

Montreal Protocol & Kigali Amendment

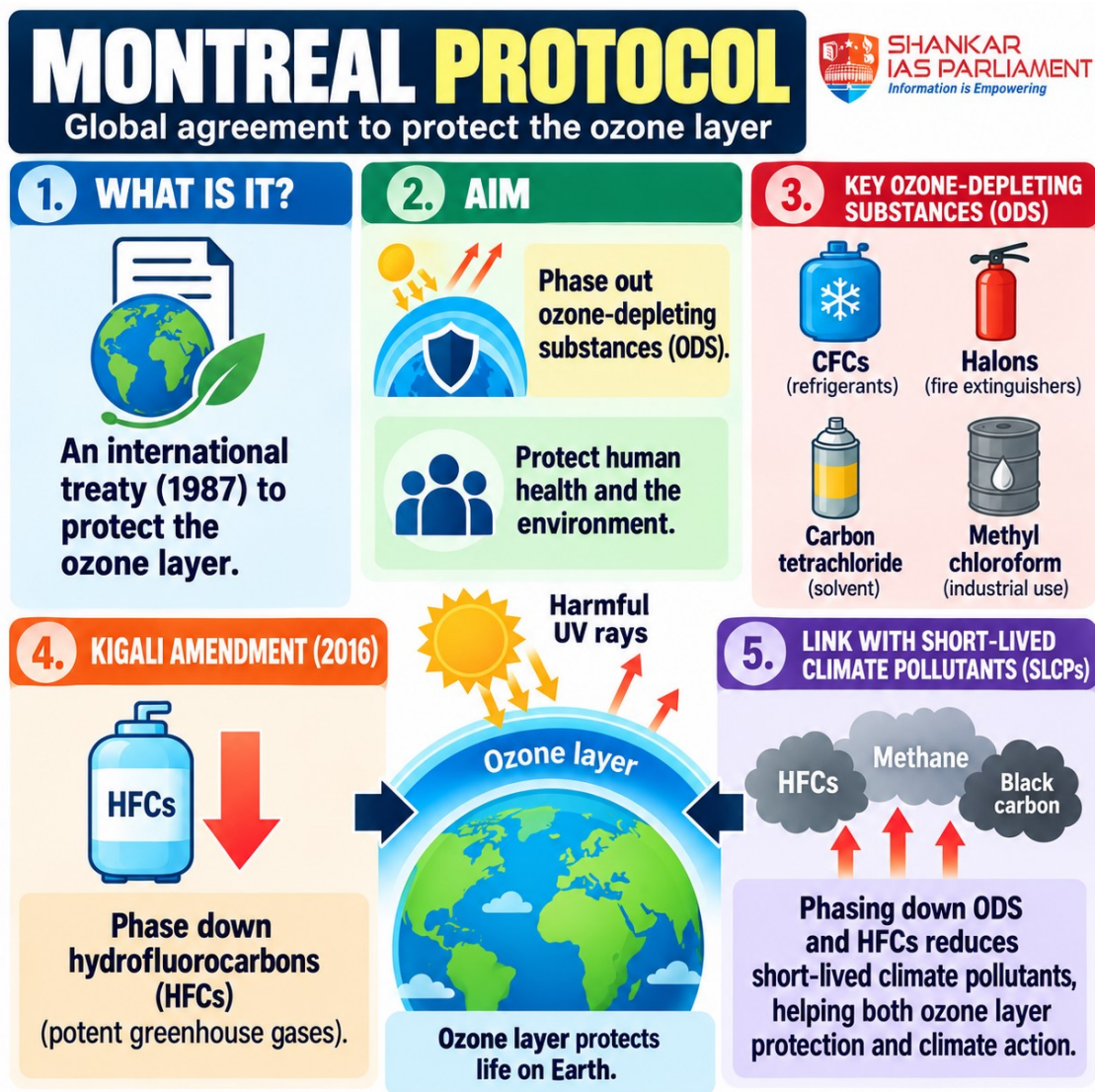
Mains: GSIII - Environment

Why in News?

The Kigali Amendment completed 10 years on October 15, 2026, aiming to phase down HFCs and prevent up to 0.5°C of global warming by 2100, while highlighting India's need for sustainable cooling.

What is the Montreal Protocol and Kigali Amendment?

- **Background** - The **Montreal Protocol (1987)** aims to phase out chlorofluorocarbons (CFCs) and other ozone-depleting substances.
 - HFCs were adopted as substitutes because they do not damage the ozone layer, but many have a much higher global warming potential than carbon dioxide.
- **Kigali Amendment** - It was adopted in Rwanda on October 15, 2016, and *entered into force in January 2019*.
- **Objective** - It establishes binding schedules to phase down HFC production and consumption, with longer compliance timelines for developing countries.
 - By early October 2026, 175 parties had joined the amendment.
- It complements the Paris Agreement's objective of limiting warming to well below 2°C while pursuing efforts to limit it to 1.5°C.



