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IIFL HOME LOAN

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PATHWAY TO CLIMATE ADAPTIVE DESIGN

Understanding the four C's of green affordable housing

23-24 August, 2022

Development Alternatives, New Delhi

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The report is about the in-depth discussion of IIFL HFL's two select affordable housing projects, from two different climatic zones and varying scales of project development.

INTRODUCTION

In the endeavour to promote Green Affordable Housing in India, IIFL Home Finance Ltd. (IIFL HFL) organised its flagship event 'Kutumb' in New Delhi in association with the Asian Development Bank (ADB). 'Kutumb' is a knowledge ecosystem conceptualised by IIFL Home Loan to promote Green Affordable Housing in India, for a better understanding of green design, rating, and financing options available.

This is Kutumb's 10th chapter and the 4th to feature in association with ADB. The event was conceptualised as 'National Kutumb' to validate the practical viability of the green solutions by bringing together live affordable housing projects and other stakeholders of the ecosystem.

The event took place as a workshop at the Development Alternatives (DA), New Delhi, on August 23rd and 24th, 2022. Ashok B Lall is also the architect for DA building. The delegates present at the event were, Mr. Monu Ratra (ED & CEO, IIFL HFL), Ashok B Lall (Principal Architect, Ashok B Lall Architects) as the mentor, Medapatti Vishnuvardhan Reddy (CEO & Director, Tranquillo Holdings and Projects Pvt. Ltd.) and Bhavya Shetty (CEO & Director at PG Shetty Constructions). The experts present at the event were Gurneet Singh (Director, Environmental Design Solutions), Zeenat Niazi, (Vice President, Development Alternatives), Sachin Sharma (IGBC Western UP Chapter).

KUTUMB 'PATHWAY TO CLIMATE ADAPTIVE DESIGN'; CONCEPT AND CONTEXT

The main objective of the two-day workshop was to bring together IIFL HFL's two select affordable housing projects, from two different climatic zones and varying scales of project development. These two projects, in discussion were

Project Aura by by Tranquillo Holdings & Projects Pvt. Ltd, Hyderabad and Project Avani by PG Shetty Constructions at Mysuru.

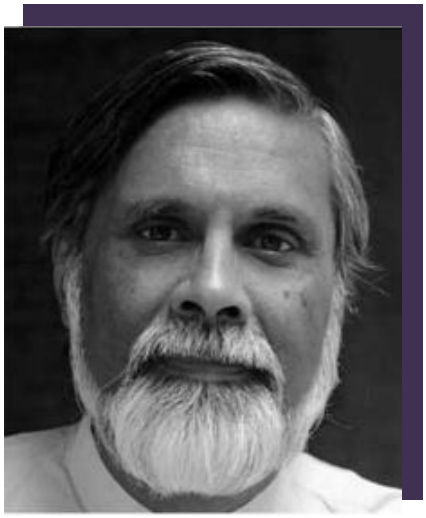
The discussion pointers of the event are curated into this report under Ashok B Lall's assistance to educate stakeholders in the ecosystem like builders, developers, architects and other institutes and organisations working towards green affordable housing.

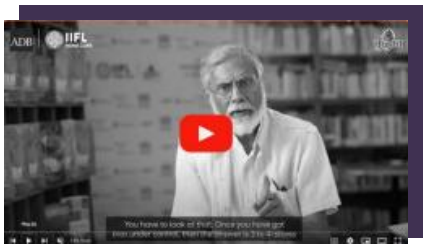
The event also witnessed audience from organisations such as Environmental Design Solutions, IGBC, Development Alternatives, and Knight Frank India as well.

OUR GREEN MASTER; ASHOK B LALL

Ashok B Lall has been leading the Ashok B Lall Architects since 1981. He is committed to environmentally sustainable and socially responsible architectural practices. With an interest and expertise in resource and energy efficient Affordable Urban Housing solutions for developing countries, Ashok has designed affordable housing projects and researched, published, and advocated for appropriate building design strategies and planning regulations that would lead to low-carbon urban futures. Ashok has executed several projects for educational and research institutions and housing in India. He engages with developing architectural curricula for the Indian context and contributes to national professional journals for architecture.

In the forthcoming sections, Ashok B Lall talks about the five elements of DA and their significance in terms of sustainability.





DEVELOPERS

Mr. Medapati Vishnuvardhan Reddy, the CEO and director of Tranquillo Holdings and Projects Pvt. Ltd. is the backbone of the company. With his strong entrepreneurial skills coupled with great understanding of world-class construction techniques, he plays an important role in shaping up Tranquillo as the next best building company in Hyderabad. Mr. Vishnu holds a Bachelor of Architecture degree from the esteemed Woodbury University, California and is currently among the top-architects of Hyderabad. His experience as an architect in the famed Gruen Associates, Los Angeles and his exposure to world architecture coupled with delivering projects with unprecedented finesse distinguishes him from the run of the mill architects.

A Bachelor of Engineering in Construction Technology and Management, Ms.Bhavya Shetty joined the family run business in 2012 as the next generation leader of the organisation to manage the generations of dedication and hard work with her unique ideas and talents. With a vision to take housing to a whole new level in the developing landscapes, in 2005, Mr. M G Somashekar , her father introduced the monolithic construction for the government sector aiming at providing fast track quality homes for the economically weaker sections. Following her father’s footsteps, she has an ardent desire to makE the technology more efficient to meet the humungous demand for housing in India in near future.

