



**GLOBAL
HOUSING
TECHNOLOGY
CHALLENGE INDIA**



AFFORDABLE SUSTAINABLE HOUSING ACCELERATOR

28-29 January, 2020

India Habitat Centre | New Delhi

Meet the COHORT

Partners:



WRI INDIA



GLOBAL HOUSING TECHNOLOGY CHALLENGE INDIA

The Government of India (GoI), through the Ministry of Housing and Urban Affairs (MoHUA), has been working towards provision of quality and affordable homes to all urban residents through the Pradhan Mantri Awas Yojana (Urban). Launched in June 2015, PMAY (U) is one of the largest public housing programs in the world, with a goal of providing homes to over 11.2 million urban families by 2022, the 75th anniversary of the country's independence.

To achieve this target, the country needs to bring a paradigm shift in its housing construction sector, deploying innovative designs, efficient technologies, novel materials, and effective delivery mechanisms at an unprecedented scale. This shift is being catalysed through the Global Housing Technology Challenge - India (GHTC-India), an initiative of MoHUA that seeks to identify and mainstream in the Indian market innovative global technologies that have the capability to provide maximum number of houses in minimum cost and time while meeting standards of safety, sustainability, adaptability, scalability, and liveability.

ASHA-India, a sub-component of GHTC-India invited Potential Future Technologies having a working and viable product that requires acceleration to mainstream their product in the market. The domains invited were construction systems and components, improving the efficiency of natural resource use, self-help innovations and digital technology in the housing sector.

Participation was received from start-ups and young entrepreneurs, research agencies, academic institutions, and other similar organisations. The participants were evaluated by a panel of jurors at the Construction Technology India (CTI) Expo-cum-Conference 2019 and subsequently by the Technical Evaluation Committee (TEC) constituted by MoHUA for the purpose of GHTC – India.

Building Materials and Technology Promotion Council (BMTPC) and World Resources Institute India (WRI India) have been entrusted with the task of conducting accelerator workshops for the shortlisted final cohort of ten innovations, in the capacity of Technical and Knowledge Partners to the Ministry.



WWW.RECYCLERIN.COM

WWW.SALTECH.CO.IN



ORGANISATION NAME:

Saltech Design Labs Pvt Ltd

TEAM: Aditya Shukla,

Yogesh Sharma, Sudhir Shukla

LOCATION: Ahmedabad, Gujarat

FOUNDED: 2018

THE SOLUTION

Saltech Design Labs Pvt. Ltd. has developed a manufacturing process and machines which can transform mixed plastic and industrial waste into composite materials, which can in turn be molded into usable, more cost-effective, and more sustainable alternatives to conventional cement concrete pre-cast pave blocks, kerb stones, and tiles. The composite manufacturing process works with various types of plastic wastes, does not require segregation, and can be employed even in highly contaminated environments.

HOW IT ADDRESSES THE PROBLEM

The technology offers a cost-efficient and better-performing alternative to conventional building materials such as clay-fired bricks, fly-ash bricks, and cement concrete. The modular and pre-cast design allows for rapid construction and lowers use of mortar and binders, in turn reducing pressure on natural resources like soil, sand, timber, and stone.

WHO IS THE TARGET GROUP

The technology is ideal for both, Business-to-Government (B2G) and Business-to-Business (B2B) audiences. In the B2G segment, the material is suitable for municipal corporations and Panchayats for construction of roads, footpaths, pavements etc., and for State & Central government agencies constructing affordable housing. In the B2B segment, the technology is suitable for builders, infrastructure developers, consultants, and green building institutions.

WHAT HAS BEEN THE IMPACT SO FAR

Since October 2019, over 40,000 square feet of paving products have been sold, translating to reductions of 32.4 tonnes of plastic waste and 70.2 tonnes of industrial waste. Employment has also been generated for 6 persons, while 50 ragpickers have been incentivized for materials sourcing.

WWW.GLORIFACGREENFORMS.COM



Impression Forever

ORGANISATION NAME:

Green Forms Private Limited

TEAM: *Ravi Kishore Vankayala,*

Director; Manikanta Kushal

Vankayala, R&D Head

LOCATION: Faridabad, Haryana

FOUNDED: 2016

THE SOLUTION

Glorifac Green Forms is a proven system of formwork for reinforced concrete made with Green Form Polystyrene Resin – a recycled, technically enhanced, and patented thermal insulation foam made with waste materials that stays in-place as a permanent interior and/or exterior substrate. The material is dry stacked, and does not require mortar or concrete filling. It can be used for various kinds of constructions, meets stringent energy efficiency standards, and can withstand natural disasters.

