

# Climate Smart Buildings (IGEN-CSB)

Indo German Energy Programme (IGEN)



Ministry of Housing and Urban Affairs  
Government of India



**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

# Who Are We

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is wholly owned by the Government of the Federal Republic of Germany
- We are service providers on behalf of the whole of German Government, mainly for the German Federal Ministry for Economic Cooperation and Development and other Ministries and public sector clients
- Over 50 years of experience and expertise in a range of thematic areas, such as:
  - Energy
  - Environment
  - Climate Change
  - Natural Resource Management
  - Skills & Vocational Training
  - Education
  - Water
  - Health
  - Good Governance.....and many more!!



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| Education | Water | Health | Good Governance.....and many more!!

# GIZ India



Our work in India is integrated with the 2030 Agenda.



Sustainability is the core of our business. A key element is our ongoing dialogue with clients and partners.

COMMITTED TO  
SDGS

SUSTAINABILITY



321 National, 44 International and 10 Integrated Experts.

TEAM OF  
DEDICATED  
EXPERTS



Business volume exceeded **EUR 46 million**.

BUSINESS  
WORTH  
IN INDIA



Over 30 ongoing projects running across 31 states and union territories, 23 cities, including **Smart Cities**, **Clean India**.

SUPPORTS  
KEY INITIATIVES



Collaboration with more than **20 partner** organisations, including government and foundations.

