

**EOI for Preparation of Compendium of Green Technologies for different Geo-Climatic zones of India (excluding NCR Region of Delhi, Punjab & Haryana State)**

Building Materials & Technology Promotion Council (BMTPC), functioning under Ministry of Housing and Urban Poverty Alleviation, Govt. of India, is engaged in promotion of innovative, cost effective & environment friendly building materials and safe construction technologies. In order to promote green technologies, BMTPC invites Expression of Interest (EOI) from reputed, experienced, technically sound consulting Government / public sector organization /NGO /Private sector firms/individual/consultant/research & Academic institutions working in the field of green technologies in the prescribed Format for the preparation of region specific details of green technologies. The objective, scope & deliverables of work are included in Terms of Reference **as enclosed**.

The interested agency/ Institution may apply with the following details;

- i. Name and address of the agency/ Institution including Contact Person
- ii. Brief Profile of the agency/ Institution
- iii. Details of the work presently
- iv. Methodology for the Study & Activity plan
- v. Budget & it's break-up
- vi. Details of work done in context of Green Technologies in the past
- vii. List of Publications, if any
- viii. Details of work done in the last five years
- ix. Turnover in last three years
- x. Details of legal documents including Pan No./Tan No./VAT No. etc
- xi. Details of the experts available for the study

Interested agency/ Institution may submit its proposal along with the above details by October 31, 2015 to the Executive Director, Building Materials & Technology Promotion Council, Core 5A, 1<sup>st</sup> Floor, India Habitat Centre, Lodhi Road, New Delhi. The shortlisted agencies would be called for detailed presentation, if required.

## Terms of Reference

### I Objective of the Study

The objective of the study is to prepare compendium of green technologies from different Geo-climatic zones in the country **excluding NCR Region of Delhi, Punjab & Haryana States for which the study is already undergoing**. The compendium to be prepared state/region wise is expected to help the implementation of integrated housing projects for EWS/ LIG segment of society with green technologies. The green technology here refers to any green material/ product/ process/system/ practice/techniques. For Geo-climatic zones, the Map of India showing Climatic Zones as per National Building Code (NBC Part 8 Building Services-Section 1 Lighting & Ventilation) may be referred to, a copy of the same is attached here.

The integrated housing projects are the projects which besides housing cover basic infrastructure components such as water supply, sewage disposal, road, storm water drain, external electrification & primary community facilities as pre-primary school building, anganwadi, community building & park.

### II Project scope & Methodology

- i) To identify, understand and measure the present level of use of green technologies through interaction with various stakeholders while giving special emphasis on Govt. depts, Public & private construction agencies, architects, experts/ energy consultants, NGOs etc. working in the area of green technologies for residential houses. While establishing the technology as green, the exhaustive details of energy & resource saving would be collected vis-à-vis conventional technology. Further, as regards present usage the % penetration/extent of use of product/technology in the particular segment needs to be covered through interaction with suppliers of both conventional & green products. The projects under certification/ already certified by Green rating agencies may also be visited. The projects implemented with vernacular architecture & techniques may also be visited /referred.
- ii) The assessment of the future potential of such technologies, the impediments coming in the way of large scale propagation of such technologies & the strategies to promote the use of such technologies would be collected through interaction with various stakeholders. The success stories would also be covered.
- iii) For actual field level data, one compulsory visit by the competent technical representative (/s)/ expert (/s) for may be up to a week time in the capital city of each State may be made. The visit to other city as alternate to capital may be justified

only in case of higher data, knowledge & usage of green product/technology in that particular city. Though the details of green technologies are expected to be covered for all major cities of each State, however, three main cities including the capital city are expected to be covered comprehensively in terms of use of green technologies. The visit to other cities of the State may be made only if it is felt necessary. The actual site photographs of the green product manufacturing unit & buildings completed/under construction would form integral part of the compendium/study.

