Enhancing Energy Efficiency & Lowering GWP of Refrigerants

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TERI

Per Capita Global Emissions
The Global Perspective

India's per capita carbon emissions are far lower than other major economies

* Carbon Emissions refers to CO2 emissions from fuel combustion
* Data for the year 2014
Paris Agreement is a Step Ahead

- Focuses on a long term goal of limiting global temperature rise to much less than 2 Deg C
- All countries take action, with developed countries taking lead
- Countries pledge action and report in a transparent manner
- Mechanism to enable “ratcheting up” of ambition in subsequent pledges
- Global technological cooperation – International Solar Alliance and Mission Innovation

India’s INDCs

Tackling Climate Change in Step with the World

India’s voluntary ‘Intended Nationally Determined Contributions’ or INDCs seek to ensure a better standard of life for the nation’s poor, and a better environment, through sustainable and responsible development.

1. Reduce carbon intensity of GDP
2. Increase share of non-fossil fuel-based electricity
3. Accelerate afforestation efforts
4. Adapt to climate change through adaptation programmes
5. Adopt a climate-friendly and cleaner path
6. Provide adequate funding for initiatives
7. Adopt and promote low carbon-intensive lifestyles
8. Adopt cutting edge technology

Our aim is to promote Sustainable Development that is centered on the unity of humanity and nature.
India: 8 levers are identified in the INDC, of which 6 are also quantified

<table>
<thead>
<tr>
<th>Reduction levers</th>
<th>Included in INDC?</th>
<th>Specification</th>
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<tbody>
<tr>
<td><strong>Non-fossil Energy</strong></td>
<td></td>
<td>• Wind: 60 GW by 2022</td>
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<td></td>
<td></td>
<td>• 100 GW by 2022</td>
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<td></td>
<td>✓</td>
<td>• Biomass: 10 GW by 2022</td>
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<td>• Nuclear: 63 GW by 2032</td>
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<td><strong>Energy efficiency</strong></td>
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<td>• Buildings: E.g. Energy Conservation Building Code</td>
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<td>✓</td>
<td>• Industry: E.g. Perform, Achieve and Trade scheme</td>
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<td>• Transport: E.g. Vehicle fuel efficiency standard</td>
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<td><strong>Fuel shifts</strong></td>
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<td>• Coal to gas: Not mentioned in the INDC</td>
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<td>• Transport (NG/biofuels): 20% blending of biofuels</td>
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<td><strong>Non energy</strong></td>
<td></td>
<td>• Specification: Not mentioned in the INDC</td>
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<tr>
<td><strong>Other</strong></td>
<td></td>
<td>• Methane: Non-CO2 emissions are not mentioned specifically in the INDC.</td>
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<td>• Nitrogen oxide: However, various measures related to reducing emissions from waste are included.</td>
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<td>• Other: Additional (cumulative) carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.</td>
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1 LULUCF: Land Use, Land Use Change and Forestry
India’s ambitious stance at Kigali

India took responsible steps to move up its ambition from an initial proposal to phase-down HFCs from 2031 to a schedule which begins phasing down HFCs 3 years earlier.

India announced mandatory HFC-23 incineration through domestic resources while other countries are seeking MLF funds for this.

India also announced an ambitious collaborative R&D programme to develop alternatives to HFCs.
**Key takeaway**

**A Decision on Energy Efficiency**

- **Decision (XXVIII/3) on Energy Efficiency** included in the Kigali Amendment for the first time – demonstrates recognition by countries on catalyzing benefits from energy efficiency along with sectoral transition

- **$80-million 'Kigali Cooling Efficiency Fund'** was launched for developing countries to provide an opportunity to improve energy efficiency of appliances while shifting to HFC alternatives
Emerging Opportunities: Enhancing EE & Lowering GWP

- There are several low-hanging fruits in the area of energy efficiency technologies that can be captured by Indian AC manufacturers.
- These measures primarily focus on optimizing the cooling capacity, thereby improving the Energy Efficiency Ratio (EER) of the equipment.
- Choice of compressor technology can affect EER up to 2%, cause lesser noise reduction cost of maintenance and hence reduce the life cycle cost of equipment.
- The quality of refrigerant gas plays a significant role in determining the cooling capacity.
- Some low GWP refrigerant gases have been shown to achieve 11% higher energy efficiency than the minimum requirements for five star rating.

The resulting energy efficiency gains and emissions mitigation will also play a significant role towards achieving India’s INDC with respect to the target of 33-35% reduction in emissions intensity.

From Politics to Economics...

Addressing climate change concerns involves choosing higher-cost lower-CO2 emission technologies over lower-cost, higher emission technologies.

Addressing climate change is about meeting higher costs (at least in the medium term) and enabling rapid technology evolution.