



India Cooling Action Plan

Submitted/Presented by:

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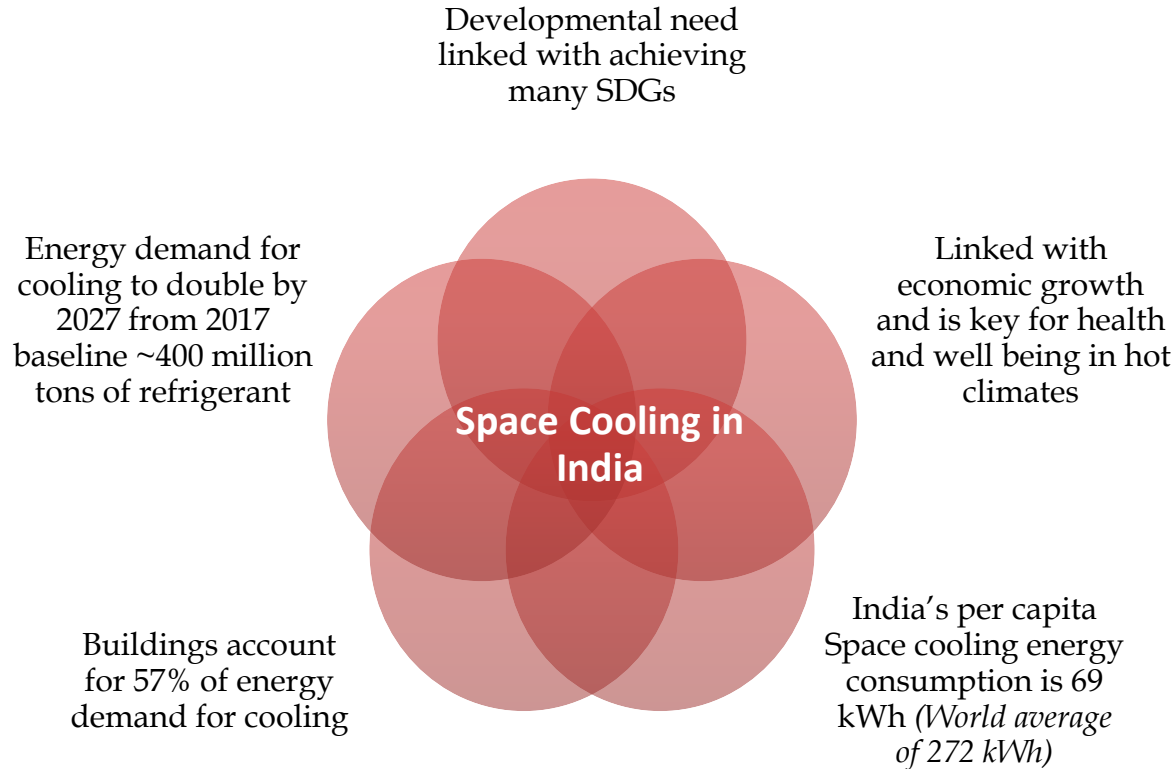
Managing Director

- India Cooling Action Plan (ICAP) was launched on 8th March, 2019 by Dr. Harsh Vardhan, Union Minister for Ministry for Environment, Forest & Climate Change
- The goal of ICAP is to provide sustainable cooling and thermal comfort for all while securing environmental & socio-economic benefits for the society
- The objectives of ICAP are
 - Reducing cooling demand across sectors by 20-25% by 2037-38
 - Reduce refrigerant demand by 25-30% by 2037-38
 - Reduce cooling energy requirements by 25-40% by 2037-38
 - Recognize “cooling & related areas” as a thrust areas of research under national S&T program
 - Training & certification of 100,000 servicing sector technicians by 2022-23, synergizing with Skill India Mission



- 1** Cooling Demand in India
- 2 Current and Projected capacity, energy consumption and emissions
- 3 Sector-wise applications
- 4 India Cooling Action Plan
- 5 Roadmap