DEVELOPMENT ALTERNATIVES (DA)

Development Alternatives is an NGO committed to spreading environmentally appropriate technology and fostering socio economic equity. The headquarters design is one of Ashok B Lall's project work. The building illustrates strategies as ways of reducing embodied energy in buildings, utilizing local materials, updating vernacular materials and forms, and reducing energy consumption and CO2 emissions. The Architects refused to accept the best available technology for the building's air-conditioning system; instead, they designed a hybrid system that is estimated to be at least 30% more efficient than conventional systems on the market. The design and form of the building can be viewed in detail from their book 'Development Alternatives world headquarters – office building in India' published by the Holcim Foundation.

Figure 2 Front facade

FIVE ELEMENTS OF CONSTRUCTION; DEVELOPMENT ALTERNATIVES (DA)

WALLS

Ashok B Lall explains how the walls are built. The walling assembly is a double layer cavity wall, the inner layer of the wall is built with cement stabilized earth

block (CSCB). The earth for the CSCB is recycled earth from the original Development Alternatives building that was demolished to make way for the new building. The outer layer is built with fly ash blocks which recycle fly ash which is a waste of thermal power plants. Almost the entire wall is using recycled materials.

Figure 1 Internal wall layer

In the cavity, there is packed waste polystyrene collected from local polystyrene packaging plants used as an insulation. Altogether we now have an insulated outer skin of the building. The natural colours and the aesthetic patterning of the block work interspersed with occasional burnt brick establishes an earthy aesthetic.

WINDOWS AND SHADINGS

The windows system is designed as a three-storey system. The bottom panel is open-able with a fly screen mesh, this is for ventilation during pleasant weather. The middle panel is a fixed glass panel, which provides daylight to the part of the

room close to the wall. The upper panel is another open-able panel which can open for ventilation, it also provides daylight into the depth of the room.

Outside the windows there is a light framework that holds perforated pre-cast panels for shading the windows/protecting them from direct sun during hot seasons. Overall, the window area is approximately 30% of the wall area. Development Alternatives was sure that they will not use aluminium/PVC for doors and windows as these are materials, if used in large quantities, will have a negative impact on the environment. Teak wood harvested from responsibly managed government forest was used for doors and windows. The carbon emissions impact of aluminium windows is 200 times greater than that of teak wood windows.

What this window design shows is that a window has multiple functions such as: view, control daylight, ventilation. Each function must be satisfied. We also see that for office building, you don't need more than 30% of wall area to be windows to serve all these functions adequately.

Figure 3 Windows and shading

TERRACOTA JALI TEXTURE

In some places, the outer leaf of the insulated walls is built by sandwiching polystyrene sheets between the inner block work and outer terracotta jali screen. The terracotta jali screen is then filled with mortar to protect and hold back the insulation layer. This technique has a decorative quality, reminiscent of traditional buildings of Northern India.

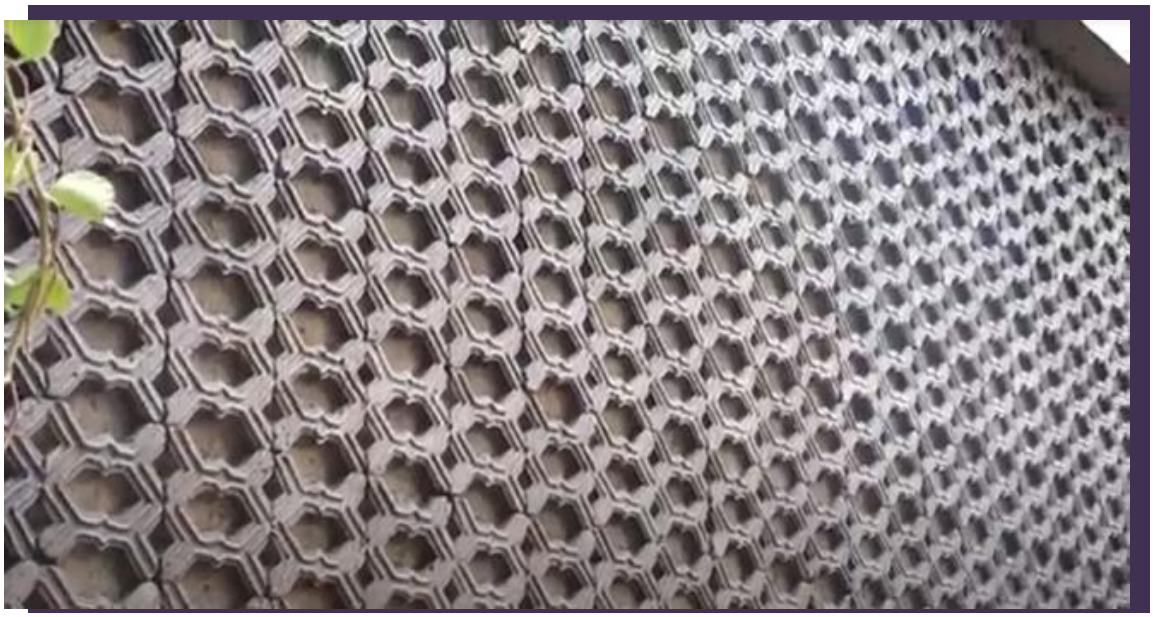


Figure 4 Terracotta Jali

SHALLOW DOMES

An analysis of the embodied energy of construction showed that reinforcement steel used in the structural system of the buildings is the highest contributor in the total embodied energy of the building. Therefore, to reduce the carbon emissions due to embodied energy it is important to minimize the quantity of steel consumed in construction systems. Domes are an age-old technique for spanning spaces perfected well before steel became available. . In the Development Alternatives building, shallow domes are used to span spaces.

