Role of Industry in Implementation of HCFC Phase-out

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Technology Drivers

Sustainability

Digital World
Life Cycle Climate Performance (LCCP) - To Measure Environment Impact

LCCP

= Direct Global Warming + Indirect Global Warming

Holistic Approach:
- Safety
- Performance
- Environment
- Economics

Refrigerant Leakage

1. Leak Rate
2. Charge Amount
3. Refrigerant GWP

Energy Consumption has 95 to 98% impact on Environment

Source: Emerson Climate Technologies, Inc.
Regulations

Product

Energy Labeling

Refrigerants

E - Waste Rules
HCFC Refrigerants in phase-out list

- **Air-conditioning and Refrigeration**
  - HCFC-22
  - HCFC-123

- **Foam Sector**
  - HCFC-141b

- **HCFC-22 is the major consumption in**
  - Refrigeration & Air-conditioning products
  - HCFC-123 is used by few manufacturers in Chillers

- **Consumption frozen from 1\textsuperscript{st} Jan 2013**
- **Phase-out to start from 1\textsuperscript{st} Jan 2015**
### Status of Refrigerants used

<table>
<thead>
<tr>
<th></th>
<th>HCFC</th>
<th>HFC</th>
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<tbody>
<tr>
<td>Room AC Fix Speed</td>
<td>R22</td>
<td>R410A, R32</td>
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<tr>
<td>Room AC Inverter</td>
<td></td>
<td>R410A</td>
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<tr>
<td>Chillers Large</td>
<td></td>
<td>R134a</td>
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<tr>
<td>Chillers small</td>
<td>R22</td>
<td>R407c, R410A</td>
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<tr>
<td>VRF</td>
<td></td>
<td>R410A</td>
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<tr>
<td>Ducted</td>
<td>R22</td>
<td>R407c, R410A</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>R22</td>
<td>R404A</td>
</tr>
</tbody>
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Natural Refrigerants

• Natural refrigerants have low GWP and Zero ODP

• They have major challenges of safety as all these refrigerants are highly flammable / toxic and have limitation of usage

• CO$_2$ Has limitation due to ambient temperature
Business process end to end

Products

India

Export

R&D → Manufacturing → Sales → Installation → Service within Warranty → Service beyond warranty → End of Life
Role of Industry

External Factors

- ECBC Labeling Program
- New technologies
- Montreal protocol
- Market dynamics
Role of Industry

Initiatives

- Skill development
- Absorb new Technologies
- Help in Developing India specific Policies
- Invest in R & D
- Integrated approach on Regulation
Present Status

• Energy regulation policies in place with clarity. This helps in planning

• Industry is closely working with various stakeholders in developing India specific standards

• Implementation of Montreal protocol is ahead of curve

• Non availability of proven refrigerants technology to adopt low GWP refrigerants specifically in large systems

• Industry has adopted low GWP technologies wherever technology is available such as C5 in foam sector
Challenges

• Shorter product life cycles driven by regulation

• Natural refrigerants have challenges of flammability and toxicity. Proven and matured technologies are not available

• Integration of regulations

• Integration of technologies

• Skill of service technicians is below the minimum acceptable level, hinders introduction of new technologies
Phase down of HFC Kigali agreement

- HFC are intermediate solutions as they have HIGH GWP and contribute to global warming
- Technologies as alternative to HFC are not yet matured
- We will have to wait to understand if they have any harmful effects
In long term, we will have to look beyond conventional cooling solutions to reduce the impact on environment due to Energy consumption & Refrigerants