HOW IT ADDRESSES THE PROBLEM

Glorifac Green Form is a sustainable alternative to conventional brick, offering operational energy savings in heating and cooling of up to 70%, with upfront cost reduction for Affordable housing

WHO IS THE TARGET GROUP

Affordable housing projects, green constructions, projects where Heating, Ventilation and Air Conditioning (HVAC) savings are paramount, such as multiplexes and malls, and projects requiring isothermal specifications, such as hospitals and laboratories.

WHAT HAS BEEN THE IMPACT SO FAR

Commercialization agreements have been made with reputed EPC construction companies recognized at Global Clean Tech Innovation Programme 2017 by UNIDO & MSME.



WWW.GOHEMP.IN



ORGANISATION NAME:

Gohemp Agroventures Pvt. Ltd

TEAM: Gaurav Dixit, CEO; Namrata Kandwal, CFO; Hardik Jain, COO; Priyank Jaiswal, Marketing; Deepak Kandwal, HR; Gaurav Shorey, Sustainability Consultant; Shashank Gautam, Design Consultant; Vikram Mitra, Hemp Consultant

LOCATION: Kandwal Village, Uttarakhand

FOUNDED: 2018

THE SOLUTION

The technology utilizes agricultural waste from the hemp-processing industry to make hempcrete, a composite concrete, which can replace walling and insulation materials in framed structures. It also lays a foundation for making composite materials with other plant products such as bamboo, mesta, jute etc.

HOW IT ADDRESSES THE PROBLEM

Buildings account for 30% global carbon emissions (10% alone by cement industry), 40% electricity consumption (mostly in HVAC) and 50% of annual earth crust excavations (sand, aggregate, steel, soil for brick etc.). Cultivating building material offers replenishable supply, and at the same time, makes a positive contribution to the environment. Buildings made from plant-based materials are low in embodied energy, have low carbon footprint, are eco-friendly, are light weight, are recyclable, thermal and sound insulating, earthquake resistant, and moisture regulating.

WHO IS THE TARGET GROUP

The material is suitable for use across the green construction spectrum.

WHAT HAS BEEN THE IMPACT SO FAR

Gohemp Agroventures will be awarded as the best hemp entrepreneur at Asian Hemp Summit 2020 to be held in Kathmandu during 31 January – 1 February. Uttarakhand government has offered it a grant of Rs. 10 lakhs to set up a machine facility for research. A building prototype based on hempcrete is approved by the Uttarakhand government for a loan subsidy.

WWW.HUMENGI.COM



ORGANISATION NAME:

Gouda-Torgerson Humengi Building System India Pvt Ltd

TEAM: *Hazem Gouda, CTO*

Rick Torgerson, CEO

Gaurav Chandra, Director

LOCATION: Gurgaon, India and California, USA

FOUNDED: 2018

THE SOLUTION

Humengi® technology is a low cost, high quality, highly accurate mass-production mortar-less self-interlocking load bearing or non-load bearing CMU system for cheaper, faster, stronger and safer construction. It allows for considerable time, and in-turn, cost reductions in construction by setting new levels of standardization.

HOW IT ADDRESSES THE PROBLEM

Humengi® technology reduces materials by using the exact amount of materials needed without waste. It reduces the dead load of all building elements, including the weight of skeleton sections and foundations. It has vertical and horizontal inner cavities to allow a complete internal reinforced concrete skeleton for any building design. Computer-to-ground differences are minimized through use of set thickness blocks that can be further customized for any dimension or shape as per requirement.

WHO IS THE TARGET GROUP

The material is suitable for use in large scale construction projects where standardization and reduced construction times are important.

WHAT HAS BEEN THE IMPACT SO FAR

Humengi® has completed research, development, production, and patenting. The technology is ready for licensing, and training.



WWW.PRASHAK.COM



ORGANISATION NAME:

Prashak Techno Enterprises Pvt. Ltd

TEAM: Dr. Praful R Naik,

Director & CEO

LOCATION: Pune, Maharashtra

FOUNDED: 2014

THE SOLUTION

Habitech-NivaraTantra® Technology comprises four innovations:

- a) Compacted-Intermeshing® blocks made from local soil/ash. Its production is entirely green process using simple-to-use equipment, unlike conventional bricks. Blocks have novel structural voids for intermittent horizontal and vertical reinforcement enabling appropriate structural strength, disaster-resilience and obviates use of beams, columns. Voids also enable natural air curtain against temperature, noise-pollution and water penetration.
- b) Peggable-Contoured® flat roofing structure comprising Joist and contoured pans leading to roof with higher load-bearing capacity and lesser cement.
- c) Anaerobic Inclined-multi-baffles® system enables better fecal matter digestion.
- d) Discharged effluent is treated in uniquely constructed-wetland comprising horizontal and sub-surface flow units with scientific hydraulic profile enabling treated water safely discharge-able for irrigation and non-drinking usage.