TRUSTED  
PARTNER

WELL-VERSED  
WITH  
DEVELOPMENT  
COOPERATION

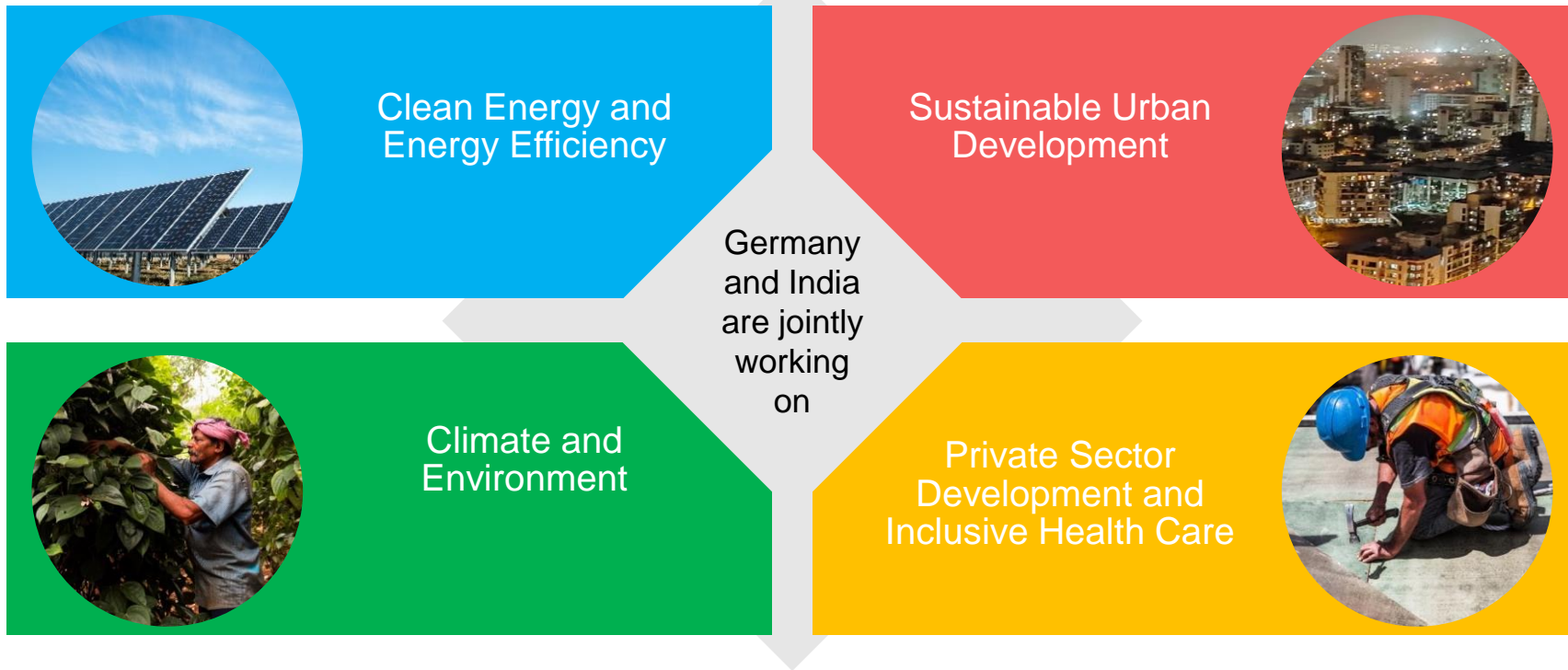


Successful contribution to **60 years** of Indo-German development cooperation.

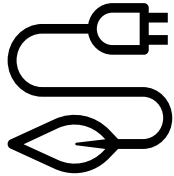


GIZ India

# GIZ India – Thematic Areas

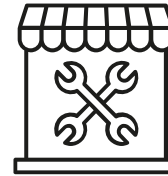


# GLZ in India – Impacts



Indo-German cooperation has improved **basic services for 100 million urbanites**

The Indo-German program for Energy Efficiency saves **over 90 million tonnes CO<sub>2</sub> per year**



Private Sector Development & Vocational Education and Training provided cooperative training opportunities **have skilled 11,000 youth across 4 Indian states**

Green Innovation Centres and ProSoil increase productivity and **income of 139,000 farmers and rehabilitation and protection of 153,000 hectares of soil**



Projects under the Indo-German Partnership for Green Urban Mobility will improve **Metro and bus services for 1.5 million people**



Climate Adaption projects improve **water security for 2.8 million people**. State climate action plans enhance **climate resilience of 150 million people**

The Indo-German Social Security Programme helped to **insure 454 million people under the national health insurance scheme (PM-JAY)**



Technical assistance for the Solar Rooftop sector achieved upskilling of **60,000 young solar engineers**



# Climate Smart Buildings



# Housing for All



Ministry of Housing  
and Urban Affairs  
Government of India

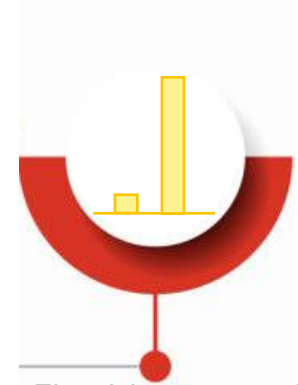
The Government of India has been implementing its flagship programme-Pradhan Mantri Awas Yojana- Urban (PMAY-U) since 2015 to fulfil the vision of 'Housing for All'.



Country's building sector is expected to increase **5-fold** from 2015 to 2050



**2/3<sup>rd</sup>** of the commercial and high-rise residential structures required in 2030, are yet to be built



Electricity consumption in residential buildings is expected to increase **7-fold** during the period 2012-2032



# Climate Smart Buildings



Federal Ministry  
for Economic Cooperation  
and Development



The objective of this project is to enhance Thermal Comfort and Energy Efficiency in affordable houses constructed under Pradhan Mantri Awas Yojana (Urban)



