Indian Housing Technology Mela

Promoting Technology & Innovation in Housing

Expo-cum-Conference

(Concept Note)

Government of India
Ministry of Housing and Urban Affairs

August, 2021

1. Introduction

i. **Indian Housing Technology Mela (IHTM):** Promoting Technology & Innovation in Housing, Expo-cum Conference is being organised by Ministry of Housing and Urban Affairs (MoHUA), Government of India for promoting domestically developed indigenous & innovative construction technologies, materials & processes for low & mid-rise (upto G+3) affordable houses.

ii. Screened and shortlisted technologies will be grouped region-wise and recommended for use in houses which are being constructed under Beneficiary Led Construction vertical of PMAY (U) as well as for other low and mid-rise structures (upto G+3).

iii. It aims to mainstream appropriate construction technologies, building materials and processes by creating a Compendium for adoption in different PMAY-Urban regions of the country which are cost-effective, energy efficient, environment-friendly, disaster resilient, easy to implement, speedier, durable and sustainable in the long run with specific focus on use of locally available materials and skills.

iv. IHTM Expo-cum Conference will showcase an exhibition of these indigenous and innovative building materials and technologies for all related stakeholders and general public for learning, pilots and adoption & mainstreaming in construction sector.

2. Background

i. MoHUA is implementing Pradhan Mantri Awas Yojana-Urban (PMAY-U) which aims to provide all weather pucca houses to all eligible beneficiaries in urban areas by year 2022. PMAY(U) targets the provision of pucca houses to about 11.20 million household in the country.

ii. In the PRAGATI[1] meeting held on 12th July 2017, Hon'ble Prime Minister emphasized and exhorted the States/UTs to accelerate adoption of innovative and alternative construction technologies to improve the pace and quality of work under PMAY-U and address the challenges of rapid urban growth and its attendant requirements. Construction of houses at the scale of PMAY(U) offers an opportunity for inviting alternative technologies from both within the country and across the globe, which may trigger a major transition through introduction of cutting-edge building materials, technologies and processes.

[11] *PRAGATI (Pro-Active Governance And Timely Implementation) is a multi-purpose and multi-modal platform chaired by Hon'ble Prime Minister, aimed at addressing common man's grievances, and simultaneously monitoring and reviewing important programmes and projects of the Government of India as well as projects flagged by State Governments.*

iii. Under PMAY(U), a Technology Sub Mission (TSM) has been set up to facilitate adoption of modern, innovative and green technologies and building materials for faster and quality construction of houses. The sub mission, inter alia, works on green buildings using natural resources, innovative technologies and materials, earthquake and other disaster resistant technologies and design.

iv. In the light of above, MoHUA initiated **Global Housing Technology Challenge India (GHTC-India)** in January 2019 which aimed to identify and mainstream globally best available proven construction technologies that are sustainable, green and disaster resilient through a challenge format which can bring a paradigm shift in construction practices for affordable housing. GHTC-India has three components viz. i) Construction Technology India (CTI): biennial Expo-cum-Conference, ii) Identifying Proven Demonstrable Technologies from across the globe to construct Light House Projects (LHPs), and iii) Providing Incubation and Acceleration support for promoting Potential Future Technologies (domestic) through establishment of Affordable Sustainable Housing Accelerators- India (ASHA-India).

v. **Construction Technology India (CTI), 2019**, the 1st Biennial Expo-cum-Conference was organized on 2-3 March 2019 for providing a platform for exhibition, assessment and promotion of Innovative Construction Technologies from across the globe. Both Indian and International Technology Providers/Companies participated in this challenge process.

