutes are being sold in these markets to comply with regulatory requirements, clearly indicating that these types of equipment using available substitutes are available, which informs our consideration of the availability of substitutes under subsection (i)(4)(B), including our consideration of subfactors such as technological achievability and commercial demands.

What restrictions on the use of HFCs is EPA proposing for retrofitted retail food refrigeration—stand-alone units?

EPA is not proposing any restrictions on the use of HFCs in retrofitted stand-alone units. For future consideration in a potential subsequent rulemaking, the Agency is taking comment on and seeking data and information regarding the prevalence of retrofitting in stand-alone units. EPA is also seeking comment on what refrigerants are commonly used in retrofitted stand-alone units. EPA is also seeking comment on a GWP limit to set for these

[85] Under CARB's HFC regulation, retail food refrigeration includes stand-alone units (equipment), refrigerated food processing and dispensing units (equipment), remote condensing units, and supermarket systems. Available in the docket and at: *https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2020/hfc2020/frorevised.pdf.*

[86] Another petition submitted by AHRI on April 13, 2021, available at *www.regulations.gov* in Docket ID No. EPA–HQ–OAR–2021–0289, requested different restrictions for the same subsectors. As discussed in section VII.D.2 of this preamble, EPA is treating AHRI's later petition as an addendum to AHRI's earlier petitions.

[87] Emerson, October 2016. The Case for R–290. E360 Outlook. Available at: *https://e360hub.emerson.com/emersons-r-290-product-offerings/the-case-for-r-290-5.*

[88] Carel, March 2020. Six Reasons to Use Propane as Refrigerant. Available at: *https://www.carel.com/blog/-/blogs/six-reasons-to-use-propane-as-refrigerant.*

[89] Mastrullo, Rita & Mauro, Alfonso & Menna, Laura & Vanoli, G.P. (2014). Replacement of R404A with propane in a light commercial vertical freezer: A parametric study of performances for different system architectures. Energy Conversion and Management. 82. 54–60. *10.1016/j.enconman.2014.02.069.*

[90] True Manufacturing, 2019, Hydrocarbon (Natural Refrigerant) Brochure. Available at: *https://www.truemfg.com/Media-Center/Marketing-Collateral.*

[91] True Manufacturing, Company Profile. Video. Available at: *https://truemfg.com/Media-Center/Videos.*

[92] See Commercial Demands and Technological Achievability TSD in the docket for a list of products in the affected sectors and subsectors using substitutes.

units. As noted earlier in the preamble, EPA does not intend to respond to any advance comments or information received regarding retrofitted retail food refrigeration—stand-alone units.

What restrictions on the use of HFCs is EPA proposing for new retail food refrigeration—refrigerated food processing and dispensing equipment?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs that have a GWP of 150 or greater beginning January 1, 2025, in retail food refrigeration—refrigerated food processing and dispensing equipment. This proposed GWP limit would apply to new equipment used in retail food refrigeration— refrigerated food processing and dispensing equipment.

For its consideration of availability of substitutes under subsection (i)(4)(B), EPA identified substitutes such as R–744 and R–717 which are available for use in this subsector in place of the HFCs and blends containing HFCs that EPA is proposing to restrict. Additionally, EPA is aware that companies have expressed interest in using other substitutes such as R–290 for this subsector.

Based on the Agency's review of available information as well as state regulatory activities, EPA is proposing a compliance date of January 1, 2025. EPA is aware of actions being taken in various states and local jurisdictions that have or will amend building codes that will increase the availability of substitutes by permitting additional substitutes, including certain flammable substitutes, with GWPs below the proposed GWP limit.[93]

What restrictions on the use of HFCs is EPA proposing for new retail food refrigeration—supermarket systems?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 150 or greater in supermarket systems with refrigerant charge capacities equal to or greater than 200 pounds beginning January 1, 2025. For supermarket systems with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems, EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 300 or greater, beginning January 1, 2025. These proposed GWP limits would apply to new retail food refrigeration—supermarket systems.

As with IPR systems, EPA is proposing to distinguish between larger supermarket systems (*i.e.,* those with refrigerant charge capacities equal to or greater than 200 pounds) and smaller systems (*i.e.,* those with refrigerant charge capacities less than 200 pounds). EPA is also proposing different GWP limits for refrigerants used in cascade systems. See section VII.F.3.a in the preamble for a discussion on EPA's rationale for making these distinctions.

For its consideration of availability of substitutes under subsection (i)(4)(B), EPA identified substitutes that are available in place of the proposed restricted substances that EPA is proposing to restrict for larger refrigerant charge capacities (*i.e.,* those with refrigerant charge capacities less than 200 pounds). These include R–717, which can be used in a secondary loop (indirect) supermarket refrigeration system, and R–744, which can be used for centralized direct and indirect supermarket refrigeration systems. For systems with smaller refrigerant charge capacities, substitute refrigerants R–454C (GWP 146), R–471A (GWP 139), and R–516A (GWP 140) can serve as other potential candidates for use in place of the HFCs and blends containing HFCs that EPA is proposing to restrict.

EPA notes that the proposed GWP limits would support the transition to lower-GWP substitutes and innovative technologies including those that have been used widely in other parts of the world, such as Europe and Canada, and have seen increased use in the United States. For example, the global market of transcritical R–744 systems, which are manufactured by a number of U.S. companies, is expected to grow significantly, at a compound annual growth rate of 12.69 percent, between 2018 and 2025.[94] R–744 systems may also provide additional beneficial environmental impacts via increased energy efficiency in some cases; however, R–744 systems can experience declining efficiencies in high ambient temperature (*e.g.,* Bahrain) although technologies continue to be under development.

What restrictions on the use of HFCs is EPA proposing for retrofitted retail food refrigeration—supermarket systems?

EPA is not proposing restrictions on the use of HFCs in retrofitted retail food refrigeration—supermarket systems. EPA acknowledges that two granted petitions contained requests for EPA to restrict the use of specific substances in retrofitted supermarkets systems (as described in this section above). However, the Agency did not find specific information on substitutes used in retrofitted supermarkets, though the Agency is aware of possible substitutes (*e.g.,* R–450A, R–513A, R–448A, and R–449A). EPA, therefore, is seeking comment on what substitutes are commonly used in retrofitted supermarket systems. As noted earlier in the preamble, EPA does not intend to respond to any advance comments or information received regarding retrofitted retail food refrigeration—supermarket systems.

What restrictions on the use of HFCs is EPA proposing for new retail food refrigeration—remote condensing units?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 150 or greater for remote condensing units with refrigerant charge capacities greater than 200 pounds beginning January 1, 2025. For remote condensing units with refrigerant charge capacities less than 200 pounds, and for the high temperature side of cascade systems, EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 300 or greater, beginning January 1, 2025. These proposed GWP limits would apply to new equipment used in remote condensing units.

EPA is proposing to distinguish between larger remote condensing units (*i.e.,* those with refrigerant charge capacities equal to or greater than 200 pounds) and smaller systems (*i.e.,* those with refrigerant charge capacities less than 200 pounds) and is proposing a different GWP limit for the high temperature side of a cascade system, based on the rationale stated in section VII.F.3.a in the preamble.

For its consideration of availability of substitutes under subsection (i)(4)(B), EPA identified available substitutes in place of the proposed restricted substances, including R–744 (GWP 1) and R–717 (GWP 0). Additional refrigerants that could potentially be available substitutes include R–454C (GWP 146), R–471A (GWP 139), and R–455A (GWP 146). R–744 remote condensing units are now commercially available in several markets, including in the United States. Although market penetration is low at present globally, it is expected to increase in the near future.[95]

[93] See the TSD on building codes in the docket for additional information on building codes and list of substitutes.

[94] Global Transcritical CO2 Systems Market by Function (Refrigeration, Air Conditioning, Heating), Application (Heat Pumps, Food Processing, Others), Region, Global Industry Analysis, Market Size, Share, Growth, Trends, and Forecast 2018 to 2025, FiorMarkets, March 2019. Report description available at: *https://www.fiormarkets.com/report/global-transcritical-co2-systems-market-by-function-refrigeration-376006.html.*

[95] Refrigeration, Air Conditioning, and Heat Pumps Technical Options Committee 2018 Assessment Report, Technical and Economic Assessment Panel, UNEP, February 2019. Available

Continued

What restrictions on the use of HFCs is EPA proposing for retrofitted retail food refrigeration—remote condensing units?

EPA is not proposing restrictions on the use of HFCs in retrofitted remote condensing units. EPA acknowledges that two granted petitions contained requests for EPA to restrict the use of specific substances in retrofitted remote condensing units. However, the Agency did not find sufficient information demonstrating that there would be available substitutes for use in remote condensing units undergoing retrofits. However, the Agency is aware of substances that could potentially be available substitutes (*e.g.,* R–450A, R–513A, and R–448A) and is therefore seeking comment on whether there are substitutes to HFCs that are commonly used in retrofitted remote condensing units. As noted earlier in the preamble, EPA does not intend to respond to any advance comments or information received regarding retrofitted retail food refrigeration—remote condensing units.

What restrictions on the use of HFCs is EPA proposing for new vending machines?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs that have a GWP of 150 or greater in vending machines beginning January 1, 2025. This proposed GWP limit would apply to new vending machines.

For its consideration of availability of substitutes under subsection (i)(4)(B), EPA identified available substitutes in place of the proposed restricted substances including, R–290 (GWP 3), R–600a (GWP <1), R–744 (GWP 1), and R–441A (GWP 3).

Vending machines using lower-GWP refrigerants, primarily R–290 and R–744, are technologically achievable and the use of these substitutes is increasing, indicating commercial demands. Two of the largest vending machine customers in the U.S. market, Coca-Cola and PepsiCo, have been using R–744 over the past decade.[96] [97] Recently, industry safety standards and building codes have been revised to allow the use of lower-GWP substitutes. ASHRAE amended the safety standard ASHRAE 15 to allow vending machines with up to 114 grams of R–290 to be used in those locations where they were not previously allowed prior to the modification of industry standards. UL also modified their standard covering this equipment ''for the unrestricted placement of vending machines refrigerated with advanced, environmentally-friendly coolants.'' [98] Beginning January 1, 2020, the NAMA Foundation partnered with DOE in a two-year, $400,000 cooperative research and development agreement on energy efficient vending machines utilizing refrigerants such as R–290.[99]

On which topics is EPA specifically requesting comment?

EPA is requesting comment on the proposed GWP limits for subsectors in retail food refrigeration and vending machines described in this section. EPA is also specifically requesting comment for new supermarket systems and remote condensing units and its proposal to establish a GWP limit of 150 or greater for HFCs and blends used in new systems with refrigerant charge capacities greater than 200 pounds, and a GWP limit of 300 or greater for HFCs and blends containing HFCs used in new systems with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems. EPA is considering whether a GWP limit lower than the proposed limit of 300 would be appropriate for systems with smaller refrigerant charge capacities (*i.e.,* less than 200 pounds). Accordingly, EPA seeks comment on technical and design challenges that exist for such systems to use refrigerants with GWPs less than 150, and strategies that can be employed to mitigate these challenges.

c. Cold Storage Warehouses

Background on Cold Storage Warehouses

Cold storage warehouses are refrigerated facilities used for the storage of temperature-controlled substances. Cold storage warehouses can be divided into two categories: central plant systems and packaged systems. Central plants are custom-built refrigeration systems that are typically used in large refrigerated warehouses with cooling capacities that range from 20 to 5,000 kW. Central plant systems deliver cool air to the refrigerated space through evaporators, which are typically suspended from the ceiling in the refrigerated space. The evaporators are connected through a piping network to multiple compressors located in a central machine room, and a condenser, which is typically mounted outside near the compressor. Central plant systems may have a direct or indirect (secondary loop) design. Direct systems circulate a primary refrigerant throughout the refrigerated space. In an indirect system, a primary refrigerant cools a secondary refrigerant in the machine room, and the secondary refrigerant is then circulated throughout the refrigerated space.

Packaged systems (also known as unitary systems) are self-contained systems that combine an evaporator, compressor, and condenser in one frame. Packaged systems are commonly installed on the roof of a refrigerated warehouse above the air cooling units that are within the refrigerated space. The evaporator is located inside the refrigerated space of a walk-in facility while the condensing unit, which is usually protected by weather resistant housing, is located outside. Packaged systems are most commonly used in small refrigerated warehouses that have a capacity of 20 to 750 kW.

In response to the phaseout of ODS under the Clean Air Act and the Montreal Protocol, in the 1990s many manufactures began the transition from CFCs to HCFC–22, and then later from HCFC–22 to HFCs—primarily R–404A and R–507, which have GWPs of 3,922 and 3,985, respectively.[100] Some ODS users transitioned to R–717, as well.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Cold Storage Warehouses

EPA granted six petitions that requested restrictions on the use of HFCs in cold storage warehouses, which were submitted by EIA, IIAR (two petitions), CARB, AHRI, and NRDC. Three petitions—submitted by EIA, IIAR, and CARB—requested that EPA establish a GWP limit of 150 for HFCs used in new cold storage warehouses that contain more than 50 pounds of refrigerant. EIA requested a compliance date of January 1, 2023, or one year following the finalization of rulemaking. IIAR requested a compliance date of January 1, 2022. CARB did not specify a compliance date.

Two petitions—AHRI and IIAR's second petition—requested that EPA establish a GWP limit of 150 for HFCs used in new cold storage warehouses with refrigerant charge capacities greater

at: *https://ozone.unep.org/sites/default/files/2019-04/RTOC-assessment-report-2018_0.pdf.*

[96] Coca-cola, January 2014, Coca-cola Installs 1 Millionth HFC-Free Cooler Globally, Preventing 5.25MM Metric Tons of CO_2. Available at: *https://www.coca-colacompany.com/press-releases/coca-cola-installs-1-millionth-hfc-free-cooler.*

[97] PepsiCo, 2020. Sustainability Focus Area: Climate. Available at: *https://www.pepsico.com/our-impact/sustainability/focus-area/climate.*

[98] Karnes, B, March 2021, Revisions to UL 541, the Standard for Refrigerated Vending Machines. Available at: *https://www.ul.com/news/revisions-ul-541-standard-refrigerated-vending-machines.*

[99] NAMA, 2019. NAMA Foundation Annual Report 2019. Available at: *https://namanow.org/wp-content/uploads/2019-NAMA-Foundation-Annual-Report.pdf.*

[100] Refrigeration, Air Conditioning, and Heat Pumps Technical Options Committee 2018 Assessment Report, Technical and Economic Assessment Panel, UNEP, February 2019. Available at: *https://ozone.unep.org/sites/default/files/2019-04/RTOC-assessment-report-2018_0.pdf.*

than 200 pounds and a GWP limit of 300 for HFCs used in new cold storage warehouses with refrigerant charge capacities less than or equal to 200 pounds. Both petitions also requested a GWP limit of 300 for the HFCs used in the high temperature side of cascade systems. These petitions requested a January 1, 2026, compliance date for these restrictions.

NRDC's petition requested that EPA specifically restrict the use of the following substances in new cold storage warehouses: HFC–227ea, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407A, R–407B, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–423A, R–424A, R–428A, R–434A, R–438A, R–507A, and RS–44 (2003 composition).

Additional information, including the relevant petitions, is available in the docket. What restrictions on the use of HFCs is EPA proposing for cold storage warehouses?

EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 150 or greater in cold storage warehouse systems with refrigerant charge capacities equal to or greater than 200 pounds beginning January 1, 2025. For cold storage warehouse equipment with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems, EPA is proposing to prohibit the use of HFCs and blends containing HFCs with a GWP of 300 or greater, beginning January 1, 2025. These proposed GWP limits would apply to new equipment used in cold storage warehouses.

EPA is proposing to distinguish between larger equipment in new cold storage warehouses (*i.e.,* those with refrigerant charge capacities equal to or greater than 200 pounds) and smaller systems (*i.e.,* those with refrigerant charge capacities less than 200 pounds) and is proposing a different GWP limit for the high temperature side of a cascade system, based on the rationale stated in section VII.F.3.a in the preamble.

For its consideration of availability of substitutes under (i)(4)(B), EPA identified several substitutes that are available in place of the substances that EPA is proposing to restrict. For systems with refrigerant charge capacities equal to or greater than 200 pounds, these include R–717 vapor compression, R–744 (GWP 1), HCFO–1233zd(E) (GWP 3.7), R–454C (GWP 146), and R–471A (GWP 139); for smaller systems, R–454A (GWP 237) is an available substitute, in addition to those listed for larger systems. In addition to traditional vapor-compression cycle systems, several other types of systems that operate using thermodynamic cycles other than vapor compression such as R–717 absorption, evaporative cooling, desiccant cooling, and Stirling cycle systems can be used in this subsector. These systems could also be used to comply with the GWP limit proposed.

Market trends show that a significant portion of cold storage warehouses have transitioned from, or completely avoided, using higher-GWP substances. Most cold storage warehouses in the United States use R–717 due to its long-standing use, lower cost per kilogram, and energy savings.[101] While R–717 is not used extensively in many other subsectors of the RACHP sector, certain characteristics of cold storage warehouses reduce their typical proximity to people and have facilitated the widespread use of that refrigerant in this application, even though R–717 is listed as a lower flammability, higher toxicity (B2L) refrigerant in ASHRAE Standard 34. For example, because cold storage warehouses are often large to achieve economies of scale and require a large amount of land use—as opposed to other systems that might be located on a building roof or a small slab next to the building—they are typically located away from population centers where land costs and taxes may be higher. In addition, the transportation of goods is typically done in large volumes—by truck or train—to reduce costs, which in turn reduces the workforce needed and the number of people at the warehouse and, in particular, near the refrigeration equipment. These factors reduce the risk of using R–717, compared with other applications where more people might be present such as an office building. Additionally, R–717 is considered by many users to be a cost-effective option for use in cold storage warehouses despite a higher capital cost for the equipment compared to HFC systems.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in new cold storage warehouse systems with refrigerant charge capacities greater than 200 pounds, and a GWP limit of 300 or greater for HFCs and blends containing HFCs used in new cold storage warehouses with refrigerant charge capacities less than 200 pounds and for the high temperature side of cascade systems. EPA is considering whether a GWP limit lower than the proposed limit of 300 would be appropriate for systems with smaller refrigerant charge capacities (*i.e.,* less than 200 pounds). Accordingly, EPA seeks comment on technical and design challenges that exist for such systems to use refrigerants with GWPs less than 150 and strategies that can be employed to mitigate these challenges.

d. Ice Rinks

Background on Ice Rinks

Ice rinks use equipment that move a fluid through pipes embedded in the concrete flooring of the facility to freeze layers of water. Ice rinks may be used by the public for recreational purposes as well as by professionals. These systems frequently use secondary loop refrigeration systems, in some cases consisting of a chiller along with associated pumps that move the chilled water or glycol working fluid. Another configuration sometimes used is a direct expansion system wherein the refrigerant flows under the ice and directly back to a compressor and condenser. System capacities vary based on the size of the ice rink and the required cooling load. Typical sizes for ice rink chillers are 50-, 100-, 150-, or 200-ton units. The ice surface is ideally maintained between 24 to 28 °F (−4.4 to −2.2 °C) depending on the application and users of the ice rink (*e.g.,* figure skating versus hockey).

Where local codes may not allow the use of ammonia in ice rinks, ice rinks first used ozone depleting CFC/HCFC refrigerants, such as R–22, before transitioning to high-GWP HFCs such as R–404A and R–507A.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Ice Rinks

EPA granted three petitions, submitted by EIA, CARB, and IIAR, which requested restrictions on the use of HFCs and blends containing HFCs for ice rinks. All three petitions requested that EPA establish a GWP limit of 150 for HFCs and blends containing HFCs used in new ice rinks with more than 50 pounds of refrigerant by January 1, 2024. EIA also requested that EPA establish a GWP limit of 750 for HFCs and blends containing HFCs used in retrofitted ice rinks with more than 50 pounds of refrigerant by January 1, 2024. Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for new ice rinks?

EPA is proposing to restrict the use of HFCs or blends containing HFCs that have a GWP of 150 or greater in new ice

[101] Ibid.

rink systems beginning January 1, 2025. These proposed GWP limits would apply to HFCs used in new ice rinks.

For its consideration of availability of substitutes under (i)(4)(B), EPA identified substitutes that are available in place of the substances that the Agency is proposing to restrict. These include R–717 (GWP 0), R–744 (GWP 1), and HCFO–1233zd(E) (GWP 3.7). R–471A (GWP 139) also meets the proposed GWP limit and can serve as a potential candidate for use in place of the substances that EPA is proposing to restrict.

Most new ice rinks use R–717 as a refrigerant due to its energy efficiency, while others are being designed to use R–744 and other lower-GWP substitutes.[102] Although R–717 is a B2L (higher toxicity, lower flammability) refrigerant, risks to the general public are addressed by confining the R–717 to separate equipment (*i.e.,* the high-side chiller) in locations with access limited to trained service personnel only. In TSDs submitted with their petition, CARB estimated that more than 80 percent of ice rinks in California use R–717.[103] According to EIA's petition, a majority of National Hockey League ice arenas also employ R–717, and the use of R–744 is becoming an increasingly popular option for ice rinks. This information indicates the technical achievability and commercial demand of substitutes.

As noted in this section above, other refrigerant options exist for new ice rinks that meet the proposed GWP limit. HCFO–1233zd(E) has been recently listed as acceptable through the SNAP program for use in new ice rinks. In areas where safety or toxicity reasons prevent the use of R–717, lower-GWP (hydrochlorofluoroolefin) HCFO or HFO chillers and lower-GWP transcritical R–744 systems are options available for use in ice rink systems. Further, EPA identified commercially available products containing some of these substitutes.[104]

What restrictions on the use of HFCs is EPA proposing for retrofitted ice rinks?

One granted petition contained a request for EPA to restrict the use of specific substances in retrofitted remote condensing (as described previously in this section). However, the Agency did not find specific information on available substitutes for retrofitted ice rinks, although the Agency is aware of possible substitutes (*e.g.,* R–450A and R–513A). EPA is therefore not proposing restrictions on the use of HFCs in retrofitted ice rinks. As noted earlier in the preamble, EPA does not intend to respond to any advance comments or information received regarding retrofitted ice rinks.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in new ice rinks.

e. Automatic Commercial Ice Machines

Background on Automatic Commercial Ice Machines

Automatic commercial ice machines (ACIM) are used in commercial establishments such as hotels, restaurants, and convenience stores to produce ice for consumer use. Many ACIM can be self-contained units, while some have the condenser separated from the portion of the machine making the ice and have refrigerant lines running between the two (referred to as remote-condensing ACIM). Self-contained or stand-alone units are a type of ACIM in which the ice-making mechanism and storage compartment are in an integral cabinet. Stand-alone ACIM contain both evaporator and condenser, have no external refrigerant connections, and are entirely factory-charged and factory-sealed with refrigerants. These types of systems are analogous to other types of stand-alone equipment like vending machines or refrigerated display cases. These types of systems generally have lower refrigerant charge sizes.

Like other types of remote-condensing RACHP equipment, remote-condensing ACIM utilize a split-system design where the evaporator (which freezes water into ice) is located indoors, while the condensing unit (which rejects heat to surrounding air) is located outdoors. In remote-compressor systems, the heat is still rejected in the indoor room but the compressor is located outdoors via interconnected refrigerant piping. These designs require field-assembled refrigerant piping to connect the indoor unit with the remote condensing unit, which significantly increases the overall refrigerant charge size required as compared to a self-contained system.

R–404A and R–410A are the most common HFC refrigerants used currently for ACIM and replaced the use of ozone depleting HCFCs such as R–22.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Automatic Commercial Ice Machines

EPA granted one petition which requested restrictions on the use of HFCs and blends containing HFCs for ACIM, which was submitted by AHRI. AHRI specifically requested that EPA establishes a GWP limit of 2,200 for HFCs and blends containing HFCs used in new ''ACIM'' [105] with charge sizes greater than 50 pounds excluding medical, scientific, and research applications by January 1, 2022. Additional information regarding this petition is available in the docket.

