5. World Ozone Day - Environment

India becomes one of the first countries with a cooling action plan - Bhupender Yadav. India has launched a pioneering Cooling Action Plan (ICAP) to sustainably meet rising cooling demands while aligning with global environmental commitments. The plan integrates the phase-out of ozone-depleting substances and HFCs, as mandated by the Montreal Protocol and Kigali Amendment, with national development goals.

India's Leadership in Sustainable Cooling on World Ozone Day 2025

India recently marked World Ozone Day 2025 (celebrated annually on September 16th) under the theme "From Science to Global Action." On this occasion, the Minister of Environment, Forest and Climate Change (MoEFCC) highlighted that India is one of the first countries in the world to develop and implement a comprehensive Cooling Action Plan (ICAP). This plan strategically aligns India's developmental needs for cooling with its global commitments to protect the ozone layer and combat climate change.

India's Journey with Global Ozone Protection

India has been an active and responsible participant in international efforts to protect the ozone layer for over three decades.

Vienna Convention (1985) - India is a party to this first international framework that established the principles for global cooperation on ozone layer protection.

Montreal Protocol (1987) - India became a signatory to this landmark treaty in 1992. The protocol is designed to phase out the production and consumption of Ozone Depleting Substances (ODS) like Chlorofluorocarbons (CFCs) and halons.

ODS Regulation and Control Rules (2000) - To implement the Montreal Protocol domestically, India enacted these rules to regulate the production, consumption, and trade of ODS, establishing a licensing and registration system.

HCFC Phase-Out Management Plan - India has successfully implemented its strategy to phase out Hydrochlorofluorocarbons (HCFCs).

Stage I (2012–2016) - Successfully met the reduction targets.

Stage II (2017–2024) - This stage is ongoing. India has already achieved a 44% reduction in HCFC use by 2020, significantly surpassing its target of 35%.

Kigali Amendment (2016) - India ratified this crucial amendment in 2021. It extends the obligations of the Montreal Protocol to include the phase-down of Hydrofluorocarbons (HFCs), which are potent greenhouse gases. This move directly links ozone protection with climate action.

National HFC Phase-Down Strategy (2023) - In line with the Kigali Amendment, India has finalized a national strategy to reduce HFC consumption, prioritizing sectors based on their current use and the availability of low Global Warming Potential (GWP) alternatives.

About the India Cooling Action Plan (ICAP) - Launched in March 2019, the ICAP is a pioneering long-term vision to address the country's rapidly growing cooling demand in a sustainable manner.

Why Sustainable Cooling Matters

Cooling is a fundamental developmental need essential for human health, agricultural productivity (food security), and economic growth. The demand for cooling in India is surging due to rising incomes, rapid urbanization, and the impacts of climate change. For instance, without intervention, refrigerant use in vehicle air-conditioning alone is projected to quadruple by 2038. This explosive growth threatens to increase energy consumption and greenhouse gas emissions, as conventional cooling systems often use refrigerants harmful to the ozone layer (ODS) or the climate (high-GWP HFCs).

ICAP Goals by 2037–38

The plan sets forth an integrated vision with clear, long-term goals.

Goal Area	Target for 2037–38
Refrigerant Demand Reduction	Reduce refrigerant demand by 25% to 30%.

Cooling Energy Reduction	Reduce cooling energy requirements by 25% to 40%.
Cooling Demand Reduction	Reduce cooling and thermal comfort demand by 20% to 25%.
Skills Training	Train and certify 100,000 servicing sector technicians.
Research and Development	Identify and promote key areas for R&D in alternative cooling technologies.

Implementation Framework

ICAP's implementation is a coordinated, multi-stakeholder effort. It is seamlessly integrated with existing national policies such as the Bureau of Energy Efficiency's (BEE) energy efficiency programs, the Ministry of Housing and Urban Affairs' (MoHUA) urban development schemes, and the Ministry of Skill Development's (MSDE) training missions. To operationalize its recommendations, the MoEF&CC has constituted six thematic working groups and an inter-ministerial steering committee to guide and review progress.

Thematic Areas of the ICAP

ICAP addresses the entire cooling ecosystem through a sector-by-sector approach.

