



INDIA AND THE KIGALI AMENDMENT TO THE MONTREAL PROTOCOL

The Kigali Amendment to the Montreal Protocol, the global pact to phase down super-climate-pollutants called hydrofluorocarbons (HFCs), is moving towards implementation. As of July 2021, 122 countries have ratified the agreement. With the United States' confirmation of its intentions to ratify, and China's formal acceptance of the Amendment in June 2021, India is the last major economy yet to announce its ratification plans. With the global climate conference this November, India's ratification of the Kigali Amendment soon would be particularly useful: it would provide a big boost to the global effort to curb these climate-harming gases and encourage other remaining countries to ratify as well.

India has for decades played a key role in bringing about the success of the Montreal Protocol, arguably the most successful international environmental treaty to date. India was central to the formation of the Kigali Amendment, and signed the original 2016 document. Ratification of the amendment would not only be a strong signal of the government's continued commitment, but it would also support Indian Industry. Ratifying would prompt "the Sooner, the Better" approach to mitigate against future global climate change from HFC usage. This is important because if India is to meet its Kigali timelines, the time to start investing in zero global warming potential (GWP) air conditioner (AC) technologies is now.



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Parties at the Montreal Protocol Meeting in Kigali, Rwanda in 2016

HFCs are used as cooling agents in refrigeration, air conditioning, and more. These super greenhouse gases are, on average, per unit weight, several thousand times more potent than carbon dioxide as a contributor to climate change. Currently, less than 10 percent of India's households own an AC unit. But urbanization, coupled with climate-induced rising temperatures and more frequent heat waves, are leading to an increasing need for cooling and refrigeration. India's demand for room air conditioners is expected to increase significantly (+800 percent) by 2038.¹ Demand is also expected to rise in all major cooling sectors of mobile air conditioners, room air conditioners, and refrigeration.

To curb emissions from India's growing refrigerant demand, early adoption of low-GWP refrigerants will be essential –



and the Kigali Amendment can help set the country on the right course.

Estimates suggest that in India alone fulfilling the Kigali Amendment and curtailing HFC usage could reduce 2 to 6 billion tons of carbon equivalent emissions through 2050.² Thus, transitioning early to climate-friendly cooling, such as by using low-GWP based refrigerants, presents an enormous opportunity to get ahead of the growing cooling demand. Effective policies, innovative market mechanisms, and financial incentives could help enable the Indian market to adopt low-GWP refrigerants.

THE WORLD IS MAKING PROGRESS ON HFCs

If left uncontrolled, global HFC emissions could add 0.5°C to global warming by the year 2100 and reverse progress towards the goal of limiting global warming to 1.5°C—necessary to avert the worst effects of climate change.³ The Kigali Amendment aims to avert this devastating climate toll by establishing an 80-85 percent phasedown in HFC use between now and 2050.

In June 2021, China became the 122nd country to ratify the Kigali Amendment, taking it another step closer to the universal membership that prior Amendments have achieved. As the leading producer and user of the majority of the world’s HFCs, China’s participation in the Kigali Amendment process is a major breakthrough signalling that climate ambition in the cooling sector is fast becoming a necessity to stay competitive in the global market.⁴

The United States is another significant HFC producer looking to reduce its emissions of this potent greenhouse gas.⁵ Within days of taking office, U.S. President Joe Biden directed his administration to prepare to send the Kigali Amendment to the Senate for its advice and consent to ratification. In addition, in late 2020, the U.S. Congress passed the American Innovation and Manufacturing (AIM) Act on HFCs, a new law that will bring the country into compliance with the major obligations of the Kigali Amendment by the start of 2022.⁶

INDIA IS ALREADY ADVANCING CLIMATE-FRIENDLY COOLING

India has shown strong climate action over the years and is one of the few countries poised to overachieve most of its commitments under the Paris Agreement. Although India is yet to ratify the Kigali Amendment, it has shown strong domestic action on climate friendly and sustainable cooling. Some of these actions on cooling include:

The India Cooling Action Plan

India released the India Cooling Action Plan (ICAP), a comprehensive plan that prioritizes efficient, climate-friendly, and affordable cooling for all, in March 2019. India’s Ministry of Environment, Forests and Climate Change (MOEFCC) and key stakeholders are now implementing the ICAP. With its framework for addressing the rising cooling demand in buildings, cold chains, transportation, and