What restrictions on the use of HFCs is EPA proposing for automatic commercial ice machines?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for self-contained ACIM with charge sizes less than or equal to 500 grams beginning January 1, 2025. EPA is proposing to restrict the use of the following HFCs and blends containing HFCs in new self-contained ACIM with refrigerant charge capacities exceeding 500 grams beginning January 1, 2025: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B, R–407A, R–410A, R–442A, R–417C, R–407F, R–437A, R–407C, RS–24 (2004 formulation), and HFC–134a. EPA is proposing to restrict the use of the following HFCs and blends containing HFCs in new remote condensing ACIM beginning January 1, 2025: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B. These proposed restrictions would apply on the use of HFCs and blends containing HFCs used in new ACIM.

EPA is proposing three different sets of restrictions on the use of HFCs and blends containing HFCs in ACIM, depending on the type of ACIM. This distinction is based on EPA's current understanding of refrigerant options available for each type of ACIM due to revised industry safety standards. All categories of ACIM are covered by UL Standard 60335–2–89 Standard for Safety for Household and Similar Electrical Appliances—Safety—Part 2–

[102] Packages—Design and Build, Toromont|CIMCO Refrigeration. Available at: *https://www.cimcorefrigeration.com/packages-design-build.*

[103] *Staff Report: Initial Statement of Reasons,* CARB, October 2020. Available at: *https://ww2.arb.ca.gov/rulemaking/2020/hfc2020.*

[104] See the *Commercial Demands and Technological Achievability* TSD in the docket for additional information.

[105] EPA believes AHRI used ''ACIM'' to refer to automatic commercial ice machines and for the purposes of this proposed action, the Agency will be using that acronym.

89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor. UL 60335–2–89 2nd edition recently increased the allowable charge limits for flammable refrigerants in commercial refrigeration equipment, including both flammable (*i.e.,* ''A3'') refrigerants and lower-flammability (*i.e.,* ''A2L'') refrigerants. UL 60335–2–89 2nd edition increases the current charge limit for stand-alone systems using propane (R–290, A3) from a maximum of 150 grams per refrigerant circuit to a maximum of either 300 grams or 500 grams per refrigerant circuit, depending on construction. For stand-alone ACIM, the UL safety standard dictates a 300 gram limit for propane for ''packaged refrigerating units and appliances with doors and/or drawers enclosing one or more refrigerated compartments.'' (22.110 DV.2). This limit applies to ''unprotected'' designs where the refrigerant can leak into the ice storage bin. For protected units, in which the refrigerant cannot leak into the bin, then a 500 gram limit is allowed when using propane and a similar amount for other A3 refrigerants. Further, the UL standard restricts the allowable charge size of flammable refrigerant in these appliances for ''self-contained appliances used in a public corridor or lobby.'' (22.110 DV.2) Certain flammable refrigerants (*i.e.,* ''A3'' or ''A2'') are not allowed in any quantities in split-systems with field-constructed refrigerant piping. (22.110 DV.3)

Based on this reading of the industry safety standard, and other information related to the (i)(4)(B) factors contained in the docket, available substitutes for self-contained ACIM include R–290 (GWP 3) where the charge size is no more than 500 grams, and R–450A (GWP 601), and R–513A (GWP 630) where the charge size is above that amount. Substitute refrigerants R–455A (GWP 146), R–454C (GWP 146), and R–454A (GWP 237) also meet the proposed GWP limit and can serve as other potential candidates for use in place of the HFCs and blends containing HFCs that EPA is proposing to restrict in self-contained units, except that R–454A would not be allowed if the charge size was less than or equal to 500 grams. Refrigerants such as R–454B (GWP 465) and HFC–32 (GWP 675), which are being pursued for other R–410A applications, and R–448A (GWP 1386) and R–449A (GWP 1396), which are being pursued for other R–404A applications, are potential candidates for self-contained ACIM with charge sizes exceeding 500 grams. Available substitutes for remote condensing ACIM include R–448A, R–449A, R–449B, and HFC–134a.

EPA is not proposing a GWP limit for remote condensing ACIM and stand-alone ACIM with refrigerant charge capacities exceeding 500 grams in this action and instead is proposing to restrict the use of specific HFCs and blends containing HFCs. EPA believes a GWP limit of 2,200, as requested in a granted petition, is high compared to the GWP limits that the Agency is proposing in other commercial refrigeration applications. For remote condensing ACIM, the Agency intends to propose a GWP limit at a later time. Likewise, if EPA finalizes a restriction of specific HFCs and blends containing HFCs for standalone ACIM with charge sizes exceeding 500 grams, we intend to propose a GWP limit at a later time. In this action, EPA is proposing to restrict specific substances used in new remote condensing ACIM, and a separate set of specific substances used in new self-contained ACIM with refrigerant charge capacities exceeding 500 grams. As stated in section VII.B of this preamble, this approach—restricting specific substances instead of setting a GWP limit for a given subsector—gives EPA time to identify a GWP limit for this subsector while still restricting those substances that have the highest environmental impact.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on: proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in new self-contained ACIM with charge sizes less than or equal to 500 grams; proposing to restrict the use of R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B, R–407A, R–410A, R–442A, R–417C, R–407F, R–437A, R–407C, RS–24 (2004 formulation), and HFC–134a in new self-contained ACIM with charge sizes greater than 500 grams; and proposing to restrict the use of R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B in remote condensing ACIM. EPA is seeking comment on the types of ACIM and substitutes (*i.e.,* refrigerants) that may be used in each type of ACIM and whether certain aspects of the ACIM (*e.g.,* charge size, harvest rate) or refrigerant (*e.g.,* flammability classification, glide, discharge temperature) affect the alternatives that may be used. EPA is requesting comment on the charge size of 500 grams as the differentiation between the proposed 150 GWP limit and the proposed restricted substances for new standalone ACIM. EPA also requests comment on the proposed transition dates and the potential environmental benefits of finalizing a later transition date for one or more of these types of ACIM. For new standalone ACIM with a charge size greater than 500 grams, EPA is also considering a restriction based on a GWP limit, possibly higher than the 150 GWP limit proposed for other standalone ACIMs. We request comment on the advantages or disadvantages of both possible approaches as compared to the proposed restriction. For consideration in a subsequent rulemaking, EPA further seeks information on a GWP limit for new remote condensing ACIM.

f. Refrigerated Transport

Background on Refrigerated Transport

The refrigerated transport subsector primarily moves perishable goods (*e.g.,* food) and pharmaceuticals at temperatures between −22 °F (− 30 °C) and 61 °F (16 °C) by various modes of transportation, including roads, vessels, and intermodal containers. For this action, EPA is proposing three distinct subsectors: refrigerated transport—road, refrigerated transport—marine, and refrigerated transport—intermodal containers.

Refrigerated transport—road consists of refrigeration for perishable goods in refrigerated vans, trucks, or trailer-mounted systems and is the most common mode of refrigerated transport. This mode includes refrigerated trucks and trailers with a separate autonomous refrigeration unit with the condenser typically located at the front of a refrigerated trailer. This subsector also covers domestic trailer refrigeration units that contain an integrated motor (*i.e.,* does not require a separate electrical power system or separate generator set to operate) that are transported as part of a truck, on truck trailers, and on railway flat cars. Other types of containers, such as seagoing ones that are connected to a vessel's electrical system or require a separate generator that is not an integral part of the refrigeration unit to operate, are not included. This subsector also does not include: (i) refrigerated vans or other vehicles where a single system also supplies passenger comfort cooling, (ii) refrigerated containers that are less than 8 feet 4 inches in width, (iii)

refrigeration units used on containers that require a separate generator to power the refrigeration unit, or (iv) ship holds.

Refrigerated transport—marine consists of refrigeration for perishable goods on refrigerated vessels and various modes of transportation via water, including merchant, naval, fishing, and cruise-shipping. And lastly, refrigerated transport—intermodal containers are refrigerated containers that allow uninterrupted storage during transport on different mobile platforms, including railways, road trucks, and vessels.

Refrigerated transport equipment manufacturers have used HFC refrigerants, mainly R–404A and HFC–134a, after phasing out ozone depleting CFC and HCFC refrigerants such as R–12 and R–22.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Refrigerated Transport

EPA granted one petition which requested restrictions on the use of HFCs and blends containing HFCs for refrigerated transport, which was submitted by AHRI. AHRI specifically requested that EPA establish a GWP limit of 2,200 for HFCs and blends containing HFCs used in new ''transport refrigeration'' by January 1, 2023. Additional information from this petition available in the docket.

What restrictions on the use of HFCs is EPA proposing for refrigerated transport—road?

EPA is proposing to restrict the use of the following HFCs and blends containing HFCs in new refrigerated transport—road systems beginning January 1, 2025: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B.

Similar to EPA's approach in addressing use of HFCs and blends containing HFCs in remote condensing ACIM, EPA is not proposing a GWP limit for refrigerated transport—road in this action and instead is proposing to restrict the use of specific HFCs and blends containing HFCs. EPA believes a GWP limit of 2,200, as requested in a granted petition, is high compared to the GWP limit that the Agency is proposing in other commercial refrigeration applications, and the Agency intends to propose a GWP limit at a later time. In this action, EPA is proposing to restrict specific substances used in new refrigerated transport—road. As stated in section VII.B of this preamble, this approach—restricting specific substances instead of setting a GWP limit for a given subsector—gives EPA time to identify a GWP limit while still restricting those substances that have the highest environmental impact (*e.g.,* R–404A, with a GWP of 3,920, is a commonly used refrigerant in this subsector that EPA is proposing to restrict).

For its considerations of availability of substitutes under subsection (i)(4)(B), EPA identified substitutes that are available in place of the substances that EPA is proposing to restrict. These include R–744 (GWP 1), R–450A (GWP 601), R–513A (GWP 630), and R–452A (GWP 2,140). Cryogenic transport refrigeration systems and direct nitrogen expansion are other existing technologically achievable options. Cryogenic systems, in particular, cool cargo by injection of stored liquid R–744 or nitrogen (R–728) to the cargo space or an evaporator. These systems are used in small and large trucks, primarily in Northern Europe. In recent years manufacturers have also developed products containing the lower-GWP alternative R–452A. R–452A has similar properties to R–404A, including cooling capacity, reliability, refrigerant charge, non-flammability, and low compressor discharge temperatures, supporting its use as a lower-GWP and technologically achievable substitute. The two major U.S.-based manufacturers of refrigeration systems for refrigerated transport—road offer systems using R–452A, [106] [107] an indication of the commercial demands and technological achievability of units using one of the available substitutes.

What restrictions on the use of HFCs is EPA proposing for refrigerated transport—marine?

EPA is proposing to restrict the use of the following HFCs and blends containing HFCs in new refrigerated transport—marine systems beginning January 1, 2025: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B. Similar to refrigerated transport—road, EPA is not proposing a GWP limit at this time.[108] EPA's rationale for restricting specific substances in this subsector and not proposing a GWP limit can be found in section VII.B of this preamble, with additional information in section VII.F.3.e (under the proposed restrictions on the use of HFCs in ACIM).

Available substitutes that can be used in refrigerated transport—marine in place of the substances that EPA is proposing to restrict include R–744, R–450A, R–513A, and R–452A. Marine transport refrigeration systems cover a wide range of merchant, naval, fishing, and cruise-shipping applications and often require specialized and custom refrigeration solutions. Historically, this sector used R–22, R–404A, R–507, R–407C, and R–134a. Today, manufacturers market lower-GWP substitutes for marine applications such as R–717, R–744, and R–290. According to TEAP, HFC/HFO blends with lower GWPs may also be suitable for some applications and system designs.[109]

What restrictions on the use of HFCs is EPA proposing for refrigerated transport—intermodal containers?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for new refrigerated transport—intermodal containers beginning January 1, 2025.

For its considerations of availability of substitutes under subsection (i)(4)(B), EPA identified substitutes that are available in place of the substances that EPA is proposing to restrict. These include R–744 and R–450A. R–513A, R–513B, and R–456A are also potential candidates. According to one TEAP report, thousands of intermodal containers operating with R–744 were purchased or leased in 2016 and 2017.[110] Further, several manufacturers now offer intermodal containers using R–513A for new and retrofit applications.[111] [112] [113] Additionally, EPA

[106] Thermo King to Reduce Global Warming Potential of Transport Refrigeration by Nearly Fifty Percent, Thermo King, January 2022. Available at: *https://www.thermoking.com/na/en/newsroom/2022/01-jan/thermo-king-to-reduce-global-warming-potential-of-transport-refr.html.*

[107] *Carrier Transicold Strengthens Sustainability Initiatives with Lower GWP Refrigerant for North America Truck and Trailer Systems, Carrier Transicold,* December 2020. Available at: *https://www.carrier.com/truck-trailer/en/north-america/news/news-article/carrier_transicold_strengthens_sustainability_initiatives_with_lower_gwp_refrigerant_for_north_america_truck_and_trailer_systems.html.*

[108] See discussion in refrigerated transport—road for EPA's rationale for not proposing a GWP limit for this subsector.

[109] Refrigeration, Air Conditioning, and Heat Pumps Technical Options Committee 2018 Assessment Report, Technical and Economic Assessment Panel, UNEP, February 2019. Available at: *https://ozone.unep.org/sites/default/files/2019-04/RTOC-assessment-report-2018_0.pdf.*

[110] Ibid.

[111] Maersk Container Industry, Star Cool—Refrigerants. Available at: *https://www.mcicontainers.com/products/star-cool/refrigerants.*

[112] *Carrier Transicold Offers Lower GWP Refrigerant Option for PrimeLINE® Container Units,* Carrier Transicold, February 2018. Available at: *https://www.carrier.com/container-refrigeration/en/*

identified one manufacturer that offers an intermodal container using R–744.[114]

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 700 or greater for HFCs and blends containing HFCs used in new refrigerated transport—intermodal containers and proposing to restrict the use of R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B in marine and road applications. EPA is seeking comment on its subdivision of the refrigerant transport subsector and substitutes that may be used in each application. For consideration in a subsequent Agency action, EPA further seeks information on a GWP limit for marine and road applications in refrigerated transport.

g. Residential Refrigeration Systems

Background on Residential Refrigeration Systems

Household refrigerators, freezers, and combination refrigerator/freezers, grouped together in this preamble as ''residential refrigeration systems,'' are appliances intended primarily for residential use, although they may be used outside the home. The designs and refrigeration capacities of equipment vary widely. Household freezers only offer storage space at freezing temperatures, while household refrigerators only offer storage space at non-freezing temperatures. Products with both a refrigerator and freezer in a single unit are most common. For purposes of this proposed rule, other small refrigerated household appliances such as chilled kitchen drawers, wine coolers, and minifridges also fall within this subsector. Household refrigerators and freezers have all refrigeration components integrated, and for the smallest types, the refrigeration circuit is entirely brazed or welded. These systems are charged with refrigerant at the factory and typically require only an electricity supply to begin operation.

CFC–12 was a commonly used refrigerant in household refrigerators and freezers prior to the Montreal Protocol and CAA restrictions on CFCs. The household refrigeration industry transitioned to HFC–134a and HCs. According to the TEAP's 2022 progress report, R–600a (isobutane) is used in 75 percent of all new units globally with HFC–134a used in the remaining 25 percent.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Residential Refrigeration

EPA granted two petitions, submitted by NRDC and CARB, that requested restrictions on the use of HFCs and blends containing HFCs for household refrigerators and freezers. NRDC and CARB requested that EPA restrict specific HFCs and blends containing HFCs used in new household refrigerators and freezers applications, replicated from SNAP Rule 21. The petitions subdivided household refrigerators and freezers into ''household refrigerators and freezers—non-compact or built-in appliances,'' ''household refrigerators and freezers—compact,'' and ''household refrigerators and freezers—built in appliances'' but requested the same set of restrictions for each group. Specifically, the petitions requested that EPA restrict FOR12A, FOR12B, HFC–134a, KDD6, R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–407F, R–410A, R–410B, R–417A, R–421A, R–421B, R–422A, R–422B, R–422C, R–422D, R–424A, R–426A, R–428A, R–434A, R–437A, R–438A, R–507A, RS–24 (2002 formulation), RS–44 (2003 formulation), SP34E, and THR–03. NRDC's petition requested that these restrictions take effect on January 1, 2023, for all subsectors; CARB did not request a specific compliance date. Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for household refrigerators and freezers?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for residential refrigeration systems beginning January 1, 2025. EPA is proposing this same date for the entire subsector, including all subdivisions differentiated in the petitions. This GWP limit would apply to new residential refrigeration systems.

For its consideration of the availability of substitutes under subsection (i)(4)(B), EPA identified substitutes that are available in place of the substances that EPA is proposing to restrict. These include R–290 (GWP 3), R–600a (GWP <1), R–441A (GWP 3), and HFC–152a (GWP 124).

According to the TEAP and its Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee (RTOC), R–600a is the main energy-efficient and cost-competitive alternative used in domestic refrigeration as it is ''. . . the ideal refrigerant for domestic refrigeration products, giving roughly 5 percent higher efficiency than HFC–134a while at the same time reducing the noise level of the unit.'' [115] This report also indicated that globally domestic refrigerators are predominantly using R–600a. For the U.S. market, RTOC reports ''substantial progress is being made to convert from HFC–134a to R–600a with the market introduction of small refrigerators and freezer[s] that typically do not use electric defrost. During recent years, this conversion has progressed'' and noted ''[a] major U.S. manufacturer introduced auto-defrost refrigerators using R–600a refrigerant to the U.S. market as early as in 2010.''

Several states and other countries have banned the use of HFC–134a refrigerant in household refrigerator-freezers. The states/commonwealths of California, Colorado, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Rhode Island, Virginia, Vermont, and Washington all have legal restrictions on refrigerator-freezers beginning 2021 through 2023. The EU has prohibited refrigerants that contain HFCs with a GWP greater than 150 in household refrigerator-freezers since January 1, 2015.[116] Commercially available and technologically achievable lower-GWP technologies are already being sold in these markets to comply with regulatory requirements.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in new residential refrigeration systems.

h. Chillers

Background on Chillers

A chiller is a type of equipment using refrigerant to typically cool water or a brine solution that is then pumped to fan coil units or other air handlers to

worldwide/news/news-article/carrier_transicold_offers_lower_gwp_refrigerant_option_for_primeline_container_units.html.

[113] Thermo King, *Container Fresh and Frozen.* Available at: *https://www.thermoking.com/na/en/marine/refrigeration-units/container-fresh-and-frozen.html.*

[114] Carrier Transicold ''*NaturaLINE*'' products. Additional information available at: *https://www.carrier.com/container-refrigeration/en/worldwide/products/Container-Units/naturaline/.*

[115] TEAP 2022 Progress Report (May 2022) and 2018 Quadrennial Assessment Report are available at: *https://ozone.unep.org/science/assessment/teap;* the 2018 Quadrennial Assessment Report includes sections for each of the TOCs: Flexible and Rigid Foams TOC, Halons TOC, Methyl Bromide TOC, Medical and Chemicals TOC, and Refrigeration, Air Conditioning and Heat Pumps TOC.

[116] For additional information, please refer to the EU legislation to control F-gases web page available at: *https://ec.europa.eu/clima/eu-action/fluorinated-greenhouse-gases/eu-legislation-control-f-gases_en.*

cool the air that is supplied to the occupied spaces. The heat absorbed by the water or brine can then be used for heating purposes and/or can be transferred directly to the air (''air-cooled''), to a cooling tower or body of water (''water-cooled''), or through evaporative coolers (''evaporative-cooled''). A chiller or group of chillers are similarly used for district cooling where a chiller plant cools water or another fluid that is then pumped to multiple locations being served, such as several buildings within the same complex. Chillers may also be used to maintain operating temperatures in various types of buildings, for example, in data centers, server farms, and agricultural/food operations.

Chillers are also used to cool process streams in industrial applications; in such instances, these are regulated as ''chillers for industrial process refrigeration'' as discussed here and not as ''industrial process refrigeration'' as discussed in section VII.F.3.a of this preamble. Chillers are also used for comfort cooling of operators or climate control and protecting process equipment in industrial buildings, for example, in industrial processes when ambient temperatures could approach 200 °F (93 °C) and corrosive conditions could exist.

There are several different types of mechanical, commercial comfort cooling AC systems known as chillers, which use refrigerants in a vapor compression cycle or by alternative technologies. Vapor compression chillers can be categorized by the type of compressor, including centrifugal, rotary, screw, scroll, and reciprocating compressors. The last four compressor types are also called positive displacement chillers.

Centrifugal chillers utilize a centrifugal compressor in a vapor-compression refrigeration cycle. They are typically used for commercial comfort AC although other uses exist. Centrifugal chillers tend to be used in larger buildings and can be found in office buildings, hotels, arenas, convention halls, airport terminals, and other occupied buildings.

Positive displacement chillers utilize positive displacement compressors such as reciprocating, screw, scroll, or rotary types. Positive displacement chillers are applied in similar situations as centrifugal chillers, again primarily for commercial comfort AC, except that positive displacement chillers tend to be used for smaller capacity needs such as in mid- and low-rise buildings.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Chillers

EPA granted four petitions, submitted by CARB, EIA, NRDC, and IIAR, which requested restrictions on the use of HFCs for applications related to chillers for comfort cooling. EPA also granted five petitions which requested restrictions on the use of HFCs for chillers for IPR; these were submitted by AHRI, CARB, EIA, and IIAR (two petitions).

For chillers used for comfort cooling, CARB and NRDC individually petitioned EPA to restrict specific substances in new centrifugal chillers and in new positive displacement chillers.[117] In new centrifugal chillers, these substances are FOR12A, FOR12B, HFC–134a, HFC–227ea, HFC–236fa, HFC–245fa, R–125/134a/600a (28.1/70/1.9), R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–410A, R–410B, R–417A, R–421A, R–422B, R–422C, R–422D, R–423A, R–424A, R–434A, R–438A, R–507A, RS–44 (2003 composition), and THR–03. In new positive displacement chillers, these are: FOR12A, FOR12B, HFC–134a, HFC–227ea, KDD6, R–125/134a/600a (28.1/70/1.9), R–125/290/134a/600a (55.0/1.0/42.5/1.5), R–404A, R–407C, R–410A, R–410B, R–417A, R–421A, R–422B, R–422C, R–422D, R–424A, R–434A, R–437A, R–438A, R–507A, RS–44 (2003 composition), SP34E, and THR–03. NRDC's petition requested a compliance date of January 1, 2024.

EIA and IIAR separately requested that EPA establish a GWP limit of 750 for new chillers used in the air conditioning sector with a compliance date of January 1, 2024.

For new chillers used for IPR, AHRI, CARB, EIA, and IIAR (two petitions) requested that EPA establish GWP limits. AHRI requested for a GWP limit of 750 for all chillers but requested a compliance date of January 1, 2024, for ''chillers (designed for chilled fluid leaving temperature >+35 °F)'' and a January 1, 2026, compliance date for other types of chillers.[118] CARB and EIA separately petitioned EPA to establish a GWP limit of 750 for ''chillers for industrial process refrigeration (new, minimum evaporator temp designed for >35 °F)''; a GWP limit of 1,500 for ''chillers for industrial process refrigeration (new, minimum evaporator temp designed for −10 °F to 35 °F)''; and a GWP limit of 2,200 for ''chillers for industrial process refrigeration (new, minimum evaporator temp designed for −58 °F to −10 °F).'' EIA's petition specifies a compliance date of January 1, 2024, for these chillers.

IIAR's first petition requested that EPA establish a GWP limit of 150 for ''chillers for industrial process refrigeration (>50 lbs)'' with a compliance date of January 1, 2026. In a second petition, IIAR requested that EPA establish the same limit for ''chillers for industrial process refrigeration (>200 lbs),'' but a GWP limit of 300 for ''chillers for industrial process refrigeration (<200 lbs).'' [119]

Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for chillers—comfort cooling?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for chillers—comfort cooling beginning January 1, 2025. This proposed GWP limit would apply to new equipment for all compressor types of chillers—comfort cooling, *i.e.,* centrifugal and positive displacement (including reciprocating, screw, scroll and rotary) chillers.

