

CONCEPT NOTE

Subject: Organizing Global Housing Technology Challenge- India (GHTC-India) to mainstream alternative and innovative technologies in the building construction industry.

1 INTRODUCTION

1.1 The present proposal seeks the approval of the Competent Authority to organize the Global Housing Technology Challenge- India (GHTC- India) by the Ministry of Housing and Urban Affairs (MoHUA). It aims to identify and mainstream a basket of innovative construction technologies from across the globe for affordable housing, that are sustainable, green and disaster-resilient. They are to be cost effective and speedier while enabling the quality construction of houses, meeting diverse geo-climatic conditions and desired functional needs. GHTC- India aspires to develop an ecosystem to deliver on the technological challenges of the housing construction sector in a holistic manner.

2 BACKGROUND

2.1 India is undergoing rapid urbanization. While 31% of India's population lived in urban areas as per Census 2011, this number is expected to reach 40% by 2030, contributing to 75% of India's Gross Domestic Product (GDP). Large sections of people are migrating for better job opportunities and a better quality of life from rural areas to cities. These cities need to provide a receptive, innovative and productive environment, which can foster faster and sustainable growth ensuring a better quality of living. For addressing increasing requirements, a comprehensive strategy to fulfill the demand arising in the housing sector is imperative.

2.2 Government of India, through the then Ministry of Housing and Urban Poverty Alleviation (MoHUPA), launched the Pradhan Mantri Awas Yojana (Urban) {PMAY-(U)} on 25.06.2015 with a vision to provide housing for all by year 2022. The Scheme was considered by the Cabinet in its meetings held on 19.02.2015 and 17.06.2015. All States/ Union Territories (UTs) have signed Memorandum of Agreement (MoA) with MoHUPA for implementation of PMAY (U). MoHUPA in July 2017 was merged with

the Ministry of Urban Development (MoUD) and a new unified Ministry of Housing and Urban Affairs (MoHUA) was created.

2.3 Within the ambit of the overarching PMAY (U), a Technology Sub-Mission (TSM) was set up, to facilitate the adoption of innovative, sustainable, green and disaster-resilient technologies and building materials for low-cost, speedier and quality construction of houses. Under TSM, MoUs were signed with Indian Institutes of Technology (IITs), National Institutes of Technology (NITs) and Planning & Architecture Institutes to provide technical support to State governments for training, testing and research work for developing technical solutions, capacity building and handholding of States/UTs/Cities. Further, innovative construction technologies have been evaluated and certified by Building Materials and Technology Promotion Council (BMTPC), an autonomous body under the aegis of the Ministry. The provisions to use innovative and alternative construction technologies including those certified by BMTPC, exist in National Building Code of India 2016 (NBC 2016), and the requirements of NBC 2016 in this regard would be complied with. A Technology Park has been set up in the campus of Hindustan Prefab Limited (HPL) at Jangpura, New Delhi to showcase these technologies through prototypes. Under PMAY (U), 8.90 lakh houses are being constructed using innovative and alternative technologies.

2.4 In the PRAGATI meeting held on 12th July 2017, Hon'ble Prime Minister emphasized and exhorted the States/UTs to accelerate the adoption of innovative and alternative construction technologies to improve the pace and quality of work under PMAY (U) in order to address the challenges of rapid urban growth and its attendant requirements. Under this scheme, nearly 1 crore houses are to be constructed by 2022; over 68.71 lakh of which have already been sanctioned so far. Out of about 36.65 lakh houses which have been constructed/ or are under construction; 8.90 lakh are using innovative and alternative technologies. Construction of houses at this scale offers an opportunity for inviting alternative technologies from across the globe which may trigger a major transition through introduction of cutting-edge building materials, technologies and processes. MoHUA has, therefore, conceptualized a Global Housing Technology Challenge-India (GHTC- India) to enable this paradigm shift in the construction sector.

2.5 To ensure a robust process, MoHUA conducted a series of consultations with State/UT governments, IITs, technology providers and other relevant stakeholders to identify broad reasons for slow and limited adoption of innovative and alternative construction technologies for affordable housing. Based on the feedback received and subsequent deliberations, the issues identified include, ensuring the suitability of foreign technologies for Indian conditions, certification and standardization including the requirement of proper specifications and codes, challenges in the procurement processes, and the necessary policy support to synergize both demand and supply. In addition, deliberations also included issues of knowledge transfer, access to raw materials and scale of demand for large scale uptake by entrepreneurs/ organizations.