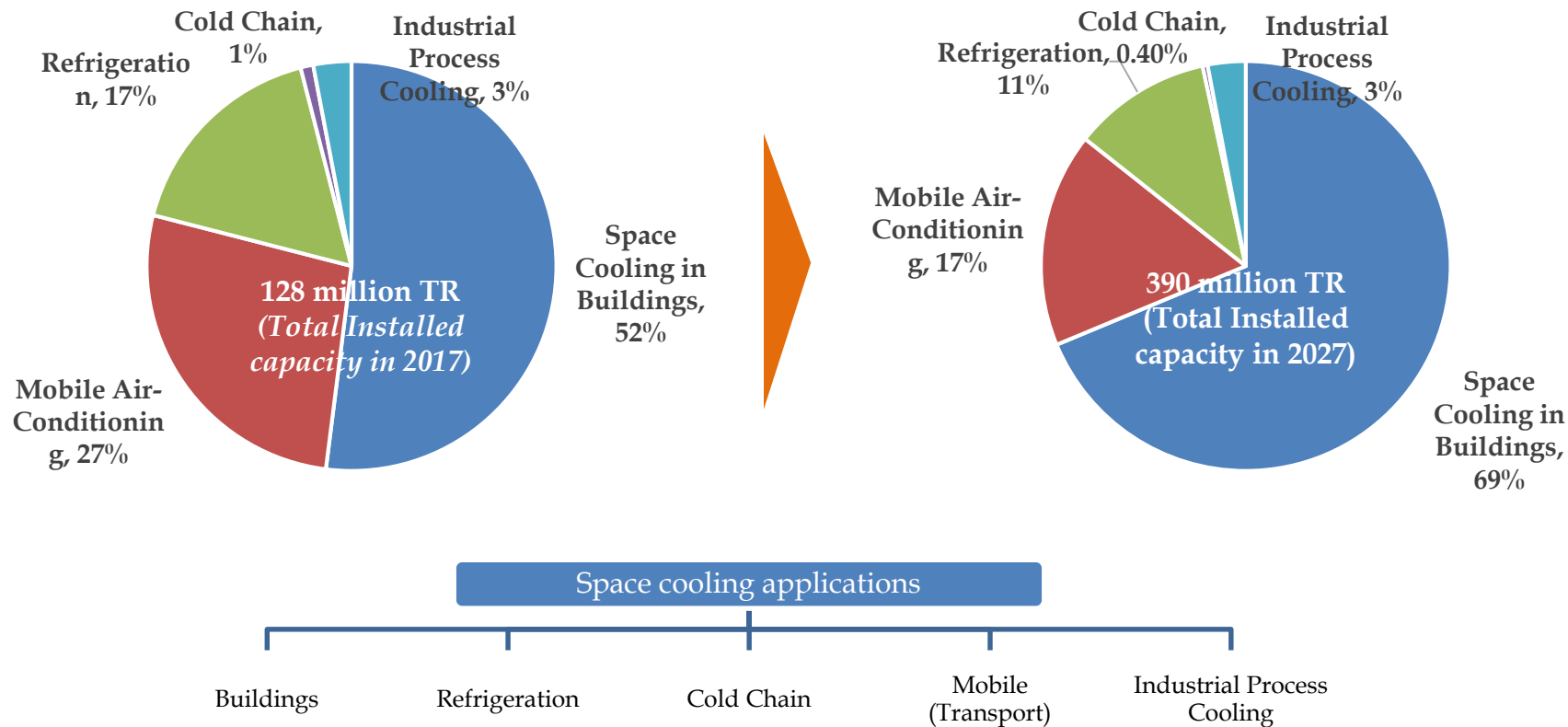
Cooling intricately linked to development goals