For its consideration of the availability of substitutes under subsection (i)(4)(B), EPA identified several substitutes that are available in place of the substances that EPA is proposing to restrict. These include HCFO–1224yd(Z) (GWP 1), HCFO–1233zd(E) (GWP 3.7), HFO–1234yf (GWP <1), HFO–1234ze(E) (GWP <1), R–514A (GWP 3), R–454C (GWP 146), R–515B (GWP 287), R–454B (GWP 465), R–450A (GWP 601), R–513A (GWP 630), and HFC–32 (GWP 675). Chillers for comfort cooling that use lower-GWP substitutes are currently available in both U.S. and international markets. Specifically, in the United States, scroll, other positive displacement, and centrifugal chillers using HCFO–1233zd(E), HFO–1234ze(E), HFC–32, R–454B, R–513A, R–514A, and R–515B are commercially available. Under the SNAP program, EPA recently proposed to expand the list of substitutes listed as acceptable for chillers, and EPA anticipates these substitutes could be used as substitutes to higher-GWP HFCs and blends containing HFCs.[120]

[117] NRDC's petition, available in Docket ID No. EPA–HQ–OAR–2021–0289, excludes those substances subject to narrowed use limits in the previously vacated SNAP Rule 21.

[118] See AHRI's petition received by EPA on August 19, 2021, available at *www.regulations.gov,* under Docket ID No. EPA–HQ–OAR–2021–0289, for other chiller types identified in their petition.

[119] EPA assumes that the ''50 lbs'' and ''200 lbs'' weight denoted in IIAR's petition refers to the refrigerant charge capacity of the system.

[120] See proposed SNAP Rule 25. EPA has proposed listing R–454A (GWP 237), R–454B (GWP

What restrictions on the use of HFCs is EPA proposing for chillers—industrial process refrigeration?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for chillers—industrial process refrigeration beginning January 1, 2025. This proposed GWP limit would apply to new equipment, except for new equipment where the temperature of the chilled fluid leaving the chiller (*i.e.,* the supply temperature to the facility) is less than –58 °F (-50 °C). These lower temperature units are excluded from this proposal.

For its consideration of the availability of substitutes under subsection (i)(4)(B), EPA identified substitutes that are available in place of the substances that EPA is proposing to restrict. These include R–717 (GWP 0), R–744 (GWP 1), R–1270 (GWP 2), R–290 (GWP 3), R–600 (GWP 4), R–450A (GWP 601), and R–513A (GWP 630). Chillers for IPR that use lower-GWP substitutes are currently available in both U.S. and international markets. In the United States, chillers for IPR using R–717, R–290, R–744, and R–513A are all available on the market. Internationally, equipment using R–1270 is available as well.

The proposed GWP limit of 700 for chillers for IPR would enable the use of available substitutes to manage safety (in particular, flammability and toxicity), efficiency, capacity, temperature glide, and other performance factors. In evaluating safety in terms of availability of substitutes for chillers for IPR, EPA notes there may be situations in which the use of hydrocarbons or R–717 may be limited due to safety concerns around flammability and toxicity risks and therefore is proposing a GWP limit that expands the number of refrigerant options for this subsector.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 700 or greater for HFCs and blends containing HFCs used in new chillers—comfort cooling and chillers—IPR. For consideration in a subsequent rulemaking, EPA is seeking comment on a lower GWP limit to propose for both subsectors. EPA is also seeking comment on its subdivision of the chiller subsector.

465), R–452B (GWP 698), and HFC–32 (GWP 675) as acceptable for chillers—comfort cooling (87 FR 45508, July 28, 2022).

i. Residential and Light Commercial Air Conditioning and Heat Pumps

Background on Residential and Light Commercial Air Conditioning and Heat Pumps

The residential and light commercial air conditioning and heat pumps subsector includes equipment for cooling air in individual rooms, single-family homes, and small commercial buildings. Heat pumps are equipment types that heat, or have the option to either cool or heat, air for such locations. This subsector differs from commercial comfort air conditioning, which uses chillers that cool water that is then used to cool air throughout a large commercial building, such as an office building or hotel. The residential and light commercial air conditioning and heat pumps subsector includes both self-contained and split systems. Self-contained systems include some rooftop AC units (*e.g.,* those ducted to supply conditioned air to multiple spaces) and many types of room ACs, including packaged terminal air conditioners (PTACs), packaged terminal heat pumps (PTHPs), some rooftop AC units, window AC units, portable room AC units, and wall-mounted self-contained ACs, designed for use in a single room. Split systems include ducted and non-ducted mini-splits (which might also be designed for use in a single room), multi-splits and variable refrigerant flow (VRF) systems, and ducted unitary splits. Water-source and ground-source heat pumps often are packaged systems similar to the self-contained equipment described in this section above but could be applied with the condenser separated from the other components, similar to split systems. Examples of equipment for residential and light commercial AC and heat pumps include the following:

- Central air conditioners, also called unitary AC or unitary split systems. These systems include an outdoor unit with a condenser and a compressor, refrigerant lines, an indoor unit with an evaporator, and ducts to carry cooled air throughout a building. Central heat pumps are similar but offer the choice to either heat or cool the indoor space;
- Multi-split air conditioners and heat pumps. These systems include one or more outdoor unit(s) with a condenser and a compressor and multiple indoor units, each of which is connected to the outdoor unit by refrigerant lines. Non-ducted multi-splits provide cooled or heated air directly from the indoor unit rather than providing the air through ducts;
- Mini-split air conditioners and heat pumps. These systems include an outdoor unit with a condenser and a compressor and a single indoor unit that is connected to the outdoor unit by refrigerant lines. Non-ducted mini-splits provide cooled or heated air directly from the indoor unit rather than being carried through ducts;
- Rooftop AC units. These are units that combine the compressor, condenser, evaporator, and a fan for ventilation in a single package and may contain additional components for filtration and dehumidification. Most units also include dampers to control air intake. Rooftop AC units cool or heat outside air that is then delivered to the space directly through the ceiling or through a duct network. Rooftop AC units are common in small commercial buildings such as a single store in a mall with no indoor passageways between stores. They can also be set up in an array to provide cooling or heating throughout a larger commercial establishment such as a department store or supermarket;
- Window air conditioners. These are self-contained units that fit in a window with the condenser extending outside the window;
- PTACs and PTHPs. These are self-contained units that consist of a separate, un-encased combination of heating and cooling assemblies mounted through a wall. PTACs and PTHPs are intended for use in a single room and do not use ducts to carry cooled air or have external refrigerant lines. Typical applications include motel or dormitory air conditioners;
- Portable room air conditioners. These are self-contained units that are designed to be moved easily from room to room, usually having wheels. They may contain an exhaust hose that can be placed through a window or door to eject heat to the outside;
- Water-source heat pumps (WSHPs) and ground-source heat pumps (GSHPs). These are similar to unitary split systems except that heat is ejected (when in cooling mode) from the condenser through a second circuit rather than directly with outside air. The second circuit transfers the heat to the ground, groundwater, or another body of water such as a lake using water, or a brine if temperatures would risk freezing. Some systems can perform heating in a similar matter with the refrigerant circuit running in reverse; regardless, the term ''heat pump'' is most often used; and
- Variable refrigerant flow/variable refrigerant volume systems. These are engineered direct expansion (DX) multi-split systems incorporating the following: a split system air-conditioner or heat pump incorporating a single

refrigerant circuit that is a common piping network to two or more indoor evaporators each capable of independent control, or compressor units. VRF systems contain a single module outdoor unit or combined module outdoor units with at least one variable capacity compressor that has three or more stages, with air or water as the heat source.

All of these types of air-conditioning equipment would be subject to the restrictions on the use of HFCs under this proposal, if finalized.

Common HFCs and blends containing HFCs used in mini-splits, multi-splits, unitary splits, and VRF are R–410A and to a lesser extent, R–407C, with GWPs of 2,090 and 1,770, respectively. Residential split systems are commonly shipped with a refrigerant charge that is then ''balanced'' by the technician once the equipment is installed in its place of use. Larger commercial sized units often are not pre-charged with refrigerant but may contain a nitrogen ''holding charge'' for shipping.

Other types of equipment, such as window air conditioners, PTACs, PTHPs, rooftop AC units, portable room air conditioners, and often GSHPs and WSHPs, are self-contained equipment with the condenser, compressor, evaporator, and tubing all within casing in a single unit. Such self-contained equipment is generally charged with refrigerant in a factory and later installed in its place of use. Common HFCs and blends containing HFCs used in such equipment include R–410A and R–134a.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Residential and Light Commercial Air Conditioning and Heat Pumps

EPA granted petitions submitted by EIA, AHRI, CARB, and AHAM which requested restrictions on the use of HFCs in the residential and light commercial air conditioning and heat pump subsector. EIA's petition refers to this category as ''residential and non-residential''; AHRI refers to this category as ''residential and light commercial''; and CARB, in its recently finalized regulation, refers to the ''specific end-uses'' of ''room/wall/window air-conditioning equipment, PTACs, PTHPs, portable air-conditioning equipment,'' and ''other air-conditioning (new) equipment, residential and nonresidential.'' [121] AHAM did not refer to this category in general but rather specifically requested restrictions on the use of HFCs for room ACs with and without electric heat and a capacity of 25,000 Btu/hr or less and for portable ACs. For the purposes of this action, EPA is considering this equipment under the subsector ''residential and light commercial air conditioning and heat pumps.''

The EIA, CARB, and AHRI petitions requested a GWP limit of 750 for HFCs used in this subsector with a compliance date of January 1, 2025, for most types of equipment and January 1, 2026, for VRF systems. CARB also requested a 750 GWP and compliance date of January 1, 2023, for window, room and portable ACs.

AHAM requested a GWP limit of 750 for substances used in portable ACs and in the two types of room ACs included in their petition, with two separate compliance deadlines—January 1, 2023, for portable ACs and for room ACs without electric heat and a capacity of 25,000 Btu/hr or less and January 1, 2024, for room ACs with electric heat and a capacity of 25,000 Btu/hr or less. AHAM requested that room AC products with a capacity over 25,000 Btu/hr be excluded from restrictions, since these products require charge sizes that for flammable refrigerants would exceed the limits allowed in UL Standard 60335–2–40, are hermetically sealed, and comprise less than 2 percent of total shipments. Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for residential and light commercial air-conditioning and heat pumps?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for new residential and light commercial air-conditioning units and heat pumps beginning January 1, 2025. For new VRF systems, EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater beginning January 1, 2026.

EPA is proposing to prohibit the use of regulated substances that have a GWP of 700 or greater, in part, because there are multiple lower-GWP substitutes available for use or will soon be available for use in residential and light commercial air-conditioning and heat pump applications. For example, R–452B, HFC–32, and R–454B have respective GWPs of approximately 698, 675, and 465, respectively, and are acceptable for use under the SNAP program. Considering the lack of refrigerants with a GWP between 700 and 750, EPA is proposing to base its GWP cutoff at 700 rather than at 750.

EPA is proposing to prohibit HFCs and blends containing an HFC in new residential and light commercial AC and heat pumps by January 1, 2025, and in new VRF systems by January 1, 2026, depending on the specific application. January 1, 2025, is roughly three and a half years after EPA's SNAP program issued listings allowing use of five lower-GWP refrigerants for residential and light commercial AC and heat pumps. Further, EPA anticipates that states will adopt the 2021 revised versions of the International Building Code and the Residential Building Code that allows for use of several lower-GWP refrigerants that exhibit lower flammability (2L flammability classification). EPA understands that by 2025 building codes may be updated or updates will be under consideration which is relevant for some but not all of the potential lower-GWP HFC refrigerants and other non-HFC substitutes. Several OEMs have also indicated that they intend to switch to using A2L refrigerants (*e.g.,* R–454B, HFC–32) once relevant codes have been updated to allow their use.[122] [123]

In the case of VRF systems, the petitioner AHRI suggested a later date of January 1, 2026. EPA agrees that more time is required for this subsector as these AC systems are larger and more complicated—this additional time is needed for designing, testing, and implementing the use of substitutes in these systems. EPA notes that California has already adopted these dates for a transition to lower-GWP refrigerants; thus, if EPA adopts the same dates for this subsector, this would allow for consistency nationwide.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 700 or greater for HFCs and blends containing HFCs used in residential and light commercial air-conditioning units and heat pumps and proposing a GWP limit of 700 for VRF systems. EPA is also seeking comment on the additional year proposed for VRF systems. Further, EPA is seeking comment on whether the Agency should provide an exception for room AC products with a capacity over 25,000 Btu/hr, or some other threshold, and any issues that these products may

[121] California Code of Regulations, Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End-uses. Available at: *https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2020/hfc2020/frorevised.pdf.*

[122] Turpin, J., R–454B Emerges as a Replacement for R–410A, ACHR News, August 2020. Available at: *https://www.achrnews.com/articles/143548-r-454b-emerges-as-a-replacement-for-r-410a.*

[123] Turpin, J., Manufacturers Eye R–32 to Replace R–410A, ACHR News, August 2020. Available at: *https://www.achrnews.com/articles/143422-manufacturers-eye-r-32-to-replace-r-410a.*

face in using substitutes with GWPs less than 700.

j. Residential Dehumidifiers

Background on Residential Dehumidifiers

Residential dehumidifiers are primarily used to remove water vapor from ambient air or directly from indoor air for comfort or material preservation purposes in the context of the home. While AC systems often combine cooling and dehumidification, residential dehumidifiers only serve the latter purpose and are often used in homes for comfort purposes. This equipment is self-contained and circulates air from a room, passes it through a cooling coil, and collects condensed water for disposal.

Some dehumidifiers for residential or light commercial use are integrated with the space air-conditioning equipment, for instance via a separate bypass in the duct through which air is dehumidified, a dehumidifying heat pipe across the indoor coil, or other types of energy recovery devices that move sensible and/or latent heat between air streams (*e.g.,* between incoming air and air vented to the outside). EPA includes this subsector under residential or light commercial AC system or heat pump.

Similar to other subsectors under residential and light commercial AC and heat pumps, the majority of residential dehumidifiers introduced previously used R–410A to originally replace R–22.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Residential Dehumidifiers

EPA granted petitions submitted by CARB and AHAM which requested restrictions on the use of HFCs for residential dehumidifiers. The CARB petition requested a GWP limit of 750 as of January 1, 2023, for HFCs used in this subsector. The AHAM petition also requested a GWP limit of 750 and requested a compliance date of two years after EPA approval of HFC–32 refrigerant for dehumidifiers. EPA understands this latter request as referring to the two years after the date that EPA finalizes an acceptable listing for HFC–32 in residential dehumidifiers under the SNAP program. Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for residential dehumidifiers?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 700 or greater for residential dehumidifiers beginning January 1, 2025. This proposed GWP limit would apply to new residential dehumidifiers.

EPA is proposing to restrict the use of regulated substances that have a GWP greater than 700 because there are refrigerants listed as acceptable under the SNAP program, or refrigerants that have been proposed to be listed as acceptable, that have GWPs of 700 or lower. For example, R–513A with a GWP of 630 is listed as acceptable. Through a separate rulemaking under the SNAP program, EPA has also proposed to list as acceptable, subject to use conditions, refrigerants such as R–452B, HFC–32, and R–454B, with respective GWPs of approximately 698, 675, and 465 (87 FR 45508, July 28, 2022).

EPA is proposing to restrict the use of regulated substances in residential dehumidifiers as of January 1, 2025. CARB petitioned EPA for January 1, 2023, as the date for restrictions of HFCs for this subsector; however, that date would not be allowable under subsection (i)(6) of the AIM Act. AHAM's petition requested that EPA establish a compliance date that is two years after the date that EPA would finalize an acceptable listing for HFC–32. As noted, EPA has issued the proposed rule and intends to finalize a rule in 2023. EPA is not tying the proposed date for compliance with a restriction under this subsection of the AIM Act for dehumidifiers to the timing for the issuance of a final rule under the SNAP program. However, EPA is proposing a date that is consistent with most other dates for restrictions in this proposed rule; EPA is proposing restrictions on HFCs in this subsector that would apply beginning January 1, 2025. That said, the Agency will keep abreast of the relevant SNAP rulemakings.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 700 or greater for HFCs and blends containing HFCs used in residential dehumidifiers.

k. Motor Vehicle Air Conditioning (MVAC)

Background on MVAC

MVAC systems cool the passenger compartment of light-duty (LD) vehicles, heavy-duty (HD) vehicles (*e.g.,* large pick-ups, delivery trucks, and semi-trucks), nonroad (also called off-road) vehicles, buses, and passenger rail vehicles. Systems used to cool passenger compartments in LD, HD, and nonroad vehicles are typically charged during vehicle manufacture and the main components are connected by flexible refrigerant lines. The vehicle types that are addressed in this action include passenger cars (including electric and hybrid passenger cars) and light-duty trucks,[124] referred to jointly in this action as LD vehicles, limited types of HD vehicles (*i.e.,* medium-duty passenger vehicles (MDPVs),[125] HD pickup trucks, and complete HD vans), and certain nonroad vehicles (*i.e.,* agricultural tractors greater than 40 HP; self-propelled agricultural machinery; compact equipment; construction, forestry, and mining equipment; and commercial utility vehicles (UTVs)).

The vehicle types covered in this proposed rule include LD, MD, and HD hybrids, plug-in hybrid electric vehicles (PHEVs), electric vehicles (EVs), and fuel cell vehicles (FCVs).[126] Hybrids, PHEVs and EVs are currently a small portion of the fleet but are expected to grow rapidly, as most manufacturers have made recent public announcements committing to billions of dollars in research towards electrification, and in some cases, manufacturers have announced specific targets for entirely phasing out internal combustion engines.[127] [128] [129] [130] For example, more than 300,000 EVs, PHEVs, and FCVs were produced in the 2020 model year (MY).[131] Of those vehicles, about 78 percent were EVs, 22 percent were PHEVs, less than 1 percent were FCVs. As more EVs are introduced into the market, use of heat pumps will

[124] Defined at 40 CFR 86.1803–01.

[125] Ibid.

[126] Hybrid vehicles store some propulsion energy in a battery, and often recapture braking energy, allowing for a smaller, more efficiently operated engine. Plug-in hybrids operate similarly to hybrids but their batteries can be charged from an external source of electricity, and generally have a longer electric only operating range. Electric vehicles operate only on energy stored in a battery that is charged from an external source of electricity, and rely exclusively on electric motors for propulsion instead of an internal combustion engine. Fuel cell vehicles use a fuel cell stack to create electricity from an onboard fuel source (usually hydrogen), which then powers an electric motor or motors to propel the vehicle.

[127] EPA, 2021. The 2021 EPA Automotive Trends Report. Available at: *https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013L1O.pdf.*

[128] U.S. Department of Energy. Model Year 2022 Alternative Fuel and Advanced Technology Vehicles. Available at: *https://afdc.energy.gov/vehicles/search/download.pdf?year=2022.*

[129] U.S. Department of Energy. Electric Vehicle Basics. Available at: *https://afdc.energy.gov/files/u/publication/electric_vehicles.pdf.*

[130] Preston, B., Bartlett, J. ''Automakers Are Adding Electric Vehicles to Their Lineups. Here's What's Coming.'' Consumer Reports. Available at: *https://www.consumerreports.org/hybrids-evs/why-electric-cars-may-soon-flood-the-usmarket-a9006292675/.*

[131] EPA, 2021. The 2021 EPA Automotive Trends Report. Available at: *https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013L1O.pdf.*

increase to redirect heat into vehicle cabins and control temperatures. This may lead to the development of more energy efficient, alternative refrigerants and technologies (*e.g.,* dual-loop systems) for EV MVAC systems and heat pumps in electrified vehicles, similar to SAE International's current, industry-led Cooperative Research Program assessing alternative refrigerants for heat pumps.[132] [133]

Vehicle Weight Classification

TABLE 5—VEHICLE WEIGHT CLASSIFICATION

Class	Light-duty vehicles	Heavy-duty vehicles						
	1–2a	2b & MDPV	3	4	5	6	7	8
GVWR (lb)	<8,500	8,501–10,000	10,001–14,000	14,001–16,000	16,001–19,500	19,501–26,000	26,001–33,000	>33,000

Vehicle weight classes and categories are used by the Federal Highway Administration, the U.S. Census Bureau, and EPA. The vehicle weight classes are defined by the Federal Highway Administration and are used consistently throughout the industry. These classes, 1 through 8, are based on gross vehicle weight rating (GVWR), the maximum weight of the vehicle, as specified by the manufacturer. GVWR includes total vehicle weight plus fluids, passengers, and cargo. EPA defines vehicle categories, also by GVWR, for the purposes of emissions and fuel economy certification. As illustrated in Table 5, EPA classifies vehicles as LD (GVWR <8,500 pounds) or HD (GVWR >8,501 pounds). MDPVs, HD pickup trucks, and complete HD vans are Class 2b and 3 vehicles with GVWRs between 8,501 and 14,000 pounds. MDPVs are classified as HD vehicles based on their GVWR, but due to their similarities to LD vehicles they are subject to the GHG emissions standards established for LD trucks.

The HD vehicle types addressed in this action (*i.e.,* MDPVs, HD pickup trucks, and HD vans) are technologically similar to LD vehicles and most are manufactured by companies with major LD markets in the United States and in a similar manner to LD vehicles.[134] Ford, General Motors, and Stellantis (formerly Fiat Chrysler Automobiles) produce approximately 100 percent of HD pickup trucks and approximately 95 percent of HD vans, with Mercedes-Benz (formerly Daimler) and Nissan producing the remaining approximately five percent of HD vans.[135] In many cases, these types of HD vehicles are versions of their LD counterparts.[136] [137] The primary difference between HD pickup trucks and vans and their LD counterpart vehicles is that HD pickups and vans are occupational or work vehicles that are designed for much higher towing and payload capabilities than are LD pickups and vans.

Complete vehicles are sold by vehicle manufacturers to end-users with no secondary manufacturer making substantial modifications prior to registration and use. Incomplete vehicles are sold by vehicle manufacturers to secondary manufacturers without the primary load-carrying device or container attached. With regard to HD pickup trucks and vans, 90 percent are sold as complete vehicles while only 10 percent are sold as incomplete (80 FR 40331, July 13, 2015). Of the 10 percent of HD pickups and vans that are sold as incomplete vehicles to secondary manufacturers, about half are HD pickup trucks and half are HD vans.

Examples of modifications by secondary manufacturers to HD pickup trucks are installing a flatbed platform or tool storage bins. EPA is not aware of any equipment added by a secondary manufacturer to an incomplete HD pickup truck that would result in a secondary manufacturer modifying or adjusting the already installed MVAC system to provide cooling capacity.

Nonroad Vehicles

Nonroad vehicles can be grouped into several categories (*e.g.,* agriculture, construction, recreation, and many other purposes).[138] The nonroad vehicles addressed in this action are:

- Agricultural tractors greater than 40 HP (including two-wheel drive, mechanical front-wheel drive, four-wheel drive, and track tractors) that are used for various agricultural applications such as farm work, planting, landscaping, and loading; [139] [140]
- Self-propelled agricultural machinery (including combines, grain and corn harvesters, sprayers, windrowers, and floaters) that are primarily used for harvesting, fertilizer, and herbicide operations; [141]
- Compact equipment (including mini excavators, turf mowers, skid-steer loaders, and tractors less than 40 HP) that are primarily used for agricultural operations and residential, commercial, and agricultural landscaping; [142]
- Construction, forestry, and mining equipment (including excavators, bulldozers, wheel loaders, feller bunchers, log skidders, road graders, articulated trucks, sub-surface machines, horizontal directional drill, trenchers, and tracked crawlers) that are primarily used to excavate surface and subsurface materials during construction, landscaping, and road maintenance and building; [143] and
- Commercial UTVs that are primarily used for ranching, farming, hunting/fishing, construction,

[132] Volume 1: Progress Report, Technology and Economic Assessment Panel, UNEP, September 2021. Available at: *https://ozone.unep.org/system/files/documents/TEAP-2021-Progress-report.pdf.*

[133] SAE International, 2022. Thermal Management Refrigerant Cooperative Research Program.

[134] This is more broadly true for HD pickup trucks than vans because every manufacturer of HD pickup trucks also makes LD pickup trucks, while only some HD van manufacturers also make LD vans. (80 FR 40148, July 13, 2015).

