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Potential Hydrofluorocarbon Phase Down: Issues for Congress

Potential Issues for Congress

Hydrofluorocarbons (HFCs), a potent set of greenhouse gases (GHGs), are used in air conditioning, refrigeration, foam blowing agents, insulation, and other applications. While many nations are poised to phase down HFCs, U.S. policies appear paused: Next steps in the executive branch are unclear. Nonetheless, Congress may face several issues related to possible phase down of HFCs both domestically and internationally:

- The Senate may consider its advice and possible consent to ratify a 2016 international treaty, the Kigali Amendment, if the President submits it to the Senate. Under the Kigali Amendment, Parties commit to eventually phase out HFC production and consumption.
- Industry and environmental groups seek, along with U.S. ratification of the Kigali Amendment, clarification of the U.S. Environmental Protection Agency's (EPA) authority to limit HFC use after a federal court in 2017 vacated part of an EPA rule.
- If the United States joins the Kigali Amendment, Congress may consider appropriations of 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, whether adverse trade issues could emerge under restrictions on trade with non-Parties.
- Should the United States seek to address the risks of climate change by controlling GHG emissions, phasing out HFCs—or not—could affect the distribution of effort among emitting sectors and the economic costs and benefits. HFC reductions can be achieved at very low cost per ton compared to many other GHG reduction options. Deciding not to abate HFC could raise the costs, difficulty, and time required to avoid any given level of climate change risk.

Several legislative proposals have been introduced in the 115th Congress, but none has seen committee action.

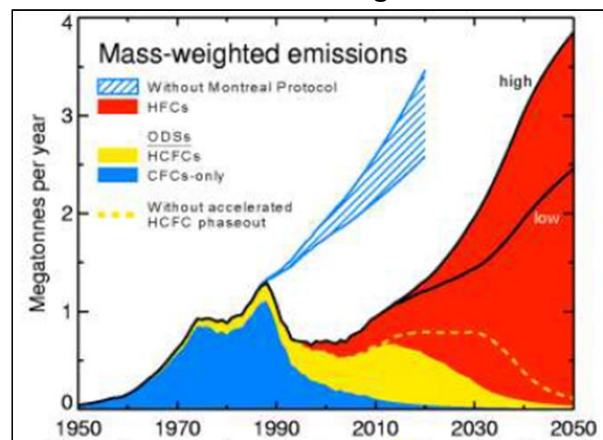
Emergence of HFCs as Pollutants

HFCs were first manufactured in the context of efforts, described below, to reduce damage to the Earth's stratospheric ozone layer, which absorbs harmful incoming solar radiation and also affects the Earth's climate. HFCs (and alternatives) replace ozone-depleting substances (ODS), including hydrochlorofluorocarbons (HCFCs). [Figure 1 illustrates how HFCs (red) replace HCFCs (yellow) which replace CFCs (blue).] HCFC use began with low levels in the 1970s and accelerated after they were

approved as replacements for more potent ODS, such as chlorofluorocarbons (CFCs).

Although scientists believe HFCs would not significantly deplete stratospheric ozone, they are GHGs, being efficient absorbers of infrared radiation in the atmosphere. Their potency, or Global Warming Potential, ranges from about 150 to 8,000 times more than the equivalent mass of carbon dioxide (CO₂), the principal human-related GHG. Once emitted to the atmosphere, various HFCs persist there for hundreds to thousands of years.

Figure 1. Estimated and Projected Emissions of ODS and HFC Substitutes Without Kigali Amendment



Source: Guus Velders, "Scenarios of ODSs and ODS Substitutes," Government of the Netherlands, presentation given May 2, 2011.

Notes: This 2011 analysis does not include control of HFC emissions (red area), as would occur under the Kigali Amendment. Also, depicting emissions of these gases by mass is not indicative of their relative environmental impacts. "High" and "low" represent a range of future emission projections.

From Protecting Stratospheric Ozone to Phasing Down HFC

In the 1970s, scientists expected but had little evidence that certain manufactured chemicals, including CFCs, would damage the Earth's protective stratospheric ozone layer. Regulation began in 1978 with U.S. restrictions on CFCs in aerosol sprays under EPA authority in the Toxic Substances Control Act of 1976, as well as Food and Drug Administration authority in the Federal Food, Drug, and Cosmetic Act. The Clean Air Act Amendments (CAAA) of 1977 (P.L. 95-95) broadly authorized EPA to regulate any activity that threatened the stratosphere and endangered public health.