Ministry of Housing and Urban Affairs  
Government of India



## Impact

1. Increased Thermal Comfort by 35%
2. Carbon mitigation 20 MtCO<sub>2</sub>e by 2030
3. E-Learning Platform

# Importance of Thermal Comfort in Built Environment

**OPPORTUNITY** to support thermally comfortable affordable housing



**REDUCE THE LOCKED IN ENERGY**  
We can reduce the demand for air-conditioning by 30-40% !



**ENHANCE THERMAL COMFORT**  
We can improve the health and wellbeing of people



**ENHANCE COST & ENERGY SAVINGS**  
for several decades  
Curtailed 30 metric tonnes of CO2!



Support the commitment of GOI towards reducing the CO2 intensity of GDP



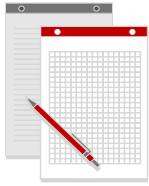
**ALTER FUTURE CONSUMPTION PATTERNS** of housing stock yet to be built through Passive Strategies in Building Construction

# Activities



## 1. Light House Project Cells

Supporting implementation of Light House Projects & Capacity development on thermal comfort



## 2. Thermal comfort Action Plan 2047

Development of Thermal Comfort standard, guidelines & Action Plan for phased adoption



## 3. Replicable Designs

Develop replicable designs for affordable housing typologies to be adopted by developers, architects, home-owners



## 4. Training Modules

Development of Training Module on Thermal Comfort for widespread dissemination



## 5. Piloting Construction of Affordable Housing

Technical assistance for Thermally Comfortable Affordable Housing Projects



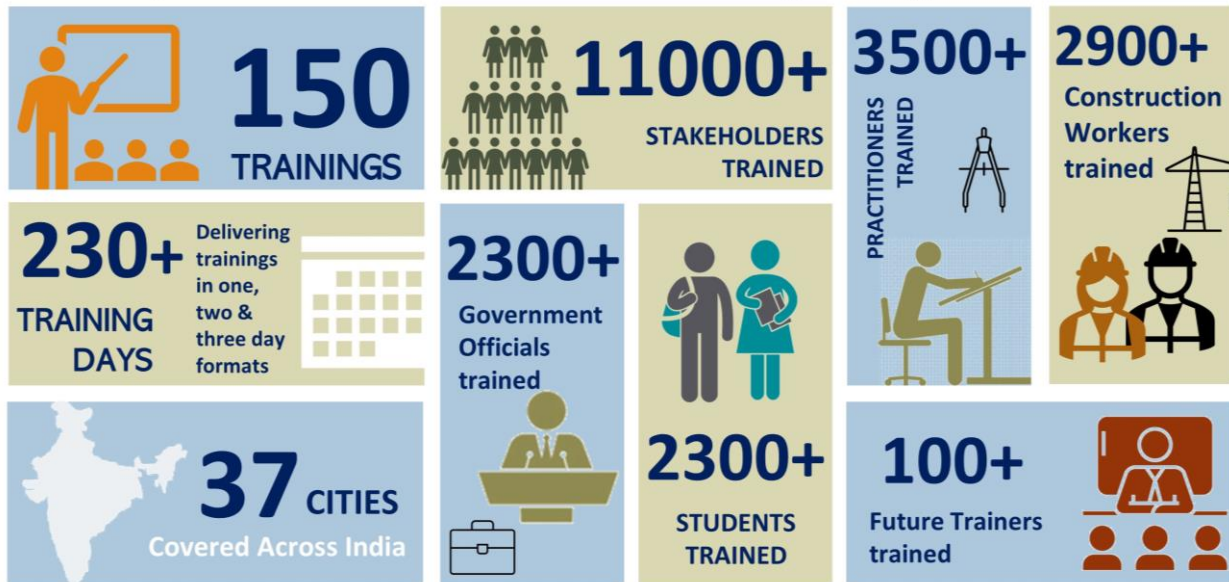
## 6. International collaboration

Technical support and mentorship from foreign universities and handholding for incubators.

