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Historic Kigali Amendment eliminates warming from one of six main greenhouse gases

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After an all-night negotiating session, Minister Vincent Biruta of Rwanda brought down the gavel shortly before 7 a.m. October 15, 2016, confirming the consensus reached by the 197 Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer to adopt the Kigali Amendment to phasedown the super climate pollutants called hydrofluorocarbons (HFCs). The amendment will avoid up to 0.5[degrees] Celsius (C) of warming by 2100 and significantly more when parallel efforts to improve energy efficiency of air conditioners and other products using HFCs are included.

Background on HFCs

HFCs are manmade chemicals used as refrigerants in cooling appliances, such as air conditioners and refrigerators, and also in specialized applications, such as foams, aerosols, fire suppressants, and solvents. They were developed as replacements for CFCs (chlorofluorocarbons) and HCFCs (hydrochlorofluorocarbons), which had been used for the same purposes as HFCs before being phased out under the Montreal Protocol due to their destructive impacts on the ozone layer. Although HFCs do not destroy the ozone layer, they are super climate pollutants, with global warming impacts up to several thousands of times as powerful as carbon dioxide by weight. Their rapid growth threatened to overwhelm the Paris Agreement's goals of limiting warming to 2[degrees]C, aiming for 1.5[degrees]C and net zero emissions by mid-century.

Climate benefits of the amendment

The global HFC phasedown plan agreed to in Kigali is expected to avoid up to 90 percent of the warming HFCs otherwise would have caused by 2100--up to 0.5[degrees]C--and considerably more from fast implementation and parallel efforts to improve energy efficiency of air conditioners and other products (see graph below). The fast mitigation provided by the Kigali Amendment will make a major contribution to the goals of the 2015 Paris Agreement on Climate Change.

How the phasedown works

The phasedown agreement reached with the Kigali Amendment follows the model of previous phaseouts under the Montreal Protocol. Developed countries will take the lead to limit HFC production and use, followed by actions to be taken by two separate groups of developing (Article 5) countries, whose efforts will be financially supported by developed countries through the Montreal Protocol's Multilateral Fund. As described in the chart below, most developed countries, including the United States, Canada, and European Union member states, will begin reducing HFCs on or before 2019 and will continue phasing them down to 15 percent of baseline levels by 2036. The majority of developing countries, including China, the world's biggest producer of HFCs, will freeze production and use on or before 2024 at agreed baseline levels and will begin reductions of production and use with a step down of 10 percent below freeze levels in 2029. Reductions will continue in steps until production and consumption reach 20 percent of freeze levels in 2045. The second group of developing countries, including India, Pakistan, and the Gulf States, will freeze production and use on or before 2028 at agreed baseline levels and will begin reductions by 2032, phasing down to only 15 percent of its freeze level by 2047. National and regional controls of HFCs and market forces already underway are expected to push the phasedown of HFCs ahead of the formal deadlines in the Kigali Amendment.

The Kigali Amendment will enter into force on January 1, 2019, once "at least twenty instruments of ratification... [are] deposited by States or regional economic integration organizations that are Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer."

Kigali decision on energy efficiency

Though HFCs are super climate pollutants, many refrigeration and air conditioning appliances' greatest source of emissions is the electricity that must be generated to run the equipment, accounting for between 70 and 95 percent of an appliance's total lifecycle climate footprint. Recent analysis calculates the climate mitigation benefits of this phasedown could be doubled if matched up with complementary measures to improve energy efficiency of appliances and equipment. A combined transition to low-global warming potential refrigerants and higher efficiency in the room air conditioning sector alone could save enough electricity to avoid building up to 1,587 medium-sized coal power plants globally by 2030, and up to 2,540 plants by 2050. In India alone, up to 142 plants could be avoided by 2030 and up to 511 plants by 2050. China will save enough energy to avoid building up to 619 plants by 2030 and up to 720 by 2050.

The phaseout of CFCs under the Montreal Protocol catalyzed substantial improvements in air conditioning and refrigerant energy efficiency--up to 60 percent in some subsectors. In efforts to catalyze similar efficiency improvements with an HFC phasedown, the Parties in Kigali also agreed on an additional decision submitted by Rwanda and Morocco to investigate opportunities to enhance the energy efficiency of appliances and equipment that use HFC refrigerants. A number of private philanthropies established a USD \$53 million fast-start fund for 2017 to achieve these energy efficiency goals, augmenting a USD \$27 million pledge by developed countries as an extra one-time contribution to the Montreal Protocol's Multilateral Fund. The World Bank also pledged up to \$1 billion in concessional lending for energy efficiency in conjunction with the HFC phasedown.

Conclusion

At the recent Conference of the Parties in Marrakech, Rwanda reiterated the importance of the Kigali Amendment, stating how "we have moved from Paris pledges to concrete actions," and called "on all countries to support early and coordinated action on HFC phasedown and energy efficiency."

The HFC phasedown agreement is the single largest measure taken thus far to mitigate climate change emissions since the Paris Agreement. Assuming fast ratification and success promoting energy efficiency of air conditioners and other products and equipment, the Kigali Amendment will avoid up to 0.5[degrees]C of warming and perhaps double this.

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A5 Parties A5 Parties Non-A5 Parties Non-A5 Parties Group 1 Group 2 (*) Group 1 Group 2 (**) Baseline 2020-2022 2024-2026
2011-2013 2011-2013 Freeze 2024 2028 1st Step 2029 - 90% 2032 - 90% 2019 - 90% 2020 - 95% 2nd Step 2035 - 70% 2037 - 80%
2024 - 60% 2025 - 65% 3rd Step 2040 - 50% 2042 - 70% 2029 - 30% 2029 - 30% 4th Step 2034 - 20% 2034 - 20% Final Step 2045
- 20% 2047-15% 2036 - 15% 2036 - 15% (*) Bahrain, India, Iran, Iraq, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, and
United Arab Emirates (**) Belarus, Kazakhstan, Russian Federation, Tajikistan, and Uzbekistan

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