

Cooling India



Center for Study of Science, Technology and Policy

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By Center for Study of Science Technology and Policy.

Space cooling is the fastest growing energy need in buildings globally. The International Energy Agency (IEA) estimates that by 2050, space cooling will account for 45% of the country's electricity demand. As India paves the way towards a low carbon emissions future, the talk about space cooling and thermal comfort gains considerable momentum. Thermal comfort for all is an aspiration that seeks fulfilment, as it enhances the physiological and psychological well-being of citizens. India can bring "thermal comfort to all" in all urban residential buildings in 2050, by using only 26% of its current annual electricity generation.

The country is well on track to achieving its current Nationally Determined Contributions (NDC) to mitigate climate change and help achieve the global targets of restricting warming to 1.5 deg C as per the Paris Agreement. But to realise this ambitious goal, stricter policy and technological measures are needed. Integrated Energy Transformation Platform (IETP) is a group of energy, technology, and experts that have come together to find sustainable development technology solutions for a decarbonised future. IETP has recognised urban space cooling as a sector that requires deep cuts in its energy demand, for which, the platform has come up with possible solutions that require policy and technology to collaborate.

How can policy and technology Intervene?

Energy-Efficient Building Envelopes (EEBE) in New Constructions; Retrofitting Existing Structures with EEBE

Considering the projected steep increase in the space cooling energy needs of the country over the next three decades, the policy space needs to accommodate, or rather prioritise thermal comfort through *energy-efficient building envelope*. EEBE could potentially help reduce India's space cooling requirement by 30% as compared to a business as usual (BAU) scenario. The real estate sector's energy efficiency strategy

ought to acknowledge the urgency for mainstreaming EEBE in new constructions and retrofitting existing buildings with it, in order to lower their space cooling needs.

Reducing space cooling requirements jointly through EEBE and use of efficient cooling technologies, can bring down cooling electricity demand by 55%, compared to BAU. An investment of INR 15–20 lakh crores on new power plants can be avoided by decelerating the consistently rising space cooling energy demand levels.

ICAP and Housing for All

The Government of India has taken the lead in preparing the India Cooling Action Plan (ICAP), aimed at reducing cooling energy demand and, thus, emissions. ICAP estimates that by 2037–38, 80%-90% of room air conditioning stock will be concentrated within the residential sector. Rapid urbanisation calls for amendments in policy initiatives such as ICAP and “Housing for All” or the Pradhan Mantri Awas Yojna (PMAY), which envisions building over 12 million houses in urban areas by 31 March 2022. Currently, PMAY does not have any provisions for EEBE or thermal comfort.

Both these policies can be coupled by mandating Energy-Efficient Building Envelopes in the construction of houses built under the PMAY to realise ICAP's goal of reducing cooling needs, and consequently, emissions.

Market Transformation

EEBE-savy materials such as low-thermal conductivity bricks and blocks, high-performance windows, roof tiles with high Solar Reflectance Index (SRI), and external movable shades can all contribute towards cooler buildings that bring down space cooling needs. A transformation in consumer-supplier behaviours to shift the preference to EEBE-savy materials can help curb energy consumption demands in the sector. One way to move towards this is to mainstream the use of energy-efficient building materials by warranting their use in building codes, standards and labelling programmes for building materials, and training and capacity-building programmes.

Research and Development

Furthering the existing energy-efficient building envelope technologies and materials, such as radiative films, new-generation insulation materials, smart windows, etc, is of paramount importance. A focussed, industry-led research and development initiative

will contribute to the formulation of a roadmap for next-generation innovation in the domain.

Conclusion

The primacy of finding cost-effective solutions for achieving deep cuts in India's space cooling requirement cannot be overstated. Considering this, it is perhaps time to take more ambitious leaps and curb carbon emissions by slowing down the space cooling demand through Energy-Efficient Building Envelopes, by strategically putting to use existing technology and discovering more effective and efficient ways of doing the same.

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About IETP: The India Energy Transformation Platform is an informal, independent, multi-stakeholder group of experts aiming to develop an informed narrative on India's strategies for meeting its Nationally Determined Contributions (NDCs) through non-linear, transformative solutions. This unique initiative hopes to ensure that India stays ahead of the curve and cements its leadership in the global transition to clean energy — even beyond 2030.

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This article was written by Arshiya Bhutani, a student of National Law School of India University, as part of her internship at CSTEP. The article is based on research studies published on www.ietp.in