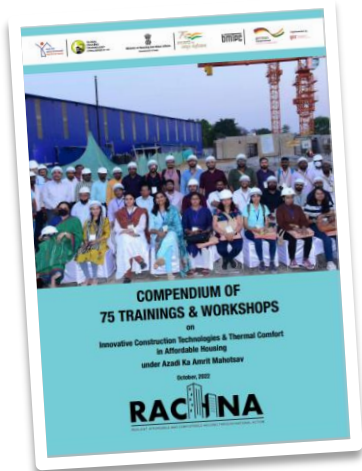
# Project Updates

- 150 Trainings conducted on Innovative construction technologies and Thermal comfort in Affordable housing

## Resilient, Affordable and Comfortable Housing Through National Action



IMPACT



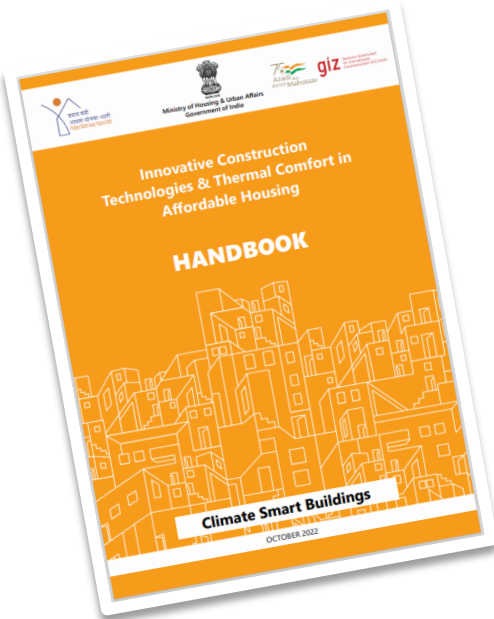
[gihc-](https://gihc-india.org/)

[india.gov.in/Content/pdf/rachna/75\\_Trainings\\_under\\_Rachna\\_Compndium.pdf](https://india.gov.in/Content/pdf/rachna/75_Trainings_under_Rachna_Compndium.pdf)

[GHTC-INDIA : RACHNA](https://gihc-india.org/)

# Project Updates

- Knowledge products published and launched for wide outreach
- Webinars and trainings conducted for widespread dissemination



**LHP : LIVE LABORATORIES**  
Webinar series and e-learning for TECHNOGRAMS  
March - November 2022

**Light House Projects : LIVE LABORATORIES**  
WEBINAR SERIES: Volume 3 – Inter-national Perspective  
e-Learning sessions on innovative techniques in new age construction  
Aug – Sep 2023

Volume 3 - Session PDF on Light House Project Rajkot, Gujarat  
Theme – International Perspectives and Practices in LHPs  
Date : 18.08.2023 , Friday | Time : 15:00 - 17:00

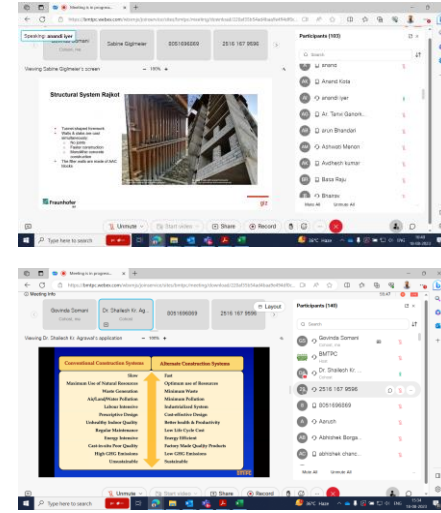
**ABOUT THE WEBINAR**  
MOHUA is organizing "e-Learning series on new age construction process" to widespread the knowledge about the new age technology, construction process, sustainability, and mass cum fast construction to TECHNOGRAMS. These webinars aims to create awareness of the different technologies used in the new age construction and enhance technical capacity. The volume 3 of this series will share international perspective via our experts from Fraunhofer, Germany on innovative technologies along with latest concepts to learn the use the new age technologies, innovate and adapt to mainstream them in the country.

