



Enrolment Proposal

Piloting Construction of Thermally Comfortable Affordable Housing (IGEN-CSB)

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Abbreviations

ARHC	Affordable Rental Housing Complex
BLC	Beneficiary Led Construction
BOD	Basis of Design
BOM	Bill of Materials
CFD	Computational Fluid Dynamics
CFM	Cubic Feet per Minute
CSB	Climate Smart Buildings
DHP	Demonstration Housing Project
EOI	Expression of Interest
EWS	Economically Weaker Section
GFC	Good For Construction
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICAP	India Cooling Action Plan
IGEN	Indo-German Energy Programme
LIG	Low Income Group
MEP	Mechanical, Electrical and Plumbing
MIG	Middle Income Group
MoHUA	Ministry of Housing and Urban Affairs
NBC	National Building Code
NDC	Nationally Determined Contributions
PMAY-U	Pradhan Mantri Awas Yojana - Urban
PMC	Project Management consultants
SDG	Sustainable Development Goals
SHGC	Solar Heat Gain Coefficient
TCAH	Thermally Comfortable Affordable Housing
TCS	Thermal Comfort Standard
UHIE	Urban Heat Island Effect
VLT	Visual Light Transmittance

Piloting Construction of Thermally Comfortable Affordable Housing

1. IGEN-CSB – Introduction

The Federal Republic of Germany and the Government of the Republic of India have, under the Indo-German Technical Cooperation, agreed to jointly promote the “Indo-German Energy Programme” (IGEN) with the aim to foster sustainability in built environment to use sustainable materials for Thermal comfort and in turn improve the environment and climate conditions. IGEN’s programme, Climate Smart Buildings (CSB) proposes to extend technical assistance and cooperation to Ministry of Housing and Urban Affairs (MoHUA) in introducing thermal comfort in its flagship programme- Pradhan Mantri Awas Yojana- Urban (PMAY-U) since 2015 to fulfil the vision of Hon’ble Prime Minister of India to provide ‘Housing for All’ by 2022.

The program aims to integrate activities like technical assistance to design and build thermally comfortable affordable housing, dissemination packages for the developers to use in future projects, public database for all to refer and training for participants and beneficiaries that can scale up Thermal Comfort Standard (TCS) compliant affordable housing to create a lasting impact.