HOW IT ADDRESSES THE PROBLEM

It enables creation of state-of-the-art, disaster resilient, environment-friendly, sustainable, green, cost-effective building structures (15-20% lower cost) of ground plus two levels using local materials and resources (unskilled manpower including women) with significantly lower use of Cement and Steel, resulting in low carbon footprint, gender equality and effective financial inclusion model.

WHO IS THE TARGET GROUP

Public/Community buildings like Schools/Colleges, Hospitals, Gramalayas, as well as housing clusters for rural/peri-urban masses, particularly EWS and LIG communities.

WHAT HAS BEEN THE IMPACT SO FAR

Rashtrapati Bhawan adopted Habitech-NivaraTantra® for showcasing value by construction of Technology-Innovations-Demonstration-Center comprising building with 12 liveable units at President's Estate, Dehradun. SMARTGRAM® conceptualized by Prashak was adopted by Rashtrapati Bhawan under which Honorable President of India Shri Pranab Mukherjee adopted 100 villages in Gurugram & Nuh districts of Haryana where till date Gramalaya in Smartgram Harchandpur under NBCC CSR-funding has been successfully completed and Secondary School in Smartgram Daulah under ONGC CSR-funding is under completion. Proposal for construction of college in Smartgram Sarmathala has been initiated by District Administration.

WWW.BIOMAN.TECH



ORGANISATION NAME:

Bioman Technologies Pvt Ltd

TEAM: T.S. Subbaiah, CEO

Joseph Fernandes, CFO

Sathya Sankaran, CTO

LOCATION: Bangalore,

Karnataka

FOUNDED: 2016

THE SOLUTION

Bioman has an onsite microbial composting technology that converts wet waste in a seamless process. The technology is designed to be rodent and smell free, and uses minimal effort. Bioman's smart bin is a proprietary closed container that is designed to 'fill-it and leave-it'. Waste is directly collected in these chambers, and microbial powder is added. This is left in the containers for the entire week without any smell or flies.

HOW IT ADDRESSES THE PROBLEM

In most cases, there is a huge effort to source consumables, monitor the operations daily, store and manage the output, and deal with rodents. Put together this makes it unfriendly for communities to adopt. Bioman is designed to serve the mass market residential and commercial segments which cannot achieve the "ideal" conditions that existing technologies demand.

WHO IS THE TARGET GROUP

Municipal corporations, housing societies, housing clusters for rural/peri-urban masses etc.

WHAT HAS BEEN THE IMPACT SO FAR

Use of Bioman has prevented 123 Tons of waste from going to landfill working with about 257 customers in just 1 year.



[HTTP://HEXPRESSIONS.ORG](http://HEXPRESSIONS.ORG)

ORGANISATION NAME:

Hexpressions Megatech Private Limited

TEAM: *Shilpa Dua, CEO, Abhimanyu Singh, CTO, Govind Singh Chauhan, Rahul Pandit, Kush Jee Kamal*



LOCATION: Jaipur, Rajasthan

FOUNDED: 2018

THE SOLUTION

Hexpression is a product service innovation providing affordable, fast, modular and sustainable homes to all sections of the society. The aim of the project is to support underserved communities with permanent shelter. The solution empowers people by providing training and skill development to build their own homes and live a dignified life.

HOW IT ADDRESSES THE PROBLEM

The housing crisis is characterized by high cost of land, and dependency on slow and expensive construction systems. Hexpressions offers a pre-fabricated construction technique consisting of an inner core (paper honeycomb made with recycled paper) and outer face material (cement board, wood, stone). This new-age material has the capacity to replace traditional construction materials, quicken the pace of construction, and reduce the carbon footprint on the planet.

WHO IS THE TARGET GROUP

Hexpressions targets a B2G/ B2B2C model focusing Governments, NGO's & philanthropic groups. Paying customers will be intermediaries (Developers, Architects, NGO's, philanthropic organizations) who are dealing in affordable housing and community development projects. End consumers will be underserved communities, refugees, homeless and people who can't afford a home.

WHAT HAS BEEN THE IMPACT SO FAR

Hexpressions has impacted lives of over 100 people, including 10 unskilled workers by training them about our new age construction technology so they can build their own homes and live a dignified life.

WWW.KAUSHALBHAHV.NET



ORGANISATION NAME:

Kaushal Bhaav Skill Solutions Pvt Ltd

TEAM: *Laxman Shankar*, Founder & Managing Director; *Priyanka Gupta*, Co-founder & COO; *Rajesh Natrajan*, Program Advisor

LOCATION: Faridabad, Haryana

FOUNDED: 2015

THE SOLUTION

Kaushal Bhaav Skill Solutions is a pioneer organization working towards employing traditional building practices. We through, community initiative and spatial planning provide; 30 sq.mt size, row housings for optimized distribution and consumption of energy and water, recycling through STP, street lighting through exterior LEDs, last mile access for internet and skilling of workforce for self-building.