[135] EPA, 2016. Regulatory Impact Analysis: Proposed Rulemaking for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles–Phase 2. August 2016. Available at: *https://nepis.epa.gov/Exe/ZyPDF.cgi/P100P7NS.PDF?Dockey=P100P7NS.PDF.*

[136] ICCT, 2015. International Council on Clean Transportation: Regulatory Considerations for Advancing Commercial Pickup and Van Efficiency Technology in the United States. Available at: *https://theicct.org/publication/regulatory-considerations-for-advancing-commercial-pickup-and-van-efficiency-technology-in-the-united-states/.*

[137] U.S. News, 2022. What Makes a Pickup Truck Heavy Duty? Available at: *https://cars.usnews.com/cars-trucks/what-makes-trucks-heavy-duty.*

[138] EPA, 2021. Basic Information about the Emission Standards Reference Guide for On-road and Nonroad Vehicles and Engines. Available online at *https://www.epa.gov/emission-standards-reference-guide/basic-information-about-emission-standards-reference-guide-road* and at *https://nepis.epa.gov/Exe/ZyPDF.cgi/P100K5U2.PDF?Dockey=P100K5U2.PDF.*

[139] Wagner, 2021. May 24, 2021, email from John Wagner of the Association of Equipment Manufacturers to EPA. Available in the docket.

[140] AEM, 2021. Appendix A: Machine Forms as Classified by AEM Membership. Available in the docket.

[141] Ibid.

[142] Ibid.

[143] Ibid.

landscaping, property maintenance, railroad maintenance, forestry, and mining.[144]

These nonroad vehicles are almost exclusively used and operated by professionals (*e.g.,* agricultural owners or skilled employees/operators) and vary by size, weight, use, and/or horsepower.[145] For example, commercial UTVs typically weigh between 1,200 and 2,400 pounds, while agricultural tractors >40 HP typically weigh between 39,000 and 50,000 pounds.[146] [147] MVAC systems in these nonroad vehicles can have charge sizes ranging from 650 grams (23 ounces) to 3,400 grams (120 ounces) depending on the manufacturer and cab size, compared to a range of 390 grams (14 ounces) to 1,600 grams (56 ounces) for MVAC systems in light and medium duty passenger vehicles, HD pickups, and complete HD vans.[148] Additionally, unlike onroad passenger vehicles, for example, nonroad vehicles are limited to non-highway terrain (*e.g.,* fields, construction sites, forests, and mines), have more robust components, are operated at low working speeds, and there are typically a limited number of vehicles in the same location.

Information Contained in the Granted Petitions Concerning the Use of HFCs for MVAC

EPA granted two petitions which requested restrictions on the use of HFCs for applications related to MVAC. The first was submitted by NRDC, the Colorado Department of Public Health & Environment, and the Institute for Governance and Sustainable Development and requested that EPA restrict the use of HFC–134a in LD vehicles beginning January 1, 2023. The second petition was submitted by CARB requesting that EPA restrict the use of HFC–134a in new LD vehicles in MY2021. Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for MVAC?

EPA is proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for MVAC systems in newly manufactured LD vehicles starting in MY 2025, as of one year after publication of a final rule, including vehicles manufactured exclusively for export. EPA is also proposing to restrict the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for MVAC systems in limited types of HD vehicles in Class 2b–3 (*i.e.,* newly manufactured MDPVs, HD pickup trucks, and complete HD vans), and certain nonroad vehicles (*i.e.,* agricultural tractors greater than 40 HP; self-propelled agricultural machinery; compact equipment; construction, forestry, and mining equipment; and commercial UTVs) starting in MY 2026, including vehicles manufactured exclusively for export.

For LD vehicles, EPA is proposing to restrict the use of HFCs and blends containing HFCs starting in MY 2025, as of one year after publication of a final rule, because three technologically achievable substitutes, R–744, HFO–1234yf, and HFC–152a, meet the proposed GWP limit of 150. HFO–1234yf is a chemical substance identified as 2,3,3,3-tetrafluoroprop-1-ene (CAS Reg. No. 754–12–1) and has a GWP of <1.[149] [150] HFC–152a and R–744 have GWPs of 124 and 1, respectively. Under SNAP, HFO–1234yf is listed as acceptable, subject to use conditions, for new LD vehicles, MDPV, HD pick-up trucks, complete HD vans, and certain types on nonroad vehicles.[151] R–744 and HFC–152a are listed under SNAP as acceptable, subject to use conditions, in new LD and HD vehicles in the United States; [152] [153] however, EPA is not aware of the use or development of HFC–152a or R–744, in any LD or HD vehicle in the United States. Use conditions for these refrigerants under the SNAP program require labeling and the use of unique fittings. The use conditions also mitigate flammability and toxicity risks.

HFO–1234yf has gained significant market share in LD vehicles in the United States since its introduction in MY 2013.[154] According to the 2021 EPA Automotive Trends Report, approximately 85 percent of MY 2020 LD vehicles sold used HFO–1234yf and some manufacturers have implemented HFO–1234yf across their entire vehicle brands.[155] EPA considers MY 2025 the date by which automobile manufacturers would be able to redesign the MVAC system of the remaining 15 percent of LD vehicle models for use with a lower-GWP refrigerant, consistent with the use conditions.

Additionally, lower-GWP refrigerants, such as HFO–1234yf, are predominantly being used in new LD vehicles in Europe and Japan.[156] For example, the proposed GWP limit of 150 for LD vehicles harmonizes with the EU's Mobile AC Directive 2006/40/EC,[157] which is aimed at reducing emissions of HFC–134a from LD MVAC systems. The directive sets a GWP limit of 150 for refrigerants used in MVAC systems installed in any LD vehicle sold in the European market after 2017, regardless of its model year. This proposed rule would harmonize with the Directive and allow adequate lead time for manufacturers to transition to lower GWP refrigerants. Similar to the Directive, EPA is proposing to limit the GWP of refrigerants used in LD MVACs rather than specifying the use of a particular refrigerant or system.

EPA previously considered the MY by which manufacturers of LD vehicles would be able to transition from use of

[144] Ibid.

[145] EPA, 2021. Basic Information about the Emission Standards Reference Guide for On-road and Nonroad Vehicles and Engines. Available online at *https://www.epa.gov/emission-standards-reference-guide/basic-information-about-emission-standards-reference-guide-road* and in the docket.

[146] Heavy-duty vehicles are often subdivided by vehicle weight classifications, as defined by the vehicle's gross vehicle weight rating (GVWR), which is a measure of the combined curb (empty) weight and cargo carrying capacity of the truck. Heavy-duty vehicles have GVWRs above 8,500. See *https://www.epa.gov/emission-standards-reference-guide/vehicle-weight-classifications-emission-standards-reference-guide.*

[147] Wagner, 2021. May 24, 2021, email from John Wagner of the Association of Equipment Manufacturers to EPA. Available in the docket.

[148] ICF, 2016. Technical Support Document for Acceptability Listing of HFO–1234yf for Motor Vehicle Air Conditioning in Limited Heavy-Duty Applications. Available in the public docket.

[149] Nielsen *et al.,* 2007. Atmospheric chemistry of CF3CF=CH2: Kinetics and mechanisms of gas-phase reactions with Cl atoms, OH radicals, and O3. *Chemical Physics Letters* 439, 18–22. Available at: *www.lexissecuritiesmosaic.com/gateway/FedReg/network_OJN_174_CF3CF=CH2.pdf.*

[150] Papadimitriou *et al.,* 2007. CF3CF=CH2 and (Z)-CF3CF=CHF: temperature dependent OH rate coefficients and global warming potentials. *Phys. Chem. Chem. Phys.,* 2007, Vol. 9, p. 1–13. Available at: *http://pubs.rsc.org/en/Content/ArticleLanding/2008/CP/b714382f.*

[151] HFO–1234yf is listed as acceptable, subject to use conditions, for new LD passenger cars and trucks (76 FR 17488, March 29, 2011), new MDPVs, HD pickup trucks, and complete HD vans (81 FR 86778, December 1, 2016), and new nonroad vehicles (86 FR 26276, May 4, 2022) at 40 CFR part 82, subpart G.

[152] CO_2 is listed as acceptable, subject to use conditions, for new vehicles only at 40 CFR part 82, subpart G; final rule published June 6, 2012 (77 FR 33315).

[153] HFC–152a is listed as acceptable, subject to use conditions, for new vehicles only at 40 CFR part 82, subpart G; final rule published June 12, 2008 (73 FR 33304).

[154] ''Model year'' is defined at 40 CFR 85.2302 and ''means the manufacturer's annual production period (as determined under 40 CFR 85.2304) which includes January 1 of such calendar year, provided, that if the manufacturer has no annual production period, the term ''model year'' shall mean the calendar year.''

[155] EPA, 2021. The 2021 EPA Automotive Trends Report. Available at: *https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013L1O.pdf.*

[156] Volume 1: Progress Report, Technology and Economic Assessment Panel, UNEP, September 2021. Available at: *https://ozone.unep.org/system/files/documents/TEAP-2021-Progress-report.pdf.*

[157] European Commission, 2006. Directive 2006/40/EC of the European Parliament and of the Council of 17 May 2006 relating to emissions from air-conditioning systems in motor vehicles and amending. Available at: *https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006L0040.*

HFC–134a for LD vehicles in support of the July 2015 SNAP final rule (80 FR 42870, July 20, 2015) and greenhouse gas and fuel economy standards for MY 2017–2025 LD vehicles issued jointly by EPA and National Highway Traffic Safety Administration on August 28, 2012.[158] For this action, EPA is proposing that restrictions on the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for LD vehicles, including vehicles manufactured exclusively for export, start in MY 2025 and become effective one year after publication of a final rule. This is because a manufacturer's annual production period or model year could be as early as January 1 of the previous calendar year. Therefore, MY 2025 vehicles could be manufactured as early as January 1, 2024, which may be earlier than the effective date of a final rule. EPA is seeking comment on whether the Agency should propose restrictions for LD vehicles with a calendar year compliance date (*e.g.,* January 1, 2025) rather than a model year.

For MDPVs, HD pickup trucks, complete HD vans, and certain nonroad vehicles addressed in this action, EPA is proposing to restrict the use of HFCs and blends containing HFCs starting MY 2026, because at least three technologically achievable substitutes, R–744, HFO–1234yf, and HFC–152a, meet the proposed GWP limit of 150. EPA is also seeking comment on whether the Agency should propose restrictions for MDPVs, HD trucks, complete HD vans, and certain nonroad vehicles with a calendar year compliance date (*e.g.,* January 1, 2026) rather than a model year.

HFO–1234yf was listed as acceptable, subject to use conditions, in 2016 under SNAP for new MDPVs, HD pickup trucks, complete HD vans and is in use or under various stages of development for these vehicle types. Because of the similarities in the MVAC systems used for these vehicles and LD vehicles, EPA considers January 1, 2026, the date by which it will be feasible for manufacturers to safely, but expeditiously, transition MVAC systems for these vehicle types.

EPA is proposing that the GWP limit of 150 or greater for MVAC systems apply to vehicles covered in this proposed rule that are manufactured exclusively for export. In the July 2015 SNAP final rule (80 FR 42870, July 20, 2015), based on comments received on the proposed rule (79 FR 46126, August 6, 2014), EPA established a narrowed use limit for MVAC systems in LD vehicles exported to countries that did not have infrastructure to service vehicles containing the alternatives found to pose less overall risk. The narrowed use limit allows for the use of HFC–134 in MVACs until MY 2026. EPA understands that certain countries to which vehicles are exported do not, and may not for some period of time, have in place the infrastructure for servicing MVAC systems with lower-GWP, flammable refrigerants (*e.g.,* HFO–1234yf and HFC–152a). EPA seeks comment regarding the technical feasibility of servicing MY 2027 and later model vehicles manufactured for export with lower-GWP refrigerants (*e.g.,* HFO–1234yf).

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs used in MVAC systems in newly manufactured LD vehicles starting in MY 2025, as of one year after publication of a final rule, including vehicles manufactured exclusively for export. EPA is also requesting comment on the proposal to restrict the use of HFCs and blends containing HFCs that have a GWP of 150 or greater for MVAC systems in limited types of HD vehicles in Class 2b–3 and certain nonroad vehicles starting in MY 2026, including vehicles manufactured exclusively for export. Additionally, EPA is requesting comment on the proposal to establish GWP limit restrictions for MVAC based on calendar year rather than model year.

4. Foam Blowing

Background

Foams are plastics (such as phenolic, polyisocyanurate, polyolefin, polyurethane, or polystyrene) that are manufactured using blowing agents to create bubbles or cells in the material's structure. The foam plastics manufacturing industries, the markets they serve, and the blowing agents used are extremely varied. The range of uses includes building materials, appliance insulation, cushioning, furniture, packaging materials, containers, flotation devices, filler, sound proofing, and shoe soles. Some foams are rigid with closed cells that still contain the foam blowing agent, which can contribute to the foam's ability to insulate. Other foams are open-celled, with the foam blowing agent escaping at the time the foam is blown, as for flexible foams.

Historically, a variety of foam blowing agents have been used for these applications. CFCs and HCFCs were typically used. In the early 1990s, ahead of the CAA and Montreal Protocol CFC phaseout, regulations implementing section 610 of the CAA included bans on the sale or distribution of foam products blown with CFCs and HCFCs, with an exception only for HCFCs used for foam insulation products as defined at 40 CFR 82.62. Blowing agents which remain in a liquid state at room temperature have been used more commonly in polyisocyanurate, polyurethane and phenolic foams, such as CFC–11, CFC–113, HCFC–141b, HFC–245fa, and HFC–365mfc. Blowing agents that are gases at room temperature have more commonly been used in polyolefin and polystyrene foams, such as CFC–12, HCFC–22, HCFC–142b, HFC–134a, and HFC–152a.

The foam blowing subsectors addressed in this action include:

- Flexible polyurethane includes open-cell foam in furniture, bedding, chair cushions, and shoe soles;
- Integral skin polyurethane includes open-cell foam used in car steering wheels, dashboards, upholstery, and shoe soles;
- Phenolic insulation board and bunstock includes insulation for roofing and walls;
- Polyolefin (*e.g.,* polyethylene, polypropylene) includes foam sheets and tubes;
- Polystyrene—extruded boardstock and billet includes closed cell insulation for roofing, walls, floors, and pipes;
- Polystyrene—extruded sheet includes closed cell foam for packaging and buoyancy or flotation;
- Rigid polyurethane—appliance foam includes insulation foam in domestic refrigerators and freezers and hot water heaters;
- Rigid polyurethane—slabstock and other includes insulation for panels and pipes, taxidermy foam, and miscellaneous uses of rigid polyurethane foam;
- Rigid polyurethane—commercial refrigeration includes insulation for vending machines, coolers, commercial refrigeration equipment, pipes, shipping containers for perishable goods, and refrigerated transport vehicles;[159]
- Rigid polyurethane—sandwich panels include insulation panels for walls and metal doors;
- Rigid polyurethane and polyisocyanurate laminated boardstock

[158] 77 FR 62624, 62807–810 (October 15, 2012); see also 75 FR 25325, 25431–32 (May 7, 2010) (discussing the same issue for MY 2012–2016 light-duty vehicles).

[159] As described in greater detail in section VII.C of this preamble above, EPA is proposing an exemption for certain applications as long as they are receiving application-specific allowances under subsection (e)(4)(B) of the Act, including structural composite preformed polyurethane foam for trailer use.

includes laminated board insulation for roofing and walls;

• Rigid polyurethane—marine flotation foam includes buoyancy or flotation foams; [160] and

• Spray foam is applied in situ and includes insulation for building envelopes, roofing, walls, doors, and other construction uses, as well as foam for building breakers for pipelines. Spray foam is broken down further into rigid polyurethane high-pressure two-component, rigid polyurethane low-pressure two-component, and rigid polyurethane one-component foam sealants. These three applications vary in the types of systems used to apply them (one component or two-component, high pressure or low pressure), who uses such systems (contractors using personal protective equipment, or consumers), and how much is applied (large-scale applications within walls or on roofs of a residence or filling in cracks, leaks and gaps in a residence). For further information on those three applications, see the preamble to SNAP Rule 21 (81 FR 86778 at 86846–86847, December 1, 2016).

Information Contained in the Granted Petitions Concerning the Use of HFCs for Foam Blowing

EPA granted five petitions which requested restrictions on the use of HFCs for foam blowing. Petitions were submitted separately by NRDC and by CARB, both requesting that EPA restrict certain HFCs in:

• Rigid Polyurethane (PU) and Polyisocyanurate Laminated Boardstock. Specifically, HFC–134a, HFC–245fa, HFC–365mfc and blends thereof;

• Rigid Polyurethane—Slabstock and Other. Specifically, HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6;

• Rigid Polyurethane—Appliance Foam. Specifically, HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6;

• Rigid Polyurethane—Commercial Refrigeration and Sandwich Panels. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6;

• Rigid Polyurethane—Marine Flotation Foam. Specifically, HFC–134a, HFC–245fa, HFC–365mfc and blends thereof; Formacel TI, and Formacel Z–6;

• Rigid PU—high-pressure two-component spray foam. Specifically, HFC–134a, HFC–245fa, and blends thereof; blends of HFC–365mfc with at least four percent HFC–245fa, and commercial blends of HFC–365mfc with 7 to 13 percent HFC–227ea and the remainder HFC–365mfc; and Formacel TI.

• Rigid PU—one-component foam sealants. Specifically, HFC–134a, HFC–245fa, and blends thereof; blends of HFC–365mfc with at least four percent HFC–245fa, and commercial blends of HFC–365mfc with 7 to 13 percent HFC–227ea and the remainder HFC–365mfc; and Formacel TI;

• Flexible Polyurethane. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof;

• Integral Skin Polyurethane. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6;

• Polystyrene—Extruded Sheet. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, and Formacel Z–6;

• Polystyrene—Extruded Boardstock and Billet. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, Formacel B, and Formacel Z–6;

• Polyolefin. Specifically, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; Formacel TI, Formacel Z–6;

• Phenolic Insulation Board and Bunstock. Specifically, HFC–143a, HFC–134a, HFC–245fa, HFC–365mfc, and blends thereof; and

• Rigid PU—low-pressure two-component spray foam. Specifically, HFC–134a, HFC–245fa, and blends thereof; blends of HFC–365mfc with at least four percent HFC–245fa, and commercial blends of HFC–365mfc with 7 to 13 percent HFC–227ea and the remainder HFC–365mfc; and Formacel TI.

NRDC requested a January 1, 2023, compliance date for most foam blowing subsectors listed, except for ''military or space- and aeronautics-related applications'' in rigid PU—high-pressure two-component spray foam and rigid PU—low-pressure two-component spray foam. For military or space- and aeronautics-related applications in these two subsectors, NRDC requested a January 1, 2025, compliance date. For all foam blowing subsectors, CARB requested that EPA ''not select later compliance dates than those provided in [SNAP] Rules 20 and 21.''

DuPont Performance Building Solutions submitted two petitions, one requesting that EPA restrict the use of HFC–134a in polystyrene—extruded boardstock and billet by January 1, 2023, and the second requesting that EPA restrict the use of HFCs [161] in rigid polyurethane—low-pressure two-component spray foam by January 1, 2022. The final petition for foams was submitted by the American Chemistry Council's Center for the Polyurethanes Industry (CPI), requesting that EPA restrict HFC use for the polyurethane industry.[162]

Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for foam blowing?

EPA is proposing to restrict the use of HFCs and blends containing HFCs with a GWP of 150 or greater for new phenolic insulation board and bunstock; polystyrene—extruded boardstock and billet; rigid polyurethane—appliance foam; rigid polyurethane—slabstock and other; rigid polyurethane—commercial refrigeration; rigid polyurethane—sandwich panels; rigid polyurethane—marine flotation foam; and spray foam (rigid polyurethane high-pressure two-component, rigid polyurethane low-pressure two component, rigid polyurethane one-component foam sealants) beginning January 1, 2025. For new flexible polyurethane; integral skin polyurethane; polyolefin; polystyrene—extruded sheet; and rigid polyurethane and polyisocyanurate laminated boardstock, EPA is proposing to fully restrict the use of HFCs and blends containing HFCs beginning January 1, 2025. This proposal would in effect prohibit the use of regulated substances for these foam subsectors.

HFCs have been widely used as blowing agents in rigid polyurethane insulation foam (*e.g.,* appliance, commercial refrigeration, sandwich panels, and spray) and polystyrene—extruded boardstock and billet in the United States since the phaseout of ODS blowing agents such as HCFC–141b and HCFC–142b, particularly where insulation value and flammability have been of greater concern. Over the past ten years, the number of available substitutes, both fluorinated and non-fluorinated, has increased, and the variety of uses for acceptable blowing agents has also expanded. These include carbon dioxide (GWP 0), light saturated

[160] As described in greater detail in section VII.C above, EPA is proposing an exemption for certain applications as long as they are receiving application-specific allowances under subsection (e)(4)(B) of the Act, including structural composite preformed polyurethane foam for marine use.

[161] DuPont's second petition requests EPA to ''. . . reinstate SNAP Rule 21 with regard to Rigid Polyurethane Low-pressure Two-component Spray Foam (2K–LP SPF) end-use. . .''.

[162] CPI requested that to reinstate the restrictions on the use of HFC foam blowing agents in the polyurethanes industry that were originally promulgated in EPA's Significant New Alternatives Policy (SNAP) Rules 20 and 21 effective January 1, 2023.

hydrocarbons with three to six carbons (GWP <1), methyl formate (GWP 11), HCFO–1233zd(E) (GWP 3.7), and HFO–1336mzz(Z) (GWP 2).

The opportunity to use HCs, CO_2, and water in the 1990s for a range of foam blowing applications in the United States has allowed many foam blowing subsectors and applications to transition directly from ODS to available substitutes, thus reducing the subsectors that rely on HCFCs or HFCs. HCs have been a lower-GWP and cost-effective substitute available for large parts of the foam sector, particularly in polystyrene—extruded sheet, rigid polyurethane—slabstock, rigid polyurethane and polyisocyanurate laminated boardstock, phenolic insulation board and bunstock, and polyolefin. HCs also are used in most of the other subsectors, but less extensively than in these five subsectors. In EPA's consideration of safety of available substitutes, flammability of foam blowing agents, including HCs, can be a concern, particularly for rigid polyurethane—two-component spray foam applications. Water is used broadly as a blowing agent in flexible polyurethane foam. In addition, other non-fluorinated compounds such as methyl formate and methylal are being used as blowing agents, alone or in combination with other compounds, particularly for use as a blowing agent in polyurethane foams.

EPA is proposing to exclude space vehicles, as defined in 40 CFR 84.3, from the proposed use restriction for spray foams. Such equipment faces unparalleled and highly demanding operating conditions and requires long lead times for their operation to be certified. This approach is consistent with EPA's CAA regulations where space vehicles were either exempted or given additional time to transition to substitute foam blowing agents.

A number of new fluorinated chemicals with lower GWPs have been introduced as foam blowing agents during the past several years. Many end users have indicated interest in these newer foam blowing agents, often to improve energy efficiency of the foam products manufactured with the foam blowing agent. For example, EPA's SNAP program has listed HCFO–1233zd(E), HFO–1234ze(E), HFO–1336mzz(E), and HFO–1336mzz(Z) as acceptable. These newer substitutes, which do not raise the flammability concerns of HCs, may prove appropriate for subsectors where highly flammable blowing agents raise safety concerns. The process and timing for retooling facilities that use the blowing agents or that incorporate the foam product into another product will vary depending on the substitute selected. Manufacturing facilities such as household refrigerator manufacturers have already been transitioning to lower-GWP substitutes for foam blowing. Production volumes for some of these newer substitutes are expanding rapidly to keep pace with growing commercial demands.

For some types of foam that have historically used gaseous blowing agents, HFC–152a or blends containing HFC–152a may be useful foam blowing agents with lower GWP than other HFCs. For example, the GWP of HFC–152a is 124, compared to 794 for HFC–365mfc, 1,030 for HFC–245fa, 1,430 for HFC–134a, and 4,470 for HFC–143a. Some manufacturers of polystyrene—extruded boardstock and billet have recently starting using blowing agents that are blends of HFC–152a and non-HFCs such as CO_2, HFO–1234ze(E), and/or HFO–1336mzz(Z), in order to transition away from using HFC–134a.