where subdivision of rooms is not required. These domes are compressive structures using fly ash block in a rising spiral arrangement and a controlled perfect geometry. In several spaces there is no steel used in spanning the space thereby considerably reducing the embodied energy of construction.

Modern buildings can also have domes!

FLOORING AND OTHER BUILDING MATERIALS

You will notice in Development Alternatives, that the flooring pattern uses rectangular pieces of varying sizes. This kind of pattern minimizes the wastage of stone which must be cut from stone slabs supply by the stone suppliers. You will also notice in the passages the stone is split (rough kota stones). Only in the office spaces is the floor made up of polished stone. So cutting and polishing stone also consumes energy. This is another way of reducing the energy required in flooring.

This kota stone is commonly available local natural stone, the other stones used are the local red and buff coloured sand stones. Remember that the doors and windows are timber, and the walls are earth of fly ash. The entire building is an expression of materials close to the natural state. Where concrete is used is also left exposed/neither plastered nor painted.

AVANI (PG SETTY)

DEVELOPER PROFILE

PG Setty group is established in the year 1964 to raise the standards of construction through innovative construction technologies such as pre-cast concrete, monolithic concrete construction to improve the construction efficiency, reduce construction wastage and reduces the construction timeline.

PROJECT INTRODUCTION

- Project Name & location: Avani, Mysuru
- Climate zone: Temperate
- Total site area: 8708.1 sq.m. *(2.4 acres)*
- Total ground coverage: 3,491 sq.m.
- Total built-up area: 19254.6 sq.m.
- Number of blocks: Two blocks Building A (G+4, 104 Units) & Building B (G+7, 78 Units)
- Total no. of dwelling units: 180
- Building Density: 75 dwelling units per acre
- Ticket size: Rs. 34 Lakhs per dwelling unit
- Construction stage: 10% *(excavation in process)*

The project Avani is an affordable housing with a vision to provide a better lifestyle to the middle-income group of Mysuru by giving them a sense of ownership as majority of the home buyers are first hand buyers. The project focuses on community well-being with minimal resource keeping and sustainability as the core of their design process.

"Sustainability is not just a checklist; it is a lifestyle"- *Bhavya Setty* (CEO - PG Setty Group)

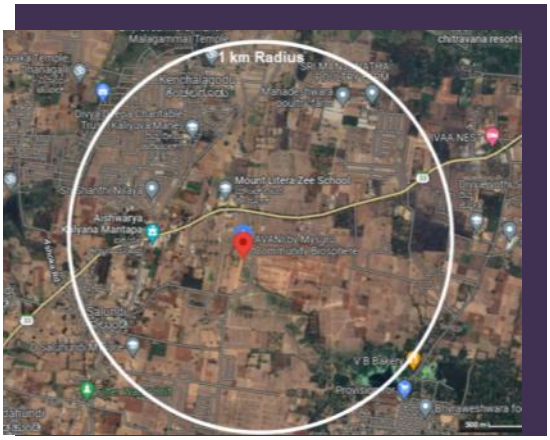


Figure 6: Site location surrounded with public transport and basic facilities

The project is constructed along the radial road (between ring road and peripheral road) of the city where the development is progressive and the drive to the center of the city is max of 20 mins from the project site.

Figure 7: Site plan: Avani, Mysuru

- The building blocks are oriented along E-W long axis to optimize solar heat gain and maximize daylight potential.
- Massing exercise was done by the Architect and the placement of building are in such a manner that adequate daylighting and ventilation is provided to both the building blocks.
- The project follows inclusive housing concept to provide residents a sense of community well-being through courtyards, walkways, etc. in the project design.

"Community wellbeing at the heart of the design"- *Bhavya Setty (CEO - PG Setty Group)*

Figure 8: Amenities and facilities in project

The project provides community services such as vegetation area to grow fruits/vegetables (medical herb garden), open air gym, walkways, pavilion for yoga, central courtyard to promote occupant well-being.

DESIGN FEATURES

The project uses pre-cast concrete technology, and the mobile factory will be located at 20 km from the project site.

This technology reduces the construction waste as the process is extremely efficient and reduces the construction time to 30% because the panels are pre-cast in the industry and transported to the site directly. The cost of pre-cast is Rs. 11/sq. ft.

The wall thickness for a pre-cast concrete is 125mm thus increasing the carpet area of the unit but there is no scope for design flexibility.

