Development of Thermal Comfort Action Plan 2050, Thermal Comfort Performance based Design Standard and Design Guidelines for Affordable Housing in India

Situation

Urban housing shortage in India is pegged at 20 million in 2022. 96% of this shortage is attributed to the economically weaker sections. Without access to adequate shelter and housing, the disadvantaged bear the brunt of climate change. The Intergovernmental Panel on Climate Change (IPCC) report highlights that the poor will be disproportionately impacted by climate change and it will only deepen inequities. While the IPCC report foretells a future scenario, the pandemic and inflationary pressures have already exacerbated inequities.

Ever since independence, the government of India has been structuring policies to overcome the urban housing challenge. In 2015, the Pradhan Mantri Awas Yojana - Urban (PMAY - U), a flagship initiative of the government of India, catapulted the 'Housing for all' mission into high gear. The government of India recognizes that affordable homes that achieve adaptive comfort through passive means is an effective way of offsetting future cooling demand and thereby conserving resources. Thermally comfortable and affordable homes present a skeleton key for unlocking a de-carbonized and equitable future for India.

Objective

The program aims to achieve thermally comfortable affordable homes that reduces discomfort hours by at least 50% (compared to 'Business as Usual' affordable housing) through implementation of passive design strategies and sustainable building practices.

Approach

Intense and frequent weather events coupled with poor housing conditions have serious health impacts on occupants. Passive design strategies can mitigate these health impacts while also being affordable.

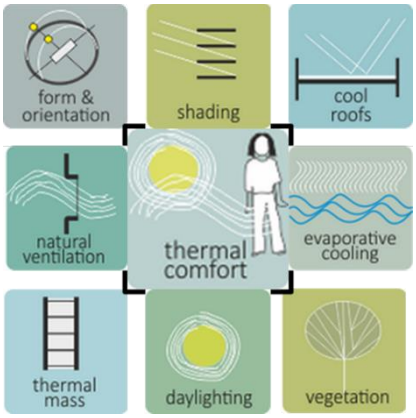

Figure 1 Passive design strategies are an affordable means to achieving adaptive comfort.

The sheer scale of urban housing shortage presents an opportunity for application of passive design principles to achieve thermally comfortable affordable homes. To leverage this potential, the program envisions promoting thermally comfortable affordable housing by,

1. laying down a design framework as standard - a regulatory instrument,
2. building capacity for design and implementation through training and educational guides, and,
3. laying down a blueprint for an ecosystem of thermally comfortable homes with an action plan.

Figure 2 The three components of the program target standardization of design, dissemination of design and construction practices, and developing an action plan for realizing thermal comfort performance in affordable housing.

The first component proposes the development of thermal comfort performance-based design standard. This standard will outline climate-wise design requirements to enhance thermal comfort. The standard will discourage mechanical conditioning practices and promote passive design principles, sustainable and cost-effective construction practices. Since the building fabric is the primary modifier of envelope gains, the standard will focus on improving thermal comfort through envelope related measures. The development of standard will include intensive research on dwelling unit characteristics, building materials, construction technologies and, policies and codes from across the globe. All this research will be synthesized into building simulation models for insights into thermal comfort performance. These insights will be shaped into design requirements for the standard.

The second component focuses on building technical capacity. The outcomes from simulation studies will be translated into guidelines for designing thermally comfortable homes. These guidelines will focus on climate-specific solutions such as, choice of materials, design strategies and construction practices for effective thermal comfort performance. The guidelines will also include curated case studies for showcasing design and construction practices. These guidelines will be disseminated to the professionals, developers, contractors, and urban local body representatives through workshops. Other digital media such as web-portals will also be developed for wider outreach.

The third component will provide technical assistance in developing thermal comfort action plan. The action plan will facilitate policy and implementation support crucial to the thermally comfortable and affordable homes ecosystem. Under this component research on policies, financial mechanisms and implementation frameworks will be undertaken. Further analyses of policy scenarios and their impact will facilitate in drawing a detailed implementation plan. The outcomes of analyses will be shared with agencies responsible for undertaking implementation of the action plan.

The resulting Design Standard, Design Guidelines and Thermal Comfort Action Plan will be an outcome of consultative decision-making involving experts from government agencies (central and state), academia, policy advocates and design professionals.

Expected Outcomes

The program is expected to have far-reaching impacts in improving the conditions of the economically marginalized in a rapidly warming environment. Component wise outcomes envisioned from the program are outlined below.

Component 1: The standard is expected to identify suitable metrics for evaluating adaptive comfort, design requirements to achieve minimum thermal comfort, and mechanisms to document and demonstrate compliance. Initially, the design standard will be incorporated in bye-laws for wide-scale implementation.

Component 2: The climate specific design guidelines, digital platforms and in-person workshops will build capacity among professionals, developers, contractors, and municipal agencies.

Component 3: The action plan presents trackable implementation framework that identifies agencies, their roles and responsibilities and time-bound targets.

Together the standard, guidelines and action plan make for a potent trident for scaling thermally comfortable and affordable homes. These yet-to be constructed homes will pave way towards an equitable and decarbonized society.

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH
Address
Ministry of Housing and Urban Affairs (MoHUA)
Nirman Bhawan, New Delhi – 110011, India
T +91 11 4949 5353
E vikash.ranjan@giz.de
I www.giz.de
https://ghtc-india.gov.in/Content/CSB.html
Location and year of publication: New Delhi, 2022