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## Hydrofluorocarbon Phasedown: Issues for Congress

Congress enacted legislation—the American Innovation and Manufacturing (AIM) Act of 2020—to phase down hydrofluorocarbons (HFCs) domestically (P.L. 116-260, Division S, §103). HFCs are potent greenhouse gases (GHGs) used in air conditioning, refrigeration, foam blowing agents, insulation, and other applications. Multiple scientific assessments conclude that anthropogenic GHGs (e.g., carbon dioxide and HFCs) have been a major driver of observed climate change since 1950.

AIM establishes a 15-year timeline to reduce domestic HFC production and consumption and directs the U.S. Environmental Protection Agency (EPA) to implement AIM’s requirements, including through regulations. AIM’s phasedown schedule appears to align with international commitments to phase down HFCs under the Kigali Amendment to the Montreal Protocol. The United States is a party to the Montreal Protocol (MP). As of early March 2021, the United States is not a party to the Kigali Amendment. The Biden Administration has signaled its interest in international efforts to reduce HFCs. For example, Executive Order 14008 instructs the Secretary of State to submit within 60 days of January 27, 2021 (i.e., March 28, 2021), the Kigali Amendment for the Senate’s advice and consent for ratification.

### Emergence of HFCs as Pollutants

HFCs were first manufactured in the context of efforts to reduce damage to the earth’s stratospheric ozone layer. HFCs are referred to as “substitute refrigerants” under the Clean Air Act (CAA), because EPA approved HFCs as replacements for ozone depleting substances (ODS).

Although scientists say HFCs would not significantly deplete stratospheric ozone, HFCs are GHGs. Their potency, measured as Global Warming Potential, ranges from about 150 to 8,000 times more than the equivalent mass of carbon dioxide (CO<sub>2</sub>), the principal human-related GHG. Absent mitigation actions, global HFC emissions and consumption are projected to increase, especially in developing countries as demand rises for cooling services using HFCs. As discussed below, over 100 countries have committed to phase down HFCs under the Kigali Amendment.

### From Protecting Stratospheric Ozone to Phasing Down HFCs

In the 1970s, scientists expected but had little evidence that certain manufactured chemicals would damage the Earth’s protective stratospheric ozone layer. Discussions about the stratospheric ozone depletion began internationally. In response to new scientific evidence in 1985 of the springtime “ozone hole” over Antarctica, 20 nations,

including the United States, agreed to the 1985 Vienna Convention for the Protection of the Ozone Layer.

### Montreal Protocol (MP)

Parties to the Vienna Convention adopted the subsidiary MP in 1987 to set binding, quantitative schedules for countries to phase out listed ODS. The MP provides for international cooperation on ODS substitutes and research, financial assistance, and trade restrictions with nonparties. The United States is among the 197 parties to the Vienna Convention and the MP.

### Kigali Amendment to the MP

As MP parties agreed to accelerate the phaseout of certain ODS, discussions turned to the projected growth in HFCs as ODS replacements. In 2016, MP parties agreed to phase down HFCs and adopted the Kigali Amendment to the MP, its fifth amendment. The Kigali Amendment contains commitments to phase down HFC production and consumption globally. One estimate suggests that the Kigali Amendment HFC phasedown schedule could avoid as much as 0.5° Celsius of global warming by 2100.

The Kigali Amendment provides for an unspecified amount of “adequate financing,” through a Multilateral Fund, to support HFC reductions in low-income countries and for research and development of affordable alternatives. It also contains HFC trade restrictions that are to go into effect on January 1, 2033, with parties that have not ratified the Kigali Amendment.

The Kigali Amendment entered into force on January 1, 2019, having been ratified by at least 20 countries. As of early March 2021, there are over 100 parties to the Kigali Amendment. Developed countries began to phase down HFCs in 2019. Most low-income countries are to freeze HFC consumption levels in 2024, while certain low-income countries are to freeze consumption in 2028. Parties to the amendment agreed to reduce HFC use by 80%-85% of their respective baselines by the late 2040s.

### Clean Air Act (CAA)

Title VI of the 1990 CAA Amendments addresses stratospheric ozone depletion by manufactured chemicals. It also implements the U.S. international responsibilities under the MP. Under Title VI, EPA allocated production and consumption tradable allowances for ODSs equal to the amounts accepted by the United States under the MP. Additional Title VI requirements include labeling ozone-depleting products and a program to approve safer substitutes.

In the 1990s and early 2000s, EPA approved certain HFCs and HFC-containing blends as acceptable substitutes for

ODSs. Years later, EPA concluded that other ODS substitutes posed lower overall risks to the environment than did HFCs.