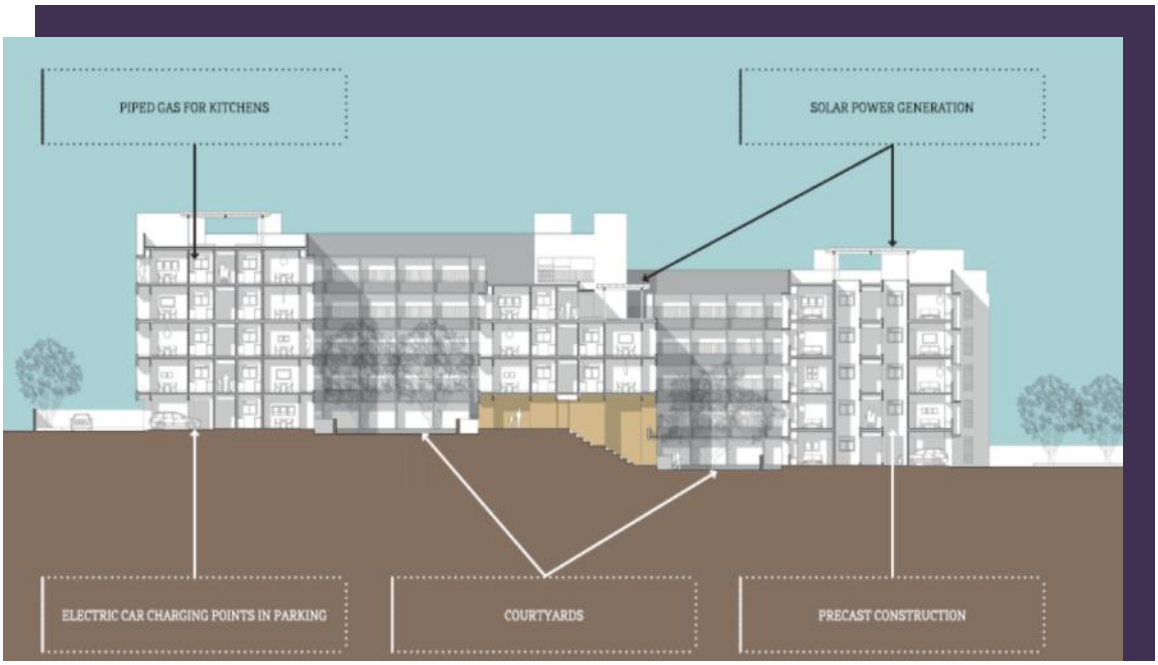


Figure 9: Measures for sustainable community

- Provision of piped gas supply for kitchen and water heating system which reduces the need for electrical geyser heating. This reduces the energy from 3W (conventional geyser) to 2W (piped gas hot water system) and serves as a gender responsive measure of providing clean and efficient energy.

- Solar PV capacity of 130 KW to be installed on roof to cater to the common area energy consumption such as lift, common area lighting, parking and STP operations.
- Rainwater harvesting and Eco hybrid STP model is provided. Dual plumbing system will be provided to reuse the STP treated water for flushing and landscaping.

Figure 5: Project team presentation and discussion with mentor and experts during National Kutumb event

DISCUSSION; MENTOR AND AVANI

Have you considered resiliency in your project?

Yes, RCC wall slabs act as a shear wall technology which is considered a better option for disasters such as earthquake than the framed structure

QUESTION 2: Why did you consider pre-cast concrete despite being a costly technology than the in-situ concrete technology?

Yes, the upfront cost of the technology is high, however, the construction time is reduced by 30% due to which the overall volume of the construction cost is similar to conventional techniques

QUESTION 3: Is thermal comfort achieved using pre-cast concrete as the thickness is 125 mm?

We haven't calculated the U-value of the material but however adding insulation to pre-cast will now reduce the carpet area. We will try to implement white/reflective paints on the wall to reduce solar heat gain.

QUESTION 4: How do you respond to the high humidity of the monsoon season?

The discomfort due to high humidity is reduced by ceiling fans.

QUESTION 5 How do you decrease the heat ingress due to the sun hitting the windows facing west and east?

External horizontal louvers and vertical plantation along the balcony railings can reduce the sun ingress

QUESTION 6 What are the setback norms for a building and the challenges related to it?

The setback requirement is defined by the tallest building within the project. For every 3m height, the setback value increases. Also, the setback is to be kept at 1/3rd of the height of the building. Due to setback and fire norm requirements, a lot of the space on-site is given as internal road as a 24m high building should have a 6m road all around. This reduces the provision of green cover area within the project site.

DISCUSSION; MENTOR AND AVANI

- Provision of insulation and high SRI paint on the roofs to reduce the cooling energy demand of the top floor.
- Provide external shading louvers for the external fenestrations. Along the west, east and south façade, optimize the window sizing to reduce heat ingress.
- Provide AAC blocks for the interior walls for better flexibility. This can make a future ready space which can be modified according to user preference.

