

Managing Cost and Making Housing Cost- Effective

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Owning house is a lifetime goal, dream and desire, which every individual wish to achieve and fulfill during his/her lifetime. However, housing remains both cost-intensive and resource extensive activity, which involves lifetime investment and decision making, based on host of personal and extraneous factors. Housing costs remains a complex issue involving large components including cost of land (costs of purchase, titling, registration duties, obtaining planning approval, and any necessary cost of environmental remediation or relocation); cost of providing infrastructure/services involving water systems, electricity grids, heating and cooling networks, roads, security systems, sanitation; and cost of construction of buildings etc.(including labor and materials cost), transportation cost, government levies, management cost and taxes. While constructing shelter every owner/builder wishes to have a house of highest quality, built in the shortest possible time but involving minimum financial cost. Accordingly, cost remains at the core of house being constructed besides the quality and the time. However, majority of the individuals and architects consider only the housing cost, which refers to the initial cost, which goes into making of the house.



According, to Le- Corbusier buildings are like machines which require both resources and service, for its operation and maintenance. Therefore, house invariably involves cost which has to be incurred after occupation in terms of using electricity and water besides lighting, heating and cooling of the house in terms of HVAC, to have both comfortable living, ambient temperature and appropriate humidity. These are operational costs, which the owner has to pay after the occupation

of house. Further, house as structures, has a much larger life span, sometimes even longer than the life span of normal human beings, accordingly these costs add up to be considerable amount when compared to the initial cost of the house. In addition to the cost of operation, there are additional costs, which have to be incurred for the maintenance and making changes, addition and alterations in the house.

As per the studies made, it is said, only 10% of the cost makes the initial cost which goes into making of the house, whereas 90% cost involves the operation and the maintenance cost of the building, which amounts to nine times the initial cost of the house, when life-cycle cost of the house is considered. Accordingly, if the house has to be made cost-effective in the real sense of the term, then we have to consider both the life-cycle cost and the initial cost, Accordingly, it will be prudent to look at the cost in long term perspective and not short term while evaluating cost-effectiveness of the house.

Considering the overall context of cost-effectiveness, even if while designing a cost-effective and resource-efficient building, if the initial cost goes up by 2-5%, it should be permitted, if it helps in lowering or reducing the operational and the maintenance cost of the buildings over its entire lifespan. Initial higher cost, can be recovered within 3-5 years of operation of house, due to reduced cost of water /electricity bill generated by lower energy and water consumption. Globally, green buildings are known for their capacity, not only to make buildings cost-effective and affordable, but also help affordable housing to graduate from affordable housing to affordable living. Green buildings are known to save up to 40% electricity and 50% water during the usage. Accordingly, while designing and constructing houses, if the building is designed as a green building, then it will make building highly cost-effective over entire period of its existence and operation. Studies made globally, have actually demonstrated that the green houses make inhabitants happy, healthy and more productive besides minimizing the cost of living. In fact, green buildings are known for their distinct advantages of creating win-win situation, both for owners, tenants and users.

Defining- Green Buildings

DEFINITION:

- "A green building is one which uses less water, optimises energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building."



As already said, housing remains highly complex and large consumer of resources and time, so to make it cost-effective it requires lot of efforts, studies and analysis to achieve economy in the cost of the house. According to the 'World Economic Forum'; Building costs include land acquisition (costs of purchase, titling, registration duties, obtaining planning approval, and any necessary environmental remediation or relocation); utility infrastructure (costs of developing, for example, e.g. water systems, electricity grids, heating and cooling networks, roads, security systems, sanitation systems); and construction costs (including

labour and materials). Since land costs and infrastructure costs are usually a factor of location, developers may account for land acquisition and utility infrastructure costs collectively when comparing locations. Cost of housing involves large number of factors including; size of the house to be constructed, place where construction to be made; climate zone in which house is located; context of the site on which house is to be constructed, design of the house; cost of approval of the house for construction and completion; design efficiency, carpet area; material to be used; specifications of the materials; building technologies to be used for construction; area, thickness and length of walls, number of toilet to be provided; specification for public health and electrification appliances/fixtures to be used; structural systems; materials for flooring roofing and walls; number of doors and windows/openings; size of openings; amount/type of wood and glass to be used; internal finishes adopted; capacity and capability of the contractor and labour hired; nature of the contract for construction; project management; quality of supervision; amount of wastage of materials ; profit margins of the contractor; cost and time of the money borrowed for construction, government levies, taxes, fees; cost of security etc.