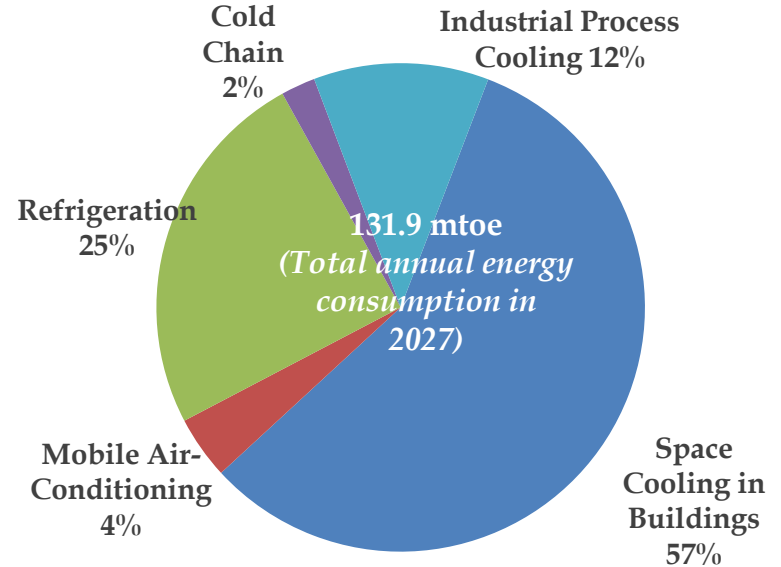
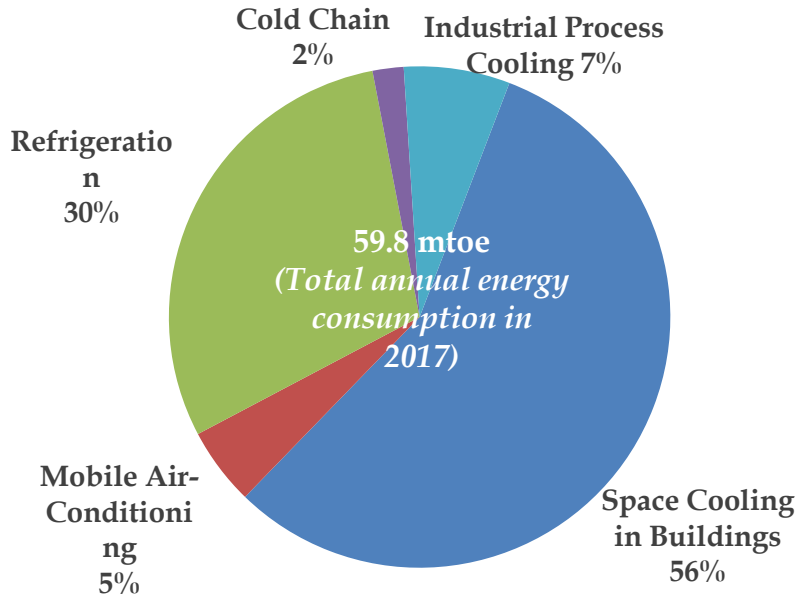


- 1 Space cooling in India
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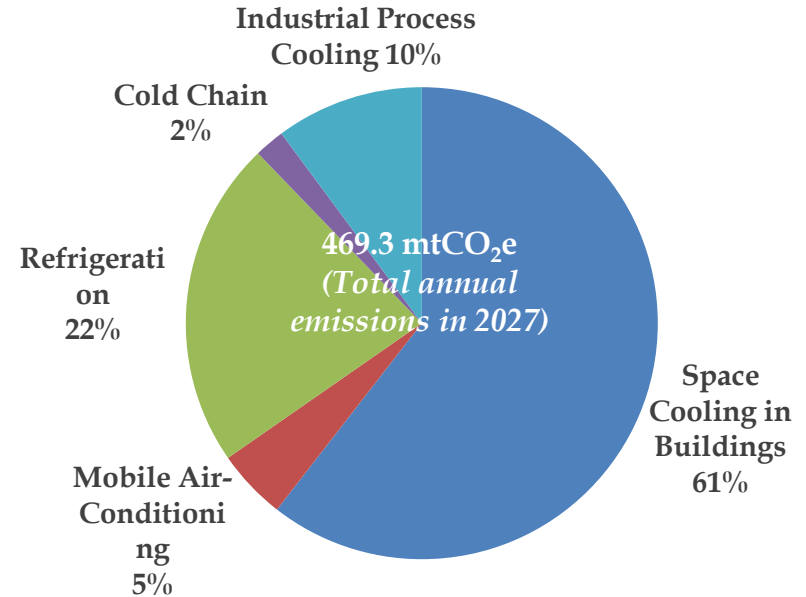
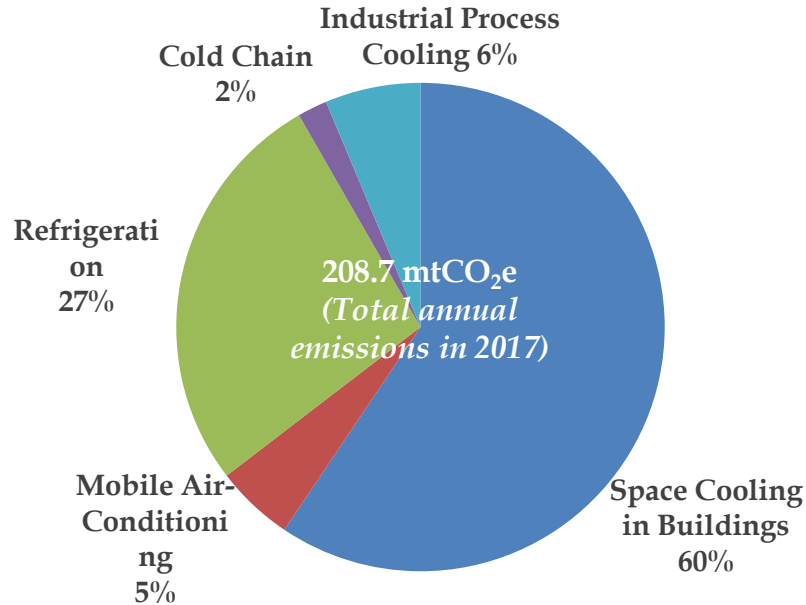
Installed Cooling Capacity (sector-wise)