For the flexible polyurethane; integral skin polyurethane; polyolefin; polystyrene—extruded sheet; and rigid polyurethane and polyisocyanurate laminated boardstock subsectors, EPA understands that there is little or no use of HFCs. As noted, water and HCs are commonly used available substitutes used as blowing agents for flexible polyurethane, polyolefin, polystyrene—extruded sheet, and rigid polyurethane and polyisocyanurate laminated boardstock.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 or greater for HFCs and blends containing HFCs for new phenolic insulation board and bunstock; polystyrene—extruded boardstock and billet; rigid polyurethane—appliance foam; rigid polyurethane—slabstock and other; rigid polyurethane—commercial refrigeration; rigid polyurethane—sandwich panels; rigid polyurethane—marine flotation foam; and spray foam (rigid polyurethane high-pressure two-component, rigid polyurethane low-pressure two component, rigid polyurethane one-component foam sealants). EPA is also requesting comment on proposing to fully restrict HFCs and blends containing HFCs for new flexible polyurethane; integral skin polyurethane; polyolefin; polystyrene—extruded sheet; and rigid polyurethane and polyisocyanurate laminated boardstock.

5. Aerosols

Background on Aerosols

Aerosols use liquefied or compressed gas to propel active ingredients in liquid, paste, or powder form in precise spray patterns with controlled droplet sizes and amounts and many also contain a solvent. The propellant, typically a gas at atmospheric pressure but a pressurized liquid in the product canister, is emitted during use. In addition to propellants, some aerosols also contain a solvent. In some cleaning applications, the propellant disperses the solvent; in other applications, the solvent product and propellant solution are evenly mixed to improve shelf-life and product performance, such as by preventing dripping and ensuring uniform film thickness for spray paints. Consumer aerosols include products for personal and household use, such as hairspray, household cleaning products, and keyboard dusters. Technical aerosols are specialized products used solely in commercial and industrial applications, such as industrial spray paints and document preservation sprays.

In this proposed rule and as discussed previously in section VII.C of this preamble, EPA is proposing an exemption for certain applications as long as they are receiving application-specific allowances under subsection (e)(4)(B) of the Act, including for certain aerosol applications. Subsection (e)(4)(B)(iv) of the AIM Act lists six applications which are to ''receive the full quantity of allowances necessary, based on projected, current, and historical trends'' for the five-year period after enactment of the AIM Act. Under the implementing regulations at 40 CFR 84.13, the following applications which typically use aerosols are currently eligible to receive application-specific allowances for calendar years through 2025: (1) for a propellant in metered-dose inhalers, (2) in the manufacture of defense sprays, and (3) for mission-critical military end uses. Therefore, EPA is not proposing to apply the requirements under this rulemaking to these uses of HFCs in these applications at this time, since they are currently receiving application-specific allowances under 40 CFR 84.13.

Information Contained in the Granted Petitions Concerning the Use of HFCs for Aerosols

EPA granted three petitions, submitted by NRDC, CARB, and HCPA with the National Aerosol Association (HCPA/NAA), which requested restrictions on the use of HFCs for applications related to aerosol

propellants. NRDC submitted a petition under subsection (i) of the AIM Act that requested EPA to replicate the provisions contained in SNAP Rules 20 and 21. Petitioners requested a start date for the restrictions of January 1, 2023.

HCPA/NAA submitted a petition that requested EPA prohibit the use of specific HFCs as aerosol propellants starting January 1, 2023; however, the petitioners also requested that EPA except the use of HFCs in certain types of aerosols (*e.g.,* cleaning products for removal of grease, flux and other soils from electrical equipment).

CARB submitted a petition that requested EPA regulations should not limit States' ability to further limit or phase out the use of HFCs in their jurisdictions.

Additional information, including the relevant petitions, is available in the docket.

What restrictions on the use of HFCs is EPA proposing for aerosols?

EPA is proposing to restrict the use of HFCs and blends containing HFCs in new aerosols that have a GWP of 150 or greater beginning January 1, 2025. Available aerosol propellants that meet this proposed GWP limit include HFC–152a (GWP 124), HFO–1234ze(E) (GWP <1), dimethyl ether (GWP 1), saturated light hydrocarbons (GWP 3–10), and CO_2 (GWP 1). Manufacturers have transitioned to HFC–152a, saturated light hydrocarbons, HFOs, compressed gases, and oxygenated organic compounds (*e.g.,* dimethyl ether).[163] Available aerosol solvents that meet this GWP include HCFO–1233yd(Z) (GWP<1), HFO–1336mzz(Z) (GWP 2), methoxytridecafluoroheptene isomers (MPHE) (GWP 2.5), HCFO–1233zd(E) (GWP 3.7), HFE–569sf2 (GWP 59), and petroleum hydrocarbons.

On which topics is EPA specifically requesting comment?

EPA is requesting comment on proposing to establish a GWP limit of 150 for HFCs and blends containing HFCs used in aerosol products.

In SNAP Rule 20, EPA allowed the use of HFC–134a for certain aerosol propellant applications because of technical limitations, such as a requirement for non-flammability and/or a specific vapor pressure. EPA has received information that indicates some of these applications may still require use of HFC–134a as a propellant; however, from our own research, we are aware of possible substitutes with lower GWPs.[164] [165] Nevertheless, in this proposal, EPA is not explicitly proposing exceptions. We are taking comment on whether and why we should include a list of exceptions for propellants in this rulemaking that matches some or all of those included in SNAP Rule 20, namely:

- Cleaning products for removal of grease, flux and other soils from electrical equipment or electronics;
- Refrigerant flushes;
- Products for sensitivity testing of smoke detectors;
- Lubricants and freeze sprays for electrical equipment or electronics;
- Sprays for aircraft maintenance;
- Sprays containing corrosion preventive compounds used in the maintenance of aircraft, electrical equipment or electronics, or military equipment;
- Pesticides for use near electrical wires or in aircraft, in total release insecticide foggers, or in certified organic use pesticides for which EPA has specifically disallowed all other lower-GWP propellants;
- Mold release agents and mold cleaners;
- Lubricants and cleaners for spinnerettes for synthetic fabrics;
- Duster sprays specifically for removal of dust from photographic negatives, semiconductor chips, specimens under electron microscopes, and energized electrical equipment;
- Adhesives and sealants in large canisters;
- Document preservation sprays;
- Wound care sprays;
- Topical coolant sprays for pain relief; and
- Products for removing bandage adhesives from skin.

We also are interested in comments related to whether these uses that were excepted under SNAP Rule 20 have transitioned or can transition to a lower GWP propellant. If a commenter suggests including an exception for use of HFC–134a in an aerosol application, we would also be interested in any supporting data and information to explain why the exception is needed.

EPA is aware that HFC–43–10mee (GWP 1,640) and HFC–245fa (GWP 1,030) may still be in use as aerosol solvents, particularly in niche applications. We are taking comment on whether this or other HFCs are currently being used as aerosol solvents. If so, we ask that commenters include specific information on the application and what would be needed to transition to a lower GWP solvent.

G. For what additional sectors or subsectors is EPA requesting advance information on the use of HFCs?

Heat Pump Water Heaters

Heat pump water heaters (HPWH) are an energy-efficient alternative to electric-resistance and combustion water heaters. Instead of heating water by running electrical current through heating elements, or via fossil fuel combustion, HPWHs use a vapor-compression refrigerant cycle (the same basic mechanism used by standard heat pumps, air conditioners, and refrigerators) to transfer heat from the surrounding air to heat water.[166]

HPWHs are sold in the residential and commercial markets. The integral design comprises a condenser combined with the storage tank in one unit, where the heating components are installed at the top of the storage tank. A split-system design differs from the integral design in that it has a separate heat pump and storage tank, which can be connected via refrigerant lines or water lines. Most HPWHs historically and today contain the refrigerant HFC–134a. Some larger, commercial models use R–410A for the low temperature cycle and HFC–134a at the high temperature cycle.[167]

The Agency is seeking information on current uses of HFCs in HPWHs to inform potential future regulatory decisions. EPA is not proposing any regulatory requirements with respect to HPWHs in this rulemaking. EPA is specifically requesting information in response to the following questions:

1. What are the main reasons for the continued use of HFCs in HPWHs and for which applications?

2. What work is underway to identify suitable lower-GWP alternatives?

3. What would be the timeline for use of alternatives?

VIII. What are the proposed enforcement and compliance provisions?

EPA seeks to deter, identify, and penalize the import, manufacture, sale, purchase, or distribution of products and other activities that would be prohibited under the proposed

[163] Transitioning to Low-GWP Alternatives in Aerosols, EPA, December 2016. Available at: *https://www.epa.gov/sites/default/files/2016-12/documents/transitioning_to_low-gwp_alternatives_in_aerosols.pdf.*

[164] See email from HCPA to EPA, dated August 8, 2022.

[165] See *Evaluation of Continued Need for HFC–134a in Specific Aerosol Propellant Applications* memo in the docket.

[166] Heat Pump Water Heaters, U.S. Department of Energy. Information available at: *https://www.energy.gov/energysaver/heat-pump-water-heaters.*

[167] Kleefkens, Onno M.Sc., Heat Pump Centre, Refrigerants for Heat Pump Water Heaters, December 2019. Available at: *https://heatpumpingtechnologies.org/annex46/wp-content/uploads/sites/53/2020/10/hpt-an46-04-task-1-refrigerants-for-heat-pump-water-heaters-1.pdf.*

restrictions on the use of HFCs. Consistent with EPA's explanation in the Allocation Framework Rule, based on prior experience with the ODS phaseout in the United States, and global experiences transitioning from ODS and HFCs, EPA anticipates there will be attempts to introduce prohibited products in the United States.

Proposed tools for encouraging compliance and aiding enforcement include requirements to label regulated products, to report the import or manufacture of products using HFCs, a prohibition on import or manufacture of regulated products above the allowable GWP level or using a proposed restricted substance, and recordkeeping in support of the reporting requirement. EPA seeks to ensure a level playing field for the regulated community and discourage the illegal manufacture, import, distribution, purchase, or sale of prohibited products.

A. What is EPA proposing for labeling requirements?

EPA is proposing to require information on labels for regulated products in the sectors and subsectors covered by this proposed rule. Knowing what HFC or blend containing an HFC is used in a product is a necessary step to ensuring that the use of HFCs complies with the restrictions to be established through this rulemaking for the respective sectors and subsectors.

EPA is proposing on-product labeling for all regulated products in the covered sectors and subsectors of this proposed rule. For products that use HFCs or blends containing an HFC, EPA is proposing that the label include (1) the HFC or blend containing an HFC used in the product; (2) the GWP of that HFC or blend containing an HFC, labeled as ''global warming potential''; and (3) the date of manufacture, or at a minimum, the four-digit year.

For products that are intended for use with HFCs or blends containing an HFC, EPA is proposing that the unfilled products be labeled to indicate (1) the HFC(s) or blend(s) containing an HFC intended for use in the product; and (2) the GWP of the HFC(s) or blend(s) containing an HFC, labeled as ''global warming potential.'' EPA further proposes that at the time of first charge the label must be marked or a new label must be added to indicate: (1) the HFC or blend containing an HFC used in the product, (2) the GWP of that HFC or blend containing an HFC, labeled as ''global warming potential;'' and (3) the date of first charge, or at a minimum, the four-digit year. The new label would only need to include (1) and (2) if they are different from what is listed on the first label or if the first label indicates that the product is intended for use with multiple HFCs or blends containing HFCs. If a new label is added, it must be affixed near but not covering the original label. EPA proposes this structure as it would allow purchasers to determine whether the product is compliant and discourage the manufacture, import, distribution, purchase, or sale of products that are intended for use with prohibited HFCs and would allow the Agency to assess compliance of the products both before and after they are charged. EPA requests comment on whether field-charged products should be required to be labeled prior to being filled with an HFC or if the label should only be required once the product contains an HFC or blend containing an HFC. EPA also requests comment on how to best structure labeling requirements for products that are intended for use with multiple regulated substances and if requiring that each regulated substance that could be used be included on the label is useful.

Additionally, EPA is proposing that labels for products in the following subsectors indicate whether the full charge is greater than, equal to, or less than 200 pounds: (1) IPR, (2) retail food refrigeration—supermarket systems, (3) retail food refrigeration—remote condensing units, and (4) cold storage warehouses. The GWP limit varies based on that charge size threshold in these subsectors, thus EPA is proposing a statement about the charge size be included in the label for the purposes of ensuring compliance.

EPA notes that other markets including the EU and United Kingdom require labels with similar information requirements for many products containing HFCs.[168] [169] These labeling requirements that are already in place in other markets indicate that the requirements are feasible for the regulated entities.

EPA is proposing that the permanent label must be formatted as follows: (1) in English; (2) durable and printed or otherwise labeled on, or affixed to, the external surface of the product; (3) readily visible and legible; (4) able to withstand open weather exposure without a substantial reduction in visibility or legibility; and (5) displayed on a background of contrasting color. Additionally, EPA is proposing to require that labels or a description of the required information be clearly included in product information, either in the text description or photo of the product, for products being sold electronically through eCommerce platforms. Regulated products would need to have the required information clearly visible in either the photos of the product or the description of the item. If a regulated product is contained within a box or other overpack that reaches the ultimate consumer, EPA is proposing that the exterior packaging must also contain a label consistent with the formatting requirements described previously. For imported products, labels must be visible and readily available for inspection.

EPA requests comment regarding whether on-product labels may not be practicable for certain products. If such products are identified, commenters should provide information on alternative labeling methods that EPA should consider in those instances. One such alternative could be including the required information on packaging materials with the product (*e.g.,* tag, pamphlet, or box containing the product). This associated packaging would need to be present with the product at the point of sale and import to fulfill the labeling requirement.

Another alternative could be to allow the information to be accessed by an on-product QR code instead of a traditional label. In order to fulfill the labeling requirement, the QR code would need to direct the consumer to a website that readily shows the required information and meets the requirements of the on-product label. EPA believes that products using a QR code also include adjacent text to indicate the purpose of the QR code, stating that the QR code contains HFC information. A QR code may be useful for products where there is limited space for on-product labels or the accompanying packaging. A nonfunctional or unreadable QR code would not fulfill the labeling requirement and would be treated as a missing QR code. For products being sold through eCommerce, the QR code would not be sufficient on its own and the product description on the eCommerce site would also have to contain the required information. The QR codes would not be issued by EPA and are separate from the QR codes required under the Allocation Framework Rule at § 84.23. EPA requests comment on if QR codes should be allowed to fulfill the labeling

[168] European Union Law. 2014. Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006 Text with EEA relevance. Available at: *http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.150.01.0195.01.ENG.*

[169] Labelling F-gas equipment you produce, import or install, UK Environment Agency, August 2019. Available at: *https://www.gov.uk/guidance/labelling-f-gas-equipment-you-produce-import-or-install.*

requirement for all products, only products where traditional labels are not practicable, or not at all and what benefits or challenges allowing QR codes may pose. EPA also requests comment on alternative methods that may be used to mark or otherwise label the product itself that would be sufficient to convey the required information (for example, color coding to identify the use of a regulated substance or date codes to identify date of manufacture).

EPA is proposing that as of the applicable compliance date, no person may sell or distribute, offer for sale or distribution, make available to sell or distribute, or import in the sectors and subsectors of the proposed rule a regulated product that contains, was manufactured with, or is intended for use with HFCs that lacks a label consistent with the requirements of this section. EPA proposes that regulated products lacking a label are presumed to use a regulated substance or a blend containing a regulated substance with a global warming potential equal to or greater than the limit proposed in this rule.

EPA is requesting comment on whether there should be a standardized process to correct missing or inaccurate labels on products, and if so, what that should be. A potential option EPA is considering would be to allow any entity within the distribution chain to label or re-label a product within their possession if they find it to be missing a label or mislabeled. EPA is also seeking comment on whether entities seeking to correct a labeling error should be required to report the initial labeling violation to the Agency. A corrected label would need to comply with all relevant labeling requirements. Further, EPA would anticipate that the entity doing the relabeling would conduct due diligence to ensure that the new label is accurate and meets the proposed labeling requirements in this rule. Allowing relabeling could reduce the number of products that may be discarded due to missing or incorrect labels, as they would not need to be returned to the importer or manufacturer. However, it may not be a cost that a distributor of a product is willing to bear, given the responsibility to correctly label products is with the manufacturer or importer.

The proposed labeling provisions are intended to support compliance with the prohibitions on the use of high-GWP HFCs in certain sectors and subsectors. Requiring a manufacturer or importer to affirmatively and publicly state through the label that the HFC being used and its GWP reinforces their compliance with the limits to be established through this rulemaking. Accurate labeling information would also support compliance with the limits by allowing distributers, as well as competitors and the general public, to assess whether a product uses a compliant HFC. The proposed labeling and packaging requirements may also ease inspection by EPA and U.S. Customs and Border Protection (CBP) as appropriate, and facilitate efforts to prevent the import or manufacture of noncompliant products. Clearly and visibly identifying the HFC or blend containing an HFC used in the product would provide one mechanism for inspectors to quickly identify noncompliant products and/or identify products for further inspection.

As a secondary consideration, the information on the labels and packaging materials could provide consumers with information about whether a product uses an HFC or blend containing an HFC and its GWP. This information may alter consumer purchasing choices and could increase market pressure for the transition away from products that use HFCs.

EPA recognizes that in this rulemaking the proposed definition of ''products'' includes components. EPA is considering how to best address components that are intended for use with HFCs but do not contain a regulated substance when shipped—*i.e.,* is not a regulated product when shipped—and whether instead of requiring each individual component be labeled, the Agency should allow labeling of a subset of the components of a single system to fulfill the requirement once the full and proper amount of HFC or blend containing an HFC is added. For example, for a supermarket refrigeration system, EPA requests comment on whether each individual case within the same subsector and using the same regulated substance in that system should be labeled or if labeling a subset of the cases and/or other components of the system in accordance with the proposed requirements would be sufficient. EPA seeks comment on the benefits and challenges of allowing labeling a subset of components to fulfill the requirement, along with specific sectors or subsectors where this option should be considered. EPA also seeks comment on how it can provide clarity on which components are covered and which are not.

EPA seeks to design this proposal in a way that would minimize compliance burden on the regulated community while maintaining the necessary components for identifying and deterring noncompliance. First, EPA recognizes that there may be products for which on-product labels are not practicable and is requesting comment on alternative labeling methods EPA should consider that would provide similar enforceability. For products that are identified with a valid rationale for why on-products labels cannot be used, EPA is considering whether to allow the required information to be included in packaging materials or available through an on-product QR code.

Second, existing labels that meet the proposed requirements and include the required information would be sufficient. EPA recognizes that certain information is already provided on products through existing UL labels, nameplates, or other labels on the product or packaging with the product at the time of import and sale. For instance, a nameplate or certification sticker on a pre-charged air conditioner might already contain the date of manufacture, the refrigerant, and the charge size, and could be modified by including the GWP of the refrigerant. Likewise, the label on a household refrigerator-freezer could be modified to include the additional information needed for the refrigerant and also the information regarding the foam insulation. EPA requests comment on the proposal to allow existing labels that contain required information to satisfy the labeling requirements or if EPA should instead consider requiring a separate standardized label containing all the required information.

EPA recognizes that products exist within the sectors and subsectors covered by this proposed rule that do not contain or use any regulated substance. EPA is considering developing a standardized voluntary label for these products that would clearly state that the product does not use HFCs. This voluntary label could assist compliance with the proposed prohibitions by indicating that the product does not use an HFC or blend containing an HFC. This would eliminate the ambiguity associated with an unlabeled product in a controlled sector or subsector (*i.e.,* the product does not use an HFC and does not need to be labeled; or the product uses an HFC and is mislabeled). This voluntary label would also provide consumers with additional information regarding HFCs and allow them to more easily differentiate between products based on whether they use HFCs. Similar voluntary labeling continues to be included on aerosol products to indicate they do not use CFCs despite a prohibition on such use since 1994. (See 82.64(c)). EPA requests comment on the value of a voluntary label that

affirmatively states that the product does not use HFCs and any benefits or challenges that such a label may pose.

EPA is considering whether to establish an administrative process to address products that have been found to be mislabeled or lacking a proper label. In the Allocation Framework Rule, EPA included a system of administrative consequences as one method to deter illegal production or import of HFCs. Under that program, EPA may adjust an entity's production or consumption allowances by retiring, revoking, or withholding them depending on the circumstances. EPA provides notice to a company of an impending administrative consequence, and then the company has an opportunity to respond prior to the Agency taking any final action. The administrative consequences do not supplant or replace any enforcement action that may be available for violations of EPA's regulations or the AIM Act. Instead, such consequences are in addition to any applicable enforcement action.

EPA's intent in the proposed rule for establishing labeling provisions is to support the enforcement of prohibitions on the use of certain HFCs and blends containing HFCs that exceed the proposed GWP limits or are otherwise prohibited. Not providing a label or mislabeling a product hampers EPA's ability to enforce those prohibitions. The administrative process considered here would have the purpose of quickly correcting mislabeled or unlabeled products. EPA is considering the option of creating a website that would provide a list of entities that manufacture, import, export, sell, distribute, or offer for sale or distribution products that have been found to be mislabeled or lacking a proper label. Transparency is a significant means of ensuring compliance, as discussed in detail in the Allocation Framework Rule (see 86 FR 55191, October 5, 2021). In this scenario, EPA would employ similar processes for notification and response finalized in 40 CFR subpart A. This would include notifying the entity of the Agency's finding that a regulated product or products is mislabeled or lacking a label, and of our intent to list them as not meeting the subsection (i) labeling provisions. The Agency would provide thirty days from the initial notification for the entity to respond, after which the entity would be publicly listed on the EPA's website. The entity could be listed on the EPA website for a minimum set time frame, such as a year. To be removed from the website, EPA is considering whether the entity would be required to submit a demonstration that the labeling issue has been resolved along with measures that the entity has put in place to reduce the likelihood of future labeling problems.

EPA requests comment on whether an administrative process as described above would support compliance with these provisions. Also, the Agency is interested in whether there are additional or alternative actions that the Agency could consider to aid compliance with the subsection (i) labeling provisions, including whether entities that are listed on EPA's website as lacking proper labels could be fully restricted from using (*e.g.,* manufacture, import, sale, export, offer for sale or distribution) any regulated substance for a set period of time. Additionally, if the listed entity receives production or consumption allowances, the Agency requests comment on whether EPA could use its authority under subsection (e) to revoke or reduce the entity's next allocation as a consequence for mislabeling products under subsection (i).

B. What potential auditing and third-party testing programs is EPA seeking advance information on?

EPA is asking for advance information on a variety of options for third-party testing and auditing that it is considering pursuing in a future rulemaking to strengthen compliance with requirements that may be established in this rulemaking and potential future rulemakings under subsection (i). Such auditing and third-party testing programs would facilitate the verification that products and equipment imported, manufactured, sold, or distributed within the United States contain allowable HFCs. Audits would also serve the important function of testing to ensure that products and equipment use allowable HFCs and that labels identifying the HFCs are accurate. Audits would assist with finding illegal products and removing them from the United States market and help deter noncompliance, incentivize future compliance, and ensure that companies that are complying with statutory and regulatory obligations are not put at a competitive disadvantage. EPA is considering a multifaceted approach for auditing and is soliciting advance information on the aspects of auditing programs discussed in the following sections, including the merits of the options discussed.

Numerous economic studies have found that third-party auditing improves company and individual compliance with the law.[170] [171] [172] EPA has used third-party auditing to improve regulatory compliance in rules, including the Renewable Fuel Standard program.[173] As noted in a Renewable Fuel Standard rulemaking, there is expert consensus that well-implemented third-party auditing is a good use of limited enforcement and oversight resources.[174] Independent and objective audits are a valuable tool to improve compliance among all companies, not just those with covert malicious intent to be inaccurate or unfair in their auditing or reporting. EPA is seeking advance information on the advantages and disadvantages of developing an auditing program to ensure compliance and input on how to structure such a program. EPA does not intend to finalize an auditing program as part of this proposed rule but seeks to gather information that the Agency believes will be useful to inform a potential future proposal. Accordingly, EPA does not intend to respond to any advance information received on the options discussed in this section in any final rulemaking for this proposal.