It will be critical and important to understand the role of the designer engaged for the designing of the house and his capability and capacity to design, which will be very vital in achieving the cost-effectiveness in the house. If the house is not designed rationally and logically, then achieving cost-effectiveness will remain a distant dream and will be difficult to achieve. Accordingly, it will be desirable that only qualified architects are engaged for designing the buildings, who have the capacity and capability to design good and cost-effective house.

Architect hired should have a good knowledge of materials, construction technologies and knowledge of the latest trends in vogue for promoting cost-effectiveness in the buildings. Knowledge of the architect to design green building will be an added advantage. Structural efficiency and designing and placing of services will remain important to achieve cost-



effectiveness in the house. Using materials, requiring low maintenance and replacement, will help in making the house cost-effective.

In search for appropriate options for making housing really cost-effective, there is an urgent need to look at different options to make house cost-effective in the real sense of the term. Suggested options for promoting economy; looking at the components which constitute the cost of the house; initial and life-cycle cost; key drivers of cost reduction in terms of planning and designing; materials; labour; technology; infrastructure; marketing; management; finance; speed etc. However, cost-effective does not mean compromising in any way on the quality of construction/building/ housing. Factors enumerated for cost-effectiveness and their context/ impact has been explained in brief below;

1 Cost of Housing includes:

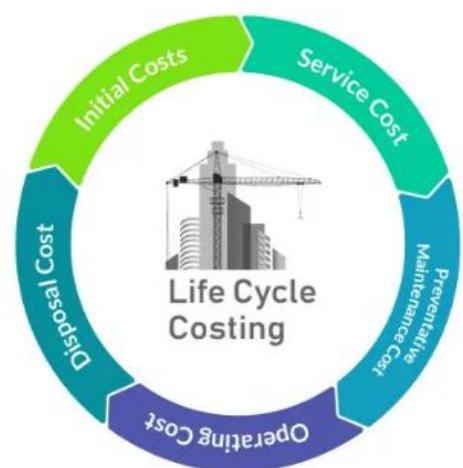
- i. Cost of sourcing land
 - ii. Cost of construction
 - iii. Cost of Services- water supply, sewerage, sanitation, electricity, mechanical, HVAC, roads, pavement, landscaping, rain water harvesting etc
 - iv. Government Charges/ levies/fees/taxes– registration/ approvals
 - v. Maintenance cost and
 - vi. Cost of operations
- Building cost needs to be viewed in both--- long term and short term
 - Building cost needs to be evaluated in terms of -- Initial Cost and Life Cycle Cost
 - Short Time cost includes Initial Cost—constitutes Cost of construction of building
 - Long Term cost component --- involves whole life cost

2. Whole life cost of building includes:

- Initial design cost
- Construction cost,
- On-going operations and
- Maintenance cost,
- Parts replacement cost
- Disposal cost or salvage value, and
- Useful life of the system or building

3. Initial Building/ Project cost includes:

- Cost of land, land registration, land survey
- Cost of Designing/ plan approval
- Cost of developing Site
- Cost of Construction
- Cost of Money
- Carrying Charges
- Government fees and Taxes



- Cost of Advertisement
- Legal expenses
- Cost of Supervision
- Cost of Manpower and Security
- Cost of Equipment and Furniture
- Transportation and Travel Charges
- Cost of Making buildings Green, Energy efficiency
- Cost of Time
- Contractor' Margin
- Builder's Margin
- Miscellaneous and Unforeseen Charge