Session	Speaker	Time
Welcome Address & Introduction	BIMTEC	15:00 - 15:05
Keynote Address	J S & M/DHAI, MOHUA	15:05 - 15:15
Short film on LHP Rajkot	MOHUA	15:15 - 15:20
Technical Details on the LHP Technology of Rajkot	BIMTEC	15:20 - 15:50
International Perspective on LHP Technology	Fraunhofer IGP, Germany	15:50 - 16:55
Q&A	BIMTEC and Fraunhofer IGP	16:55 - 16:55
Vote of Thanks	GIZ	16:55 - 17:00

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Meeting number: 2155 147 9196  
Password: 159800

**TARGET GROUPS :**  
Faculty & research students, technical professionals, Central/ State/ U&I officials, construction agencies, Builders/ Developers/ Owners/ entrepreneurs/ innovators who have enrolled themselves as "TECHNOGRAMS" as well as other concerned stakeholders including Public/ Private Entities and other Practitioners.

CONTACT: [giz-moh@giz.in](mailto:giz-moh@giz.in)



[Rachna\\_Handbook.pdf \(ghc-india.gov.in\)](https://ghc-india.gov.in)

**Relevance Of Used Material**

Energy efficiency  
Material efficiency

1. Precast Concrete Construction System: 3D Precast Volumetric
2. Monolithic Concrete Construction
3. Precast Concrete Construction System: Precast Concrete Assembly at Site
4. Prefabricated Sandwich Panel System
5. Light Gauge Steel Structural System: Erection and Management
6. Stay in place formwork System

# Project Updates

- PRiTHVi Standard : “Passive and Resilient Thermal comfort Standard based on Viable Solutions ”
- Volume 1: Single-family Affordable Housing
- Volume 2: Multi-family Affordable Housing



Advance Training  
& Mentorship for  
upcoming  
Construction  
Technologies  
under **ASHA India**

**Introduction to PRiTHVi Standard**  
“Passive and Resilient Thermal comfort Standard based on Viable Solutions ” -  
Volume 1: Single-family Affordable Housing

**WHY?**  
Rapid construction is happening in the affordable housing with single family house (Beneficiary Led Construction - BLC) as the biggest component. These single-family houses will last for next 50-60 years. It is important that these buildings:  
• Provide maximum comfort via passive measures  
• Reduce the need of active measures thus optimize energy demand  
• Adapt to the local sustainable architecture specific to climate zone.

This document puts together the **concepts of thermal comfort** and **simple affordable measures of passive design** that can be adopted to achieve thermal comfort within affordable housing with no/ low-cost solutions.

**HOW IS IT MADE?**  
MoHUA and GIZ has done extensive study on single family houses in terms of  
• How is the BLC level construction done, planning and preferences, and passive design principles of our local architecture.  
• The BLC design mapping helped in understanding typical design requirements and how passive measures (simple and the one applicable at small scale construction) can help in making a house more thermally comfortable.

Given the size of plot and the flexibility of layout, it's important to focus on the passive measures based on local architecture and climate zone requirements for BLC construction.

**WHAT IT SAYS?**  
This Volume 1 caters to passive and resilient recommendations for Single-Family Affordable Housing to enhance thermal comfort in affordable housing.

This standard lays emphasis on the simple passive principles which are naturally available, applicable in small plot sites, and have no major cost implication. All it needs is simple steps to be followed from the design stage itself.

1. *Passive measures at site level - site planning & Built form*
2. *Internal planning – flexibility, layout, landscaping & future expansion*
3. *Building Element planning - Windows, natural ventilation*
4. *Building material selection - Walls & Roofs*

**Introduction to PRiTHVi Standard**  
“Passive and Resilient Thermal comfort Standard based on Viable Solutions ” -  
Volume 2: Multi-family Affordable Housing

**WHY?**  
India is witnessing rapid construction in the affordable housing segment to meet the growing demands. These buildings will last for next 50-60 years. It is important that these buildings:  
• Provide maximum thermal comfort via passive measures  
• Reduce the need of active measures thus optimize energy demand  
• Are sustainable and resilient in their lifespan

This document puts together the **concepts of thermal comfort** and **simple affordable measures of passive design** that can be adopted to achieve thermal comfort within affordable housing with no/ low-cost implication.