   a. 54 Innovative Construction Technologies were shortlisted as per their suitability of construction in different geo-climatic regions of the country and grouped into six broad categories namely (i) Precast Concrete Construction System - 3D Precast volumetric (ii) Precast Concrete Construction System - Precast components assembled at site (iii) Light Gauge Steel Structural System & Pre-engineered Steel Structural System (iv) Prefabricated Sandwich Panel System (v) Monolithic Concrete Construction, and (vi) Stay in Place Formwork System. These technologies were mostly found to be suitable for high rise structures and have great potential to be used under Affordable Housing in Partnership (AHP), In-situ Slum Rehabilitation (ISSR) component of PMAY-U and other high-rise housing projects being constructed in the country

   b. As a part of GHTC- India, six **Light House Projects (LHP)** consisting of about 1,000 houses each with physical & social infrastructure facilities are being constructed at six places across the country namely Indore (Madhya Pradesh); Rajkot (Gujarat); Chennai (Tamil Nadu); Ranchi (Jharkhand); Agartala (Tripura) and; Lucknow (Uttar Pradesh). The foundation stone of all 6 LHPs was laid by the Hon'ble Prime Minister on 01.01.2021 through Video Conferencing jointly with concerned Governors/ Chief Ministers/ State Ministers at the site of the LHPs.

c. These LHPs is showcasing the use of the six distinct shortlisted innovative technologies (one each from the above broad groups) for field level application, learning and replication. The LHPs will demonstrate and deliver ready to live mass housing at an expedited pace as compared to conventional brick and mortar construction and will be more economical, sustainable, of high quality and durability. These projects shall serve as **Live laboratories** for all stakeholders including Research & Development leading to the successful transfer of technologies from the lab to the field. The whole process of Live Laboratory will be based on the principles of **Learning, Exploration, Adaptation and Replication** through on-site learning, multi stakeholder consultation, finding ideas for solutions, learning by doing, experimentation and innovation for further adaptation of these disruptive technologies as per their local needs and contexts.

d. A drive for free online Enrolment of **Technograhis** has been started for exposing the interested stakeholders to the innovative construction technologies through onsite activities to learn different phases of use of innovative technologies in LHPs and Offsite Workshops/ Webinars, Webcasting, Mentoring on Technical know-how/Module etc. Technograhis are the change agents innovative and sustainable technologies who will bring about technology transition in the construction sector and its adoption in the country.

e. A e-Learning module on GHTC-India website has been developed related to Live Laboratories i.e. https://ghtc-india.gov.in wherein all stakeholders can register themselves to visit six LHPs, learn the use of latest innovative technologies, innovate and adapt as per their local needs and contexts as of new construction technologies to be adopted as 'Make in India'.

f. The Ministry in partnership with BMTPC and SPA, Delhi is conducting **online course** on Vulnerability Atlas of India which is useful for urban managers, State & National Authorities dealing with disaster mitigation and management in evaluation of multi-hazard profile of the region and incorporating them in DPRs, Design basis and Tender documents. In collaboration with BMTPC and SPA, Delhi the Ministry is also conducting an online certificate course named NAVARITIH (New, Affordable, Validated, Research Innovation Technologies for Indian Housing) is also underway with an aim to enhance the capability of building professionals about the new and emerging building materials, technologies and processes for construction.

g. Further, under **ASHA-India**, Incubation Centres have been set up in four Indian Institutes of Technology (IlTs) in Bombay, Kharagpur, Madras, Roorkee and at CBRI-CSIR at North-East Institute of Science and

Technologies (NEIST), Jorhat to provide Incubation Support to those potential future technologies that are not yet market ready and undergoing iterative design and development phase. For those potential future technologies that have completed prototype stage and are at various stages of readiness and requires up-scaling, investment, publicity and market support, Acceleration support through Accelerator Workshops and Master classes on various aspects are being provided.