4 Key Drivers to Cost Reduction in Housing

- Architectural design and Planning– Best option to reduce cost—
- Site planning based on optimum utilization of the land/available resources
- Minimizing area under roads, services, parking etc
- Adopting optimum design solutions- architecturally, structurally, Services etc.
- Adopting Simple form,
- Evolving Functional design,
- Optimum utilization of spaces- both within/outside
- Multiple uses of spaces,
- Minimizing area under walls, circulation etc,
- High building efficiency (high carpet area/covered area ratio),
- Low rise- avoiding lifts
- Minimum wood work-- minimum doors
- Minimizing variations in the sizes of doors and windows,
- Avoiding large openings
- Room/corridors sizes based on the available sizes of tiles /marbles for avoiding wastage when laying flooring etc.
- Using windows/ glass opening sizes based on the available sizes of the wood/glass in the market
- Making simple safety provisions for disaster management
- Promoting Standardization
- Reducing Building Load- self/ occupied,
- Designing thin and lean structures



- Minimizing PH fixtures/toilets
- Clubbing/planning all public health services in close proximity.
- Adopting efficient structural system
- Avoiding large spans
- Avoiding large projections
- Avoiding large area under balconies and projections.
- Making optimum use of day lighting
- Making optimum use of prevailing wind direction for cross –ventilation, where required
- Designing with nature
- Making optimum use of Panchbhutas while designing- Prithvi, Agni, Vaayu, Jal and Aakash
- Making optimum use of orientation
- Making optimum use of sun for heat and light
- Adopt integrated approach to design
- Minimize single loaded corridors, promote doubly loaded corridors to minimize area under circulation
- Minimizing building foot- prints
- Designing compact buildings
- Designing Green Buildings –to reduce cost of electricity/water and generating its own energy

5 Materials

- Using cost-effective materials,
- Using pre-cast, pre- fabricated, re-cycled materials
- Using local materials,
- Using minimum variety of materials
- Using materials in the natural form
- Using recycled materials from demolished structures- bricks etc.
- Using available building components from old buildings- doors, windows, fixtures furniture etc.
- Using materials made from waste- fly ash bricks etc.
- Minimizing use of steel and Cement,
- Using materials requiring minimum maintenance and upkeep/replacement
- Using materials which are light weight
- Using materials which are easy to handle
- Using materials not occupying large space
- Using materials which can be handled by locally available labour and manpower
- Using materials which do not requiring specialized cutting and shaping
- Using materials not requiring special machinery and manpower for handling



- Using materials available in standard shape and size, having little variations
- Using materials requiring minimum fixing and bonding materials.
- Using limited number of variety of materials for flooring, roofing construction to avoid wastage

- Using materials which leaves no wastage.
- Using materials involving less quantity
- Using materials requiring less water for manufacturing/laying/curing
- Using materials requiring less energy for manufacturing- low energy
- Using materials which permit speedier construction
- Using materials involving minimum transportation

6 Labour

- Minimizing manual labour component
- Using local labour
- Involving labour actively in construction by explaining them the design and construction
- Using skilled labour having knowledge and experience of handling material used
- Avoiding outside/specialized labour
- Promoting standardization, pre- fabrication, cast-in-situ components
- Promoting repetitive and simple construction
- Managing labour skillfully, for maximizing output
- Taking care of the labour for their basic day to day needs
- Making arrangement for shelter near the site for housing the outside labour- in large projects

- Creating a crèche for the children of the working women in projects ,having large duration and employing number of women as construction workers with children

7 Technology

- Making use of state of art construction technologies to promote cost-effectiveness
- Promoting technologies which lead to time reduction besides ensuring appropriate quality
- Using technologies for saving on -- labour, space, materials and money

- Using innovative walling and roofing system
- Using Pre-cast and ferro- cement components
- Using pre-cast Aerated Cement Concrete Blocks
- Using technologies involving minimum wastage of materials
- Promoting technologies for repetitive work
- Using technologies for creating materials locally
- Using technologies for brick laying and plastering
- Using innovative technologies for sewage water treatment-phytoremediation system



- Using technologies which need low operational and maintenance cost
- Using state of art locally available refined technologies
- Using materials made out of construction & demolition waste.

