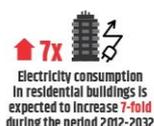
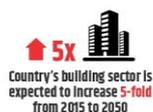
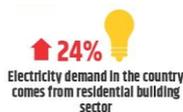


# Climate Smart Buildings Programme (IGEN-CSB)

## Situation

Climate responsive architecture has been part of traditional buildings built in India since the beginning of civilizations, utilizing passive design strategies and innovative building material to provide comfortable indoor living conditions that was responsive to local climate and geography. However, the contemporary buildings now have an excessive requirement for external heating/cooling systems to reach comfortable levels of thermal comfort, an exercise which is very energy intensive and unsustainable. India's rapid urbanization is putting an added pressure to construct more buildings, which already accounts for more than 30 percent of India's total electricity consumption. In line with expanding development, the country's building footprint is expected to increase by five times between 2015 and 2050. The energy penalty will be enormous due to unprecedented electricity demand.

India is at a unique crossroads where two thirds of the commercial and high-rise residential structures that will exist in 2030, are yet to be built. The government of India has been implementing its flagship program, Pradhan Mantri Awas Yojana – Urban (PMAY-U) since 2015 to address affordable housing need in urban areas. As an outcome, 11.3 million affordable houses are being constructed within the mission period. These houses built will last for 50-60 years and will have a potential to impact resource usage during its lifetime. A significant portion of the projected electricity demand is expected to come from active cooling requirements from upcoming housing projects, thus making thermal comfort an imperative concept to be considered while designing and building homes.

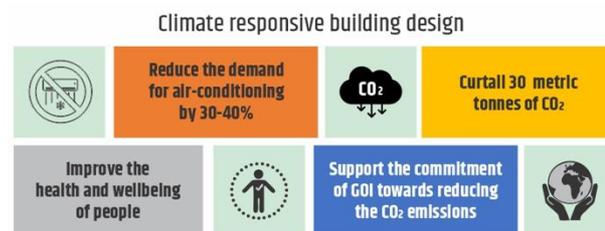


## Objective

Enhance climate resilience and thermal comfort of affordable housing stock by adopting sustainable and low-impact design, materials and best available construction technology.

## Approach

GIZ on behalf of The Federal Ministry of Economic Cooperation and Development (BMZ), Germany, and in cooperation with the Ministry of Housing and Urban Affairs, Government of India aim to foster sustainability in built environment in order to use sustainable materials for Thermal comfort and in turn improve the environment and climate conditions.



GIZ is supporting MoHUA in developing climate responsive solutions for affordable housing aligned with Sustainable Development Goals & NDC

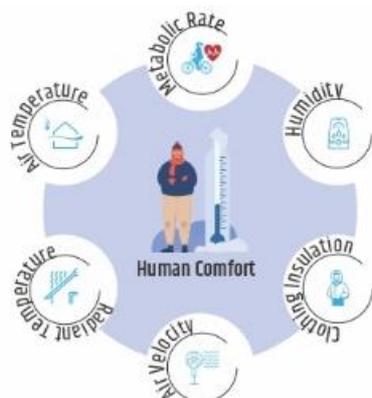
The project proposes to extend technical assistance and cooperation for the following:

- Technical assistance in developing thermal comfort action plan for Affordable Housing and support mass scale application in selected states
- Technical support in implementation of Global Housing Technology Challenge-India (GHTC-India) started by Ministry of Housing & Urban Affairs (MoHUA)

The project will aim to enhance climate resilience and thermal comfort in buildings by adopting innovative passive measures, local sustainable and low embodied energy material coupled with best available technologies for affordable housing construction. These building constructed and operated using innovative technologies and appropriate modern products, materials and designs will lead to sustainability in buildings and mitigation of carbon emissions.

**Establishing of cluster cells in Light House Project States** where pilot affordable housing projects are being built utilizing innovative construction technologies. Six

cluster cells will be established in each Light House Project states and serve as a focal point to monitor the progress of these pilot projects, provide technical handholding and document lessons learnt. These projects are intended to serve as live laboratories for successful transfer of new technologies from lab to field. These cells will be instrumental in inclusion of thermal comfort & climate resilience in the local government framework through byelaws amendment and support in implementation of pilot affordable housing projects and foster upcoming stock of thermally comfortable affordable housing for each climatic zones of India.



**Development of thermal comfort action plan 2050 and thermal comfort standards cum guidelines** to enhance thermal comfort in affordable housing in India. The action plan aims to reduce the discomfort hours by 50% in affordable housing compared to typical design conditions and provide a roadmap to reach this objective. The standards and guidelines will act as a one stop guide for design and construction specifications to enhance thermal comfort in affordable housing projects with recommendations on various passive design and construction measures.

**Training programs on thermal comfort in affordable housing in India** to enhance the awareness on thermal comfort and provide professionals and senior government officials with necessary knowledge for framing thermal comfort policy and integration processes at national/state level. Additionally, advanced

training programs will be developed for building professionals to equip them with in-depth knowledge on thermal comfort, relevant international and national standards, and basic tools for thermal comfort analysis and know-how of new and emerging innovative materials and construction technology. The training programs developed will build upon the learnings from multiple affordable housing projects in different climatic zones of India.

**Catalogue of climate specific replicable design packages for affordable housing** will allow developers to choose from ready to use architectural designs and specifications, materials and innovative construction technologies etc., to construct sustainable affordable housing that will provide enhanced thermal comfort. The catalogue targets affordable housing stock that is yet to be built and will ensure conformity of best practices.

**Support for mainstreaming upcoming and innovative building technologies** through international university collaborations. They will provide technical handholding and capacity development of existing accelerator programs and assist in fast-track penetration of such technologies for wider adoption in the affordable housing sector for sustainable and thermally comfortable buildings. Infrastructure needed for material testing and certification will also be strengthened.

## Goals & Achievements

- The project targets to build capacities of 1400 Govt officials and Contractors/ Masons/ Applicators to enhance Thermal Comfort in affordable housing.
- The project shall develop 1000 Replicable designs for mainstreaming thermal comfort in houses in different climatic zones.
- The project will monitor the performance of Light House Projects (LHPs), Demonstration housing projects (DHP) constructed under Global Housing Technology Challenge (GHTC-India).
- The project will enhance the knowledge of Technograhis on sustainable building materials and construction technologies.

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