3. Rationale

i. Through PMAY (U), a basket of options is offered to ensure inclusion of a greater number of people depending on their income, finance and availability of land through four Verticals i.e. In Situ Slum Rehabilitation (ISSR), Affordable Housing in Partnership (AHP), Beneficiary Led Construction (BLC) and, Credit Linked Subsidy Scheme (CLSS).

ii. Out of 1.13 Crore sanctioned houses so far under PMAY(U), more than 60% houses are constructed through BLC vertical. The typical construction under AHP and ISSR is apartments in clusters (G+3 and above) whereas, under BLC, it is owner driven single or double storey houses on the land available with the beneficiaries and is self-constructed or through local masons/artisans. Cultural preferences, geo-hazard conditions, and availability of local materials/ skills further influence the type of construction in different regions under BLC vertical.

iii. During the implementation of the Mission, it has been observed that depending on the natural resources of the region, socio-economic conditions, living preferences and climatic and hazard conditions of the region, use of locally available materials and time-tested indigenous, traditional and local construction practices are undertaken. This includes EKRA walling in North East, Dhajji Diwari in Jammu and Kashmir & Himachal Pradesh, Bhonga Houses in Kachchh, and stabilized mud blocks in extreme weather conditions which are found to be regionally more suitable, sustainable, cost effective and easily implementable.

iv. **Existing Knowledge Repository:** Various research institutes across the country have further developed and used cost effective regionally available technologies over the years such as Building Materials & Technology Promotion Council, New Delhi, Central Building Research Institute, Roorkee; Structural Engineering Research Centre, Chennai and other Institutions such as Centre for Application of Science and Technology in Rural Areas (ASTRA) in IISC, Bangalore, HUDCO, New Delhi, Centre of Science for Villages (CSV Wardha), Indian Plywood Research Institute, Bangalore, Habitat Technology Group (HTG) Thiruvananthapuram, Auroville Building Centres (AVBC), Nirmithi Kendra in Kerala etc. In addition, various creative professionals over time have also introduced many innovative options that

contribute to cost reduction and offers solutions which are functional, durable, aesthetically pleasing and acceptable by users.

v. Many of these materials and construction techniques have been tried with success in some projects which can be replicated and upscaled given its advantages. Further, they remained confined in their region and not reached to other regions of the country. Limited outreach and low level of awareness about these technology options at the level of practicing professionals, artisans and individuals dealing with house construction; inadequate delivery mechanism and knowledge dissemination; lack of enabling institutional mechanisms and entrepreneurship are some of the reasons of these not getting into mainstream practice. Both traditional construction techniques and materials as well as alternate technologies that are innovative and sustainable are to be identified with their suitability in other regions with a focus on the need of individual houses under BLC and other mid-rise houses across the country with diverse climatic and hazard conditions.

vi. On the one hand, there are pockets of rich knowledge and repository on use of indigenous construction materials and technologies; and on the other, there is tremendous scope and interest among Innovators, Start-ups, Entrepreneurs, and Small & Medium Developers on use of Innovative and Alternate Construction Systems, Material, Components and Processes for low and mid-rise housing categories.

vii. It is, therefore, imperative to promote the adoption of these technology options and identify other innovative appropriate construction technologies, materials and processes for their use in construction of houses under BLC and other low and mid-rise housing. For successful implementation of such technologies in field, the supply side should be equally strong. Materials and components should be easily available without additional burden of high transportation cost.

viii. Apart from creating necessary awareness about the technologies, materials and processes; capacity building of professionals, masons, construction workers and artisans would be required for use in the field. Other than structural systems, other innovations in building materials, components, tools and equipment like automatic plaster machine and bar bending machines, that help in bringing speed and quality in low and mid-rise construction across the country are essential.