POST EVENT LEARNINGS

Design suggestions to be incorporated in Avani project

- Provision of 50 mm over deck EPS insulation on roof to
- Provisions for hanging shading devices
- Reflective paints on west walls

Suggestions from the Avani project team to byelaws/policy makers

- Lands closer to business spaces, shall be dedicated for affordable housing at incentivised prices.
- Single window statutory clearance for green affordable housing to improve the timeline of the project effectively.
- Incentivizing stakeholders (builders, end users) while adapting to sustainable measures. E.g.: property tax, utility bills, registration tax, etc. Property tax GST for private affordable housing developers is 18% whereas for government affordable housing projects the GST is 12%. The property tax needs to be brought down to 12% for private players as well.
- Incentives to end users to be provided by the government such as property tax rebate for green affordable housing users.

DEVELOPER FEEDBACK

Question 1: What are your thoughts on the format and flow of the national Kutumb event?

The event was filled with knowledge and very interactive in nature. The format of the event was interesting in nature where information is shared on how to do things in a sustainable manner on first day, and on second day it took consideration into the practicality of the projects and the challenged that developer face. The mentor and experts were patient enough to hear us out and give their suggestions which was an interesting way of addressing the problems. Overall, it was an enriching session for us.

Question 2: What are some of the key takeaways from the whole workshop?

- *The three major take aways for us from the event are:*
- *Design flexibility should be kept in mind while designing houses and we might consider that in our future projects. The ways to incorporate flexibility in planning while using pre-cast concrete technology will be looked upon.*
- *Simple design strategies like window shading and exterior reflective coatings can help in creating a better thermal comfort for the home buyers.*
- *Sustainable development should look at the overall picture of project lifecycle like waste management, post usage project life, etc.*

Question 3: What do you think about the solutions suggested by the experts and how would you incorporate those in your current or future projects?

- Simple suggestions that can be incorporated during the design and initial construction stage of the projects were majorly discussed in the session. A lot of the suggestions were discussed with us that can be incorporated in our projects. Few suggestions like provision of insulation on roof surface, shading

device on windows, etc will be incorporated in our current project.

- Many more suggestions were discussed in the event that we look forward to use in our future projects and come back with our learning on the same.

AURO (TRANQUILLO)

DEVELOPER PROFILE

Though Tranquillo Holdings and Projects Pvt. Ltd. emerged as an independent entity in 2018, the promoters hold an infallible history of delivering various reputed projects all over the twin cities. With an array of housing projects (completed, on-going & up-coming) which constitute a total built-up area of 11 lakh sq.ft, Tranquillo is on a building marathon at this present juncture.

Directors of Tranquillo Projects and Holdings Private Limited are Vishnuvardhan Reddy Medapati, Sridevi Medapati, Prakash Reddy Medapati and Harsha Vardhan Reddy Medapati.

PROJECT FEATURES

- Location: Hyderabad
- Total of 210 units (2 BHK) in a total area of 2.3 acre
- There are four building blocks and a club house within the project site
- It is a gated community project with amenities such as club house provided within the project boundary
- The project uses Jaguar, Eco 365 low flow plumbing fixtures
- The project will be installing SBR process STP system within the site
- The construction material used in red brick and framed structure
- Piped gas provided for cooking and water heating facilities
- The target market is middle or upper middle-class group and the cost of one flat starts at Rs. 42 lakhs of saleable area and PMAY scheme is not viable anymore where residents get a maximum subsidy amount of Rs. 2.5 to 3 lakh per household

- Hyderabad is a Vastu centric community and the ideal orientation for kitchen is south-east and for master bedroom it's south-west. South facing entrance in Hyderabad will not sell considering the Vastu
- Luxury Amenities like Club House, swimming pool, Gym etc. are given preference.

Figure 6: Project team presentation and discussion with mentor and experts during National Kutumb event

DISCUSSION BETWEEN MENTOR AND AURA

- The setback norms for a varying height of the building: For every 3m height, the building setback increases between the building. Also, the setback should be kept as 1/3rd of the height of the building
- Set back between the bungalow and the road: The Indian laws to provide a setback are influenced by the British Era practice of providing Gardens in the

backyard and front. Setbacks are given to optimize inclusion between the building and the green spaces

- Reduced daylighting in Bedroom spaces which were planned considering Vastu orientation: provision of square courtyard could enhance the daylight and ventilation potential evenly to all the blocks.
- Use of common walls: This will reduce the exposed surface area of the units to heat gain. Also, al lot of wastage of carpet area can also be avoided
- Use of light weight bricks: The lightweight bricks are mixed with Charcoal and straw. These bricks are stronger and have better thermal properties with air cavities inside
- Shading the balcony space on the west orientation: Provision of horizontal louvers on the exterior of the balcony can reduce the heat gain

Figure 10 Suggestions in the planning provided by the Mentor Ashok B Lall

Figure 11 Suggestions given by the mentor Ashok B Lall for AURA

Figure 12 Suggestions for the future projects by the Mentor Ashok B Lall

QUESTIONS ASKED BY THE PANELIST

Question 1: Does financing relate to carbon footprint?

IGBC and GRIHA talks about operational carbon intensity but the embodied energy intensity delivered per carpet area is completely ignored in both the ratings. The financing institute can come up with frameworks to reduce the ROI for reduced embodied carbon footprint which also needs a rigorous monitoring mechanism.

Question 2: Is degree of circularity considered post construction on a long term?

Not for now as the building material labelling doesn't come up with the carbon footprint and the life cycle analysis of the product. This can be considered in future as it reduces construction waste reaching landfill, but the data collection source is a constraint here

Question 3 Why construction technology like compressed timber panel not considered?