1. Who should be subject to the independent third-party testing and audits?

EPA is seeking advance information on the framework for a third-party testing program and is considering several different options for this framework. The first option would be to require manufacturers of regulated products to receive a third-party certification that the products are compliant with this proposed rule. Under this option, any manufacturer or importer of regulated products would be required to show that the product is certified compliant with subsection (i) use restrictions before that product could be imported, offered for sale, sold, or otherwise distributed. It would be prohibited to import into the United

[170] Esther Duflo, Michael Greenstone, Rohini Pande, and Nicholas Ryan, ''Truth-Telling by Third-Party Auditors and the Response of Polluting Firms: Experimental Evidence from India,'' *Journal of Economics* (2013), 1499–1545. *doi:10.1093/qje/qjt024.*

[171] Henrik Kleven, Martin Knudsen, Claus Kreiner, Søren Pedersen, and Emmanuel Saez, ''Unwilling or Unable to Cheat? Evidence From a Tax Audit Experiment in Denmark.'' *Econometrica,* 79: 651–692. (2011) *https://doi.org/10.3982/ECTA9113.*

[172] Marcelo Bérgolo, Rodrigo Ceni, Guillermo Cruces, Matias Giaccobasso, and Ricardo Perez-Truglia, ''Tax Audits as Scarecrows: Evidence from a Large-Scale Field Experiment,'' NBER Working Paper No. 23631 July 2017, Revised January 2020 JEL No. C93, H26, K42.

[173] More information on the Renewable Fuel Standard program available at: *https://www.epa.gov/renewable-fuel-standard-program.*

[174] 79 FR 42080, July 18, 2014.

States or domestically manufacture any uncertified regulated product. The certification process would include registering the manufacturer or importer into a third-party certification system that would have the authority to test and verify products and report their findings directly to EPA. Accordingly, EPA anticipates that this option could involve use of foreign third-party certifiers.

An alternative to product certification for regulated products would be to require a representative sample of all domestically manufactured and imported regulated products to be tested for compliance by a third-party at the point of manufacture (in the case of domestically manufactured products), or on import (*i.e.,* at the ports in the case of importers). For imported products, EPA could consider options that would allow for samples to be provided prior to arrival in the U.S. or be tested following release. Another option EPA is considering would require that all retailers that sell, offer for sale, distribute, or make available for sale or distribution regulated products to register and participate in a third-party auditing program. Under this structure, third-party auditors would select a certain number of products to test for compliance per year and report the results to EPA.

EPA is seeking specific comment on the relative strengths and weaknesses of these approaches to testing and auditing, and whether they are optimally used singly or in combination. To facilitate such comment, EPA notes that it believes a strength of the manufacturer and importer-focused third-party certification for all products that may contain HFCs is that it would reduce the likelihood that noncompliant products will be manufactured or imported because it would signal the need for compliance with subsection (i) restrictions early in the market chain. We have particular concern about noncompliant imports into the United States by retailers and through online eCommerce and establishing auditing that would occur at the point of import may minimize noncompliance. It would also reduce the burden on retailers to identify whether they sell products that may contain HFCs and thus need to register with the third-party certification program. This would be especially beneficial for small businesses that may be less familiar with environmental regulations and less familiar with what types of products may contain HFCs.

Potential weaknesses of the third-party certification system include difficulty in identifying which products would need to be certified in order to be sold or distributed in the United States and the degree to which EPA or an accreditation board would be able to provide adequate oversight to foreign third-party certifiers. Additionally, given that all products would need to be certified compliant prior to import, EPA is concerned that accrediting enough certifiers to conduct the required testing would be challenging. A related challenge may concern how auditing results are shared with the Agency including the format in which they are presented. EPA is seeking input on ways to mitigate these potential challenges.

Alternatively, a potential strength of a retailer-focused third-party auditing program is that products will consistently be tested for compliance by various third-party auditors. This could provide a continuous stream of data to understand how many tested products are compliant and assist EPA in knowing which products to focus on for enforcement. A potential weakness is that more noncompliant products may be made available in the U.S. market, especially from foreign distributors through eCommerce. Furthermore, it may be challenging to assess compliance of products sold by foreign businesses through online eCommerce as these entities would not be participants of the auditing program. In order to reduce potential rates of noncompliance, EPA is seeking input on the frequency with which third-party audits should be conducted and methods of addressing potential noncompliance by foreign eCommerce businesses.

In addition to either of these proposed structures, EPA is also considering an auditing program for non-residential equipment that is field charged with regulated substances. Two options EPA is considering include either a periodic audit of the owners of the existing equipment to review whether this field-charged equipment is being charged with a compliant substance or to audit the field chargers when equipment is charged to determine that it is being charged with a compliant substance. EPA is seeking comment on the relative strengths or weaknesses of either approach and whether the field chargers or equipment owners should maintain sufficient documentation to support such an audit. EPA believes a potential strength of auditing the owners of the non-residential field-charged equipment is that it will narrow the universe of audited parties to only those owners of the equipment that is being periodically field-charged with regulated substances and could encourage this industry to provide its own oversight of field charging entities to ensure that its equipment is compliant.

In addition to seeking input on the relative strengths and weaknesses of these two possible structures for a third-party testing and auditing program, EPA is also seeking advance information on any other structures that could be effective in ensuring noncompliant products are unavailable in the U.S. market. As discussed in the Lesley K. McAllister law review article, *Third Party Programs to Assess Regulatory Compliance,*[175] one of the metrics of success for such a program is the rate of compliance that the program enhances.[176] Common drivers of the rate of compliance includes the frequency with which testing is carried out and the regularity that testing will be conducted on a given regulated entity.[177] For example, even if testing will only be conducted on a regulated entity once every few years, if the entity knows to anticipate testing with regularity, the entity is more likely to change its processes to be compliant. EPA is especially interested in any comments that address how the third-party program can be structured to enhance rates of compliance.

2. What elements and criteria should be included in the third-party auditors and/or accreditation body requirements?

EPA is seeking advance information on how the accreditation process should be structured for third-party auditors or certifiers and what criteria should be included in the accreditation process. First, EPA is seeking input on how accreditation of third-party auditors or certifiers should be structured. The above-cited McAllister law review article notes that different agencies have structured third-party programs in a variety of ways. That article notes that the most common structure is for the government agency to recognize a third-party accreditation body that in turn accredits conformity assessment bodies, *i.e.,* third-party auditors or certifiers.[178] However, the article recognizes that this structure varies under different regulatory programs, noting that in some instances the regulatory agency may accredit the third-party auditors or certifiers directly, and that other programs accredit a combination of third-party auditors and testing bodies (*e.g.,* laboratories).[179]

EPA is seeking feedback on how the accreditation system could be structured

[175] 53 B.C. L. Rev. 1 (Jan. 2012).
[176] *Id.* at 44–45.
[177] *Id.* at 44–45.
[178] *Id.* at 7.
[179] *Id.*

for third-party auditors or certifiers, and whether that accreditation system should be headed by accreditation bodies recognized by EPA. EPA is seeking input on the relative strengths and weaknesses of recognizing accreditation bodies to conduct the accreditation process of third-party auditors or certifiers and the strengths and weaknesses of EPA directly accrediting third-party auditors or certifiers.

If a comment recommends that EPA recognize accreditation bodies to accredit third-party auditors or certifiers, EPA is also interested in input on what criteria should be used to assess EPA's recognition of these bodies. Such criteria could include, for example: how the accreditation body must demonstrate legal authority (*e.g.,* governmental or contractual) to perform assessment of third-party auditors necessary to assess the applicant's capability to conduct audits; criteria for competency and capacity to adequately assess applicants' capabilities as an auditor; criteria to reduce conflicts of interest and promote independence in the assessment body; and what recordkeeping requirements should exist to qualify for accreditation.

EPA is also seeking input on what criteria should be used, either by EPA or by the accreditation body, to accredit third-party auditors. Such criteria could include, for example: laboratory testing capabilities the applicant must have, and requirements to ensure the capabilities are adequate for testing for compliant HFCs; expertise the applicant must have in order to adequately assess compliance beyond testing capabilities; recordkeeping requirements that should be required; criteria to reduce conflicts of interest and promote independence in the third-party auditor; frequency that the applicant should be re-assessed for accreditation; and how the reports should be provided to EPA and/or the accreditation body.

Of particular interest to EPA is advance information on how the third-party auditing program should be paid for. EPA is considering implementing a fee-based system paid by all registered entities that distribute products that may contain HFCs in the U.S. market. If using a fee-based structure, EPA is seeking input on whether to provide a fee-structure that is proportionate to the size of business in order to mitigate impacts on small businesses. Although EPA is considering a fee-based approach, EPA also welcomes comments on alternative payment structures that could foster the greatest level of independence between registered regulated entities and the third-party accreditation body and/or third-party auditors.

The above-cited McAllister law review article notes that one of the metrics of success for third-party auditing programs is the extent to which the program produces reliable results. Primarily this metric is driven by the extent to which the program requirements foster third-party auditors' competency and independence.[180] In order to foster competency, EPA believes the testing capabilities to determine that any HFCs in a product are compliant will be paramount. EPA is especially interested in any comments regarding recommended requirements to ensure that third-party auditors are capable of this type of testing and any additional requirements that should be added to enhance the likelihood that third-party auditors will be competent to assess products' compliance.

Likewise, EPA is interested in advance information on enhancing the independence of third-party auditors. EPA believes a fee-based system will foster independence in auditors as they would not be paid directly by the entity being audited. However, EPA is interested in comments on additional criteria that would foster independence. Such criteria could include a required amount of time that the auditor would not work for the audited entity both before and after the audit. EPA believes such criteria could help reduce commercial and financial pressures on the auditor that could potentially compromise the audit.

Another metric of success discussed in the McAllister article is the agency's capacity to administer the third-party program.[181] Depending on how the third-party program is designed, implementing the program may require a large investment of agency time and resources. In particular, if EPA is directly accrediting third-party auditors rather than delegating that to accreditation bodies, EPA will need enough resources to adequately assess each of the third-party auditor applicants. It would also require EPA personnel to develop the necessary expertise to consistently evaluate capabilities of applicants. EPA directly accrediting third-party auditors could present additional challenges when assessing potential foreign third-party auditor applicants.

[180] *Id.* at 40.

[181] *Id.* at 45–48.

IX. What are the proposed recordkeeping and reporting requirements?

EPA is proposing recordkeeping and reporting requirements for any entity that domestically manufactures or imports products that use or are intended to use regulated substances or blends containing a regulated substance and is subject to the restrictions in this proposed rulemaking.

A subset of the entities that would be subject to these proposed reporting requirements is currently subject to reporting requirements under subpart QQ of the GHGRP.[182] The GHGRP, 40 CFR part 98, covers the mandatory reporting of greenhouse gas emissions and supplies from certain facilities and suppliers. To decrease the administrative burden, particularly to those entities that would be subject to both subpart QQ of 40 CFR part 98 and this proposed rulemaking, EPA is proposing reporting requirements similar to the data elements required by the GHGRP. The data elements in subpart QQ of the GHGRP form the starting point for the proposed recordkeeping and reporting requirements further outlined in this section.[183] EPA is taking this proposed approach because many of the data elements in subpart QQ provide information necessary for EPA to assess compliance with this proposed rule.

While some of the proposed requirements overlap with those of the GHGRP, this proposal would require all manufacturers and importers of products that use or are intended to use regulated substances or blends containing a regulated substance subject to these proposed restrictions to electronically report certain information to EPA. This is in contrast to the GHGRP where reporting is not required for entities that import and export less than the equivalent of 25,000 $MTCO_2e$ per year and are not otherwise required to report under 40 CFR part 98. Under subpart QQ, entities that import or export an annual quantity of fluorinated greenhouse gases (as defined in 40 CFR part 98) contained in pre-charged equipment or closed-cell foams that is equivalent to 25,000 metric tons CO_2e [184] or more are required to provide annual reports detailing certain

[182] 40 CFR part 98, subpart QQ, ''*Importers and Exporters of Fluorinated Greenhouse Gases Contained in Pre-Charged Equipment or Closed-Cell Foams.*''

[183] EPA is not proposing any changes to 40 CFR part 98 in this rulemaking.

[184] Calculated as specified in 40 CFR 98.2.

information regarding their imports or exports of such products.

Instead, for this rule EPA is proposing to apply the provisions to all entities that domestically manufacture or import products that use or are intended to use regulated substances or blends containing a regulated substance subject to this proposed rulemaking regardless of the amount of regulated substances in those products. EPA believes requiring these entities to report will be important for understanding how HFCs are being used or are intended for use in products and would provide important information for verifying compliance and allowing for oversight.

EPA is proposing that reports be submitted electronically using EPA's Central Data Exchange (CDX) [185] through EPA's electronic Greenhouse Gas Reporting Tool (e-GGRT).[186] EPA intends to avoid duplicative burden between the AIM Act and the GHGRP and reporting through e-GGRT will aid in the synchronization of these systems. Entities already subject to reporting under 40 CFR part 98, subpart QQ may need to augment their reporting in order to comply with reporting requirements under this proposal but would not need to duplicate their efforts. Where there is overlap in requested data, EPA intends to provide the ability to populate a draft annual GHGRP report with data submitted under the AIM Act, which the GHGRP reporter could then revise or augment as necessary, certify, and submit as required under 40 CFR part 98. EPA seeks comment on additional ways the Agency can utilize existing data collection to ensure compliance with the proposed restrictions.

A. What reporting is EPA proposing to require?

EPA is proposing that covered entities provide reports to EPA that include: (1) the sector and subsector of the product based on the categorization in this rulemaking; (2) for each type of pre-charged equipment with a unique combination of charge size and regulated substance or blend containing a regulated substance, the identity of the HFC or HFC blend used and its GWP, charge size (including holding charge, if applicable), and number of each product type domestically manufactured or imported; (3) for each element in (2) in this list, the total mass in metric tons of each HFC or blend containing an HFC used in the product type, and the mass of the regulated substance or blend containing a regulated substance per unit of equipment type; and (4) the dates on which the products were imported or domestically manufactured.

For the proposed requirement to report the total mass in metric tons of each HFC or blend containing an HFC used in the regulated products, including those in the RACHP and aerosols sectors, but excluding those in the foam blowing sector, reporters shall use the following equation:

$$I = \Sigma_t S_t * N_t * 0.001$$

where:

I = Total mass of the regulated substance or blend containing a regulated substance (metric tons) in all regulated products the reporter imports and/or domestically manufacturers quarterly.

t = Equipment/product type using a regulated substance or blend containing a regulated substance.

S_t = Mass of the regulated substance or blend containing a regulated substance per unit of equipment type t (charge per piece of equipment, kg).

N_t = Number of units of equipment type t imported or domestically manufactured quarterly (pieces of equipment).

0.001 = Factor converting kg to metric tons.

For the foam blowing sector, for those foams that are an integrated part of a product (*e.g.,* the foam in a household refrigerator or freezer), S_t shall be the mass of the regulated substance or blend containing a regulated substance in the foam used as part of the product), and all other factors in the equation above shall remain the same.

For the foam blowing sector, for those foams that are considered the product itself (*e.g.,* extruded polystyrene boardstock), S_t shall be the density of the regulated substance or blend containing a regulated substance in foam (charge per cubic foot of foam, kg of regulated substance per cubic foot), N_t shall be the total volume of foam imported or domestically manufactured quarterly (cubic feet of foam), and all other factors in the equation above shall remain the same.

This equation is used in 40 CFR part 98 subpart QQ for imports and exports of pre-charged equipment and closed-cell foams that contain a fluorinated GHG, as defined under 40 CFR part 98, and is already in use and familiar to those currently subject to reporting under subpart QQ.

EPA is requesting comment on the proposed reporting requirements and whether specific data should additionally be required for other sectors or subsectors such as: a list of each specific product model using regulated substances that falls within each type and unique combination of charge size and regulated substance or blend containing a regulated substance as reported per above; a differentiation by model number of the products as reported per above; an estimation of future imports over some period of time such as the next quarter or next year; information on the source of the HFC or HFC blend such as company name and address; or other information that would prove useful for the purposes of this proposed regulation.

For equipment that is shipped without an HFC but is intended to use an HFC (*e.g.,* field-charged equipment), EPA is proposing that the manufacturer or importer of the dry shipped equipment report on the number of products, the HFC or HFC blend the products are intended for use with, and the expected quantity of HFC or HFC blend that the product would contain when fully charged. EPA requests comment on requiring additional data elements such as whether the product is also intended for use with substances other than HFCs or HFC blends, the sector(s) and subsector(s) the product is used in, and whether the product is a component or subassembly. The Agency also requests comment on other data points that may be useful in determining the number of HFC products that are manufactured or imported without a charge. Alternatively, EPA could require entities who manufacture or import products that are designed for but do not contain an HFC or HFC blend to affirm they are a covered entity on an annual basis and list the types of products they manufacture or import, the quantity they manufactured or imported last year, and the regulated substances their equipment is designed to work with.

EPA notes that the definition of manufacture for this proposed rule includes the entity responsible for charging a field charged product. EPA proposes for the reporting and recordkeeping section, technicians are not included as manufacturers and would therefore not be subject to the proposed reporting and recordkeeping requirements.

Requiring reporting from entities that are manufacturing products that are intended for but do not contain HFCs and HFC blends would ensure EPA knows the full universe of relevant products that likely will contain HFCs or HFC blends in the covered sectors and subsectors and know the full universe of entities that manufacture and import these products. These proposed data requirements would provide information regarding the quantity and type of HFCs used in the

[185] Central Data Exchange is EPA's electronic reporting site (*https://cdx.epa.gov/*).

[186] E–GGRT is EPA's electronic Greenhouse Gas Reporting Tool for certain sources and suppliers of GHGs in the United States to report GHG emissions (*https://ghgreporting.epa.gov/ghg/login.do*).

three sectors (*i.e.,* RACHP, foam blowing, and aerosols) covered in this proposed rulemaking. This information will support EPA's efforts to assess the compliance of the regulated industries and will assist with efforts to enforce requirements established in this rulemaking. EPA is proposing that importers and manufacturers of products using regulated substances or blends containing a regulated substance who fail to report required information or provide inaccurate information would be considered a violation. EPA does not believe that reporting the information listed in this section above will be overly burdensome for the regulated community. Much of the information is already required for a portion of those impacted by this proposed rulemaking. The required data is limited to the information needed to ensure compliance and monitor the import and manufacture of the use of HFCs in products.

EPA seeks to ensure a level playing field for the regulated community and views regular reporting as a central mechanism for ensuring compliant companies are not placed at a competitive disadvantage. EPA requests comment on the proposed reporting requirements, including comments related to whether additional data should be collected or if complying with the proposed requirements will be overly burdensome.

EPA is proposing that reports described in this section be submitted to EPA within 45 days of the end of the applicable reporting period, unless otherwise specified. The report would need to be signed and attested by a responsible officer. EPA is proposing that importers and domestic manufacturers of products subject to the proposed reporting requirements provide a statement of certification that the data they provide is accurate. EPA is also proposing that reporters be required to certify that their products use only allowed HFCs, do not exceed any applicable GWP limit, and are properly labeled. EPA requests comment on the proposed certification requirements.

What is the proposed frequency of reporting?

EPA is proposing to require quarterly reporting from domestic manufacturers and importers subject to the proposed reporting requirement. The proposed frequency would allow for the Agency to review data throughout the year, identify trends, and identify noncompliance with the GWP limits and inaccurate reporting on an ongoing basis. Quarterly reporting is consistent with other reporting under the Allocation Framework Rule. Quarterly reporting may allow the Agency to more quickly identify trends and enforce against any production or import of a regulated product that uses or is intended to use a regulated substance or blend containing a regulated substance that is above the GWP limit or otherwise restricted as proposed in this rule. Doing so may limit the amount of such noncompliant product that enters commerce compared to an annual report. This frequency of reporting may likewise provide manufacturers and importers the ability to more quickly stop production or import of such noncompliant product and return to compliance with the provisions of this proposed rule. Quarterly reporting may also allow EPA to identify and correct inaccurate reporting more quickly so that the errors can be corrected. Quarterly reporting would also provide more information for understanding where HFCs and blends containing HFCs continue to be used in the sectors and subsectors covered by this rule, which would allow the Agency to understand market dynamics and the transitions that are occurring in those sectors and subsectors more quickly than semi-annual or annual reporting. The reports could also inform potential future rulemakings under subsection (i) of the AIM Act or potentially under other subsections of the Act. In light of these considerations, EPA is proposing the collection of quarterly reporting as the most appropriate frequency. EPA is taking comment on whether semi-annual, annual reporting, or another reporting frequency would adequately provide the same level of information and enforcement potential.

EPA is also taking comment on whether it would be appropriate to require notification to EPA prior to importing products that use or are intended to use HFCs. This would be analogous to the requirements at 40 CFR 84.31(c)(7) that require importers of bulk HFCs to report to EPA what they are importing early enough that EPA and CBP can determine if there are sufficient allowances for the imported HFCs or blends containing HFCs. In this case the notice would certify to EPA that the products using HFCs are in compliance with these standards and would provide the data required in the quarterly reporting program described in this section above for the products in the shipment. This information could be used to assist CBP as well as EPA personnel that may need to assess if a given product is consistent with requirements established in this rulemaking. While EPA notes that providing information regarding regulated products prior to their import may have compliance related advantages, such as enabling noncompliant products to be stopped before entering the market, such a system would require significant EPA resources to administer. EPA seeks comments on potential advantages or disadvantages of importers reporting prior to import in addition to quarterly, semi-annual, or annual reporting, including whether reporting prior to import would be useful for assessing compliance.

B. What recordkeeping is EPA proposing?

EPA is proposing that entities that import or domestically manufacture regulated products in the sectors and subsectors covered by this rule maintain records that form the basis of the reports outlined in section IX.A of this preamble above for a minimum of three years and make them available to EPA upon request. EPA also proposes that the importer or domestic manufacturer retain records of the company or retailer to whom the regulated product was sold, distributed, or in any way conveyed to. Information regarding where products have been distributed, sold, or conveyed to after import or manufacture may be necessary for tracking noncompliant products when they are identified and removing them from the market.

In addition, EPA is proposing that importers retain the following records substantiating each of the imports that they report: (1) a copy of the bill of lading for the import, (2) the invoice for the import, (3) the CBP entry documentation if applicable, (4) ports of arrival and entry though which the products passed, and (5) country of origin and if different the country of shipment to the United States. These requirements are consistent with the recordkeeping already required for the subset of importers subject to subpart QQ of the GHGRP and will allow EPA to enforce the proposed restrictions by tracking the movement and sources of noncompliant products when they are identified.

EPA requests comment on the proposed recordkeeping requirements and whether additional recordkeeping should be required. EPA also requests comment on whether the Agency should consider a retention period for records of five years in alignment with the HFC Framework rule.

X. What are the costs and benefits of this proposed action?

EPA estimated the costs and benefits of restricting HFCs consistent with this proposal. This analysis, presented in the RIA addendum contained in the docket, is intended to provide the public with information on the relevant costs and benefits of this action, if finalized as proposed, and to comply with executive orders. To the extent that EPA has relied upon costs and benefits estimates for purposes of analyzing factors under subsection (i)(4), as discussed in sections VII.E and VII.F of this preamble, EPA has summarized those estimates in the *Costs and Environmental Impacts* TSD.

In the RIA addendum, EPA also included estimates of the social cost of HFCs in order to quantify climate benefits, chiefly for the purpose of providing useful information to the public and to comply with E.O. 12866. Although EPA is using the social costs of HFCs for purposes of that assessment, this proposed action does not rely on the estimates of these costs as a record basis for the agency action, and EPA would reach the proposed conclusions even in the absence of the social costs of HFCs.

A. Assessment of Costs and Additional Benefits Utilizing Transition Options

The RIA addendum conducted for this proposed rule follows a methodology that is consistent with the costs and benefits analysis detailed in the Allocation Framework RIA, released in 2021, as well as the Addendum to that RIA accompanying the proposed 2024 Allocation Rule. In the Allocation Framework RIA and that Addendum, costs and benefits are calculated for the entire compliance period of the HFC phasedown (2022–2036), using a marginal abatement cost (MAC) curve to evaluate the availability and cost of abatement required to meet the AIM Act phasedown caps for production and consumption. Similarly, for this proposed rule, EPA quantifies the costs associated with the transitions necessary for compliance, but does so based on the sector- and subsector-specific restrictions proposed by this rule as opposed to an overall production and consumption cap. Both approaches, as discussed in the respective RIAs, also quantify the monetized climate benefits associated with the reduction in emissions over time as a result of decreased consumption of regulated substances.[187]

Because the phasedown in HFC consumption and production has already been codified under the Allocation Framework Rule, with further changes proposed under the 2024 Allocation Rule, the full extent of the reductions that would result from this proposed rule are not considered additional. Therefore, in calculating the impacts from this proposed rule, we calculate the ''incremental'' costs and environmental impacts (either increased or decreased) that this proposed rule would achieve compared to what the Allocation Framework Rule as updated by the proposed 2024 Allocation Rule achieves. This difference is considered the additional costs and environmental impacts realized by this proposed rule, should it be finalized as proposed.