HOW IT ADDRESSES THE PROBLEM

Ultra cost effective, Zero Net Carbon Homes, with integrated community units addressing the needs of various life stages and secondary vocation opportunities for poor.

WHO IS THE TARGET GROUP

Economically Weaker Section with an annual household income of 1lac and a spending capacity of 50k - 70k.

WHAT HAS BEEN THE IMPACT SO FAR

The results from a pilot project for restoration/ fresh construction of 11,000 Sq. Ft are:

- a) Carbon savings of 53 tonnes (audited by Third Party)
- b) 10 set of dwellings (321 Sq. Ft)
- c) Cost of Construction: Rs. 800/- per sq. ft. (compared with a possible minimum of Rs. 1100/- per sq. ft. for concretized development)
- d) Employment for: 40 Skilled and Certified Mason and 40 unskilled labor
- e) Impact: ~200 people impacted



WWW.TARALTEC.COM



ORGANISATION NAME:

Taraltec Solutions Pvt Ltd

TEAM: Anjan Mukherjee, CEO and

Founder; Anil Vaidya, Finance;

Piyul Mukherjee, Marketing;

Sugato Banerji, Technical;

Ravi Raman, Technical;

Biswajit Chakrabarti, Technical;

Praduddha Ganguli, Advisor

LOCATION: Mumbai, Maharashtra

FOUNDED: 2017

THE SOLUTION

The Taraltec® Disinfecting Reactor is a device which can be retrofitted on the community and building water/sewage water systems to make water safe for use/reuse. Unlike current alternatives to the disinfecting of water/waste water, namely UV, filters, membranes etc. which requires consumables and expert supervision, this device uses a bio-mimicry based scientific principle of physics & does not require any of these/& significantly less chemicals, if at all.

HOW IT ADDRESSES THE PROBLEM

In nature, a snapping shrimp (Alpheid) attacks its prey by shooting a jet of water by snapping its claw, causing cavitation bubbles to form as the ambient pressure goes below the vapor pressure. On recovery of the ambient pressure, this bubble implodes with localized energy release, with temperatures of several thousand degrees, pressures of hundreds of bars, with intense shear & turbulence. The Taraltec Reactor uses the same biomimicry for physically killing the microbes/ do mixing and blending as well as to break or ionize molecules. Millions of these bubbles are created to occupy every point of the Reactor, placed in the path of the flowing fluid. It is purely a mechanical means of getting transformation in fluids and is totally environmentally friendly.

WHO IS THE TARGET GROUP

Water & waste water disinfection systems at both building and community level.

WHAT HAS BEEN THE IMPACT SO FAR

Taraltec reactor for borewell handpumps is already commercialized impacting the rural underprivileged in undeveloped areas to the extent of about a million people by giving them safe water. The product line is being extended.

WWW.NEBESKIE.COM

nebeskie

ORGANISATION NAME:

Nebeskie Labs Pvt Ltd

TEAM: *Rahul Dev Mandal, CEO,
Shikha, Purushottam, Anik Bose*

MENTORS: *CM Patil, Rakesh Gupta,
Dr Biswajit Saha*

LOCATION: Hubli and Chennai

FOUNDED: 2016

THE SOLUTION

Enture is an Edge IoT solution to create a network of electrical appliances to monitor and save energy up to 30% consumption, enabling energy-efficient urban environments. It helps save energy and promote a greener earth for future generations with energy analytics. Enture consists of multiple device controllers and sensors which are controlled and monitored by intelligent Enture Hubs.

HOW IT ADDRESSES THE PROBLEM

Enture delivers value to users through easy to integrate nodes (controllers and sensors), scalable artificial intelligence / machine learning, and Hardware as a Service (monthly subscription) platform - addressing 3 major pain points i.e. high cost of installation, high subscription charges and infrastructure changes.

Enture technology innovation is in reducing recurring IoT cloud costs by 80% through edge computing, making electricity management economically viable - low carbon solution, and yielding higher returns on investment. A patent for the technology has been filed.

WHO IS THE TARGET GROUP

Educational Institutes, SEZs, Hospitals, Banks, Gated Apartments, and Government Smart City projects. SBI Hubli and SRM University are prominent customers.

WHAT HAS BEEN THE IMPACT SO FAR

More than 2000 Enture Nodes has been subscribed, and Nebeskie's mission is to connect 1 million Enture Node in 2020, saving 1000 Million Units of electricity.



**Ministry of Housing
and Urban Affairs**
Government of India

Nirman Bhawan, Maulana Azad Road,
New Delhi-110011.
www.mohua.gov.in

 ghtc-india.gov.in
 support-ghtc.india@gov.in
 [@GhtcIndia](https://twitter.com/GhtcIndia)
 facebook.com/globalhousingtechnology
 linkedin.com/in/ghtcindia

Partners:



WRI INDIA