Piloting Construction of Thermally Comfortable Affordable Housing

Situation

In earlier times sustainability and sustainable buildings have been the usual way of life in India. Monuments and different heritage buildings/homes were erected with an aim of preservation and sustenance of environment by following the principles of vernacular architecture practices. These buildings provided thermal comfort to the occupants. They were designed using passive techniques with minimum external intervention, which in modern times have become quite necessary.

Rapid urbanization is creating an unprecedented demand for the construction of buildings, which already account for more than 30 percent of India's total electricity consumption. In line with expanding development, the country's building sector is expected to increase five-fold from 2015 to 2050.

Currently, work in building thermal comfort has been partially addressed through development of thermal comfort standards for building and development of Eco-Niwas Samhita 2018 (ENS) for multi-storey residential building. However, to achieve the desired level of thermal comfort, enhance ease of understanding of wider citizens of the country, and development of capacity of stakeholders, further efforts are required.

Objective

The program aims to support piloting construction of Thermally Comfortable Affordable Housing (TCAH) that reduces the discomfort hours in new affordable homes by at least 50% (compared to 'Business as Usual' affordable housing) through implementation of passive design strategies and sustainable building practices.

Approach

Pilot projects for Thermally Comfortable Affordable Housing (TCAH) provide a unique opportunity to

- Showcase projects to sensitize the industry towards TCAH
- Prepare market and industry for Thermal Comfort Standard (TCS) compliant affordable housing
- Familiarize stakeholders with technology and design strategies needed for TCAH projects
- Develop expertise of professionals competent to design & build TCS compliant projects

To ensure that these objectives are met, we propose to identify pilot projects and provide technical assistance to transform them into thermally comfortable affordable housing projects that can become examples of best practices to be adopted in future projects.

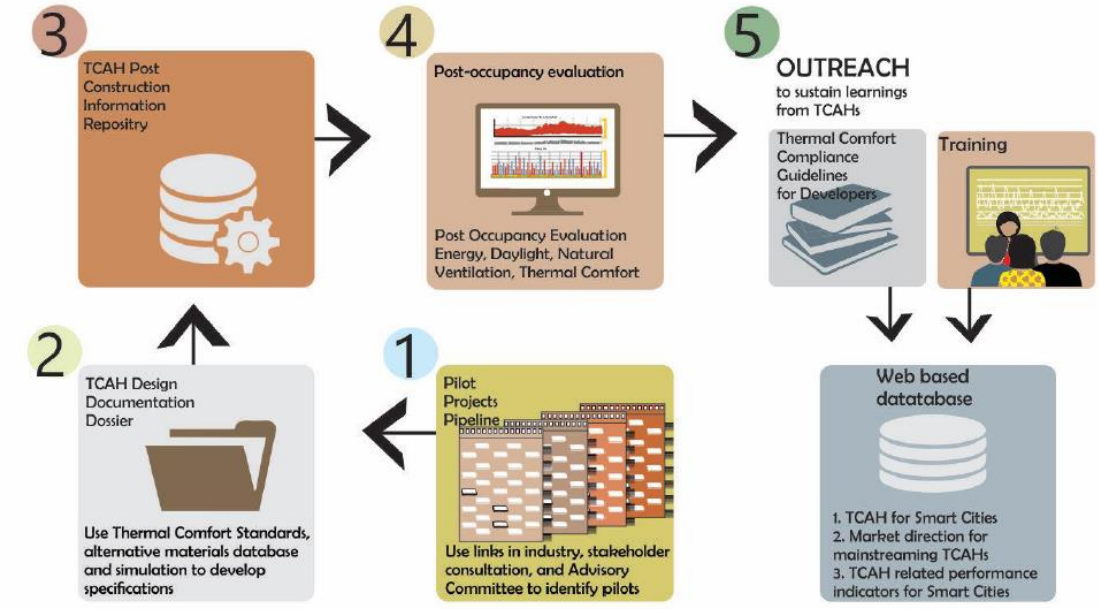

Figure 1: Proposed process and activities of the Thermally Comfortable Affordable Housing (TCAH) project

Benefits of the Program

Improved Shading
Context specific shading to minimize heat gain

Optimum Ventilation
Optimum natural ventilation design

Enhanced Environment
Site level planning to enhance overall micro-climate

Lower UHIE
Heat reflective surfaces to mitigate urban heat island effect

Built Environment
Passive design measures to enhance the built-environment

Technical Assistance Offered

New urban housing in India is heavily focused on construction of affordable housing (housing for families belonging to low and medium-income groups). The design of the new affordable housing should ensure acceptable level of thermal comfort for the occupants without the use of air-conditioning, which majority of the occupants are unable to afford. Thus, proper design of building envelope to control heat ingress and allow adequate ventilation becomes critically important. The project will offer technical assistance to achieve these and handhold through various project stages to help with implementation.

Design Development
- Design Evaluation
- Design Recommendation
- Material matrix

Tender & GFC
- Material Selection
- Vendor Shortlisting
- Facilitate Material Procurement

During & Post Construction
- Monitoring Implementation
- Documenting lessons learnt during implementation

Expected Outcomes

The program is expected to have far-reaching impacts in improving the conditions of the economically marginalized in a rapidly warming environment by showcasing use of passive design strategies through pilot projects.

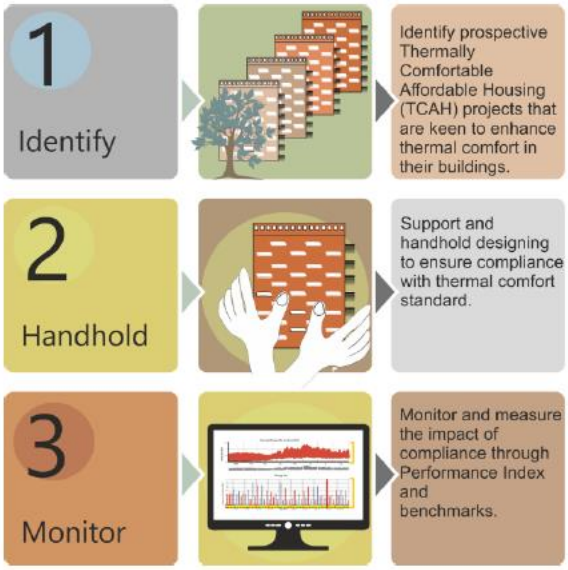

Figure 2: Expected outcomes of TCAH program

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