EPA estimates that the proposed rule would have incremental benefits relative to those assessed for the Allocation Rules, although—as discussed in the RIA addendum and the *Costs and Environmental Impacts* TSD—the extent of these benefits varies depending on the mix and timing of industry transitions made in order to achieve compliance in affected subsectors. In its analysis of the Allocation Rules, EPA estimated that regulated entities would adopt specific technology transition options to achieve compliance with the statutory allowance cap step-downs. Industry is already making many of these transitions, and we expect that achieving the allowance cap step-downs will require many of the same subsector-specific technology transitions that would also be required by this proposed rule. However, the rule may in some cases require regulated entities to further accelerate transitions in specific subsectors, relative to what EPA previously assumed in its analysis of the Allocation Rules. Conversely, entities in a discrete set of subsectors not covered by this proposed rule could conceivably forgo or delay adopting abatement options that were assumed to be undertaken to comply with the Allocation Rules.

Given this uncertainty, EPA analyzed two scenarios to represent the range of potential incremental impacts resulting from the proposed rule: a ''base case'' and ''high additionality case.'' Under the proposed rule, EPA estimates that HFC emissions and consumption from 2025–2050 would be further reduced by an annual average of approximately 5 to 35 $MMTCO_2e$ and 28 to 43 $MMTCO_2e$, respectively. The annual incremental consumption and emissions avoided are shown in Table 6 for select years as well as on a cumulative basis.

TABLE 6—INCREMENTAL CONSUMPTION AND EMISSION REDUCTIONS FROM THE PROPOSED RULE, 2025–2050

[$MMTCO_2e$]

Year	Consumption reductions		Emission reductions	
	Base case	High additionality case	Base case	High additionality case
2025	9	42	−52	8
2030	26	51	−12	35
2035	41	51	6	45
2040	21	29	27	40
2045	35	44	27	37
2050	37	46	30	38
Total (cumulative)	735	1121	134	903

[187] For the sake of comparison, results from both sets of analyses are included in the RIA addendum contained in the docket.

In order to calculate the climate benefits associated with consumption abatement, the consumption changes were expressed in terms of emissions reductions. Emissions avoided in each year can also be less than the consumption avoided in the same year because of the delay between when an HFC is produced or imported and when it is emitted to the atmosphere.

As noted above, the base case scenario of incremental benefits shows that this proposed rule would achieve overall emission reductions over the full time horizon for implementation. However, the incremental emissions reductions under the transition pathway evaluated for the proposed rule are in some cases assumed to be more gradual than those EPA previously estimated to occur with implementation of the Allocation Rules. This is primarily because a) the base case does not include certain actions to reduce consumption (and, consequently, reduce emissions) previously assumed in the Allocation Rule reference case, including increased leak reduction and enhanced recovery of HFCs, and b) the assumed timing of emission reductions achieved or forgone differs depending on assumed equipment lifetime and the subsector and technology being modeled. Overall, the abatement options analyzed for compliance with this proposed rule result in more consumption reductions on a cumulative basis; however, some of the consequent emission reductions in this proposal would come at a later time than the emission reductions from the Allocation Rule reference case. As a result, when compared to the analysis of the Allocation Rules, the base case scenario results in slightly higher emissions in earlier model years while yielding greater emission reductions in later years and overall.

Although the base case scenario is a reasonable projection of the potential impacts of this proposed rule, there is reason to believe that it is a conservative one, and that the incremental emission reduction benefits associated with this proposed rule could be substantially greater than reflected in the base case scenario. Previous regulatory programs to reduce chemical use in the affected industries show that regulated entities do not limit their response to the required compliance level; rather, regulated entities may take additional actions that transform industry practices for various reasons, including the anticipation of future restrictions, strengthening their competitive position, and supporting overall environmental goals. For this reason, in the high additionality case we assumed certain abatement options not covered by the proposed rule—but which were assumed in the prior accounting of benefits for the Allocation Rules—are also included to illustrate the potential for incremental benefits. In both scenarios, on a cumulative basis the rule is expected to yield incremental emission reductions, ranging from 134 to 903 $MMTCO_2e$ through 2050 (respectively, about 3 percent and 20 percent of the total emissions over that same time period in the Allocations Rules analyses). In the RIA addendum, we estimate the present value of these incremental benefits to be between $5 billion and $51 billion in 2020 dollars.

TABLE 7—SUMMARY OF ANNUAL INCREMENTAL CLIMATE BENEFITS, COSTS, AND NET BENEFITS OF THE TECHNOLOGY TRANSITIONS RULE BASE CASE AND HIGH ADDITIONALITY CASE SCENARIOS FOR THE 2025–2050 TIMEFRAME

[Millions of 2020$, discounted to 2022] [a] [b] [c] [d]

Base case	Year			High additionality case		
	Incremental climate benefits (3%)	Annual costs (negative values are savings)	Net benefits (3% benefits, 3% or 7% costs) [e]	Incremental climate benefits (3%)	Annual costs (negative values are savings)	Net benefits (3% benefits, 3% or 7% costs) [e]
2025	−$3,603	−$395	−$3,209	$546	$31	$515
2029	−1,043	50	−1,092	2,563	335	2,227
2034	141	−200	340	3,739	−77	3,816
2036	−404	−677	273	3,213	−635	3,848
2040	2,669	−848	3,516	3,928	−784	4,712
2045	2,946	−786	3,732	4,031	−717	4,748
2050	3,606	−817	4,422	4,677	−743	5,419

Discount rate	3%	3%	7%	3%	7%	3%	3%	7%	3%	7%
PV	$5,084	−$8,045	−$4,225	$13,130	$9,309	$51,145	−$5,140	−$2,190	$56,285	$53,335
EAV	311	−492	−438	803	748	3,126	−314	−227	3,440	3,353

[a] Benefits include only those related to climate. Climate benefits are based on changes in HFC emissions and are calculated using four different estimates of the SC–HFCs (model average at 2.5 percent, 3 percent, and 5 percent discount rates; 95th percentile at 3 percent discount rate). For purposes of this table, we show the effects associated with the model average at a 3 percent discount rate, but the Agency does not have a single central SC–HFC point estimate. We emphasize the importance and value of considering the benefits calculated using all four SC–HFC estimates. As discussed in Chapter 5 of the RIA addendum a consideration of climate effects calculated using discount rates below 3 percent, including 2 percent and lower, is also warranted when discounting intergenerational impacts.

[b] Rows may not appear to add correctly due to rounding.

[c] The annualized present value of costs and benefits are calculated as if they occur over a 26-year period from 2025 to 2050.

[d] The costs presented in this table are annual estimates.

[e] The PV for the 7% net benefits column is found by taking the difference between the PV of climate benefits at 3% and the PV of costs discounted at 7%. Due to the intergenerational nature of climate impacts the social rate of return to capital, estimated to be 7 percent in OMB's Circular A–4, is not appropriate for use in calculating PV of climate benefits.

Climate benefits presented in Tables 7, 8, and 9 are based on changes (increases or reductions) in HFC emissions compared to the Allocation Framework Rule compliance case (*i.e.,* after consideration of the Allocation Framework Rule and proposed 2024 Allocation Rule) and are calculated using four different global estimates of the social cost of HFCs (SC–HFCs): the model average at 2.5 percent, 3 percent, and 5 percent discount rates and the 95th percentile at 3 percent discount rate. For the presentational purposes of Table 7, we show the incremental benefits associated with the average SC–HFCs at a 3 percent discount rate, but

the Agency does not have a single central SC–HFCs point estimate.

EPA estimates the climate benefits for this rule using a measure of the social cost of each HFC (collectively referred to as SC–HFCs) that is affected by the rule. The SC–HFCs is the monetary value of the net harm to society associated with a marginal increase in HFC emissions in a given year, or the benefit of avoiding that increase. In principle, SC–HFCs includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk and natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. As with the estimates of the social cost of other GHGs, the SC–HFC estimates are found to increase over time within the models—*i.e.,* the societal harm from one metric ton emitted in 2030 is higher than the harm caused by one metric ton emitted in 2025—because future emissions produce larger incremental damages as physical and economic systems become more stressed in response to greater climatic change, and because gross domestic product (GDP) is growing over time and many damage categories are modeled as proportional to GDP. The SC–HFCs, therefore, reflects the societal value of reducing emissions of the gas in question by one metric ton. The SC–HFCs is the theoretically appropriate value to use in conducting benefit-cost analyses of policies that affect HFC emissions.

The gas specific SC–HFC estimates used in this analysis were developed using methodologies that are consistent with the methodology underlying estimates of the social cost of other GHGs (carbon dioxide [SC–CO_2], methane [SC–CH_4], and nitrous oxide [SC–N_2O]), collectively referred to as SC–GHG, presented in the *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* published in February 2021 by the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) (IWG 2021). As a member of the IWG involved in the development of the February 2021 SC–GHG TSD, the EPA agrees that the TSD represents the most appropriate methodology for estimating the social cost of greenhouse gases until revised estimates have been developed reflecting the latest, peer-reviewed science. Therefore, EPA views the SC–HFC estimates used in analysis to be appropriate for use in benefit-cost analysis until improved estimates of the social cost of other GHGs are developed.

As discussed in the February 2021 TSD, the IWG emphasized the importance and value of considering the benefits calculated using all four estimates (model average at 2.5, 3, and 5 percent discount rates, and 95th percentile at 3 percent discount rate). In addition, the TSD explained that a consideration of climate benefits calculated using discount rates below 3 percent, including 2 percent and lower, is also warranted when discounting intergenerational impacts. As a member of the IWG involved in the development of the February 2021 TSD, EPA agrees with this assessment for the purpose of estimating climate benefits from HFC reductions as well, and will continue to follow developments in the literature pertaining to this issue.

Table 8 presents the sum of incremental climate benefits across all HFCs reduced for the proposed Technology Transitions Rule for 2025, 2029, 2034, 2036, 2040, 2045, and 2050 in the base case scenario.

TABLE 8—INCREMENTAL CLIMATE BENEFITS FOR THE PROPOSED RULE FOR SELECT YEARS FROM 2025–2050 (BASE CASE SCENARIO) [a] [b]

[Billions of 2020$]

Year	Incremental climate benefits by discount rate and statistic			
	5% (average)	3% (average)	2.5% (average)	3% (95th percentile)
2025	−1.5	−3.6	−4.8	−9.5
2029	−0.5	−1.0	−1.4	−2.8
2034	0.1	0.1	0.2	0.4
2036	1.1	−0.4	−0.4	−1.2
2040	1.3	2.7	3.5	7.1
2045	1.3	2.9	3.8	7.8
2050	1.7	3.6	4.6	9.5

[a] Benefits include only those related to climate. See Table 6–3 in the RIA addendum for the full time series of climate benefits using the SC–HFC.

[b] Climate benefits are based on changes in HFC emissions and are calculated using four different estimates of the SC–HFCs (model average at 2.5 percent, 3 percent, and 5 percent discount rates; and 95th percentile at 3 percent discount rate). The IWG emphasized, and EPA agrees with, the importance and value of considering the benefits calculated using all four estimates. As discussed in the Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 (IWG 2021), a consideration of climate benefits calculated using discount rates below 3 percent, including 2 percent and lower, are also warranted when discounting intergenerational impacts.

EPA estimates that the present value of cumulative net incremental benefits evaluated from 2025 through 2050 would range from $13.1 billion to $56.2 billion at a 3 percent discount rate, or $9.3 billion to $53.3 billion at a 7 percent discount rate. These comprise cumulative incremental climate benefits due to reducing HFC emissions (with a present value ranging from $5 billion to $51.1 billion) as well as cumulative incremental compliance savings (with a present value ranging from $5.1 billion to $8 billion at a 3 percent discount rate or $2.1 billion to $4.2 billion at a 7 percent discount rate).

The estimation of incremental benefits due to reductions in HFC emissions resulting from the proposed restrictions involved three steps. First, the difference between the consumption of HFCs realized under this proposed rule and the consumption that would have been expected based on the analysis in the Allocation Framework RIA as adjusted by the Addendum for the proposed 2024 Allocation Rule was calculated for each year of the restrictions in metric tons of carbon dioxide equivalent ($MTCO_2e$). Although the Allocation Framework Rule only required allowances for domestic bulk consumption (*i.e.,* in that rule, EPA defines consumption, with respect to a regulated substance, to mean bulk production plus bulk imports minus

bulk exports), the consumption reduction estimates in the Allocation Framework RIA included reductions in imported products containing HFCs. Second, using EPA's Vintaging Model, the changes in consumption were used to estimate changes in HFC emissions, which generally lag consumption by some time as HFCs incorporated into equipment and products are eventually released to the environment. Finally, the climate benefits were calculated by multiplying the HFC emission reductions for each year by the appropriate social cost of HFC to arrive at the monetary value of HFC emission reductions.

The incremental climate benefits of this rule derive mostly from preventing the emissions of HFCs with high GWPs, thus reducing the damage from climate change that would have been induced by those emissions. The emission reductions attributed to this proposed rule are only those beyond the reductions expected based on the Allocation Framework Rule as updated by the proposed 2024 Allocation Rule, due to more rapid and/or comprehensive transitions to HFC substitutes in certain sectors or subsectors than would otherwise occur in the Allocation Framework Rule compliance case. The reduction in emissions follows from a reduction in the production and consumption of HFCs measured in millions of $MTCO_2e$, or $MMTCO_2e$, that would occur as a result of the restrictions proposed in this rule. It is assumed that all HFCs produced or consumed would be emitted eventually, either in their initial use (*e.g.,* as propellants), during the lifetime of HFC-containing products (*e.g.,* off-gassing from closed-cell foams or leaks from refrigeration systems), or during servicing—including the reuse of HFC recovered and possibly reclaimed—or disposal of HFC-containing products.

EPA recognizes the shortcomings and limitations associated with the current interim IWG estimates and underlying methodology. Since the SC–HFC estimates are based on the same methodology underlying the SC–GHG estimates presented in the IWG February 2021 TSD, they share a number of limitations that are common to those SC–GHG estimates. The limitations were outlined in the February 2021 TSD and include that the current scientific and economic understanding of discounting approaches suggests discount rates appropriate for intergenerational analysis in the context of climate change are likely to be less than 3 percent, near 2 percent or lower. Additionally, the Integrated Assessment Models (IAMs) used to produce these estimates do not include all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature, and the science underlying their ''damage functions''—*i.e.,* the core parts of the IAMs that map global mean temperature changes and other physical impacts of climate change into economic (both market and nonmarket) damages—lags behind the most recent research.

The modeling limitations do not all work in the same direction in terms of their influence on the SC–HFC estimates. However, as discussed in the February 2021 TSD, the IWG has recommended that, taken together, the limitations suggest that the SC–GHG estimates likely underestimate the damages from GHG emissions. Therefore, as a member of the IWG involved in the development of the February 2021 TSD, EPA agrees that the interim SC–GHG estimates represent the most appropriate estimate of the SC–GHG until revised estimates have been developed reflecting the latest, peer reviewed science.

B. Scoping Analysis of Imports of Regulated Products

In the Technology Transitions Rule RIA addendum, EPA examined the scope of HFCs supplied in and emitted from equipment and products that are imported to the United States containing HFCs. We explained that the Allocation Framework Rule program does not require the expenditure of allowances when importing products with HFCs to the United States. We also indicated in the Allocation Framework Rule that subsection (i) of the AIM Act provided authority that would be appropriate to address such imports. In this proposed rule, under subsection (i) of the AIM Act, restrictions are proposed to apply equally to imported and domestically manufactured products and equipment that contain regulated substances or blends containing a regulated substance.

In the RIA addendum, we reiterate that while the Allocation Framework Rule did not restrict imports of products containing HFCs, the analysis performed for that rule as well as the proposed 2024 Allocation Rule assumed a whole-market approach. In other words, transitions that were selected by the models to meet HFC consumption reductions were assumed to apply equally to imported products and domestically manufactured products. We were not at the time able to distinguish the two because the models used (*i.e.,* the Vintaging Model and the MAC model) are agnostic as to the location of product manufacture. The models are used to project demand for and emissions from products containing HFCs in the United States or HFC emitting processes carried out in the United States.

To understand the historical and potential future scope of imports in products, and the effects that the proposed restrictions could have, EPA evaluated additional information to analyze eight scenarios as explained in Annex D to the RIA addendum. The scenarios derived from two approaches at estimates of what HFCs or substitutes are contained in the imported products, two scenarios for how future imports would grow, and two methods of evaluating the substitutes that would be used in imported products to comply with the proposed restrictions. From these calculations of reductions in the supply of HFCs inside products, we applied a simplified emission model to estimate the time-dependent emission reductions, which due to the multi-year use of some products lag the initial supply. We used these emission reduction estimates, by gas over time, and the same SC–HFCs factors from the Allocation Framework RIA, to derive climate benefits. As described in the RIA addendum, these estimates are provided as a scoping analysis and are considered in whole just a subset of the climate benefits achieved from other actions taken under the AIM Act.

As detailed in Annex D to the RIA addendum, annual reductions in the supply of HFCs in imported products ranged from 30.0 to 46.6 $MTCO_2e$ in 2029, from 31.0 to 54.1 $MMTCO_2e$ in 2034, and from 31.0 to 57.1 $MMTCO_2e$ in 2036, depending on the scenario. The cumulative reductions for the years 2025 through 2050 ranged from 829 to 1,540 $MMTCO_2e$, equal to about 12 to 23 percent of the projected reductions in the Allocation Rules analysis and about 11 to 20 percent of the combined projected reductions due to the Allocation Rules plus the incremental reductions due to this proposed Technology Transitions Rule.

The emission reductions lag the reductions in supply as explained in this section above but increase significantly as products expend their lifecycle and HFCs are emitted. Annual emission reductions ranged from 0 to 0.8 $MMTCO_2e$ in 2029, from 0 to 1.0 $MMTCO_2e$ in 2034, and from 0.9 to 2.8 $MMTCO_2e$ in 2036, depending on the scenario. The cumulative emissions reductions for the years 2025 through 2050 ranged from 318 to 459 $MMTCO_2e$, equal to about 7 to 10 percent of the projected reductions in the Allocation

Rules analysis and essentially the same percentages for the combined projected reductions in the Allocation Rules analysis plus the incremental reductions due to this proposed Technology Transition Rule.

Climate benefits of the emission reductions are shown in Table 9. As noted in this section above, these benefits are not considered additional to the Allocation Framework Rule or to this proposed rule and are shown to inform the reader of the potential scope of the benefits from restricting imported products using HFCs.

TABLE 9—CLIMATE BENEFITS FROM RESTRICTING IMPORTS OF REGULATED PRODUCTS FOR 2025–2050

[Billions of 2020$, discounted to 2022]

Year	Net climate benefits at 3% (average) discount rate
	Range of eight scenarios
2025	0.
2029	0.
2034	0 to 0.1.
2036	0.1 to 0.2.
2040	2.2 to 2.7.
2045	3.0 to 4.1.
2050	4.0 to 6.6.

XI. Statutory and Executive Order Review

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is an economically significant regulatory action that was submitted to OMB for review. Any changes made in response to OMB recommendations have been documented in the docket. A summary of the potential costs and benefits associated with this action is included in section X of this preamble, and EPA prepared an analysis of the potential costs and benefits associated with this action, which is available in Docket Number EPA–HQ–OAR–2021–0643.

B. Paperwork Reduction Act (PRA)

The information collection activities in this proposed rule have been submitted for approval to OMB under the PRA. The Information Collection Request (ICR) document that EPA prepared has been assigned EPA ICR number [2742.01]. You can find a copy of the ICR in the docket, and it is briefly summarized here.

Subsection (k)(1)(C) of the AIM Act states that section 114 of the CAA applies to the AIM Act and rules promulgated under it as if the AIM Act were included in title VI of the CAA. Thus, section 114 of the Clean Air Act, which provides authority to the EPA Administrator to require recordkeeping and reporting in carrying out provisions of the CAA, also applies to and supports this rulemaking.

EPA is proposing to apply labeling and packaging requirements to products using either an HFC or a blend containing an HFC, in the sectors and subsectors covered by this proposed rule, in order to encourage compliance and aid enforcement. EPA is also proposing recordkeeping and reporting requirements for any entity that domestically manufactures or imports regulated products to allow the Agency to review data and identify noncompliance with GWP restrictions and inaccurate reporting.

Respondents/affected entities: Respondents and affected entities will be individuals or companies that manufacture, import, export, package, sell or otherwise distribute a product within the sectors or subsectors addressed by this proposed rule that uses or is intended to use certain HFCs that are defined as a regulated substance under the AIM Act, or blends that contain a regulated substance.

Respondent's obligation to respond: Mandatory (AIM Act and section 114 of the CAA).

Estimated number of respondents: 199,086,175.

Frequency of response: Quarterly, annually, and as needed depending on the nature of the report.

Total estimated burden: 69,355 hours (per year) in the first year; 56,520 hours per year in all following years. Burden is defined at 5 CFR 1320.3(b).

Total estimated cost [188]: $27,107,658 (per year) in the first year, $25,475,817 per year thereafter, includes $19,955,215 annualized capital or operation & maintenance costs.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

Submit your comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to EPA using the docket identified at the beginning of this rule. EPA will respond to any ICR-related comments in the final rule. You may also send your ICR-related comments to OMB's Office of Information and Regulatory Affairs using the interface at *www.reginfo.gov/public/do/PRAMain.* Find this particular information collection by selecting ''Currently under Review—Open for Public Comments'' or by using the search function. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after receipt, OMB must receive comments no later than January 17, 2023.

[188] Costs are provided in 2022 dollars.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. The small entities subject to the requirements of this action include manufacturers of equipment or products within the affected subsectors (*e.g.,* manufacturers of stand-alone/self-contained refrigeration systems, manufacturers of aerosol products, manufacturers of foam products and appliances containing foam) or end-users of equipment within affected subsectors (*e.g.,* supermarkets, warehouse clubs/superstores, convenience stores). EPA estimates that approximately 162 of the 51,047 potentially affected small businesses could incur costs in excess of one percent of annual sales and that approximately 110 small businesses could incur costs in excess of three percent of annual sales. Because there is not a significant percentage of small businesses that may experience a significant impact, it can be presumed that this action will have no SISNOSE. Details of this analysis are presented in *Economic Impact Screening Analysis for Restrictions on the Use of Hydrofluorocarbons under Subsection (i) of the American Innovation and Manufacturing Act,* which is available in Docket Number EPA–HQ–OAR–2021–0643.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. Thus, Executive Order 13175 does not apply to this action. EPA periodically updates tribal officials on air regulations through the monthly meetings of the National Tribal Air Association and will share information on this rulemaking through this and other fora.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

This action is subject to Executive Order 13045 because it is an economically significant regulatory action as defined by Executive Order 12866, and EPA believes that the environmental health or safety risk addressed by this action has a disproportionate effect on children. Accordingly, we have evaluated the environmental health or safety effects of climate change on children.

GHGs, including HFCs, contribute to climate change. The GHG emissions reductions resulting from implementation of this rule will further improve children's health. The assessment literature cited in EPA's 2009 and 2016 Endangerment Findings concluded that certain populations and life stages, including children, the elderly, and the poor, are most vulnerable to climate-related health effects. The assessment literature since 2016 strengthens these conclusions by providing more detailed findings regarding these groups' vulnerabilities and the projected impacts they may experience.

These assessments describe how children's unique physiological and developmental factors contribute to making them particularly vulnerable to climate change. Impacts to children are expected from heat waves, air pollution, infectious and waterborne illnesses, and mental health effects resulting from extreme weather events. In addition, children are among those especially susceptible to most allergic diseases, as well as health effects associated with heat waves, storms, and floods. Additional health concerns may arise in low-income households, especially those with children, if climate change reduces food availability and increases prices, leading to food insecurity within households. More detailed information on the impacts of climate change to human health and welfare is provided in section III.B of this preamble.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution or use of energy. This action applies to certain regulated substances and certain applications containing regulated substances, none of which are used to supply or distribute energy.