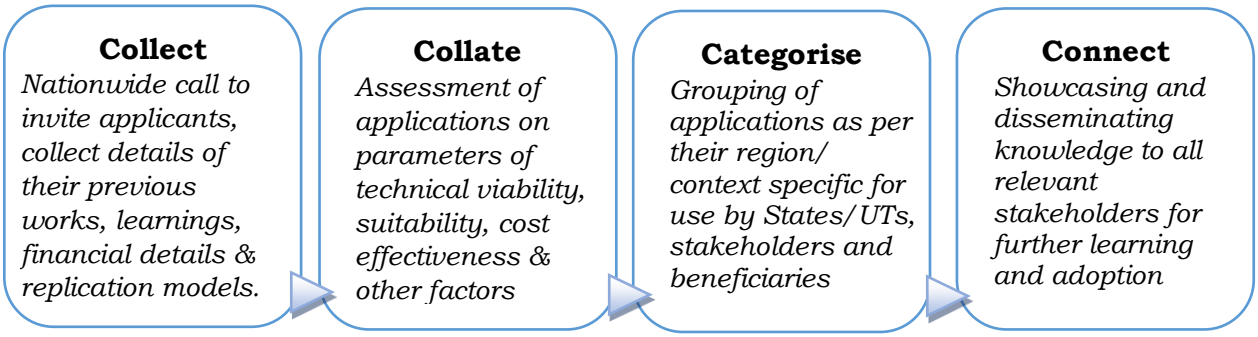
ix. It is important to provide a common platform to bring together all above stakeholders to demonstrate and interact at one place on various options available with regard to technologies, materials and processes for use of indigenous and alternate technologies in BLC and similar type of house construction for different Geo-climatic regions of the country.

x. Also, a concerted effort is required to create mass awareness to accept such innovations through expositions and other outreach methods that will mainstream its use. It is important to give PMAY(U) region wise complete technology package to the beneficiaries and to States/UTs/ULBs that will help in faster, sustainable and cost-effective construction of houses to enable the country to fulfil the target set up by Hon'ble Prime Minister to provide pucca house to all households by 2022.

4. Proposal

MoHUA proposes to organize Indian Housing Technology Mela (IHTM): Promoting Technology & Innovation in Housing, Expo-cum Conference under the ambit of GHTC-India for promoting indigenous & innovative construction technologies, materials & processes for low & mid-rise (upto G+3) affordable houses such as those constructed under BLC vertical of PMAY(U). IHTM Expo-cum-Conference will ensure exposure and visibility to technology providers, provide an opportunity for cross learning, enable better adoption and market linkages, and to achieve scale. The event will be an integral part of the Construction Technology Year 2019-20 which was declared by the Hon'ble Prime Minister during CTI 2019.

IHTM Expo-cum-Conference has been conceptualized on **4C's Strategy** of Collect, Collate, Categorize and Connect as detailed below:



IHTM Expo-cum-Conference has following two components as detailed below:

Component 1: National Exhibition

i. A National Exhibition to provide a platform to all stakeholders associated with proven indigenous building materials, techniques and technologies that are innovative and sustainable. The exhibition will showcase such technologies and materials through live demonstrations, audio visual tools, knowledge dissemination opportunities, peer to peer learning and the exchange of knowledge and business.

ii. Relevant stakeholders and potential applicants will be invited to participate in the Exhibition through a simple online registration process at https://ghtc-india.gov.in. The Technical Evaluation Committee (TEC)

constituted at MoHUA will screen and assess the technology applications received for suitability of the technologies and materials for construction.

iii. Following stakeholders will be invited to participate in the event:

a) **Innovative Technology and Material Providers** with materials, products and construction techniques that are sustainable, and replace energy intensive processes, reduce air, water and land pollution, and minimizes the use of scarce natural resources. These technologies will also improve the quality, durability, workability and disaster resilience of structures, and address context specificities and increase the speed of construction. Building components providers who supply walling, roofing and flooring systems and other components that save natural resources will also participate.
b) **Academic Institutions/ Research & Development (R&D) Institutions** who have successfully developed sustainable cost effective, environment friendly and disaster resistant construction building materials and technologies.
c) **Innovators, Start-ups, Entrepreneurs** who use Innovative and Alternate Construction Systems, Material and Components for low and mid-rise housing categories. This shall exclude load bearing ordinary burnt clay brick/ solid concrete block/ stone masonry with in-situ RCC roof and Cast in-situ RC frame with ordinary burnt clay brick/solid concrete blocks. Technology providers having complete housing systems who use sustainable locally available materials, industrial and construction demolition waste and/or agriculture waste successfully in the construction of houses.
d) **Indigenous Technology providers** providing complete housing systems using sustainable materials using traditional/local architecture, materials and techniques that suit the local climate and have improved quality, resource efficiency, disaster resilience, durability, improved workability and speed of construction.
e) **Construction Tools and Equipment providers** with innovative techniques to bring cost effectiveness, quality, speed and ease of working.
f) **Elected representatives** and public including beneficiaries in Exhibition for learning and exposure.
g) **Contractors/ Developers** involved in Real Estate.
h) **Public/ Private Agencies** in the construction sector.
i) **Professionals** including Engineers, Architects, Planners
j) **Relevant Civil Society Organizations** dealing with the subject
k) **Other stakeholders** such as various State and UT government, Government agencies including State Public Works Departments (PWDs) and Housing Boards, Research and Development (R&D) Institutes, Academia, students of technical institutes, Technologists and PACS holders of BMTPC will be invited to participate as delegates.