Why is Sustainable Cooling Important for India?

- **Rising electricity demand** - Cooling accounts for slightly more than 10% of India's annual electricity demand, while air-conditioners can consume up to one-third of electricity on hot summer nights.
- **Dual climate impact** - Refrigerant leakage directly contributes to global warming, while electricity consumption generates emissions when power comes from fossil fuels.
- **Economic benefits** - Energy-efficient appliances reduce household electricity bills and limit the need for additional power-generation capacity.
- **Industrial competitiveness** - Adopting efficient technologies and suitable refrigerants can help Indian manufacturers meet evolving domestic and international standards.

India's Commitments under the Kigali Amendment	
Year	Commitment
2028	Freeze HFC production and consumption at the agreed baseline
2032	Reduce HFC production and consumption by 10% below the baseline

2047	Achieve an 85% reduction below the baseline
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What is the Role of the Multilateral Fund?

The Multilateral Fund was established in 1990 and began operations in 1991 under the Montreal Protocol.

- **Financial and technological support** - Developed countries contribute funds to meet the agreed additional compliance costs of developing countries.
- **Climate benefits** - The Fund estimates that its work helped developing countries avoid emissions of approximately 50 billion tonnes of carbon dioxide between 1995 and 2021.
- **Significance for India** - Access to finance can help Indian manufacturers transition to climate-friendly refrigerants while meeting growing cooling demand.

Why Has the Montreal Protocol Been Successful?

- **Binding targets** - Clear phase-out and phase-down schedules provide certainty for governments and manufacturers.
- **Progressive strengthening** - Controls have been tightened and extended to additional chemicals as alternatives have become available.
- **Scientific and technological assessment** - Expert panels evaluate available technologies, enabling governments to strengthen commitments in line with industrial capabilities.
- **Differentiated timelines** - Developing countries receive longer compliance periods and financial assistance.
- **Adaptive framework** - The approach described as “start and strengthen” allows the agreement to evolve without renegotiating its basic framework.

Montreal protocol - Short Lived Pollutants

- Short-lived climate pollutants (SLCPs) cause strong warming but remain in the atmosphere for less time than CO₂. These are
 - **Methane** - Emitted by oil and gas operations, agriculture and waste.
 - **Black Carbon** - Produced by incomplete combustion of fuels.
 - **Hydrofluorocarbons (HFCs)** - Used as refrigerants in air-conditioners and refrigerators.
 - **Tropospheric Ozone** - Ground-level ozone formed by chemical reactions between air pollutants in sunlight.
- The Montreal Protocol model could support binding international agreements to reduce emissions, particularly methane leaks from oil and gas operations.
- In India, mitigation measures must also address agricultural emissions and black carbon while protecting farmers' livelihoods and promoting cleaner fuels.

What are the Major Challenges in Implementing the Kigali Amendment?

- **Rising cooling demand** - Rapid growth in air-conditioning use could increase electricity consumption and associated emissions.
- **Transition costs and technological gaps** - Manufacturers need financial assistance,

suitable alternatives and technical expertise to modify production facilities.

- **Refrigerant leakage** - Existing equipment continues to release HFCs during servicing, maintenance and disposal, requiring stronger recovery systems.
- **Incomplete global participation** - Wider participation, adequate financing and effective implementation are necessary to maximise climate benefits.

What Measures Should India Adopt for Sustainable Cooling?

- **Improve appliance efficiency** - Strengthen energy-efficiency standards and promote high-efficiency air-conditioners before the treaty deadlines, reducing electricity bills and future power demand.
- **Promote climate-friendly refrigerants** - Encourage alternatives with lower global warming potential and support manufacturers in redesigning equipment and production processes.
- **Strengthen refrigerant management** - Recover and reuse refrigerants during servicing and safely destroy them when reuse is impractical, including during equipment disposal.
- **Improve market regulation** - Enforce efficiency standards for imported equipment to prevent the entry of inexpensive but energy-intensive appliances.
- **Expand consumer awareness** - Encourage consumers to consider lifetime electricity costs rather than only the initial purchase price.

What lies ahead?

- The Kigali Amendment demonstrates how binding international commitments, financial assistance can address global environmental challenges.
- For India, the priority is to combine energy-efficient cooling, climate-friendly refrigerants and effective refrigerant recovery to meet rising cooling demand.

Reference

[The Indian Express| The Kigali Amendment at 10](#)