HCFC Phase-out in India and Policy integration with the National Cooling Action Plan

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October 2017
International Negotiations

- **18th March 1991**: India became a Party to the Vienna Convention.


- **3rd March 2003**: India ratified the Copenhagen Amendment (1992), Montreal Amendment (1997) and Beijing Amendment (1999).

- **September 2007**: Accelerated phase-out of HCFCs vide decision XIX/6 of 19th Meeting of the Parties (MOP).

- **October 2016**: India adopted the Kigali Amendment to Phase down HFCs.
India’s Achievements in Implementing Montreal Protocol

- Total phase-out of production and consumption of CFCs, CTC and Halons from 1st January, 2010, as per the Montreal Protocol schedule.
- Phase-out of use of CFCs and Halons in manufacturing of new equipments w.e.f. 1.1.2003.
- Phase-out of production and consumption of CFCs with effect from 1st August 2008, 17 months prior to the schedule of the Montreal Protocol.
- **Adoption of accelerated phase-out of HCFCs by 2030**

### Maximum HCFC Consumption (ODP tonnes)

<table>
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<tr>
<th></th>
<th>Baseline</th>
<th>2013</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1,608.23</td>
<td>1,608.23</td>
<td>1,447.41</td>
<td>1,045.35</td>
<td>522.68</td>
<td>40.21</td>
<td>0</td>
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<tr>
<td>2020</td>
<td>1,045.35</td>
<td>90%</td>
<td>65%</td>
<td>32.5%</td>
<td>2.5%</td>
<td>0</td>
<td></td>
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<tr>
<td>2025</td>
<td>522.68</td>
<td>65%</td>
<td>32.5%</td>
<td>2.5%</td>
<td>0</td>
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<tr>
<td>2030</td>
<td>40.21</td>
<td>32.5%</td>
<td>2.5%</td>
<td>0</td>
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<tr>
<td>2040</td>
<td>0</td>
<td>2.5%</td>
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</tbody>
</table>

- 100%
Need for Phasing out HCFCs

- During the implementation of the CFC phase-out under the Montreal Protocol, HCFCs were approved as interim substitutes for CFCs in many of the projects and activities supported by the Multilateral Fund. HCFCs were also used historically as refrigerants in the refrigeration and air conditioning industry.
- In 1991, it was recognized that the phase-out of production and consumption of CFCs and halons is not enough to control the depletion of ozone layer. Other fluorocarbon chemicals like Hydrochlorofluorocarbons (HCFCs) with up to 15% ODP of that of CFCs, which are also ODSs, need to be controlled.
- HCFCs therefore would eventually have to be phased-out.
- HCFCs are used in India in various industry sectors, such as Air Conditioning, Refrigeration, Foams, Firefighting and Solvents.
- The overall HCFC consumption in India increased from 3,792 metric tonnes in 1994 to 21,863 metric tonnes in 2010, indicating an average annual growth rate of about 11.57%. In the past five years (2006 to 2010), the overall HCFC consumption in India has grown from 8,912 metric tonnes to 21,863 metric tonnes, signifying an average compounded annual growth rate of 19.7%. The main reasons for this growth are sustained economic development and resulting increase in demand for consumer, commercial and industrial products that use HCFCs.
Prioritization of foam sector – HCFC-141b phase-out (310.53 ODP tonne of HCFC 141b)

- Mainly because of ODP impact

- **Sub-sectors**: Domestic refrigeration insulation foam, continuous sandwich panels and discontinuous sandwich panels

Support systems houses that produce polyols – to ensure low GWP HCFC free technologies are available from 2015 onwards in the country

- For capacity building to adopt good servicing practices and service equipment using alternatives (31.24 ODP tonne of HCFC-22)

Support training for enforcement agencies

Project Management and Coordination
HPMP Stage II (2015-2023)

- Approved in 77th ExCom in December 2016
- Total Value  USD 44.91 Million
- Prioritization  Foam Sector from existing consumption of 638.02 (554.97 ODP T – HCFC 141b & 83.05 in imported pre blended Polyols) to 0 ODP T in 2020.
- Prioritization  Refrigeration & Air-conditioning Sector reduction of 131.47 ODP Tonnes
- Support to service sector: For capacity building to adopt good servicing practices and service equipment using alternatives
- Support training for enforcement agencies
- Project Management and Coordination
Need for Kigali Amendment on HFCs and Energy Efficiency

- During the phase down of HCFCs, HFCs with a much higher global Warming Potential started to penetrate the market. HFCs is currently 1% of GHG emission (though growing at rate of 8 to 9% per year).
- Given the current growth of Room ACs in India, the CO2 equivalent emissions on account of usage of HFCs would sabotage all efforts to protect environment made under the Montreal Protocol.
- India represents only around 2% of the global production and consumption of HFCs but our manufacturing and consumption sector is expected to grow at a rapid pace in future.
- HFC emissions from end-use sectors will grow significantly: by 186 times from current level to 500 million tonne CO2e in 2050. 77% of HFC emissions are expected to generate from buildings sector.
- Urbanization may lead to 33 fold increase in power consumption from air conditioning alone. Cooling has become an integral part of 21st Century, considering the dependence of steel, chemical, medicine industries and data centers on cooling.
- Therefore it is significant to address the energy consumption parameter of RAC along with HFC transition. Efficiency improvement of ACs along with refrigerant transition roughly doubles the emissions benefit of either policy undertaken in isolation.
HFC emissions from end-use sectors will grow significantly: by 186 times from current level to 500 million tonne CO$_2$e in 2050.
The Twenty-Eighth Meeting of the Parties,