Annual Energy Consumption (mtoe)



Annual emissions mtCO₂e

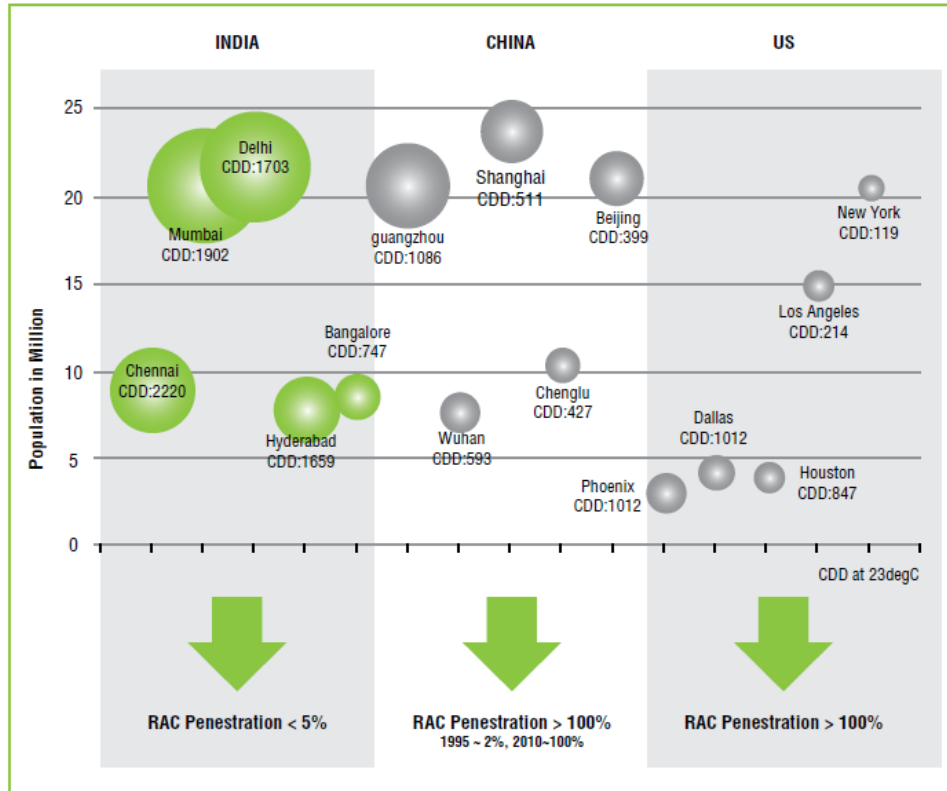




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- There are 272 million households in India as in 2017-18, of which 8% have room air conditioners, i.e., on an average 1.2 AC per household
- With the households to increase to 328 million by 2027-28, the %age households to have AC would increase to 21%
- The penetration in the Rural households is very miniscule of the total rural households in 2017-18
- The space cooling technologies can be classified as:
 - Refrigerant based
 - Non - refrigerant based
- With the advancement in vapour compression technology, like variable speed drives, advanced compressors, improved heat exchangers etc. the sector has significant energy saving potential

RAC penetration in India is very low



Source: AEEE, Thermal Comfort For all, Sustainable and Smart Space Cooling

- Total cold chain infra requirement is of 36,807,850 MT of which there is a gap of around 85-90%
- There would be further increase due to various growth drivers and schemes like,
 - Doubling Farmers Income,
 - Gramin Agriculture Markets,
 - Agriculture Produce & Livestock Marketing