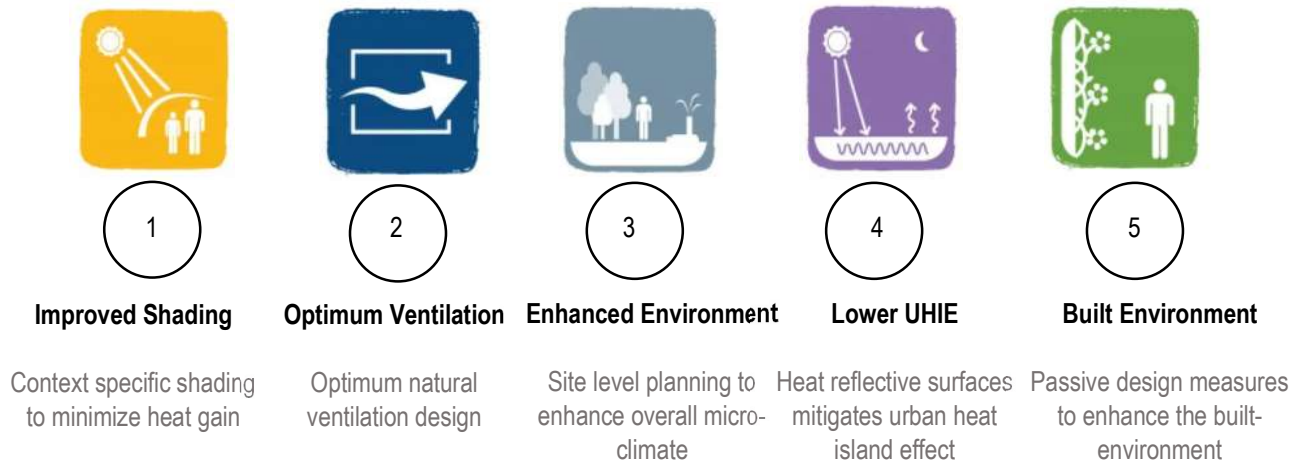
2. About the Project

The “Piloting Construction of Thermally Comfortable Affordable Housing” project is a key component of the Climate Smart Buildings (CSB) program under the Indo-German Technical Cooperation. The project team intends to identify pilot Affordable housing projects, ranging from private projects to public Affordable housing projects under PMAY-U and additional pilot projects (one in each climate zone) for individual beneficiary led houses and affordable rental housing to make them thermally comfortable. The project targets to transform the current affordable housing practices towards enhancing thermal comfort and evaluate the impact of thermally comfortable design and construction practices within affordable housing segment. This is a key milestone towards scaling construction of thermally comfortable housing under PMAY-Urban mission.

The objective of the project is to provide technical assistance and support to shortlisted affordable housing projects to achieve and showcase compliance with the thermal comfort standards and document the lessons learnt during implementation of pilot **Thermally Comfortable Affordable Housing (TCAH)**.

The program will build on existing knowledge and have linkages to existing standards (EcoNIWAS Samhita, Residential Labelling Scheme, etc.), policies & commitments (ICAP, NDCs, SDGs, Comfort for all, Housing for all, etc.) and the “Thermal Comfort Standard for Affordable Housing” currently under development.

3. Benefits of the Program



Benefits to Developers

1. Technical Assistance for Thermal Comfort Design
2. Improved Marketability
3. Initial and lifecycle cost optimisation
4. Acknowledgement in National/ Govt Web Portals
5. Publication of Case studies by MoHUA/ GIZ

Benefits to Occupants

1. Lower Heat Gain in the spaces
2. Improved Energy Efficiency
3. Well Ventilated spaces
4. Better Thermal Comfort

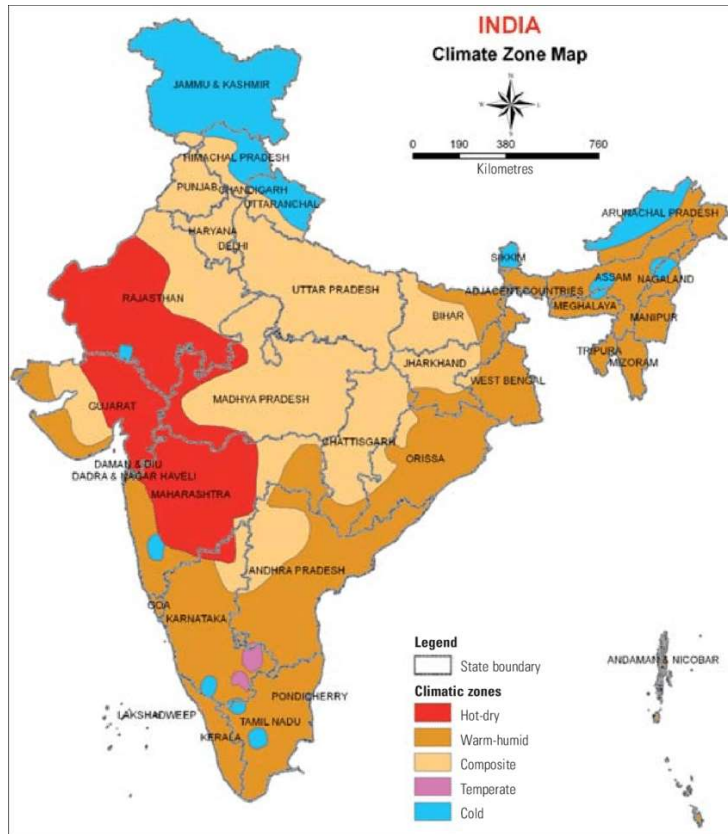
4. Selection approach for eligible projects

The project team intends to target 50 Affordable housing projects, including 15 projects from ARHC, DHPs & BLC (preferably cluster projects). The projects should be at the concept or schematic design stage, so that both design and specification changes for enhancing thermal comfort can be incorporated. The projects should preferably be large developments, complying with either of the following criteria:

1. Existing state/local housing policy for EWS & LIG (if applicable); else
2. Affordable Housing in Partnership (AHP) under PMAY-U (AHP)
 - a. At least 250 dwelling units in the project
 - b. At least 35% of the houses in the project should be for EWS category

In addition to large scale projects, technical assistance may also be provided for Beneficiary-led Construction (BLC), Affordable Rental Housing Complexes (ARHCs) and Demonstration Housing Project (DHP).