2.6 Typically conventional construction systems (such as the use of brick and mortar) are slow paced, energy intensive, dependent on natural resources and have large carbon footprint. They use low levels of mechanization and have high dependence on manual labour. The entry of innovative and alternative construction technologies in India has been gaining usage, and while they have entered the market, their uptake needs to be enhanced. A concerted effort is required to create mass awareness to accept a technology transition from conventional to new technologies through lighthouse projects, expositions and other outreach methods that will mainstream its use.

2.7 This transition will contribute towards achieving the Sustainable Development Goals (SDGs) as laid out by the United Nations (UN), the New Urban Agenda and the Paris Climate Accord to which India is a signatory and other such international commitments. The use of alternative, innovative and fast-track technologies aims at, a) conservation of natural resources; b) bringing speed in construction; c) utilization of industrial and construction demolition waste; d) reduction in air and noise pollution; e) optimum use of water; f) increased labour productivity; g) cost reduction; h) safe and disaster resilient houses; and i) all weather site execution etc. Such a technology transition aligns well with the vision of New India 2022. This will bring the country at par with the advanced economies of the world and their rigorous standards in the construction sector. It will also provide an opportunity for domestic industry to promote export.

3 PROPOSAL

MoHUA proposes to organize an international competition titled Global Housing Technology Challenge- India (GHTC- India) in 2019-20, wherein alternative and innovative technologies from across the world will be mainstreamed, through a global challenge process. It seeks to demonstrate and deliver ready to live-in houses in a shorter time, with lower cost and with better quality of construction in a sustainable manner. It also seeks to promote future technologies, to foster an environment of research and development in the country. The proposed challenge framework has the following three components:

3.1 Components

3.1.1 Component-1: Grand Expo and Conference on Alternative and Innovative Construction Technologies

- i) A Grand Expo and Conference will be organized to provide a platform to all stakeholders associated with housing construction for the exchange of knowledge and business. This event will be conducted biennially. The first Expo and Conference will be organized by MoHUA in partnership with NAREDCO. Subsequent Expos to be organized by NAREDCO in partnership with MoHUA.
- ii) Proven and demonstrable technology providers from across the globe and India will be invited to the Expo through a simple screening process so that the organizers of GHTC-India may evaluate and assess the range of technologies available. Potential future technologies will also be invited and screened to participate at the expo.
- iii) Other Stakeholders such as academia, students of technical institutes, technologists, engineers, architects, Research and Development (R&D) institutes, Government agencies including housing boards & state Public Works department (PWDs), developers, entrepreneurs etc. will be invited to participate as delegates. Developers and construction companies who may serve as local support partners to execute project on ground in partnership with global technology providers will also be invited through a simple registration process.
- iv) Various events such as seminars, MoU signing, accelerator workshops and masterclasses, exhibition of prototypes, posters, digital interfaces, and PMAY (U) projects are envisaged.

v) Networking events are also planned at the expo such as networking events (Business to Business (B2B), Business to Government (B2G) and Government to Government (G2G).

3.2.1 Component-2: Proven Demonstrable Technologies for the Construction of Lighthouse Projects

3.2.1.1 Component 2, Stream 1: Proven and Demonstrable Technologies

i) Such technologies will be invited through an Expression of Interest (EoI) in the form of website from across the world which are suitable for use in the Indian context. They will initially be screened to participate in the Grand Expo and Conference and where they will interact with a Technical Evaluation Committee (TEC). ii) Post the expo the TEC through rigorous assessments will shortlist and empanel a basket of technologies that could be considered for demonstration through actual implementation of lighthouse projects on the ground. Criterion such as sustainability, scalability, adaptability and safety will be used to evaluating the proven technologies. iii) Once the sites are selected for the implementation of lighthouse projects, the empaneled basket of technologies will be sorted site wise by the TEC. This sorting will ensure location specific exclusive technologies as per the site's geo climatic conditions. These selected technology providers will be invited through a tender process to plan and construct a complete building project on approximately 1- 2 hectares of land at each location for the construction of an affordable housing project. The key challenge parameters for selection is the ability of the technology to deliver maximum number of dwelling units in minimum time and minimum cost. Technology providers will be encouraged to transfer technologies and shall provide technical support and capacity building.

