Mainstreaming Sustainable Social Housing
Highlights of India’s commitments

Agendas supported by the Government of India having bearing on urban development, climate change mitigation and resource efficiency in particular:

• the 2030 Agenda for Sustainable Development,

• the Paris Agreement and

• the New Urban Agenda.

All the above instruments, exert international pressure to put policies and tools in place for steering the Indian social housing sector towards greater sustainability.
Need for a Decision Support Tool

Need for comparative assessment of trade-offs between different green building materials and construction technologies available.
Sustainability Index

A Sustainability Index will

• be developed built on a multi-criteria decision support system

• provide the targeted beneficiaries with evidence based performance information

• aid decision making in choice of building materials and construction technologies

Process of derivation, selection and detailing of the attributes underlying the Sustainability Index.

Identify Attributes

Attributes: Methodological description of the dimensions of sustainability (Social, Economic, Environmental) that would help to measure and calibrate progress towards achieving sustainable development.
Derivation of the Attributes

The Attributes of the Sustainability Index have been

• derived from a literature review,
  
  - The 2015 BMTPC report on “Multi-Attribute Evaluation Methodology for Selection of Emerging Housing Technologies” and
  
  - Other government reports

• MaS-SHIP Stakeholder Dialogues and project meetings
BMTPC’s List of Attributes

Attributes for Evaluating Emerging Housing Technologies

Primary Attributes
- Mandatory Attributes
  - Functional Requirements
  - Constructability
  - Economic Viability
  - Maintenance
  - Sustainability
  - Finish Quality
- Proferred and Desired Attributes
  - Initial Cost
  - Maintenance Cost
  - Eco-friendliness
  - Internal Finish

Secondary Attributes
- Strength & Stability Requirements
- Performance & Statutory Compliances
- Fire Resistance
- Design Flexibility
- Simplicity in execution & maintainability
- Design Compatibility
- Speed of construction
- Economies of scale
- Type of Maintenance
- Ease of Maintenance

Tertiary Attributes
- Stability against vertical loads
- Stability against Lateral Forces
- Violation of Statutory Provisions
- Restriction on no of floors
- Foundation Type
- Skilled Labour
- Lead Time
- Efficiency of design
- Supply Chain Reliability
- Technology Transfer Possibility
- Water Tightness
- Construction Safety
- Temporary Services Requirement
- Equipment
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- Technology Transfer Possibility
- Weather Resistance
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- Temporary Services Require
MaS-SHIP Attributes - Selection

Availability of Primary or Secondary data sources for measuring or quantifying the attributes.
Assign each attribute a RAG label (Red, Amber, Green) where

‘Red’ signifies, “field surveys necessary for data collection”,

‘Amber’ signifies, “data can be collected through desk research”, and

‘Green’ signifies that “normalized data is readily available”.

Tier 1- Normalized Data readily available
Tier 2- Data can be gathered through desk research
Tier 3- Field surveys necessary
Tier 4- Data unavailable
MaS-SHIP Attributes of the SI

Tier 1- Normalized Data readily available
1. Embodied Energy
7. Thermal Performance
8. Noise Transmission
9. Thermal Mass
12. Cost per Sq. M

Tier 2- Data can be gathered through desk research
2. Carbon Emissions
4. Current Recycled Content

Tier 3- Field surveys necessary
3. Future Reusability
5. Water Efficiency
6. Impact on Cooling loads
10. Modification Ability
11. Ease & Frequency of maintenance
13. Time of construction
14. Supply Chain
15. Skill Requirement

Tier 4- Data unavailable
Critical Resource Use Durability
Familiarity of a Material

A short-listed 15 attributes were selected from an initial long list of 29 attributes.
Decision Support Tool

- Sustainability in social housing differs from place to place.
- Need for solutions depending on geography, climate, culture and economy.

The project intends to develop a **Decision Support Tool** which is adaptable to a variety of contexts.
Selection of Case Studies

Qualifying threshold of States
Type and number of cities in a State

STEP 2
Type of Cities
- **Class I**: 1,00,000 and above
- Class II: 50,000 to 99,999
- Class III: 20,000 to 49,999
- Class IV: 10,000 to 19,999
- Class V: 5,000 to 9,999

Number of cities
- > Or = 3 Class I cities in a State
Selection of Case Studies

Factor Analysis

- Share of urban housing shortage in a State (50% weightage)
- Average Annual Exponential Growth Rate (AEGR) (50% weightage)

STEP 3

- Factor analysis based ranking
  - Hot & Dry: Gujarat, Maharashtra, Rajasthan
  - Warm & Humid: Assam, Odisha, Andhra Pradesh
  - Composite: Bihar, Jharkhand, Uttar Pradesh
  - Temperate: Karnataka
  - Cold: Uttarakhand, Jammu & Kashmir
Selection of Case Studies

Ranking based on completed Social Housing projects

STEP 5

- Ranking based on Completed Social Housing projects under the most recent Central Program (RAY)
- Rajasthan (Hot and Dry)
- Andhra Pradesh (Warm and Humid)
- Uttar Pradesh (Composite)
- Karnataka (Temperate)
- Uttarakhand (Cold)
Data Collection

Tier 1 - Normalized Data readily available
1. Embodied Energy
7. Thermal Performance
8. Noise Transmission
9. Thermal Mass
12. Cost per Sq. M

Tier 2 - Data can be gathered through desk research
2. Carbon Emissions
4. Current Recycled Content

Tier 3 - Field surveys necessary
3. Future Reusability
5. Water Efficiency
6. Impact on Cooling loads
10. Modification Ability
11. Ease & Frequency of maintenance
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15. Skill Requirement

Tier 4 - Data unavailable
Critical Resource Use Durability
Familiarity of a Material

Conserving Now, Preserving Future
Data Collection - Field Survey

Manufacturers

Manufacturing phase

Supply of sustainable building materials and technologies

Developers

Construction phase

Appropriate selection of sustainable building materials and technologies

Homeowners

Usage phase

User experience of the choice of these materials and technologies

Insight from field surveys:

Availability of relevant published datasets for database building enabling the choice selection of the building materials and construction technologies.
Key Points

Relatively limited uptake globally (in relation to the total number of new builds and the existing stock) can be broadly attributed to three major factors:

- **Skill requirement**
  to correct gather and assess data may lie beyond the current expertise of many built environment professionals.

- **Cost**
  the building designers, owners and occupants here, are often separate entities, and resource efficiency measures implemented at the design stage will not benefit all stakeholders.

- **Low demand**
  Particularly in temperate climates with low operating costs, sustainability concerns take second place behind affordability concerns.
Thank You

To know more about us you may visit: http://www.teriin.org/

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