- Recognizing that a phase-down of hydrofluorocarbons under the Montreal Protocol would present additional opportunities to catalyse and secure improvements in the energy efficiency of appliances and equipment,

- Highlighting the large returns on investment that have resulted from modest expenditures on energy efficiency, and the substantial savings available for both consumers and governments,

Decides:

- To request the Technology and Economic Assessment Panel to review energy efficiency opportunities in the refrigeration and air-conditioning and heat-pump sectors related to a transition to climate-friendly alternatives, including not in kind options;

- To invite parties to submit, on voluntary basis, relevant information on energy efficiency innovations in the refrigeration, air-conditioning and heat-pump sectors to the Ozone Secretariat by May 2017;

- To request the TEAP to assess the information submitted by parties on energy efficiency opportunities in the refrigeration and air-conditioning sectors during the transition to low and zero -global-warming-potential alternatives and to report to twenty-ninth meeting of the parties, in [2017].
Need for an Integrated Approach

- Convergence between domestic policies to enhance EE while lowering GWP of refrigerants
- Leapfrog HCFC transitions to low-GWP refrigerants and energy efficient systems to avoid technology and system lock-in with HFCs
- Prioritise “access to cooling” as a development goal
- But at the same time reduce cooling demand through smart Building design in order to reduce consumption and emissions of HFCs and enhance energy productivity
- Framework involving the entire spectrum of energy consumption segments during HFC transition
- Innovative implementation or business model to deliver efficient and low-GWP cooling together
- International collaboration for testing and standards
- To meet both – India’s Climate Change and Montreal Protocol goals
Potential for Energy Efficiency Improvements

The split between direct and indirect emissions depends on various factors such as:

- the GWP of the refrigerant used;
- the amount of refrigerant leakage that occurs;
- the energy demand of the RAC system and the hours of usage;
- the CO2 emissions factor of the power station(s) supplying the electricity used.

Potential Indirect emission savings that can be achieved during HCFC phase out stages:

- Attain Equipment efficiency through better design and energy efficient compressors (60-70%)
- Reduced indirect emissions through reduced cooling demand from Buildings through smart designs (50%)
- Servicing, Management and Behaviour change through capacity building and timely servicing etc (10-20%)
- Refrigerant change (5-10%) – Low-GWP refrigerant to be carefully chosen to be inputted only into an equipment which catalyse efficiency
Recognizing the cross cutting use of refrigeration and air conditioning technologies in various sectors and close linkage of energy efficiency with refrigerant transitions while phasing down HFCs, it has been decided to develop a National Cooling Action Plan. This plan would inter-alia integrate the phase out of ODSs/phase down of HFCs while maximizing energy efficiency of air-conditioning equipment's. National Cooling Action Plan will lend a long term perspective to different sectors using refrigerants, foaming agents and cooling technologies etc.

The National Cooling Action Plan will develop a perspective plan for 20 years on refrigerants in different sectors, equipments, building design/envelope, insulation etc. and its relationship to energy efficiency.

The MoEFCC has also set up a committee comprising of the representatives from government, industry, academia and research organizations. Its terms of work will be as follows:

(I) to examine and understand the growth of refrigerants and associated technologies across the world (both in developing and developed countries),

(II) examine the rate of growth / penetration of cooling technologies in different sectors in India: projection over a period of 20 years,

(III) understand the factors responsible for energy efficiency in building, RAC equipment, cold storages etc., and its linkage to the HFC phase-down,

(IV) recommend policy changes/steps required to attain the objective of promotion of low GWP refrigerants and not-in-kind technologies for cooling in India with a perspective of improving energy efficiency of equipments and saving in energy consumption in building, RAC equipment, cold storages etc.
Implementation Model – I
Synchronizing Energy Efficiency policies post Kigali

1) Minimum Energy Performance Standards (MEPS) specifies efficiency-floor for RAC products

*Current: Revision every two-years in India*

*Synchronising MPES with HFC phase-down*

- indicating GWP ceiling?
- Technology Specific MEPS?
- MEPS based on cooling capacity?

2) Product labelling - Star labeling also serves as basis for super-efficient appliance endorsement

*Current: India introduces ISEER starting in 2018*

*Synchronizing Product Labeling with HFC phase-down*

- Refrigerant and GWP as essential information on product labels?


- Inclusion of EE goals in Training Programmes
- Equipment or tools required for EE checks?
1. EESL’s Super Efficiency Air Conditioning Programme (ESEAP) - Rolled out a tender for 100,000 super-efficient ACs in March 2017

2. China’s “Promotion of Energy-Efficient Products to the Benefit of the People” programme from 2009 to 2013: encouraged consumers to buy energy-efficient products by lowering the up-front price of these products

3. Green Mortgage Loans and Programme for Sustainable Integral Improvement in Existing Housing in Mexico: low-income HHs incentivised to purchase efficient equipment, including energy-efficient air conditioners, beneficiaries receive a discount of up to 40 per cent of the cost of the efficient technology

4. The Adi HusadaESCO in Indonesia undertook a project to retrofit old air conditioners by changing the refrigerants to hydrocarbons with total savings of 22 per cent with a payback period of one year
Thank You

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