8 Infrastructure

- Using Solar Energy
- Using Solar water heating
- Promoting Water conservation
- Reducing electricity/water consumption
- Involving low energy consumption equipment
- Using only star rated electrical equipment
- Using water efficient WCs/urinals/ faucets
- Promoting recycling / multiple use of water
- Installing rain water harvesting system
- Using low energy LED lighting instead of florescent



lighting

- Using day-lighting to the optimum level
- Making optimum use of landscaping and existing trees/ flora/fauna
- Using local variety of trees for landscaping
- Using landscaping requiring minimum water
- Planning all services near to location of municipal services – to reduce the length of service network
- Promoting recycling and reuse to minimize waste and promote reuse

9 Marketing

- Minimizing supply chain- inter-mediatory
- Serving End -Users directly
- Promoting economy of scale
- Treating affordable housing as the volume game and not the profit game
- Promoting Engineered Quality Products
- Promoting disposal of houses in minimum time span
- Constructing houses based on local demand, culture and needs only
- Promoting construction, based on affordability
- Tying up with reputed financial institutions for adequate flow of funds and disposal of houses
- Displaying effectively the end products as sample on site.



10 Management

- Promoting Effective and efficient/ professional management for the project
- Using minimum time for construction / completion of building/project
- Minimizing overhead expenses to optimize housing cost
- Entering into long term contracts for essential materials- cement/ steel/sand/ tiles etc

- Outsourcing to trained petty contractors
- Promoting effective checks and balances
- Promoting security of site and materials
- Promoting effective planning of work schedule
- Ensuring quality
- Procuring materials directly from reputed manufacturers
- Avoiding hasty and unscheduled purchases
- Completing project within given time span
- Minimizing time over-run/ cost over-run
- Adopting technologies to minimize construction period



11. Financing

- Reducing cost of money
- Sourcing funds from reputed institutions offering lowest rates of interest
- Completing the project in minimum time span
- Ensuring shorter working capital cycle
- Making beneficiaries part of the project in financing

12 Others

- Sourcing land at most competitive price
- Keeping Builders, Contractor margins low
- Rationalizing Government charges, taxes, levies and fees
- Minimizing transportation
- Minimizing specialized/hired machinery

The costs associated with raw materials, structural framework, plumbing, elevators, electrical work etc. vary according to the height of the structure being built. When urban expert Alain Bertaud, graphed the relationship between cost and density, he found that an optimal value in cost savings was achieved between 20 and 25 floors, with an FSI of between 6 and 7. The cheaper land is, the lower these figures will be (Bertaud,2010).

In addition to factors defined above, for housing to be affordable in the real sense of the term, housing must be closely located to the points of employment economic activities and rationally linked with the quality of life. No housing can be considered “affordable” if it is located far from economic opportunities. Housing markets and labour markets have close link ages. High crime rates is known to adversely impact the housing and make it unaffordable ,due to lower acceptability of neighbourhood and presence of less economic opportunities in the nearby areas. Accordingly, people need to travel large distances for



sourcing job and spend more money/time for accessing job and going back home, which makes housing unattractive, unaffordable and cost intensive. In the Mexican city of Puebla, households located on the periphery were found to spend twice as much cash and three times as much time commuting as those who live centrally (Duren N., 2017). When the Iniciamos Tu Casa programme, relocated poor inhabitants into new houses outside the city centre and away from livelihood options, many of the homes were abandoned within a year (King, Orloff, Virsilas, & Pande, 2017). The same consideration applies to amenities such as education and health services. Plans for affordable housing developments need to account for transit stations and walking/cycling infrastructure: The “20-minute neighbourhood” concept aims for every day; non-work needs to be accessible within 20 minutes’ walk. Thus, for rationalising cost locational aspect of houses assumes lot of importance. To lower the life-cycle cost and for making affordable housing a distinct reality, affordable housing should be closely linked with, both in time, space, and distance, to the productive economic activities and job market in the city.

Note; All images in the article are sources from google.com; which are personally and gratefully acknowledged.

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