I. National Technology Transfer and Advancement Act (NTTAA)

This rulemaking does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629, February 16, 1994) directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations (people of color and/or indigenous peoples) and low-income populations.

The EPA believes that the human health or environmental conditions that exist prior to this action result in or have the potential to result in disproportionate and adverse human health or environmental effects on people of color, low-income populations and/or indigenous peoples. EPA carefully evaluated available information on HFC substitute production facilities and the characteristics of nearby communities to evaluate these impacts in the context of this proposed rulemaking. Based on this analysis, EPA finds evidence of environmental justice concerns near HFC production facilities from cumulative exposure to existing environmental hazards in these communities. However, the Agency recognizes that restricting HFC use under the Allocation Framework Rule may cause significant changes in the location and quantity of production of both HFCs and their substitutes, and that these changes may in turn affect emissions of hazardous air pollutants at chemical production facilities. Thus, given uncertainties about where and in what quantities HFC substitutes will be produced, EPA cannot determine the extent to which this rule will exacerbate or reduce existing disproportionate adverse effects on communities of color and low-income people as specified in Executive Order 12898 (59 FR 7629, February 16, 1994).

The EPA believes that it is practicable to assess whether this action is likely to result in new disproportionately high and adverse effects on people of color, low-income populations and/or indigenous peoples. A summary of the Agency's approach for considering potential environmental justice concerns as a result of this rulemaking can be found in section III.C of the preamble, and our environmental justice analysis can be found in the RIA addendum, available in the docket. Based on the analysis, EPA determined that this rule will reduce emissions of potent GHGs, which will reduce the effects of climate change, including the public health and welfare effects on people of color, low-income populations and/or indigenous peoples. As noted in section III.C of this preamble, the Agency will continue to evaluate the impacts of this program on communities with environmental justice concerns and consider further action, as appropriate, to protect health in communities affected by HFC substitute production.

List of Subjects in 40 CFR Part 84

Environmental protection, Administrative practice and procedure, Air pollution control, Chemicals, Climate change, Emissions, Imports, Reporting and recordkeeping requirements.

Michael S. Regan,

Administrator.

For the reasons stated in the preamble, EPA proposes to amend 40 CFR part 84 as follows:

PART 84—PHASEDOWN OF HYDROFLUOROCARBONS

■ 1. The authority citation for part 84 continues to read as follows:

Authority: Pub. L. 116–260, Division S, Sec. 103.

■ 2. Add subpart B consisting of §§ 84.50 through 84.66 to part 84 to read as follows:

Subpart B—Restrictions on the Use of Hydrofluorocarbons

Sec.
84.50 Purpose.

§ 84.50 Purpose.

The purpose of the regulations in this subpart is to implement subsection (i) of 42 U.S.C. 7675, with respect to establishing restrictions on the use of a regulated substance in the sector or subsector in which the regulated substance is used, and to provide requirements associated with the submission of petitions seeking such restrictions.

§ 84.52 Definitions.

For the terms not defined in this subpart but that are defined in § 84.3, the definitions in § 84.3 shall apply. For the purposes of this subpart B:

Blend containing a regulated substance means any mixture that contains one or more regulated substances used in a sector or subsector.

Export means the transport of a regulated product from inside the United States or its territories to persons outside the United States or its territories, excluding United States military bases and ships for onboard use.

Exporter means the person who contracts to sell any regulated product for export or transfers a regulated product to an affiliate in another country.

Importer means any person who imports any regulated product into the United States. Importer includes the person primarily liable for the payment of any duties on the merchandise or an authorized agent acting on his or her behalf. The term also includes:

(i) The consignee;

(ii) The importer of record;

(iii) The actual owner; or

(iv) The transferee, if the right to withdraw merchandise from a bonded warehouse has been transferred.

Manufacture means to complete a product's manufacturing and assembly processes such that it is ready for initial sale, distribution, or operation. For equipment that is assembled and charged in the field, manufacture means to complete the circuit holding the regulated substance, charge with a full charge, and otherwise make functional for use for its intended purpose.

Product means an item or category of items manufactured from raw or recycled materials which is used to perform a function or task. The term product includes, but is not limited to: equipment, appliances, components, subcomponents, foams, foam blowing systems (*e.g.,* pre-blended polyols), fire suppression systems or devices, aerosols, pressurized dispensers, and wipes.

Regulated product means any product in the sectors or subsectors identified in § 84.56 that contains or was manufactured with a regulated substance or a blend that contains a regulated substance, including products intended to be used with a regulated substance, or that is otherwise subject to the prohibitions of this subpart.

Retrofit means to upgrade existing equipment where the regulated substance is changed, which—

(i) Includes the conversion of equipment to achieve system compatibility; and

(ii) May include changes in lubricants, gaskets, filters, driers, valves, o-rings, or equipment components for that purpose. Examples of equipment subject to retrofit include air-conditioning and refrigeration appliances, fire suppression systems, and foam blowing equipment.

Sector means a broad category of applications including but not limited to: refrigeration, air conditioning and heat pumps; foam blowing; aerosols; chemical manufacturing; cleaning solvents; fire suppression and explosion protection; and semiconductor manufacturing.

Subsector means processes, classes of applications, or specific uses that are related to one another within a single sector or subsector.

Substitute means any substance, product, or alternative manufacturing process, whether existing or new, that is used, or intended for use, in a sector or subsector with a lower global warming potential than the regulated substance, whether neat or used in a blend, to which a use restriction would apply.

Use means for any person to take any action with or to a regulated substance, regardless of whether the regulated substance is in bulk, contained within a product, or otherwise, except for the destruction of a regulated substance. Actions include, but are not limited to, the utilization, deployment, sale, distribution, discharge, incorporation, transformation, or other manipulation.

§ 84.54 Prohibitions on use of hydrofluorocarbons.

(a) Effective January 1, 2025, no person may manufacture or import any product that uses or is intended to use a regulated substance or blend containing a regulated substance as listed in § 84.56(a), (c), (d), and (e).

(b) Effective January 1, 2026, no person may sell or distribute, offer to sell or distribute, make available to sell or distribute, purchase or receive, attempt to purchase or receive, or export any product that uses or is intended to use a regulated substance or blend containing a regulated substance as listed in § 84.56(a), (c), (d), and (e), except after a period of ordinary utilization or operation of the product by an ultimate consumer.

(c) Effective [DATE ONE YEAR AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE **FEDERAL REGISTER**], beginning model year 2025, no person may manufacture or import any mobile vehicle air-conditioning system for light-duty passenger cars and trucks that uses or is intended to use a regulated substance or a blend containing a regulated substance as listed in § 84.56(b).

(d) Effective January 1, 2026, no person may sell or distribute, offer to sell or distribute, make available to sell or distribute, purchase or receive, attempt to purchase or receive, or export any mobile vehicle air-conditioning system for light-duty passenger cars and trucks that uses or is intended to use a regulated substance or a blend containing a regulated substance as listed in § 84.56(b), except after a period of ordinary utilization or operation of the product by an ultimate consumer.

(e) Effective [DATE ONE YEAR AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE **FEDERAL REGISTER**], beginning model year 2026, no person may manufacture or import any mobile vehicle air-conditioning system for medium-duty passenger vehicles, heavy-duty pick-up trucks, complete heavy-duty vans, and certain nonroad vehicles that uses or is intended to use a regulated substance or a blend containing a regulated substance as listed in § 84.56(b).

(f) Effective January 1, 2027, no person may sell or distribute, offer to sell or distribute, make available to sell or distribute, purchase or receive, attempt to purchase or receive, or export any mobile vehicle air-conditioning system for medium-duty passenger vehicles, heavy-duty pick-up trucks, complete heavy-duty vans, and certain nonroad vehicles that uses or is intended to use a regulated substance or a blend containing a regulated substance as listed in § 84.56(b), except after a period of ordinary utilization or operation of the product by an ultimate consumer.

(g) Effective January 1, 2026, no person may manufacture or import any

residential and light commercial air conditioning and heat pump—variable refrigerant flow system, that uses or is intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater.

(h) Effective January 1, 2027, no person may sell or distribute, offer to sell or distribute, make available to sell or distribute, purchase or receive, attempt to purchase or receive, or export any residential and light commercial air conditioning and heat pump—variable refrigerant flow system, that uses or is intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater, except after a period of ordinary utilization or operation of the product by an ultimate consumer.

(i) Effective January 1, 2025, no person may import, sell, distribute, offer for sale or distribution, or make available for sale or distribution, any regulated product that is not labeled in accordance with § 84.60.

(j) No person may sell, distribute, offer for sale or distribution, or make available for sale or distribution, any product within a sector or subsector containing, using, or intended to use a regulated substance or blend containing a regulated substance that is in violation of paragraphs (a) through (i) of this section, except for such actions needed to re-export or recover the regulated substance and destroy the product. Every kilogram of a regulated substance or blend containing a regulated substance contained in or used in a product in contravention of this paragraph constitutes a separate violation of this subpart. Every kilogram of a regulated substance or blend containing a regulated substance intended for use in a product in contravention of this paragraph constitutes a separate violation of this subpart. Sale or distribution, or offer for sale or distribution, of products containing, using, or intended to use less than one kilogram of a regulated substance or blend containing a regulated substance in contravention of this paragraph constitutes a violation of this subpart.

(k) (1) No person may provide false, inaccurate, or misleading information to EPA when reporting or providing any communication required under this subpart.

(2) No person may falsely indicate through marketing, packaging, labeling, or other means that a product sold or distributed, or offered for sale or distribution, uses a regulated substance, blend containing a regulated substance, or substitute that differs from the regulated substance, blend containing a regulated substance, or substitute that is actually used.

(l) Section (k) of the AIM Act states that sections 113, 114, 304, and 307 of the Clean Air Act (42 U.S.C. 7413, 7414, 7604, 7607) shall apply to this section and any rule, rulemaking, or regulation promulgated by the Administrator pursuant to this section as though this section were expressly included in title VI of that Act (42 U.S.C. 7671 *et seq.*). Violation of this part is subject to Federal enforcement and the penalties laid out in section 113 of the Clean Air Act.

§ 84.56 Sectors and subsectors subject to use restrictions.

(a) *Refrigeration, air conditioning, and heat pump.* Products in the following subsectors within the refrigeration, air conditioning, and heat pump sector are subject to the prohibitions in § 84.54(a) and (b):

(1) Industrial process refrigeration systems with refrigerant charge capacities of 200 pounds or greater, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater, except as noted in § 84.56(a)(3);

(2) Industrial process refrigeration systems with refrigerant charge capacities less than 200 pounds, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater, except as noted in § 84.56(a)(3);

(3) Industrial process refrigeration, specifically the high temperature side of cascade systems used in industrial process refrigeration applications, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater;

(4) Retail food refrigeration—stand-alone units, when using or intended to use a regulated substance, or a blend containing a regulated substance with a global warming potential of 150 or greater;

(5) Retail food refrigeration—refrigerated food processing and dispensing equipment, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater;

(6) Retail food refrigeration—supermarket systems with refrigerant charge capacities of 200 pounds or greater, when using or intended to use a regulated substance, or a blend containing a regulated substance with a global warming potential of 150 or greater, except as noted in § 84.56(a)(8);

(7) Retail food refrigeration—supermarket systems with refrigerant charge capacities less than 200 pounds, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater, except as noted in § 84.56(a)(8);

(8) Retail food refrigeration—supermarket, specifically the high temperature side of cascade systems used in retail food refrigeration—supermarket applications, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater;

(9) Retail food refrigeration—remote condensing units with refrigerant charge capacities of 200 pounds or greater, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater;

(10) Retail food refrigeration—remote condensing units with refrigerant charge capacities less than 200 pounds, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater;

(11) Cold storage warehouse systems with refrigerant charge capacities of 200 pounds or greater, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater, except as noted in § 84.56(a)(13);

(12) Cold storage warehouse systems with refrigerant charge capacities less than 200 pounds, when using or intended to use a regulated substance, or a blend containing a regulated substance with a global warming potential of 300 or greater, except as noted in § 84.56(a)(13);

(13) Cold storage warehouse, specifically the high temperature side of cascade systems used in cold storage facility applications, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 300 or greater;

(14) Ice rink systems, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater;

(15) Automatic commercial ice machines—standalone, with refrigerant charge capacities of 500 grams or lower, when using or intended to use a regulated substance or a blend containing a regulated substance with a

global warming potential of 150 or greater;

(16) Automatic commercial ice machines—standalone, with refrigerant charge capacities of more than 500 grams, when using or intended to use any of the following: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, R–410B, R–407A, R–410A, R–442A, R–417C, R–407F, R–437A, R–407C, RS–24 (2004 formulation), and HFC–134a;

(17) Automatic commercial ice machines—remote, when using or intended to use any of the following: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B;

(18) Transport refrigeration—intermodal containers, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater;

(19) Transport refrigeration—road systems, when using or intended to use any of the following: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B;

(20) Transport refrigeration—marine systems, when using or intended to use any of the following: R–404A, R–507, R–507A, R–428A, R–422C, R–434A, R–421B, R–408A, R–422A, R–407B, R–402A, R–422D, R–421A, R–125/R–290/R–134a/R–600a (55/1/42.5/1.5), R–422B, R–424A, R–402B, GHG–X5, R–417A, R–438A, and R–410B;

(21) Residential refrigeration systems, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater;

(22) Chillers—industrial process refrigeration, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater, except where the temperature of the chilled fluid leaving the chiller is less than −58 °F (−50 °C);

(23) Chillers—comfort cooling, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater;

(24) Residential and light commercial air-conditioning and heat pump systems, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater, except for variable refrigerant flow air-conditioning systems;

(25) Residential dehumidifiers, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 700 or greater; and

(26) Vending machines, when using or intended to use a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater.

(b) *Motor vehicle air conditioning.* Products in the following subsectors within the motor vehicle air conditioning subsector are subject to the prohibitions in § 84.54(c), (d), (e), and (f), when using a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater:

(1) Light-duty passenger cars;

(2) Light-duty trucks;

(3) Medium-duty passenger vehicles;

(4) Heavy-duty pickup trucks;

(5) Complete heavy-duty vans; and

(6) Certain nonroad vehicles (*i.e.,* agricultural tractors greater than 40 horsepower; self-propelled agricultural machinery; compact equipment; construction, forestry, and mining equipment; and commercial utility vehicles only).

(c) *Foam blowing.* Products in the following subsectors within the foam blowing sector are subject to the prohibitions in § 84.54(a) and (b), when using a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater:

(1) Phenolic insulation board and bunstock;

(2) Polystyrene—extruded boardstock and billet;

(3) Rigid polyurethane—appliance foam;

(4) Rigid polyurethane—slabstock and other;

(5) Rigid polyurethane—commercial refrigeration;

(6) Rigid polyurethane—sandwich panels;

(7) Rigid polyurethane—marine flotation foam; and

(8) Spray foam (*i.e.,* rigid polyurethane high-pressure two-component, rigid polyurethane low-pressure two-component, and rigid polyurethane one-component foam sealants).

(i) Spray foam when used for space vehicles as defined in § 84.3 is excluded from this prohibition.

(ii) [Reserved]

(d) *Aerosols.* Products in the aerosol sector are subject to the prohibitions in § 84.54(a) and (b), when using a regulated substance or a blend containing a regulated substance with a global warming potential of 150 or greater.

(e) *Full restrictions on the use of regulated substances.* Products in the following subsectors within the foam blowing sector are subject to the prohibitions in § 84.54(a) and (b), when using a regulated substance or a blend containing a regulated substance:

(1) Flexible polyurethane;

(2) Integral skin polyurethane;

(3) Polyolefin;

(4) Polystyrene—extruded sheet; and

(5) Rigid polyurethane and polyisocyanurate laminated boardstock.

§ 84.58 Exemptions.

The regulations under this subpart do not apply to:

(a) Equipment in existence prior to December 27, 2020; and

(b) Any product using a regulated substance or a blend containing a regulated substance, or intended to use a regulated substance or a blend containing a regulated substance, in an application listed at § 84.13(a), for a year or years for which that application receives an application-specific allowance as defined at § 84.3.

§ 84.60 Labeling.

(a) Any regulated product within a sector or subsector listed in § 84.56 that is imported, sold, distributed, offered for sale or distribution, or made available for sale must have a permanent label compliant with paragraph (b) stating:

(1) The chemical name(s) or American Society of Heating, Refrigerating and Air-Conditioning Engineers designation of the regulated substance(s) or blend containing a regulated substance;

(2) The global warming potential of the regulated substance or blend containing a regulated substance according to § 84.66, labeled as ''global warming potential'';

(3) The full date, or at minimum the four-digit year, of manufacture. For field charged equipment, this shall be the date of first charge and be completed at first charge.

(4) An indication that the full refrigerant charge is either greater than two hundred pounds or less than two hundred pounds for products in the following subsectors:

(i) Industrial process refrigeration;

(ii) Retail food refrigeration—supermarket systems;

(iii) Retail food refrigeration—remote condensing units; and

(iv) Cold storage warehouses.

(5) An indication that the full refrigerant charge is either greater than 500 grams or is equal to or less than 500 grams for products in the following subsector:

(i) Automatic commercial ice machines—standalone.

(ii) [Reserved]

(b) The permanent label must be:

(1) In English;

(2) Durable and printed or otherwise labeled on, or affixed to, an external surface of the product;

(3) Readily visible and legible;

(4) Able to withstand open weather exposure without a substantial reduction in visibility or legibility; and

(5) Displayed on a background of contrasting color.

(c) For products sold or distributed, offered for sale or distribution, or made available electronically through online commerce, the label must be readily visible and legible in either photographs of the products, photographs of packaging materials that contain the required information, or an item description that contains the required information.

(d) Any regulated product lacking a label will be presumed to use a regulated substance with a global warming potential that exceeds the limit in § 84.56.

§ 84.62 Recordkeeping and reporting.

(a) *Reporting.* (1) Any person, with the exception of persons in (a)(3), who imports or manufactures a product that uses or is intended to use a regulated substance or blend containing a regulated substance, must comply with the following recordkeeping and reporting requirements:

(i) Reports must be submitted quarterly to EPA within 45 days of the end of the applicable reporting period;

(ii) Reports, petitions, and any related supporting documents must be submitted electronically in a format specified by EPA;

(iii) Each report shall be signed and attested by a responsible officer;

(iv) Each report must provide a statement of certification that the data are accurate, the products use only allowed regulated substances and are properly labeled.

(2) Reports provided to EPA must include the following information:

(i) The sector and subsector of the product based on the categorization in § 84.56;

(ii) For each type of factory-charged equipment with a unique combination of charge size and regulated substance or blend containing a regulated substance, the identity of the regulated substance or blend containing a regulated substance and its global warming potential according to § 84.66, charge size (holding charge, if applicable), and number of units imported or domestically manufactured;

(iii) For each type of dry shipped equipment with a unique combination of intended charge size and intended regulated substance or blend containing a regulated substance, the identity of the intended regulated substance or blend containing a regulated substance and its global warming potential according to § 84.66, charge size, and number of units imported or domestically manufactured;

(iv) Total mass in metric tons of each regulated substance or blend containing a regulated substance imported or domestically manufactured in factory-charged equipment pursuant to this paragraph (a)(2); and the mass of the regulated substance or blend containing a regulated substance per unit of equipment type.

(v) Dates on which the products were imported or domestically manufactured.

(3) Persons that field-charge equipment in order to complete the manufacture of a product are not subject to the reporting provision in paragraph (a)(1) of this section.

(4) Any failure by an importer or domestic manufacturer of a product that uses or is intended to use a regulated substance or a blend containing a regulated substance to report required information or provide accurate information pursuant to this section shall be considered a violation of this section.

(b) *Recordkeeping.* (1) Each importer or domestic manufacturer of a product that uses or is intended to use a regulated substance or blend containing a regulated substance must retain the following records for a minimum of three years and make them available to EPA upon request:

(i) Records that form the basis of the reports outlined in paragraph (a)(2) of this section; and

(ii) The company or retailer to whom the regulated products were sold, distributed, or in any way conveyed to.

(2) In addition to the records in paragraph (b)(1) of this section, importers of products containing a regulated substance or a blend containing a regulated substance must retain the following records for each import:

(i) A copy of the bill of lading;

(ii) The invoice;

(iii) The U.S. Customs and Border Protection entry documentation;

(iv) Port of entry through which the products passed;

(v) Country of origin and if different the country of shipment to the United States.

(3) Persons that field charge equipment in order to complete the manufacture of a product are not subject to the recordkeeping provision in paragraph (b)(1) of this section.

§ 84.64 Technology transitions petition requirements.

(a) *Required elements.* Each petition sent to the Administrator under subsection (i) of the AIM Act shall include the following elements:

(1) *Identification of the sector or subsector.* Petitioners must identify the sector(s) or subsector(s) for which restrictions on use of the regulated substance would apply.

(2) *Identification of restriction on the use of a regulated substance.* For each sector or subsector identified in a petition, petitioners must identify the restriction on the use of a regulated substance through either of the following:

(i) A global warming potential limit that will apply to regulated substances or blends containing regulated substances with global warming potentials at or above that limit.

(ii) Identification of the regulated substance or blend containing regulated substance to be restricted and its global warming potential according to § 84.66.

(3) *Identification of effective date.* For each restriction on the use of a regulated substance contained in petitions, petitioners must include an effective date on which the regulated substance use restriction would commence, or state that the effective date should be one year after promulgation of the rule. Petitioners should provide information supporting the identified effective date.

(4) *Statement on the use of negotiated rulemaking.* Petitioners must include a request that the Administrator negotiate with stakeholders in accordance with the negotiated rulemaking procedure provided for under subchapter III of chapter 5 of title 5, United States Code. Petitioners must include an explanation of their position to support or oppose the use of the negotiated rulemaking procedure.

(5) *Information supporting the requested restriction.* For each requested restriction, to the extent practicable, petitioners must provide information related to the considerations provided in AIM Act subsection (i)(4) to facilitate the Agency's review of the petition.

(b) *Submission of petitions.* Any petition submitted to the Administrator must be submitted electronically using the designated email address listed on

the EPA Technology Transitions website.

§ 84.66 Global warming potentials.

(a) *Regulated substances.* The global warming potential of a regulated substance is the exchange value for the regulated substance listed in subsection (c) of the AIM Act and in appendix A to this part 84.

(b) *Blends containing a regulated substance.* For blends containing a regulated substance, the global warming potential of the blend is the sum of the global warming potentials of each constituent of the blend multiplied by that constituent's nominal mass fraction within the blend. The global warming potential of each constituent shall be as follows:

(1) For each constituent within the blend that is a regulated substance, the global warming potential shall be as provided in § 84.66(a);

(2) Where trans-dichloroethylene, also referred to as HCO–1130(E), is a constituent of the blend, the global warming potential of this constituent shall be one;

(3) Where cis-1-chloro-2,3,3,3-tetrafluoropropene, also referred to as HCFO–1224yd(Z), is a constituent of the blend, the global warming potential of this constituent shall be five;

(4) For each constituent that is not a regulated substance, is not HCO–1130(E), is not HCFO–1224yd(Z), but does have a global warming potential listed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, the global warming potential of the constituent shall be that listed as the 100-year integrated global warming potential and shall be the net global warming potential;

(5) For each constituent that is not a regulated substance, is not HCO–1130(E), is not HCFO–1224yd(Z), and is not listed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, the global warming potential of the constituent shall be that listed as the 100-year integrated global warming potential in the 2018 report by the World Meteorological Organization, titled ''Scientific Assessment of Ozone Depletion: 2018'';

(6) For each constituent that is not a regulated substance, is not HCO–1130(E), is not HCFO–1224yd(Z), is not listed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, and is not listed in the 2018 report by the World Meteorological Organization, the global warming potential of the constituent shall be that listed in Table A–1 to 40 CFR part 98, as it existed on December 15, 2022, including the use of default global warming potential values for constituents that are not specifically listed in that table;

(7) For cases in (4) through (6) above where a qualifier, including but not limited to approximately, ~, less than, <, much less than, <<, greater than, and >, is provided with a global warming potential value, the value shown shall be the global warming potential of the constituent without consideration of the qualifier; (8) For constituents that do not have a global warming potential as provided in paragraphs (b)(1) through (b)(7) of this section, the global warming potential of the constituent shall be zero.

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