- Road transport sector has grown at the CAGR of 15% for past 15 years, while rail transport has grown at the CAGR of 2.5%
- Passenger car stock is going to double by 2027-28 as compared to 2017-18,
 - With this the refrigerant demand is also set to double by 2027-28
- Passenger bus stock will increase by 60% by 2027-28 as compared to 2017-18,
 - But refrigerant demand would more than double as more AC buses would be produced
- Refrigerant demand in railways would also increase to double by 2027-28



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MoEF&CC



Empowered Steering Committee

Chaired by: Secretary, MoEF&CC

Members: Secretaries of related Ministries (Finance, Chemicals & Petrochemicals, Industrial Development, Commerce, Petroleum & Natural Gas, Science & Technology, DG-CSIR), Nominated Experts



Steering Committee for implementation of ICAP

Chaired by: Additional Secretary, MoEF&CC

Members: Representatives of related Ministries (Power, Road Transport & Highways, Agriculture, Industrial Policy & Promotion), Representative of State Governments, Representatives of Industry Associations, R&D and Civil Society Institutions

Interlinkages of Cooling with Government Programs & Initiatives

GLOBAL PRIORITIES	Climate Change Sustainable Development Goals							
Departments & Entities	Ozone Cell	BEE EESL State Designated Agencies (SDA)	CPWD NBCC State PWD Development Authorities	National Centre for Cold-chain Development NCCD)	State Transport Departments State Road Transport Undertakings	Department of Heavy Industry	Electronics Sector Skills Council of India	Ministry of Science and Technology (DST) TIFAC
Programs & Initiatives		S&L ECBC CAFE norms BEEP ESEAP	PMAY-Housing for All Smart Cities Mission Government E- Marketplace	Doubling Farmers# Income (DFI) Gramin Agricultural Markets (GrAMs)	AMRUT - Public Transportation Metro Rail Projects CAFE norms	FAME India	Pradhan Mantri Kaushal Vikas Yojana Government E-Market-place	Mission Innovation

Source: ICAP, Ozone Cell, MoEF&CC



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Applicability of Initiatives

Program / Initiative	Type of Compliance	Applicable to
Standard & Labelling (S&L)	Mandatory	10 Appliances / Equipment
	Voluntary	12 Appliances / Equipment
Energy Conservation Building Code (ECBC Code)	Mandatory	Commercial Building having connected of >100 kW or contract demand of >120 kVA
CAFÉ norms	Mandatory	For passenger cars
Building Energy Efficiency Program (BEEP)	Incentive based	For Commercial / Public buildings
Faster Adoption and Manufacturing of Hybrid and Electric vehicles in India (FAME India)	Incentive based	For promoting EVs

- Passive design and envelope improvements in new construction to inherently reduce the need of active space cooling
- Adoption of Adaptive Thermal comfort based set point for AC operation, i.e., minimum thermostat setting could be mandatorily kept between 24 -26 degree Celsius
- Retrofitting or retro-commissioning existing buildings to reduce cooling requirement and energy consumption
- Demand Side Management Programs with DISCOMs to replace inefficient ACs
- Building Energy Data collection & Management system and reporting should be made mandatory for all new construction having connected load of 100 kW or greater
- Eco-labelling program for cooling appliances, showing environmental footprint of the appliance
- Integrated approach for energy efficient building design of commercial buildings with a mandate to minimize cooling needs under as a condition under Environmental clearance policy

- Standardization of cold chain infrastructure components
- Develop low cost technologies, and alternate & hybrid sources of energy
- Development of safety standards for flammable & toxic refrigerants
- Creating user awareness, to purchase refrigeration equipment based on life-cycle cost against initial purchase cost
- Also, creating user awareness for adoption of proper O&M practices
- Market transformation mechanism, to eliminate inefficiencies due to obsolete refrigeration equipment
- Standards & Labelling program to be expanded to commercial appliances also
- Adoption of feasible new cold chain & refrigeration technologies

- Star labelling of passenger cars
- Reduction in cooling & refrigerant demand by shifting passenger traffic to public transport, and thus push towards public transport
- Development of low refrigerant charge mobile air conditioning systems including secondary loop systems
- Improving mobile air conditioning systems efficiency of hybrid & electric vehicles, as EVs require secondary cooling for the battery
- Building integrated and high quality public transport systems in Tier 2/3 to reduce personalized vehicle demand

Thank You

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