To address HFC emissions and their projected effect on climate change, EPA promulgated two rules under CAA Title VI in 2015 and 2016. These rules were partially vacated by the court. For more information, see

- CRS In Focus IF11541, *Hydrofluorocarbons (HFCs): EPA and State Actions*; and
- CRS Legal Sidebar WSLG1868, *D.C. Circuit Rejects EPA's Efforts to Ban Hydrofluorocarbons: Part I*; and CRS Legal Sidebar WSLG1869, *D.C. Circuit Rejects EPA's Efforts to Ban Hydrofluorocarbons: Part II* (available to congressional clients upon request).

Given that AIM establishes a separate legal authority to phase down HFCs, EPA is expected to shift its regulation of HFCs from CAA Title VI to AIM.

## American Innovation and Manufacturing Act (AIM)

Congress in AIM set a schedule to reduce domestic HFC production and consumption. AIM identifies a list of nearly 20 HFCs subject to the phasedown schedule; these are the same HFCs identified in the Kigali Amendment. The AIM schedule begins with a 10% reduction in HFC production and consumption compared to a 2011-2013 baseline. The reductions increase until reaching 85% in 2036. AIM does not completely eliminate HFCs (see **Table 1**).

**Table 1. AIM Phasedown of HFCs**

Time Period	Percentage of Reduction in Production	Percentage of Reduction in Consumption
2020-2023	10%	10%
2024-2028	30%	30%
2029-2033	70%	70%
2034-2035	80%	80%
2036 and beyond	85%	85%

**Source:** AIM, Section 103(e)(2).

AIM authorizes an allowance allocation and trading program to implement the phasedown. It requires each “person” to hold allowances for the HFCs produced and consumed, respectively, in a given year. The total number of annual allowances must correspond to the phasedown schedule. EPA is to promulgate regulations for the allocation and trading program by September 23, 2021.

AIM identifies *essential uses* of HFCs for which EPA must allocate the “full quantity of allowances necessary, based on projected, current, and historical trends” for the first five years of the phasedown (§103(e)(4)(B)(iv)). *Essential uses* include inhalers for asthma, propellants for defense sprays, foams for marine and trailer use, and military and aerospace fire suppression. Stakeholders have reported a lack of

chemical substitutes for the HFCs used in these applications. AIM specifies conditions under which EPA may designate other essential uses.

AIM authorizes EPA to grant petitions to accelerate the phasedown schedule after 2024. Under the law, EPA must consider factors, such as availability of substitutes, costs, and environmental impacts, when deciding on petitions. Also, AIM’s “technology transitions” provisions specify conditions under which EPA can restrict HFC use on a sector or subsector basis.

AIM requires EPA to set rules for the management of equipment containing HFCs and their substitutes. For example, EPA is to establish regulations to maximize reclamation of HFCs used as refrigerants—e.g., removing refrigerants and reprocessing them for future use—to minimize releases, and to ensure safety of technicians and consumers. AIM also authorizes small business technology grants: \$5 million per fiscal year for FY2021 through FY2023. Subject to appropriations, EPA is to award grants to small businesses for purchase of equipment for the recycling, recovery, or reclamation of HFC substitutes.

AIM also addresses international trade of HFCs. It specifies how EPA should reduce the number of U.S. production allowances when HFCs are exported. It also prohibits the export of HFCs to a foreign country after January 1, 2033, if that country has not, among other things, “enacted or otherwise established ... the same or similar requirements” as AIM (§103(j)).

## Issues for Congress

Congress may face several issues related to HFCs:

- If, as directed under E.O. 14008, the Secretary of State submits the Kigali Amendment to the Senate, the Senate may provide its advice and possible consent to the President to ratify it. Some view ratification as important to U.S. participation in international climate change negotiations and suggest it may encourage other major HFC users, such as China and India, to ratify the Kigali Amendment. Others have questioned the need for ratification, given that AIM authorizes a domestic HFC phasedown. Some are wary that any treaty infringes on U.S. sovereignty or are wary of environmental treaties or regulation in particular.
- If the United States joins the Kigali Amendment, Congress may consider appropriations for the U.S. contribution, if any, to international “adequate financing” of HFC reduction efforts by low-income countries.
- Should the United States not join the Kigali Amendment, Congress may consider whether adverse trade conditions may emerge under restrictions on trade with nonparties.
- As EPA implements AIM, Congress may conduct oversight on topics such as allowance allocation and trading and requirements to manage equipment containing HFCs. Congress may also consider appropriations for the small business technology grants.

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