This is mainly because fire code regulation becomes a problem for timber and so finding a quality compressed timber is not a cost-effective option

Question 4: Can solar capacity meet the energy demand of the building and how?

60% of roof area with solar PV can reduce 80% of energy demand and so considering the building to be 6 floors, this 60% demand can meet 100% of energy consumption

Question 5: How do you define the heights of the building when the contour of the place is uneven?

To avoid equalizing the land and excavating the soil for construction, government should bring strict regulations to reduce such activity.

CHALLENGES DISCUSSED BY THE AURA TEAM

- Operational expenditure on STP should be studied by the local bodies and put in law
- Incentivizing the green projects by the government authorities
- Creating awareness within customers and to bring changes from the school education level
- Planning according to Vastu and customer demands

FEEDBACK; AURA

Question 1: How was your experience of attending the whole event?

- *This was a splendid event that has been organized by IIFL where different stake holders of sustainability process like the architects, IGBC team, the builder and other mentors who can brainstorm and give ideas of the upcoming projects.*
- *It has been a good learning experience. Other construction techniques and ideas that are going around in affordable housing were discussed. It has been a good experience overall.*

Question 2: What are your some of the key takeaways from the whole workshop?

- *Long term sustainability goals should focus upon and kept in mind. Because construction is such that we look at creating houses that lasts longer. Though, how sustainable it will be at its end life or when it is demolished should also be looked at.*
- *Prefab construction method was discussed in this workshop. It reduces the construction timeline and create a better-quality product overall.*

Question 3: How practical do you think the solutions given and the discussions were?

- *The solutions discussed were quite practical. Though a small but important step has been taken to initiate the thought process. Though bigger steps are still required.*
- *Some of the measures discussed can be implemented right away in the projects. Some measures require detailed thought process such a EV component has been talked about as the future of sustainability. That can be incorporated in future.*

EXPERT FEEDBACK

EXPERT I

Gurneet Singh (D**irector, Environmental Design Solutions**) is an experienced sustainability and energy efficiency consultant, building performance diagnostics expert and educator and has led the energy efficiency team at EDS for nearly 15 years. His experience includes areas such as energy sector policy and regulatory implementations, techno-economic feasibility studies, energy performance contracting projects, LEED, and GRIHA certification projects. He specializes in Integrated Building Design; using simulation tools to assist in the design and delivery of energy-efficient buildings predicting the performance of the daylight systems and energy-efficient cooling services.

(Source: https://edu.wfmmedia.com/faculty/gurneet-singh/)

1. **Expert experience:** *Gurneet's overall experience at the event was quite good and the format of the interactive format was also valuable. He also suggested that the project's in detail designs can be shared with experts beforehand for better understanding of the project*
2. **What is your take on the suggestions given by the developers on Day 02 in terms of achieving sustainability and energy efficiency in their projects?** *Roof insulation and white paint will help reducing the indoor air temperature majorly. However, paint with time will wear-out and the team will have to re-paint to maintain the efficiency. In such case, white tile can be used where innovative designs such as mural or artwork can be tried out.*

Green wall can act as a shading strategy which reduces the indoor temperature as well.

3. **What is your take on the challenges proposed by the developers on Day 02?** *Vastu will have certain requirements as conveyed by the developer. However, the developers need to find a balance between vastu and energy efficiency in terms of climate responsive design. They should start questioning the vastu consultant on the requirements mentioned in vastu to see the best balance if they can achieve in terms of energy efficiency considering the occupant comfort.*

   In terms of affordability and land prices, as the developer suggested it is better to have affordable houses near the industrial areas as the target audience for affordable housing is the people working in industries. Good idea would be the housing should be at reach of your workplace because affordable housing people will opt for it. In terms of land prices, we need to understand the breakeven of the unit sale price to understand the land price. If government works on giving subsidies on the land cost, then the ticket size of the unit will reduce eventually matching the affordable market range.

EXPERT II

Zeenat Niazi (**Vice President, Development Alternatives)**is a sustainable development planner, trained as an architect and in human settlement planning issues. She leads the policy studies and development action initiatives at the Development Alternatives Group. Zeenat's work over three decades has focused on sustainable housing and habitat in human settlements, community-based approaches to climate and disaster resilience and support to national, sub-national and local government governments in mainstreaming integrated planning for achieving Agenda 2030 and the Paris Agreement in India.

(Source: https://in.linkedin.com/in/zeenat-niazi-83070317)

1. **Expert experience:** Zeenat found the overall structure of the event extremely interesting and refreshing. The whole master class format that was the backbone of the event was extremely useful according to her. The learning and training could happen at the same time because of such a format. The further flexibility of the event provided more valuable inputs from discussion. The developers of the two projects shortlisted were also very receptive to the whole discussion, bringing in the angle of practical feasibility regarding the suggestions for the projects. Further the presence of a solid green master, Ashok B Lall ensured that the discussion was driven towards sustainable and green solutions that were practical enough to be adapted by the developers.
2. **Based on the two case studies that were demonstrated, what are your suggestions on climate responsive strategies for the two climatic zones i.e., warm & humid, and temperate affordable housing projects?**

Zeenat mentioned that open-source websites such as https://www.mainstreamingsustainablehousing.org/dst to select sustainable building material and technologies specific to climate. This website will help the developers input their project details, geography and then the design guideline for sustainable building materials will be provided. It also maps the sustainable building materials and technologies specific to the geography. The website is currently being housed under Oxford brooks university.