iv) After evaluation of technologies from worldwide, TEC will empanel a basket of technologies and specific technologies will be sorted site wise.

v) Request for Proposal (RFP) for construction of six lighthouse projects at six PMAY(U) regions under GHTC-India will be issued by the Ministry. The technologies will be screened and empaneled as basket of technologies which will be further grouped as site specific exclusive technology for six sites. Owing to the unique nature of the challenge and for effective coordination with States/UTs, evaluation of

bids of all six regions will be evaluated centrally by a Bid Evaluation Committee to be constituted after issuance of RFP which would include a member from the concerned State/UT. In order to propagate the use of different technologies across the regions, one shortlisted technology provider would be allotted work in one region only, though the technology providers are free to participate in the bidding process for more than one location. Once a particular technology (as distinct from technology provider) has been selected as a winner for one site, bids using the same technology for other sites shall not be considered. This will ensure that different sites will have separate and exclusive technologies.

vi) During the process of housing construction, necessary data, information and other details will be collected for developing Schedule of Rates (SORs) by CPWD and BMTPC.

vii) The projects with selected technologies at different places shall serve as live laboratories for different aspects of transfer of technologies to field application, such as planning, design, production of components, construction practices, testing etc. for both faculty and students of IITs/ NITs/ Engineering colleges/ Planning and Architecture colleges, Builders, Professionals of Private and Public sectors and other stakeholders involved in such constructions. For this purpose, periodic interactions, webcasting etc. will be organized.

3.2.1.2 Component 2, Stream 2: For States and Union Territories (UTs)

i. States / UTs will be invited to participate in Component 2 as collaborators and will be shortlisted by the TEC through a Terms of Reference (ToR). Interested States/ UTs shall ensure provision of encumbrance free and adequately serviced land of preferably 1- 2 hectares while committing to comprehensive operational assistance for the construction of the housing projects. They must facilitate relaxation of development control regulations, fast-track approvals and certifications for speedy construction, ensure fund availability, finalize beneficiary identification and land to support the establishment of construction components factory.

ii. The States/ UTs concerned, shall also provide a consent to MoHUA for agreeing to allot the work to agencies which have been selected through bidding

process centrally including funding. Convergence with other missions/ schemes will be built into the design. A transparent criterion for selection of States/ UTs will be worked out accordingly.

- iii. For the subsequent allotment of constructed houses to the beneficiaries in States/ UTs, procedures of existing guidelines of PMAY (U) will be followed.
- iv. Considering that large scale housing constructions are being undertaken by the Indian Army and Central Armed Police Forces, they may like to introduce alternative housing technologies being brought into the country through GHTC-India. Accordingly, if these agencies are willing, they may undertake projects on their own land, and with their own finances, using any selected technology through this challenge.
- v. Application of innovative and alternative construction technologies at limited scale has large cost implications but has a significant opportunity cost. To offset this impact and absorb the issues related to economies of scale and other related factors, a Technology Innovation Grant (TIG) is proposed. TIG will be a financial grant and will be in addition to the existing funding under PMAY (U).
- vi. It is proposed to construct around 6,000 dwelling units (DUs) at an approximate cost of Rs. 8.00 lakh per DU by using innovative and alternate housing technologies in at least 6 locations. A notional amount for TIG is proposed which may increase or decrease based on the size and cost of the project.
- vii. The average cost of Rs. 8.00 lakh per DU has been assessed as per the existing Demonstration Housing Projects (DHPs) guidelines formulated under TSM of PMAY(U) mission whereas the average cost of a DU under Affordable Housing Project (AHP) of PMAY (U) is Rs. 6 lakhs. The difference of Rs. 2.00 lakh or 20% of the estimated cost, whichever is less as gap funding will be released by MoHUA to the implementing agency as TIG.