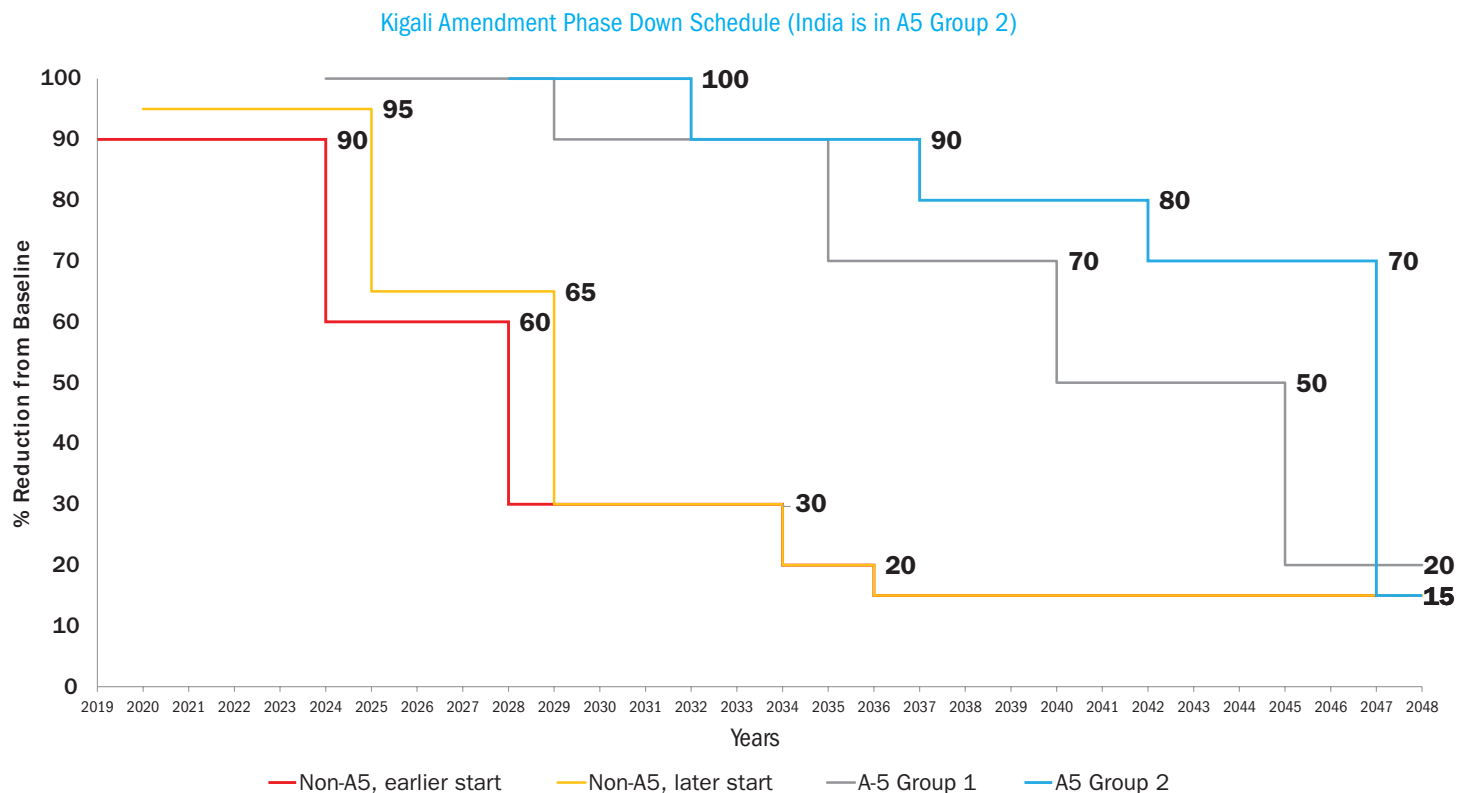




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Air conditioners in a building in Delhi, India

refrigeration, the ICAP aims to reduce refrigerant demand by 25-30 percent by 2037, train and certify 100,000 servicing sector technicians by 2022-2023, and reduce overall demand for cooling across sectors by 20-25 percent.⁷