The agency is required to cover the details of all the prevalent green technologies of the State/ region utilizing low resources; low embodied & operational energy. However, some indicative technologies under various segments, the agencies may find applications are listed below;

a) Walling System

- i. Fly Ash based bricks/blocks
- ii. Cellular Light weight Concrete blocks (CLC)
- iii. Autoclaved Aerated Concrete (AAC)
- iv. Rat trap –bond walling
- v. Cavity walls with or without insulation material
- vi. Concrete stone masonry blocks with or without recycled stone
- vii. Gypsum Panels
- viii. Precast hollow/solid concrete blocks
- ix. Pre-cast / Prefabricated/ Partially prefabricated components
- x. Concrete elements using light weight aggregates both natural & synthetic
- xi. Traditional/Local materials/components and others

b) Roofing System

- i. Filler slab
- ii. plank & joist roofing
- iii. Brick panel roofing system
- iv. Funicular shell roofing
- v. Bamboo mat corrugated sheets
- vi. Ferro cement channels
- vii. Pre-cast / Prefabricated/ Partially prefabricated components
- viii. Light weight concrete panels
- ix. Light weight panel systems
- x. Thermal insulation using natural & synthetic materials
- xi. Traditional/Local components and others

c) Foundation systems;

- d) Passive Architecture practices; ensuring day lighting & ventilation through building orientation, openings etc.
- e) Wood substitutes ; such as Particle board etc
- f) Water conservation (reduce, recycle/reuse & recharge); such as water efficient appliances & fixtures, Efficient recycling/reuse method, Rain Water harvesting techniques etc.
- g) Green Sewage disposal system; Green cost effective sewage treatment process, bio digester technology for toilets etc.
- h) Joinery and Miscellaneous
  - i. RCC Door and Window Frames
  - ii. Ferro Cement door shutters
  - iii. Ferro Cement sun shades-cum-lintel
  - iv. Ferro Cement staircases
  - v. Puf injected door shutters
  - vi. Glass fibre reinforced door shutters
  - vii. Rubber-wood/poplar door shutters
  - viii. Coir composite door shutters
  - ix. Bamboo ply door shutters
- i) Use of renewable Energy; Solar/ other renewable energy based lighting
- j) Low emitting materials (low voc content); Paints, Adhesives, Coatings etc.

The new & upcoming green products/technologies have to be given special emphasis as during recent years many new technologies have come to India. The draft amendment to NATIONAL BUILDING CODE OF INDIA 2005 in the form of new part, Part 11 Approach to Sustainability, may be referred as useful guideline for this exercise.

### **III The deliverables of the project;**

To prepare the product/technology wise details including the following;

- 1) Name of Product/technology;
  - 2) Suitability in Climatic Zone/(s):
  - 3) Applicable in Cities/Zones:
  - 4) Technical details;
- Technical details would include details of various components, mix composition, process of manufacturing/ installation, technical properties, Codes/ Guidelines on the product/ technology, if any. The regional variation if any is required to be suitably incorporated.

- 5) Green Aspects:  
The resource & energy saving details, use of industrial/ agricultural waste if any needs to be elaborated. The green properties need to be explained in engineering terms. The regional variation if any is required to be suitably incorporated.
- 6) Details for enterprise development  
Machines, materials, lands, capital, power required to set up a plant with optimum capacity. Also required to be included is the list of machinery & raw material supplier along with their address & contact details – **to be Annexed (1)**
- 7) List of up- to- date (latest) Manufacturers/Suppliers of the product/technology with complete address & contact details, along with their capacity- **to be Annexed ( 2)**
- 8) List of up- to- date (latest) contractors involved in the construction using the product / technology with complete address & contact details along with the major works executed by them – **to be Annexed ( 3)**
- 9) List of the major projects using the product/technology
- 10)List of the Experts, Architects, engineers, departments who can assist in planning, designing & implementation of the project using the product/ technology
- 11)Present cost of the product / technology vis-à-vis conventional counterpart (comparison can be made on per m<sup>2</sup> cost basis or per unit basis as applicable)
- 12) The percentage penetration/ extent of use of the product/technology in the particular segment
- 13)The assessment of the future potential of such technologies, the impediments coming in the way of large scale propagation, the strategies to promote the use of such technologies
- 14) Documentation of success stories, if any

### **Bidding Methodology & Payment Term**

All the States & UTs are to be ultimately covered under the study. Bid is invited for single State/UT or by clubbing two or more States/ UTs or for a region. However, in each case of bid clubbing two or more States or for a region, the budget for individual State/UT also needs to be specified separately, as the work may be assigned for single State, two/three states or part of the region quoted. The preference would be given to the Agencies having some establishment or local

network partner (Individual/agency/Institution/NGO etc.) or prior experience of work in that state or region for which the bid has been submitted.

The work is to be completed in 6 months time. Any extension of work may be given on justified reasons only. The agency needs to give interim report of the work to BMTPC on bimonthly basis.

The payment would be released in four installments of 30%, 20%, 20% & 30%. The 1st installment of 30% would be released as advance amount, 20% after each of the two bi-monthly reports, & balance 30% after submission of final report.