3.3.1 Component-3: Potential Future Technologies for Incubation and Acceleration Support

- i) For those Indian technologies, which have potential but need more technical handholding/ improvements to fulfill the structural, functional and other requirements in Indian conditions for affordable housing, incubation and acceleration support will

be provided. Through the Affordable Sustainable Housing Accelerators- India (ASHA-India) initiative, Centers will be set up in 4 IITs (IIT Bombay, IIT Kharagpur, IIT Madras, IIT Roorkee).

ii) On being shortlisted post application screening, applicants will participate in Accelerator Workshops conducted by Funders, Certification and Standards Agencies and Industry Leaders. They will serve as a fulcrum to connect various upcoming technology providers with the larger construction eco-system. Post the workshops and in person pitch evaluations, cohort shortlisting will be done. Based on the specific needs of the cohorts, masterclasses will be designed and conducted during the Grand Expo and Conference. This will be organized by BMTPC and they may onboard knowledge partners and collaborators of national and international repute willing to associate on a no-cost and no-commitment basis, to run these accelerator workshops.

iii) Winning potential technologies that are market ready as evaluated by TEC will receive a cash reward. Winning potential technologies that require further handholding as evaluated by TEC will receive incubation support at select Indian Institutes of Technology (IITs) through the ASHA-India initiative. Under ASHA-India, IITs will provide mentoring, workshop and testing facilities, IPR support, financial advice, networking support and branding.

i) These Centers at select IITs will utilize the existing testing facilities of the Institute and create further facilities, which may be essential for validation of technologies for structural safety, acoustic, thermal and other important parameters against the requirements given in the National Building Code of India/relevant Indian Standard as recommended by BMTPC and approved by Central Sanctioning and Monitoring Committee (CSMC).

ii) These Centers will receive Grant from MoHUA, based on the detailed proposals which will be appraised by BMTPC under TSM, as per existing PMAY (U) guidelines. A protocol will be followed for this purpose. After the Mission, these Centers will work on self-sustainable basis.

iii) These Centers will also help in developing design guidelines, construction manuals and other necessary guidelines, relevant for effective use of such technologies in the region.

3.4 Convergence with other Missions and Schemes

The GHTC- India will converge with other existing centrally sponsored schemes and Missions such as Smart Cities, AMRUT, Swachh Bharat (U), PMAY (U), National Urban Livelihood Mission (NULM), Ujjwala, Ujala, Make in India, Atal Innovation Mission (AIM), Skill India Mission and other programs.

3.5 Administration of the Challenge

- i) The GHTC-India will be administered by the MoHUA and Joint Secretary and Mission Director (Housing for All) will be the nodal officer for conducting the challenge. Consulting agencies for Branding, Communication & Event Management will be onboarded by MoHUA.
- ii) The Empowered Committee (EC) under the chairmanship of Secretary, MoHUA will take decisions for the Challenge.
- iii) A Technical Evaluation Committee (TEC) under the chairmanship of the Director General, CPWD, will be set up.
- iv) Earlier the Bloomberg Philanthropies (BP) had assisted MoHUA in organizing Smart Cities challenge in India. Therefore, the Ministry contacted BP for assisting in organizing GHTC-India as a Knowledge Partner (KP). A Design workshop on GHTC-India was organized on 4-5 January 2018 wherein BP along with World Resource Institute (WRI) India, National Institute of Urban Affairs (NIUA), Massachusetts Institute of Technology (MIT) and other organizations participated. Subsequently, the BP agreed to assist the GHTC-India as strategic advisors only.
- v) WRI India showed interest and offered to the Ministry to be associated as a Knowledge Partner (KP) for GHTC-India on no-cost and no-commitment basis. The WRI global network has previously supported Instituto del Fondo Nacional de la Vivienda para los Trabajadores (INFONAVIT), the public agency in Mexico who are responsible for implementing an acclaimed national housing program and providing research support to Minha Casa Minha Vida (MCMV) the ambitious Brazilian housing program with a goal to build a million homes by 2030, will provide support in advancement of Housing for All. WRI India is its wholly owned subsidiary, registered in India as an Indian Company. WRI has been supporting Cities and developing research on urban planning and mobility in India through its cities and transparent program since 2008.
- vi) Other collaborators of national and international repute such as Indian Institute of Technologies (IITs), National Institute of Technologies (NITs), National Institute of

Urban Affairs (NIUA), Massachusetts Institute of Technology (MIT), Future of Shelter Accelerator (FOSA) , International Finance Corporation-World Bank Group etc. willing to associate in the GHTC- India will also be on boarded on no-cost and no-commitment basis.