India has also proactively implemented and accelerated its efforts to phase out first-generation fluorocarbons and hydrochlorofluorocarbons (HCFCs – essentially precursors to HFCs) under the Montreal Protocol, taking decisive domestic action and accelerating its phase-down past stated commitments. India's HCFC Phaseout Management Plan 2 (HPMP2) outlines how India will reduce HCFC consumption from 2009-2010 levels by 60 percent in 2023.⁸ HPMP2 also includes plans for India's largest air conditioner manufacturers to switch to a refrigerant known as R-32 that has relatively lower-GWP than HFC 410a and HCFCs.⁹ The adoption of R-32 through HPMP2 is enabling India to leapfrog high-GWP refrigerants including R-410a and R-22. In fact, six companies are already phasing out of HCFC-22 and moving directly to R-32 for room ACs.¹⁰

Evolving Domestic Standards on Refrigerants and Industry Innovation

India has implemented a series of domestic standards that will enable industries to smoothly transition to low-GWP alternatives such as ammonia. Though the cold chain sector is already using ammonia as a refrigerant, India plans to further increase the uptake of low-GWP alternatives (including ammonia) for commercial and cold chain applications. The country already has an approved code

of practice specific to Indian conditions for the design and installation of closed-circuit ammonia refrigeration systems. The Bureau of Indian Standards has also started work on the safety standards for R-290, another low-GWP refrigerant, for room air conditioners.

Indian manufacturers, such as Godrej & Boyce, are world leaders in their production of R-290 units, which are substantially less climate polluting than units that utilize R-32 or R-410a, another HFC alternative.¹¹ Their leadership on manufacturing split R-290 room air conditioner units and others that follow suit will have a clear market advantage as the world looks to adopt low-GWP refrigerants.¹² With the goal of integrating energy efficiency into India's cooling sector, India's Energy Efficiency Services Limited (EESL) launched a Super-Efficient Air Conditioning program in 2018, which is now due to enter its third phase. EESL's bulk procurement program for room ACs enables the consumers to buy super-efficient air conditioners with 1.5TR cooling capacity at 50 percent market price. The air conditioners also use a low-GWP HFC, R-32. The program is due for revision this year and had limited success in 2020, on account of distribution challenges related to COVID-19.

Promoting Technology Innovation

The Global Cooling Prize exemplifies the type of innovation that can come with a supportive political environment and financing. This international initiative funnelled resources to research and develop solutions to accelerate cooling with a lower climate impact.¹³ The initiative was led by Rocky Mountain Institute and the Department of Science & Technology (DST), Government of India, as well as Mission Innovation. The prize received innovative submissions and finalists included Indian companies. The winners were Daikin India and China's GREE, whose low-GWP solutions are entirely novel in residential air conditioning designs.¹⁴ The prize has shown how industry innovation can expand the breadth of low climate impact solutions. Appropriate policy, fiscal and financial solutions will have to be designed to bring these innovations to market and scale.

KEY REASONS FOR INDIA TO RATIFY THE KIGALI AMENDMENT

India's ratification of the Kigali Amendment could usher in global and domestic environmental and economic benefits. Four reasons for India's timely ratification of the Kigali Amendment are below.

1. **A boost for India's domestic manufacturing and employment generation goals.** The ratification would signify that India is ready to compete in the market for low-GWP (climate-friendly) refrigerants, which will

spur domestic innovation and attract international investments. The global marketplace is shifting to low-GWP refrigerant production, and early adoption of low-GWP refrigerants will lead to a competitive advantage. Manufacturers and stakeholders agree that the Montreal Protocol is an effective vehicle for refrigerant market transformation, including room ACs.¹⁵ Early adoption can help signal to industry that India will continue to have strong demand for low-GWP equipment; this will help attract industry to manufacture in India. If India is seen as a hub for low-GWP development, this will promote local Indian manufacturing jobs and air-conditioning servicing jobs. For example, CEEW estimates that the total number of jobs in the Indian air-conditioning service sector is expected to grow to 2 million by 2030.¹⁶

2. Achieving India's climate change and cooling commitments.

India is one of the few countries on track to meet its climate commitments under the Paris Agreement. Ratifying Kigali would further solidify this trend. Currently, India has ambitious renewable energy targets, aiming to install 175 gigawatts (GW) of renewable energy by 2022 and 450 GW by 2030. India also has progressive building efficiency policies: the Energy Conservation Building Code (ECBC) sets minimum energy standards for commercial buildings. As of June 2021, 17 states and two union territories have adopted the ECBC. Both India's renewable energy and energy efficiency targets have been instrumental in India's ongoing efforts to curb emissions and cut emission intensity by 33 to 35 percent of 2005 levels by 2030.

