



India Cooling Action Plan (ICAP)

ICAP is a long term vision to address the cooling requirement across sectors. **Reducing cooling demand by 20-25% and refrigeration demand by 25-30% by the year 2037 are the goals of this plan.**

Cooling requirement is cross-sectoral and is an essential part of economic growth. It is required across the different sectors of the economy such as residential and commercial buildings, cold chains and refrigeration, transport and industries.

Key Points

- It seeks to recognize **“cooling and related areas” as a thrust area of research** under National S&T Programme.
- It also seeks to **reduce cooling energy requirements by 25% to 40% by 2037-38.**
- **Training and certification of 1,00,000 servicing sector technicians** by 2022-23, in synergy with Skill India Mission.
- It also makes provision for cooling for Economically Weaker Section (**EWS**) and Low Income Group (**LIG**) housing.
- In line with Montreal Protocol, the plan emphasis on **cutting those elements that deplete ozone layer.**
- Its goal is to provide sustainable cooling and thermal comfort for all while securing environmental and socio-economic benefits for the society.

Need

- **Refrigeration and cooling cause around 10% of global CO2 emissions.**
- Mass deaths due to high temperatures in summer.
- Increase in the number of people who use air conditioning.
- **Present- day cooling systems in India, being not very high energy efficient.**
- It has been seen that untrained and unskilled technicians generally handle ACs and Refrigerators which leads to **leakages** from these units.

Impact

- The plan **encourages the use of materials that are energy efficient** where embodied energy is minimum i.e. amount of energy used in making the material is less.
- **Thermal cooling** through refrigerators or air conditioners **will be done in more energy efficient manner.**
 - When one has a right cooling comfort, the productivity of him/her increases, leading to benefits for the economy.
- The plan will possibly lead to **emergence of new technologies** in the area of cooling and can also make India leader of such technologies.
- The plan will help in **converging the interests** of consumers that with of the interests of the economy and that of the mankind in terms of climate change.
 - **Consumers will be able to save money** as their electricity bill due to air conditioning will come down.
 - New efficient technologies will provide a **marketing advantage to builders.**

- The plan will help India in meeting its **Paris commitment of reducing carbon emissions.**

Way Forward

- Following **immediate solutions** can be taken into consideration:
 - Buildings, doors and windows need to be build **air tight** to save energy.
 - **White Painted Roofs** that are considered as highly energy efficient all over the world in terms of providing cooling comfort; is another solution.
- Plan seems to be urban centric. Indian government needs to think even about the people who work in agricultural fields or live in the pavements in the urban areas.
- **The scope and the umbrella of this plan has to be increased** in order to include plants. The green roofs as well as the green pavements are very important for reducing the heat load in the urban regions.
- Some efforts also need to be done in **'space cooling'** i.e. technology of buildings need to be such that it provides thermal comfort to people.
- New cities can be designed in a way that **one building provides the shade to the other**, thus reducing incoming solar radiations and the heat load.
- India needs to come up with **star rating for thermal comfort** in the same way it has for energy efficiency.
- In the field of cooling, there are some emerging technologies that do not use refrigeration or air conditioning. India needs to think on such technologies.

India has enormous creative abilities in terms of innovation and technology. By using that, government authorities need to make implementation of ICAP as effective as possible.

Drishti Input:

Thermal Comfort

- Thermal comfort is a **condition of mind that expresses satisfaction with the thermal environment.**
- Due to its subjectivity, thermal comfort is different for every individual. **It is maintained when the heat generated by the human metabolism is allowed to dissipate at a rate that maintains thermal equilibrium in the body.**
 - Any heat gain or loss beyond that, generates substantial discomfort.
 - Essentially, to maintain thermal comfort, the heat produced must be equal to the heat lost.
- There are **six primary thermal comfort variables:**
 - **Air Temperature:** It is a common component of thermal comfort; it can easily be influenced with passive and mechanical heating and cooling.
 - **Mean Radiant Temperature:** It is the weighted average temperature of all exposed surfaces in a room. Combined with the air temperature, it allows defining the operative temperature which is the most essential component of thermal comfort.
 - **Air Velocity:** It quantifies the speed and direction of the air movements in the room. Rapid air velocity fluctuations might result in draught complaints.
 - **Humidity:** It is the moisture content of the air. Too high or too low humidity levels may induce discomfort.
 - **Clothing Level:** It determines the amount of insulation added to the human body. Higher clothing levels will reduce the heat through the skin and lower the environment's temperature perceived as comfortable.
 - **Physical Activity Level:** Also called metabolic heat, it has an influence on the amount of heat produced by the human body and therefore also in the perception of a hot or cold environment.

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