iv. The Exhibition will focus on display of innovative housing construction technologies including construction equipment & building materials, Smart & Green Building solutions and building management systems for a sustainable future for the promotion of technology providers and innovators for demonstration, and marketing purposes.

v. It will provide a platform to stakeholders of construction industry comprising of Architects, Builders & Developers, Structural Engineers, Corporates, Designers, Facility Managers, Government, Institutions, Contractors, Dealers, Distributors, Nodal agencies, Product manufacturers & suppliers, Machinery and Equipment dealers, Service Consultants associated with housing construction for the exchange of knowledge and business.

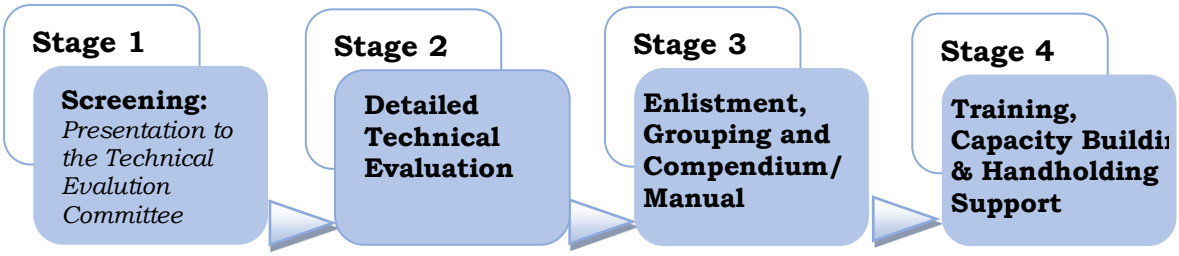
vi. It will provide an interface for traditional technologies, new innovators, technologists, to interact with end consumers and for exchange of knowledge and business at one location.

vii. Audio- Visual gallery for live demonstration, visual representation, video films on technical knowhow of new and innovative housing components will also be part of exhibition.

viii. Various events such as Technical Sessions, Panel discussions and display of PMAY (U) projects are envisaged in the exhibition. Apart from these, Networking sessions; Convergence with the Start-up India scheme, Skill India Mission and other related Missions; Advocacy and Confidence Building programmes on innovative technologies/ housing components and its use; outreach events to build mass awareness and Training and Capacity Building sessions will be part of IHTM Expo-cum-Conference.

Component2: Screening, Shortlisting and Dissemination

In the second component, screening and shortlisting of region-specific construction technologies and materials will be conducted in following stages:



i. **Stage 1: Screening: Presentation to the Technical Committee:** Potential applicants will be provided an opportunity for making a presentation before the TEC during the exhibition. Technology Providers will be required to present about details of their technologies with respect to its usage in constructing small and mid-rise houses with sustainability including the supply chain mechanism and delivery process.

ii. Stage 2: Detailed Technical Evaluation:

The Technical committee will further assess the suitability of technologies and materials on parameters such as cost effectiveness, energy conservation, reduction of pollution, disaster resilience, thermal & fire resistance, eco-friendliness, speed, quality, durability, life cycle cost and ease of construction for the beneficiaries. The committee may like to conduct site visits and predefined testing of the technologies/materials proposed by the applicants.

iii. Stage 3: Enlistment, Grouping and Compendium:

Based on the presentation including their successful implementation in field, the indigenous and innovative construction technologies & building will be shortlisted and grouped as per PMAY-Urban regions for further learning and adoption in various regions of the country. Once the technologies are shortlisted and grouped, a Compendium/Manual of the Technologies will be prepared and circulated to all states/ UTs for use. Complete documentation of the IHTM Expo-cum-Conference including Exhibition, screening process, shortlisting and enlistment will be done by MoHUA under TSM for further reference and learning.

iv. Stage 4: Training, Capacity Building & Handholding Support:

Region wise training and capacity building programme on use of such shortlisted innovative technologies and use of materials will be organised by MoHUA for learning, dissemination and adoption by State/UT govts in their housing projects.

5. Expected Outcomes

The expected outcomes of IHTM Expo-cum-Conference has been categorized in following areas:

1. Readily available empanelled technologies/ materials for use.

2. Compendium/ dynamic website of technologies circulated to all States/ UTs and other stakeholders for learning and adoption.

3. States/UT Governments will be facilitated for adoption of these technologies and innovative materials through Inclusion in various circulars, specifications, SORs, tender documents etc.

4. Training & Capacity Building: Regional training on use of such shortlisted innovative technologies & materials

5. The post-prototype potential technologies shortlisted through IHTM Expo-cum-Conference will be supported through ASHA-India scheme

6. The shortlisted technologies will be possibly adopted for constructing Demonstration Housing Projects under TSM component of PMAY(U).

7. Creating mass awareness and acceptance for traditional and new construction technologies and materials that are innovative and sustainable for use by all stakeholders from various segments including public and private sector.

IHTM Expo-cum-Conference will be a win-win for all participating stakeholders. It is envisaged that various agencies/ stakeholders will gain from this Expo as detailed below:

a) Central Government Agencies: *-*

- Shortlisting of appropriate innovative technologies and materials are expected to impact in realization of the vision of providing Housing for All by year 2022 by bringing cost effectiveness, speed, energy conservation in construction of affordable houses particularly low-rise housing.
- Central government agencies to be benefited through latest housing technology knowhow, mainstreaming of innovative and alternative technologies and use of innovative materials in low and midrise structures.
- This would also be useful for PMAY (Gramin) since these technologies will be relevant for the rural areas as well.
- Apart from achieving the goal of Housing for All, it will contribute towards fulfilling the Government of India's agenda of "Make in India" and "Skill India".
- Contributing towards fulfillment of Sustainable Development Goals (SDGs) and other National and International commitments.
- Demonstration Housing Projects (DHPs) under PMAY(U) at appropriate places to be provided by States/UTs in different regions, the prototype models of houses using the shortlisted technologies may be constructed through BMTPC. These DHPs shall serve as live laboratory for training of local artisans, local developers, Engineers and Architects and field level applications in the respective regions.

b) States/UTs: *-*

- Readily available Compendium of technologies that is suitable for implementation in various regional context for low and mid-rise structures in urban and rural areas.
- States/UTs will be encouraged to adopt these technologies for beneficiary led construction through circulars, specifications, SORs and tender documents.

c) Participating Agencies: *-*

- Benefits in form of certifications and incorporation in Schedule of Rates (SORs) and standards.
- Opportunity to implement their technology on ground in various States/UTs as a housing project approved by the government
- Opportunity to showcase their emerging technologies at the exhibition and networking with key certification agencies.
- Construction Agencies, Developers, Contractors, Distributors, Dealers will get exposure to the national construction practices and knowhow. This may unleash tremendous business opportunities in the construction sector. It will provide an opportunity for growth of their ancillary industries and provide the required skill set in the new construction regime.

d) Beneficiaries and Others

- PMAY (U) beneficiaries (house owners) will have access to innovative construction technologies and materials for use and thereby improved living conditions and environment with a sense of dignity.
- It will open a gate for construction workers for skill development and training in new areas of construction practices and thereby helping in their career progression.
- Academic Institutions, Students, Practitioners will get technological knowhow to the construction materials, technologies and processes.

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