1. **Space Cooling in Buildings** - Promotes green building codes, energy-efficient ACs through BEE star ratings, and urban planning strategies like reflective roofing to reduce the "urban heat island effect."
2. **Cold Chain & Refrigeration** - Aims to reduce the 30-40% of perishable produce lost post-harvest by strengthening the cold chain. This helps double farmers' income, ensures food and vaccine safety, and boosts agricultural exports.
3. **Transport Air-Conditioning** - Addresses the quadrupling demand for vehicle AC by promoting low-GWP refrigerants, green labels for cars to incentivize efficiency, and expanding public transport networks.
4. **Servicing Sector** - Focuses on upskilling India's millions of AC technicians through certification programs to ensure proper handling of refrigerants, reduce leakage, and improve livelihoods.
5. **Refrigerant Supply & Indigenous Production** - Emphasizes supporting domestic manufacturing of alternative refrigerants under the "Make in India" initiative to reduce import dependency and ensure supply stability.
6. **Research & Development (R&D)** - Envisions innovation in alternative refrigerants (like ammonia, CO_2) and new technologies such as solar-powered and district cooling systems through public-private collaboration.

Benefits and Challenges of ICAP

Benefits

Environmental - Protects the ozone layer and mitigates climate change. India's CO_2 equivalent reductions from these efforts increased from 4.26 million MT in 2020 to 7.69 million MT in 2023.

Economic - Reduces food wastage, boosts farmer incomes, and lowers energy bills for households and businesses.

Social - Ensures thermal comfort for all, including in Economically Weaker Section (EWS) housing, improving quality of life.

Industrial - Supports domestic manufacturing of ACs and refrigerants under the "Make in India" mission.

Health - Reduces exposure to harmful UV radiation, lowering risks of skin cancer and cataracts.

Challenges

High Upfront Costs - Energy-efficient appliances and low-GWP refrigerants are often more expensive initially.

Consumer Awareness - Many consumers are unaware of the environmental impact of inefficient appliances or refrigerant leakage.

Enforcement and Monitoring - Tracking refrigerant use and disposal across the vast and unorganized servicing sector is difficult.

Global Dependency - India still relies on imported technologies and chemicals for many advanced cooling solutions.

The Science of Ozone Depletion

Good vs. Bad Ozone - The ozone layer in the stratosphere is "good ozone" that acts as a UV shield. Tropospheric ozone at ground level is "bad ozone," a harmful pollutant.

Causes of Depletion - Depletion is mainly caused by man-made chemicals like CFCs and halons. These stable substances rise to the stratosphere, where UV radiation breaks them down, releasing chlorine or bromine atoms that destroy ozone molecules. Volcanic eruptions can worsen this process.

Environmental Effects of Ozone Depletion

Area Affected	Specific Impacts
Human Health	Increased UV radiation raises risks of skin cancer, cataracts, blindness, and weakened immune systems. A 1% ozone decrease can lead to 2 million new cataract cases annually.
Agriculture	Higher UV levels harm crops like rice, wheat, and corn, reducing growth and photosynthesis. A 1% UV-B increase could cut food production by 1%.
Marine Life	UV radiation threatens plankton, the base of the aquatic food chain, and harms the larvae of fish, shrimp, and crabs, reducing fish yields.
Materials	UV radiation damages materials like wood, plastic, and rubber, leading to costly replacements.

Major Ozone-Depleting Substances (ODS)

The Montreal Protocol and its amendments regulate a wide range of chemicals used across various sectors.

Chemical/Group	Sector / Use	Phase-Out Status
Chlorofluorocarbons (CFCs)	Refrigerators, ACs, aerosols, spray cans, foams	Fully Phased Out
Halons	Fire extinguishers (industrial, aviation, defense)	Phased Out
Carbon Tetrachloride	Solvents, feedstock for CFCs	Controlled
Hydrochlorofluorocarbons (HCFCs)	Refrigeration, air-conditioning, foams	Being Phased Out
Methyl Bromide	Agriculture fumigation, pest control	Controlled Use Only
1,1,1-Trichloroethane (Methyl Chloroform)	Industrial solvents, metal cleaning	Phased Out

Way Forward and Conclusion

The path forward requires scaling up affordable technologies, strengthening digital monitoring of refrigerants, and integrating sustainable cooling practices into citizen-centric initiatives like Mission LiFE. Aligning with the Kigali Amendment commitments through technology transfer and climate finance remains crucial. India's ICAP is a powerful example of how ozone layer protection and climate action can be pursued simultaneously with national development goals. By translating scientific commitments into a long-term policy roadmap, India has shown leadership in achieving measurable results. The key challenge now is to implement these solutions equitably and at scale, ensuring a sustainable and cool future for all.

Source - https - //www.newsonair.gov.in/india-becomes-one-of-the-first-countries-with-a-cooling-action-plan-bhupender-yadav/