- vii) Detailed guidelines for conducting GHTC- India will be issued by MoHUA.
- viii) Complete documentation of the challenge will be done for future reference.

4. JUSTIFICATION

4.1 The organization of GHTC- India has the following justifications: -

- i. The GHTC- India will address the requirement of a technology transition to alternative and innovative construction through lighthouse projects on ground, a grand exposition, supporting upcoming technologies, workshops and other outreach methods to create mass awareness and acceptance to mainstream its use.
- ii. GHTC- India is expected to impact significantly the realization of the vision of providing Housing for All by the year 2022 by increasing the speed of construction of affordable houses, while lowering its cost thereby reducing delays in construction sector.
- iii. The local construction enterprises currently operate in scattered regions without market development support and are forced to limit their operations, volume/ turnover and geographical reach. These enterprises will get a boost through this challenge with large scale tie ups, and the required market development support from across the country.
- iv. This challenge will enable the convergence of housing sector with other missions & schemes as well as other Ministries. The challenge will also bring about a synergy with various ministries to facilitate the policy and program support to housing sector in holistic manner.
- v. The challenge will align with the “Make in India” mission with direct emphasis on technology transfer. This will have a comprehensive impact on the manufacturing and logistic sector.
- vi. The GHTC- India will also boost the “Skill India Mission” due to its potential to catalyze the skills of construction workers such as Mechanical, Electrical and Plumbing (MEP), Fabricators, Molders, System designers, Safety operators, Technicians amongst others.

The GHTC- India will contribute substantially towards achieving the Sustainable Development Goals (SDGs) as laid out by the United Nations (UN), the New Urban Agenda and the Paris Climate Accord to which India is a signatory and similar international commitments by gradually migrating from inefficient & carbon intensive processes to cleaner and compliant options.

5. Expected Outcome of GHTC-India

The GHTC- India will be a win-win situation for all the participating stakeholders because of the benefits it contains thereof. Following outcomes are envisaged from GHTC- India: -

1. Central Government Agencies: -

- i. Apart from achieving the goal of housing for all (urban), it will contribute towards fulfilling the Government of India's agenda of "Make in India" and "Skill India"
- ii. Contributing toward fulfillment of SDGs and other national and international commitments.
- iii. Central government agencies to be benefited through latest housing technology knowhow, mainstreaming of innovative and alternative technologies etc.

2. States/UTs: -

- i. Readily available empaneled basket of technologies that are suitable for implementation in the Indian context.
- ii. Prestige of winning the Global Challenge and implementing housing project that showcases innovative and alternative technologies, which will serve as lighthouse projects.
- iii. Technology Innovation Grant (TIG), in addition to the PMAY (U) contribution, to promote the uptake of innovative and alternative technologies in affordable housing.

3. Global Technology Providers: -

- i. Benefit from innovative and alternative technologies being incorporated in Schedule of Rates (SORs) and standards, receiving certifications, and fast track approvals.

- ii. Opportunity to implement their technology on ground as a housing project approved by the government.
 - iii. Providing an impetus to set up large scale production units potentially resulting in uptake of innovative and alternative technologies in the Indian construction industry.
4. Local Technology Partners and Developers: -
- i. Opportunity to form consortiums with Global technology providers in the construction sector.
 - ii. Exposure to international construction practices and knowhow.
 - iii. Unleash tremendous business opportunities in the Construction sector in the country.
 - iv. Growth of ancillary industries and provide the required skill set in the innovative and alternative construction regime.
5. Emerging Technology Providers: -
- i. Opportunity to showcase their emerging technologies at a grand expo.
 - ii. Receive mentoring at premier technical institutes, networking with key certification agencies.
6. Academic Institutions and Students: -
- i. Incubation Grant to facilitate the conduct and structuring of incubation and accelerator programs.
 - ii. Promotion of technological knowhow and skills as included in the academic curriculum for research students and other relevant stakeholders.
7. Laborers and Beneficiaries: -
- i. They will gain from being trained and skill enabled for employment in the modernized construction industry that is envisaged by the MoHUA thereby accessing higher paying jobs.
 - ii. Through the GHTC- India the beneficiaries (house owners) will have access to improved living conditions and environment with a sense of dignity.