1985 Vienna Convention

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.

1987 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 safer substitutes for ODS, research cooperation, financial assistance, and trade restrictions with non-Parties. A series of amendments to the MP set specific schedules for freezing, reducing, and prohibiting production and consumption of CFCs, HCFCs, and additional ODS. There are 197 Parties to the Vienna Convention and the MP, including the United States.

CAAA of 1990

To provide EPA authority beyond that in Section 157 of the CAAA of 1977, Congress enacted the CAAA of 1990 (P.L. 101-549), Title VI, to protect stratospheric ozone. Under Title VI, EPA allocated production and consumption tradable allowances for ODS equal to the amounts accepted by the United States under the MP. EPA developed a complementary comprehensive program, including ODS production and import limits; requirements for labeling, recovery and recycling; and equipment technician certification. It established the Significant New Alternatives Policy (SNAP) to approve safer substitutes.

In 1994, SNAP—in accordance with the 1993 U.S. Climate Change Action Plan—first listed HFCs as acceptable substitutes for ODS in certain uses. At that time, EPA concluded that the CAAA mandate to evaluate substitutes based on reducing overall risk to human health and the environment authorized impact on climate as a permissible SNAP evaluation criterion.

In 2015, EPA concluded that other ODS substitutes posed lower overall risks to the environment than did HFCs and so listed HFCs as unacceptable in specified uses. EPA set timetables to phase down HFC uses and listed some acceptable alternatives. A federal court in 2017, in *Mexichem Fluor, Inc. v. EPA*, took a narrower view, vacating part of the 2015 EPA rule. EPA has not provided a response to that ruling.

The Kigali Amendment to the MP

In 2007, MP Parties agreed to accelerate a phaseout of HCFCs. Studies projected strong growth of HFCs as replacements (**Figure 1**), particularly in developing countries. A 2009 study projected that uncontrolled HFC emissions could globally add as much climate forcing in 2050 as 9%-19% of business-as-usual CO₂ emissions.

Consequently, in 2016, nearly 200 nations—including the United States—agreed to the Kigali Agreement to the MP. It contains commitments eventually to phase out HFC production and consumption globally.

Developed countries are to begin to phase down HFCs by 2019. Most low-income countries freeze HFC consumption levels in 2024, while certain low-income countries freeze consumption in 2028. By the late 2040s, Parties agreed to

consume no more than 15%-20% of their respective baselines.

The Kigali Amendment also 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.

One widely cited estimate suggested that the Kigali Amendment HFC phase-down schedule could avoid as much as 0.5° Celsius of global warming by 2100.

Alternatives to HFCs

There are several means to reduce HFC production and consumption. These include conserving and recycling HFCs, substituting other substances (e.g., ammonia or CO₂) that are less potent GHG than HFCs, and modifying the technologies that use HFCs, including energy efficiency.

Costs, Trade, and the Ratification Question

Many industry and environmental groups support U.S. ratification of the Kigali Amendment and EPA regulation to assure compliance with it. Without those, certain U.S. companies’ abilities to access international markets with U.S.-developed ODS substitutes could be adversely affected by the treaty’s trade restrictions. The costs are expected to be low and some measures could yield net cost savings, particularly through energy efficiency. Some industry representatives urge careful monitoring of the availability of substitutes. Experts expect the unit costs to fall over time with technological advance and expansion of the global market. Studies also concluded that delaying a phasedown could significantly increase costs by increasing the investment in equipment that would need to be replaced once conversions to HFC-free technologies begin.

The Kigali Amendment is expected to enter into force on January 1, 2019, having been ratified, accepted, or approved by 37 nations. The United States signed the Kigali Amendment in 2016. To become a Party, the United States must ratify the treaty with the advice and consent of the Senate. The Trump Administration has not submitted it to the Senate and has not indicated its intentions. Some argue that any treaty infringes on U.S. sovereignty or may be wary of environmental treaties or regulation in particular.

For more information

CRS Legal Sidebar WSLG1868, *D.C. Circuit Rejects EPA’s Efforts to Ban Hydrofluorocarbons: Part 1*, by Linda Tsang

CRS Legal Sidebar WSLG1869, *D.C. Circuit Rejects EPA’s Efforts to Ban Hydrofluorocarbons: Part 2*, by Linda Tsang

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