**HOW IS IT MADE?**  
MoHUA and GIZ have conducted extensive living laboratory experiments on all the 6 Light House Projects to:  
• Study the performance of these LHPs in different climate zones in attaining the desired level of thermal comfort inside the building.  
• Experiments were conducted in all LHPs to test the impact of various passive measures along with the level of impact of each passive measure.

PRiTHVi prescribes the recommendations derived from the experiments done on the 6 Light House Projects and concluded results

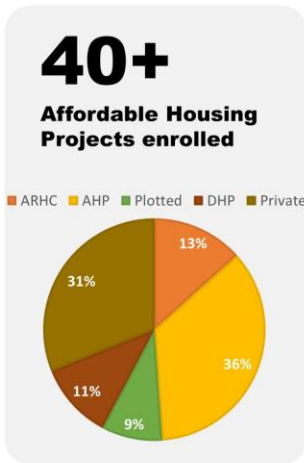
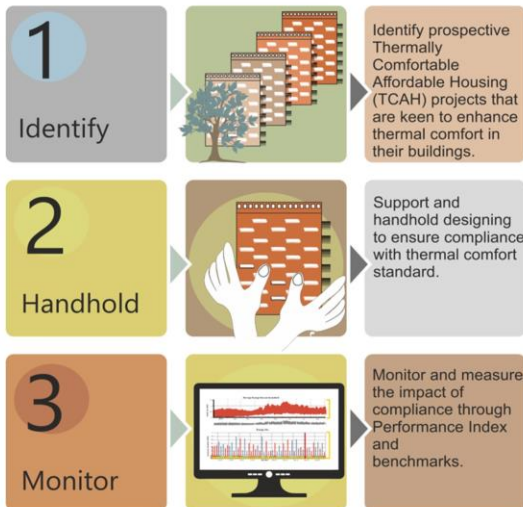
**WHAT IT SAYS?**  
This Volume 2 caters to passive and resilient recommendations for Multi-Family Affordable Housing to enhance thermal comfort.

This standard lays emphasis on the following 5 passive principles which are naturally available and have no major cost implication. All it needs is simple steps to be followed from the design stage itself.

1. *Orientation and Mutual Shading of Building Blocks as per Sun path*
2. *Shading of Windows to Optimize Solar Radiations*
3. *Correct Glass Selection for Windows to Optimize Solar Heat Gains*
4. *Enhance Natural Ventilation inside the home*
5. *Application of Cool Roof*

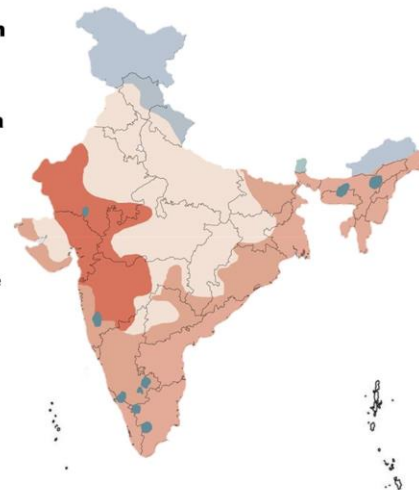
# Project Updates

- Demonstration Projects for Thermally Comfortable Affordable Housing in India



Projects located in  
**35+**  
Cities across India

- 06 Project in Hot-Dry Zone
- 20 Projects in Warm-Humid Zone
- 16 Projects in Composite Zone
- 02 Project in Temperate Zone
- 01 Project in Cold Zone



# Project Updates

- All project activities and knowledge products available on GIZ & GHTC-India website.



<https://ghtc-india.gov.in/>



[Constructing climate smart buildings \(giz.de\)](https://www.giz.de)





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- Suchitrita Bhattacharya
- Ravinder Kumar



# Thank You!