For a country like India which is already experiencing extreme heat waves, cooling is an absolute necessity. Ratifying the Kigali Amendment would demonstrate that India has a plan to provide much-needed cooling for millions while balancing the need to protect the

environment. Adopting low-GWP refrigerants will enable India to achieve both its development and climate action targets. Demand for cooling is expected to grow rapidly: an estimated 63 million rural poor people in India lack access to cooling.¹⁷ Sustainable cooling, cooling that is powered by sources that are not climate polluting, is critical to ensure Indians are not exposed to extreme heat risk and is critical to sustaining access to cooling in the long run.¹⁸

3. **A position of strength at the Montreal Protocol.** India has already established strong climate credentials from its work on the Montreal Protocol for the past several decades. Ratifying the Kigali Amendment would strengthen India's influence and goodwill around the globe and help bolster India's efforts to establish smart policies and bylaws, including energy efficiency while phasing down HFCs.

A major co-benefit of the Montreal Protocol implementation has been improved energy efficiency. Lower-GWP refrigerants generally provide higher efficiency and cooling capacity compared to conventional HFCs and HCFCs.¹⁹ In addition, transitions to new refrigerants have historically sparked innovation and upgrades of aging designs and components – presenting an additional opportunity to improve air conditioner energy efficiency.²⁰ The emissions reductions from energy efficiency are also substantial. It is therefore, beneficial to improve energy efficiency as equipment transitions to lower-GWP refrigerants. India is a big proponent of enhancing or maintaining energy efficiency while phasing down HFCs. India's ratification will help in strengthening its stance on energy efficiency at the Montreal Protocol. Ratification could also potentially help India secure additional Multilateral Fund financing for investment in manufacturing and low-GWP equipment production. One example of such a project would be funding for AC manufacturing companies to jump-start the transition to low-GWP refrigerants. Leapfrogging to the best alternatives may provide increased access to multilateral funding.

4. **Build upon the progress India has made on phasing down HFCs.** India has been moving forward to implement the India Cooling Action Plan, which sets domestic targets for cooling efficiency and refrigerants but may not be enough by itself for India to meet Kigali timelines.²¹ The ICAP provides short-, medium- and long-term recommendations on interventions across differing refrigerant sectors to reduce HFC usage, cooling demand and advance sustainable cooling and thermal comfort for all. Furthermore, ratifying the Kigali amendment would help India continue forward



Photo Credits: NRDC

Indian Government and Civil Society Stakeholders at the Montreal Protocol Discussion in November 2019

progress on low-GWP refrigerant adoption. Ratification would help lay a clear policy framework to prevent imports that utilize highly potent (high-GWP) HFCs, such as R-134a, R410a, and R-404a.²² A country that does not ratify the Amendment risks operating with technologies that are becoming obsolete or failing to upgrade its processes and facilities. It therefore will be at an economic disadvantage. This can potentially result in loss of export markets for industries even before the Protocol's trade controls apply to HFCs and would curtail the use of the latest innovative technology. Without proper market signals, dumping of obsolete and cheap technology with high-GWP refrigerants also remains a risk, though that is more of a risk in the informal market.

would signal to the international community that India remains a critical global stakeholder in charting a low carbon future and is committed to climate-friendly cooling for all. This will also lead to a ripple effect, encouraging other major economies to ratify and moving the Amendment to universal ratification, sooner rather than later. India's ratification of the Kigali Amendment would be a win for the global fight against climate change. It would also be a timely signal to the world in the lead-up to COP 26 that India intends to continue to be a leader in the fight against global warming. Moreover, setting the country on course to an early phasedown of HFCs could help drive domestic innovation and connect Indian industry to international low-GWP refrigerant markets and give them an opportunity to become a globally competitive in low-GWP refrigerant cooling products.

With COP 26 approaching, this year is seen as the year to increase climate ambition. Ratifying the Kigali Amendment

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HIGHLIGHTED RESOURCES



Frequently Asked Question (FAQs) Cool Roofs

May 2020

<https://www.nrdc.org/sites/default/files/india-cool-roofs-faq-20200527.pdf>



Towering Possibilities in India

September 2019

<https://www.nrdc.org/sites/default/files/towering-possibilities-in-india-20190910.pdf>



Cooling with Less Warming

November 2018

<https://www.nrdc.org/sites/default/files/cooling-india-air-conditioners-market-profile-2018-fs.pdf>



Improving Air Conditioners in India

April 2018

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HIGHLIGHTED BLOGS

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