Zeenat is also very happy to collaborate with IIFL to work together on the aspect of identifying sustainable building materials for the projects specific to their climate zone.

Zeenat also mentioned that IIFL can ask the developers from the next round to present two slides on their project indicating their green inputs and map it against the credit points in the rating system. This activity will be a framework mentioning the green strategies against the number of points to achieve green certification. The audience will get a clear idea on the green certification journey of the project by the developers to achieve green certification

3. **What is your take on the challenges proposed by the developers on Day 02?** *Zeenat highlighted that vastu is a marketing challenge for Hyderabad. The cultural mindset of people is such that they do a checklist on vastu first without considering the green aspects. Zeenat proposed that the developer should bring such mindset change among people to match vastu and green. In this way, the project can full-fill the green criteria and will be able to sell on the vastu criteria. She also highlighted that in the project brochures, the project team can keep advertising so there is a little bit of mindset change on the customers by educating them on the green aspects of the project. The team can't ignore vastu and go green because the same is not acceptable by the customers. The developer must go step-by-step gently, shifting the market*

and publish articles in local newspapers on 'Why green is Vastu?'. Zeenat was excited that by this way the developer will start building the thought into the customers mind that 'being green is more vastu than vastu. It's a subtle way of advertising by addressing the issue and the developer should include this advertising in their marketing budget as well.

With that the developer must give commercial benefits to the customer as their projects are green, expensive, and not vastu oriented. For example, if the developers get 2% less re-finance in that case whether there-finance factors into the capital cost or does it factor only into the operational cost for the affordability. Because if it factors into the capital cost, then the project's EMI can go down, the down payment goes down and in fact the developer knows they will be delaying only on the operational cost. In such case, the impact on immediate capital cost should be there which can influence the project business model.

For Mysore is concerned, Zeenat proudly exclaimed that Bhavya is ahead of the market trying to move the market in a certain direction. As per her, if their land cost strategy is part of the market plan it is a smart move because at this stage the cost will come down. But very quickly the land value will go up with development and so the resale value of apartment would go higher. This is a plus-plus for the developer. It will eventually also depend on Mysore's plan for transport connectivity, and other infrastructure facilities. Because if the developer can manage connectivity to the community, provide better wastewater sewage treatment plants, then their dependence on not having a total connectivity will be less from the city.

4. **How practical are the solutions proposed by the developers on day 02 will be implemented in their current project?** *Zeenat is guessing that if the developers sort of made such suggestions and they are serious about it, they*

would have done the implications of their strategies in any of their byelaws or clearances. Because if the project team incorporate such changes in their project, they need to apply for plan approvals again. But importantly the green strategy incorporation will have an implication on the cost of the product and on how they are planning to sell the product. If they had thought the strategy interventions in the end of Day 01 of the event and suggests that it will make only Rs. 150/sq. ft difference, the owner will agree as they can bare within their profit margin. Then the owners will do it.

Zeenat also explained the need to ask appropriate questions like, 'What is the implication of the strategy either on the price of your product or your business?'. IIFL team along with the experts need to have a discussion with them before the event on margin of profit, ROI to get an idea on how financing can help the product become greener.

5 **Do you have any other suggestions on this event?** *Zeenat suggested that, if GVP team can keep a track on the projects that were discussed during the event, this would help the experts and GVP team discuss on the success story of the green strategies implemented on the project in a similar session from next time. She also suggested that the developer group can talk about the changes they made in their project and challenges faced which will act as a success story for the next set of developers.*

EXPERT III

Sachin Sharma (**IGBC Western UP Chapter)** is presently Project Director with the Wave Infratech, real estate arm of the Wave Group. He is handling the development of upcoming integrated mix land use township on NH-24 and commercial projects at Noida. Sachin has master's degree in management from New Delhi and has experience of more than 15 years in planning, execution, construction, development and operations of urban projects, infrastructure, and energy sector. He has extensively worked in India and international markets like Africa, Europe, Southeast Asia, and Latin America on various infrastructure projects. Previously he has worked with Bajaj Hindustan Ltd as Executive President-Infrastructure and at New Delhi based company DSC limited as VP – Business Development.