The projects should be spread across the 5 climatic zones of India such that measures for incorporating thermal comfort across different climates and geographical regions can be showcased through these Pilot projects and can serve as examples in that zone/ state for future adoption.



Each zone should nominate projects as per the table below:

S. No.	Climate Zone	States
1.	Hot- Dry	Gujarat (Ahmedabad, Surat, Vadodra), Rajasthan, Maharashtra (Aurangabad, Sholapur)
2.	Warm Humid	Andhra Pradesh, Assam, Bihar (Bhagalpur, Raxaul), Chattisgarh (Jagdelpur), Goa, Gujarat (Jamnagar, Veraval), Karnataka, Kerala, Maharashtra, Manipur, Odisha, Tamil Nadu, Telangana (Ramagundam), West Bengal
3.	Composite	Bihar (Patna), Chandigarh, Gujarat (Rajkot), Haryana, Jharkhand, Madhya Pradesh, Delhi, Punjab, Rajasthan (Jaipur), Telangana (Hyderabad), Uttar Pradesh, Uttarakhand (Dehradun)
4.	Temperate	Karnataka (Bengaluru)
5.	Cold	Jammu & Kashmir, Himachal Pradesh, Meghalaya,

The Technical assistance to the enrolled projects shall be available till Oct 2023.

This project will act as a stepping stone for transformation for current construction practices and will facilitate stakeholders to get familiarized with technology and design strategies needed for TCAH projects.

This will also help to develop expertise of professionals competent to design & build thermal comfort standard (TCS) compliant projects and prepare market and industry for TCS compliant affordable housing

5. Criteria for shortlisting

All the eligible projects will be shortlisted based on the following given criteria:

- (a) Projects meeting **minimum project requirements** as mentioned above under Section 4.
- (b) **Large development projects** – Preferable
- (c) Projects which are at the **concept or schematic design stage** (having construction completion stage finished preferably within 3 years from the date of submitting Expression of Interest)

6. Required Inputs

The following information/documents shall be required to be submitted by the project team members if the project is selected/ shortlisted:

During Design Development

- (a) Basis of Design (BoD) Reports
- (b) Architectural & Services Drawings

During Tendering & GFC Development

- (a) Tender Packages and Bill of Materials (BoM)
- (b) Good for Construction (GFC) drawings

During Construction

- (a) Facilitation for site monitoring

Post Construction & During Occupancy

- (a) Facilitation for Onsite monitoring & verification for thermal comfort achieved

7. Technical Assistance Offered

GIZ shall support TCAH projects in reviewing and handholding during designing phase to ensure that all requirements of the thermal comfort standards are incorporated in the proposed projects. Following activities are envisaged under the technical assistance:

During Design Development

- Evaluate concept/schematic building design prepared by the project team.
- Provide recommendations on the concept design prepared by the project to align with Thermal comfort standard using integrated design approach.
- Provide inputs to make the project design meet all requirements of thermal comfort standards for applicable climatic zone
- Provide technical standards and specifications of material/equipment for thermal comfort standards compliance.
- Ensure and confirm all requirements of thermal comfort standards are incorporated in the final design drawings and specifications. GIZ shall use appropriate simulation software (Energy and CFD) to demonstrate compliance as described in the thermal comfort standards.
- Ensure the design includes real time building performance monitoring and consumption data acquisition systems (Smart Meters) for benchmarking of building performance

During Tender & GFC preparation

- Support the project in incorporating thermal comfort standard requirements in Tender documents.
- Facilitate selection of material/products that are appropriate – high performance, certified wherever applicable.
- Provide list of vendors/suppliers of building materials, equipment, etc. to the project team
- Support the project during material and equipment procurement process, review and validate bill of materials (BoM) and equipment.

During Construction Stage

- Support the project in monitoring implementation of suggested measures during construction.

Post Construction

- Support the project in Monitoring, measurement & validating the thermal comfort level achieved post construction.

It must be noted that the technical assistance will be limited to the scope of making the project thermally comfortable and no assistance shall be provided to the project team required for sanction process, statutory body approval, local bye-laws compliance etc.