

Montreal Protocol

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The Montreal Protocol is widely recognized as one of the most successful environmental agreements.

Effectiveness of the Montreal Protocol

1. Reduction of Ozone-Depleting Substances (ODS):

- The Montreal Protocol has significantly reduced emissions of ODS, including Hydrochlorofluorocarbons (HCFCs).*
- Since 2021, five years earlier than anticipated, there has been a notable decrease in the globally averaged chlorine content of ODS in the troposphere.*

2. Impact of HCFCs:

- HCFCs, which are compounds made up of carbon, hydrogen, chlorine, and fluorine, were commonly used as refrigerants and in foam production.*
- HCFC-22, the most prevalent HCFC, has seen a substantial decline. HCFC-22's Global Warming Potential (GWP) is thousands of times higher than that of carbon dioxide (CO₂), making it a significant greenhouse gas.*

3. HCFC-141b:

- There has been a minor decline in HCFC-141b, the second most common HCFC. HCFC-141b was used as a blowing agent in rigid polyurethane foam production.*
- India has successfully phased out HCFC-141b under the ODS (Regulation and Control) Amendment Rules, 2014, aligning with its commitments under the Montreal Protocol.*

Key Components of the Montreal Protocol

• History and Implementation:

- Signed in 1987, the Montreal Protocol is a global treaty designed to phase out the production and use of ODS.*
- It is implemented under the Vienna Convention, which was adopted in 1985.*

• Kigali Amendment:

- Adopted in 2016 and in force since 2019, the Kigali Amendment focuses on phasing down Hydrofluorocarbons (HFCs).*
- HFCs, while not ODS, have a GWP that is thousands of times greater than CO₂ and thus contribute significantly to global warming.*

Ozone and Ozone-Depleting Substances (ODS)

• Ozone Layers:

- Stratospheric Ozone (Good Ozone): Located 10-40 km above the Earth's surface, it absorbs and protects Earth from harmful UV radiation.*
- Tropospheric Ozone (Bad Ozone): Formed closer to the Earth's surface, it is a harmful*

pollutant that can cause respiratory issues and other health problems.

- **ODS Characteristics:**

- *Human-made chemicals containing chlorine and bromine, such as CFCs and HCFCs, reach the stratosphere where they break down ozone molecules through catalytic reactions.*

The Montreal Protocol's achievements in reducing ODS and the Kigali Amendment's efforts to address HFCs mark significant progress in global environmental protection, contributing to both ozone layer recovery and climate change mitigation.