1. **Can IGBC create a guideline for fast racking the approval process of projects in collaboration with RERA within a particular timeframe?:** *Sachin highlighted that RERA, Town & country planning and IGBC are all different islands and not interconnected with each other. He was mentioning on how ratings can help in fast tracing the projects which are targeting green certification. He acknowledged the suggestion and mentioned that the same can be discussed during the IGBC board member meeting to take it forward.*
2. **Can IGBC bring marking system on green products, so it becomes easy for the developers to select the green approved products?** *Sachin mentioned that, in the last three years IGBC has done a massive work on rating the materials of the building. The developers can see the materials approved by IGBC in IGBC website which give a huge database to the developers.*

KEY TAKEWAYS

CLIMATE ADAPTIVE STRATEGIES

- For temperate climate in Mysore, the strategies can be primarily cross ventilation and solar passive design features. Once solar passive climate responsive design is taken care in an affordable housing project, it's a great passive strategy addition as mechanical cooling will not be required. This creates an affordable environment for the entire project.
- For warm and humid climate in Hyderabad, during the day the temperatures are very high, and so an efficient envelope assembly is needed to delay the heat ingress during the day. The envelope strategy should be such that it restricts the window-wall ratio to cut heat ingress, shade the glazing and thermal mass of wall should be efficient to reduce indoor air temperature. After mid-night there is a cool breeze, so cross ventilation strategy can be followed which flushes cool air inside when the outdoor ambient air temperature is less than the indoor to achieve thermal comfort at nights. Evaporative cooler for the club house and common utility area can be explored as a design strategy for Hyderabad climate.

CULTURE IN TRANSITION

- Living in multi-storey flat is a new step for the first-time home buyer, especially in Tier-2 and 3 cities. However, group housing and multi-storey flats are inevitable, if cities must utilize their land optimally, remain compact and sustainable.
- Developers have created ways to respond to buyers' sentiment which prefers the independent home and the home on the street. So, one response in Avani's case is to design streets in the air. The street in the air connects many neighbors.

- There is cultural belief which are strong pre-requisites for a house design to be acceptable to the buyer. So, these may sometime be contrary to the principles of climatic design and efficiency of construction.

AFFORDABILITY AND LAND POLICY

- Developers are struggling to provide affordable housing at convenient locations close to city social services, good transportation, places of employment. In the open land market, within 30 to 40 minutes commute to work is proving to be so expensive for EWS and LIG categories. With increasing FSI being permitted land values tend to rise proportionate to FSI. With FSI greater than 1.5 building heights rise beyond 15 meters and building become subject to more stringent byelaws or fire safety and incur higher cost of construction as well as maintenance and operation.
- EWS and LIG affordability land prices need to be controlled by state policy and buildings up to 50-meter height would be optimal/in terms of construction cost, operation & maintenance, and cultural acceptability.

BUILDING REGULATIONS AND TRANSACTION COST FOR APPROVAL

- There is a need for simplified building byelaws for affordable housing. Site setback requirements and distances between buildings can be reviewed to enable more positive open green spaces to be formed in larger developments.
- Parking requirements and paved road requirements can be reviewed to minimize hardscape and to maximize soft ground.
- External shading of windows giving protection from direct solar radiation during hot seasons needs to be mandated.
- Insulation of roofs and reflective roof finish need to be mandated.

- Provision for future installation of roof mounted solar PVs with grid connectivity need to be mandated.
- The time taken for building approvals is usually more than one year, this adds to the project cost and creates uncertainty for the developers. Single window approval for affordable housing with simplified byelaws needs to be instituted.

GREEN RATING SYSTEMS

- To promote climate conscious design the mandatory recommendations above maybe brought into the green rating system as mandatory for affordable housing.
- The standards for embodied energy for structural system calculated from intensity of steel and cement consumed per sq.m. of carpet area can be benchmarked.
- Provision of independent water metering for each dwelling unit can be a pre-requisite.
- Many conditions for each project are peculiar to the project. Site related criteria and credits need to provide flexibility to be appropriate to the site conditions of the project. For e.g., Existing vegetation, natural soil, soil capacity for rainwater harvesting, access to municipal sewage system, water supply, etc. All these maybe align with simplified byelaws for affordable housing.

OPPORTUNITIES FOR DEVELOPERS

- Developers can leverage their marketing by showing the benefits of climate appropriate design and other green practices for the health and well-being of residents. Design for comfort will mean less needs for air conditioning. Design for comfort and daylight mean less electricity consumption. Design for comfort and sleep mean better health and productivity.

More green space and soft ground means less pollution and cooler outdoors. More green outdoor space means for children play and recreation. Accessible shaded roofs mean more recreational space and space for growing organic vegetables, herbs, etc.

- Water saving and recycling means water harvesting will assure water supply. Independent home water metering will assure careful use of scarce water resource.
- Builders can offer accessories that improve performance and energy efficiency of residences at a wholesale price - energy efficient ceiling fans, LED light fixtures, star rated air conditioners, external movable shading devices, etc.
- Provide for EV charging points for both 2-wheeler and 4-wheelers.
- The brand value of a company depends on the long-term performance of the housing developments. The developers can float subsidiary companies that provide operational and maintenance services and give guarantees to the resident at affordable prices.
- Developers should partner with NGOs that promote kitchen gardening and recycling of waste as a compost to form clubs for householders and children.

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An ESG Initiative Towards Green Affordable Housing

IIFL HFL's Sustainability Report 2021-22

IIFL HFL's Guide to Sustainable Affordable Housing

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Watch Susan Olsen, Unit Head, Private Sector Financial Institutions, Mekong Region, Asian Development Bank

"We chose IIFL Home Finance to work with in the sector as they have been a pioneer of green affordable housing in the country"

Watch: Okju Jeong, Urban Planning & Climate Change Specialist, Asian Development Bank

"Asian Development Bank is delighted to have supported IIFL HFL through the joint initiative for green affordable housing for women in India"

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