

CREATING RESILIENT, EFFICIENT AND SUSTAINABLE THERMAL COMFORT SOLUTIONS FOR AFFORDABLE HOUSING (CREST SOLUTIONS FOR AFFORDABLE HOUSING)



The rising temperatures and unevenly spread demand for active cooling mechanisms disproportionately impact the lower economic groups and provides with an opportunity to evaluate, and design houses that mainstream thermal comfort for all, minimizing energy, refrigerant and resource use in the affordable housing sector.

CONTEXT

- ▶ Current housing shortage in India stands at **18.78 million houses**
- ▶ Residential air conditioning demand to grow from **~8% in 2018 to ~21% in 2027** of which **room ACs would dominate at 80%-90% share.**
- ▶ Energy demand from room ACs is expected to be **152 TWh by 2030.**
- ▶ In addition, building sector refrigeration and air-conditioning systems accounted for **43% of HCFC consumption** in India, in 2015.

PROJECT RELEVANCE TO NATIONAL PRIORITIES

India being a signatory to the **Montreal Protocol** is committed to phasing out **Ozone Depleting Substances (ODS)** including HCFCs and HFCs. Further, under the **PMAY**, India plans to build **12 million houses by 2022** and the implementation of **Eco Niwas Samhita (ECBC – R)** has been postulated to have energy saving potential of **125 billion units by 2030.** The **India Cooling Action Plan (ICAP)** recommends to take an integrated approach between policy and technology, which provides the provision for developing the interlinkages between refrigerant use, energy demand and affordable housing policies. Thus, forming the basis of this project to address the challenges related to thermal comfort, affordability and climate change with an emphasis on phasing out HCFCs and reducing cooling load from the affordable housing sector in India.

PROJECT GOALS AND OUTCOMES

The goal of the project is to propose 1 low energy cooling technology and 3 – 5 building (envelope) design measures per climate zone in India, which can be used to reduce the cooling load and heat stress in the affordable houses making them more sustainable. This will help in achieving the following outcomes:

Delineate

Potential of building envelop design measures for multiple climate zone in India specific to **Affordable Housing (Compliance with ENS)**

Enable

Enable **policy makers** to highlight the **applicability and scalability of solutions for Affordable Housing**

Foster

Foster **energy-efficiency and thermal comfort** in Affordable Housing in India

Facilitate

Facilitate the **implementation of ICAP, ENS & HPMP – II** in Affordable Housing

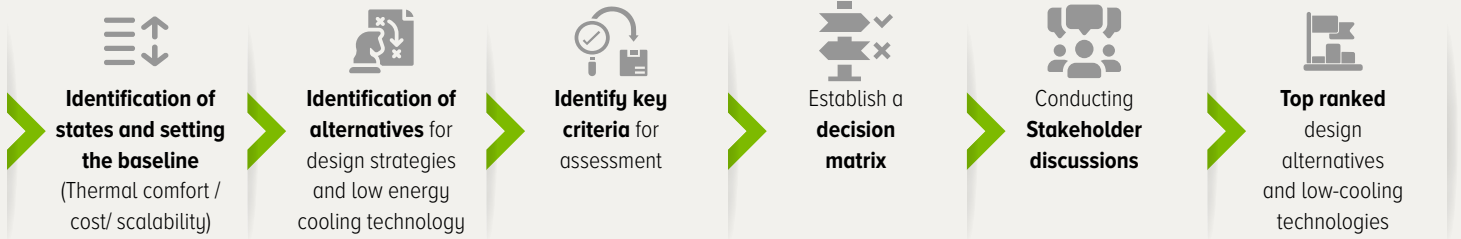
Reduction

Cooling load, Life Cycle Cost and Operational Cost in Affordable Housing

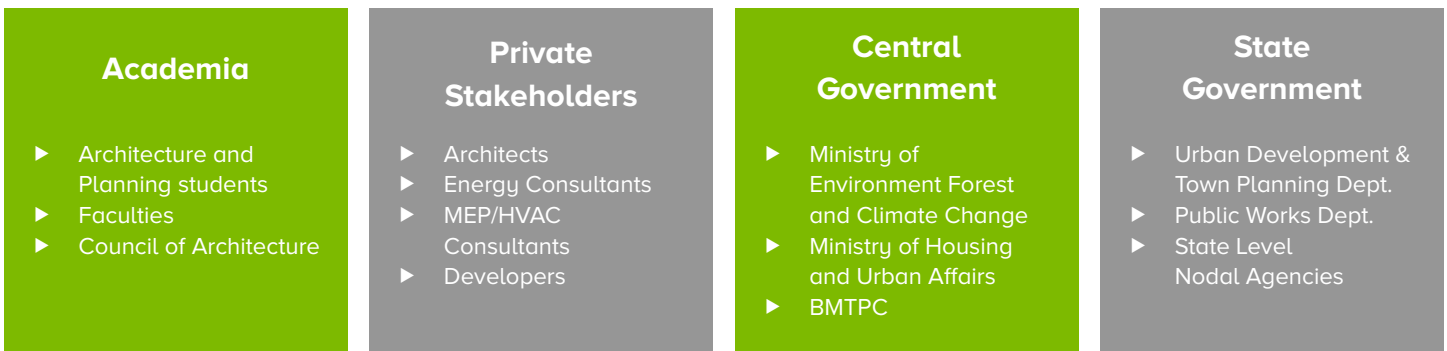


PROJECT APPROACH AND METHODOLOGY

A comprehensive list of alternative designs and sustainable cooling technologies will be identified by extensive literature review and in consultation with experts. This list would then be evaluated using multi-criteria assessment through a consultative process to consensually agree on the best design and technology alternatives to be proposed as potential solutions for implementation in affordable housing to reduce the cooling demand.



KEY STAKEHOLDERS



ABOUT AEEE

Alliance for an Energy Efficient Economy (AEEE), is one of the leading organizations in India that works on creating awareness about energy efficiency as a resource. It is a policy advocacy and energy efficiency market enabler with a not-for-profit motive. We advocate for data-driven and evidence-based energy efficiency policies and research.

We foster a culture of energy efficiency in India, working with industry, government and civil society organizations. AEEE advocates for *Thermal Comfort for All*, and a *Lean-Mean-Green* philosophy to design and construct net-zero energy-water-waste built environments, Sustainable Transportation and robust Energy Data Framework for better policy-making and implementation, to build a culture of energy efficiency in India.