Post Occupancy Evaluation of Green Homes

Consumer Insights

Eco-cities India program

August, 2018

In partnership with

European Union

IFC International Finance Corporation
WORLD BANK GROUP

Creating Markets, Creating Opportunities

This document has been prepared by KANTAR IMRB for IFC as part of Eco-cities program supported by the European Union.

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1. Background

A Introduction

The International Finance Corporation (IFC), under its Eco-Cities India Program, co-funded by the European Union (EU) has convened the Sustainable Housing Leadership Consortium (SHLC), a collaborative industry - led voluntary initiative, to catalyze sustainability in India's housing sector. The SHLC includes, Godrej Properties, Mahindra Lifespace Developers Limited, Shapoorji Pallonji Real Estate, Tata Housing Development and VBHC Value Homes Private Limited. One of the objectives of the SHLC is to raise public awareness about the green building concept and the benefits of living in green homes.

A post occupancy study of residents from both Green Buildings and non-green buildings has been undertaken to capture the current understanding of the Green Building Concept and the benefits of living in green buildings. IFC had assigned the B2B & Industrial Research Division of KANTAR IMRB to carry out this study.

This document outlines the findings from the study.

B Objectives of the study

The main objectives of this study:

- To determine the awareness levels about "Green Homes" among the occupants of the residential projects identified from the SHLC developers as a dataset.
- The survey also discussed on occupants' understanding of Green Homes and the benefit that it provides

C Evaluation Design

The survey was conducted among residents from 15 projects of SHLC members across 6 cities in India.

The survey covered occupants residing in:

- Pune – 3 Projects
- Kolkata – 3 Projects
- Gurgaon – 2 Projects
- Mumbai – 1 Project
- Chennai – 4 projects
- Bangalore – 2 Projects

D Method of data collection

Data collection involved primary quantitative interviews with a structured questionnaire. The duration of the interviews was about 12-15 minutes. The interviews were face-to-face interviews with the option for self-administration with electronic tablets and for very few instances, in paper/pen format.

The sampling was proposed proportional to the assumed occupancy rate; however, the actual occupancy was much lower. This was compounded by the delays in permissions, low response rates among respondents and hence there were varying samples achieved across projects. This was mitigated through sample weighting for data analysis. A total sample of 1114 residents was achieved, out of which 655 respondents were green home residents and 459 resident were non-green home residents.

E Respondents' demographic profile

1114 residents from various residential projects of the SHLC members were interviewed for the post occupancy evaluation of Green Homes. The respondents were between the ages of 18 to 75 years with their annual income ranging from approximately INR 5 Lakhs to INR 50 Lakhs. The residents of the residential complexes predominantly belonged to upper and middle income groups. 47% respondents owned the home and 53% were tenants.

2. Key Insights

A Key findings associated with the awareness levels of the concept Green homes amongst residents:

- Overall only 45% of Green Home residents were aware of the concept of Green Homes.
- 35% of Green Home residents were unaware of the existence of certifications validating Green Homes.
  - Of those aware, 80% of the Green Home residents were unaware of the type of certifications their residential property has.
- 40% of Green Home residents did not believe that Green-building certifications provided more trust for homebuyers.
- 53% of Green Home residents did not believe that their way of living affected the environment.
- Among prospective homebuyers, Green-building certifications did not factor in the top three aspects that would influence purchase of Green Homes. The top three aspects are, location of the house, cost of the house and reputation of the builder.

B Findings of awareness of the benefits of green homes amongst residents:

- Only 20% of Green Home residents chose monetary benefits such as reduction in utility costs (electricity bills, water bills etc.), lower annual maintenance or long-term savings as critical factors to choose Green Homes. Indicating low awareness of monetary benefits among residents.
- 50% of Green Home residents did not believe they were paying lesser for utilities in Green Homes.
  - Among those who believed they were paying lesser, 35% of residents believed they were able to save only 10% in utility costs
- 44% of Green Home residents did not believe that annual maintenance charges are lesser in Green homes compared to normal residences.
- Most of the Non-Green home residents were unaware of Green home projects and the benefits that they provide.

C Insights on awareness of Green Home features among residents:

- Among those aware of Green Homes, only 30% of Green Home residents defined Green homes in terms of features.
- Only 40% - 60% of Green Home residents were aware of the availability of Green Home features in their residential building.
- 40% Green Home residents felt that utilizing solar energy would make their homes more environment friendly.
- 20% believed that solar panels in buildings are one among the crucial factors while choosing Green Homes.
- 20% of Green Home residents believed that waste water treatments were necessary to have an eco-friendly home.

The detailed findings of the study are covered in the subsequent pages.

3. Detailed Findings

A Awareness of the Green Homes concept

Only half of the respondents believed that their home and way of living affected the environment. Residents cited 'use of appliances such as air-conditioners, refrigerators', 'misuse of water', 'improper waste segregation' as factors that affect the environment.

Figure 1 indicates that majority of the respondents were unaware of the concept of "Green Homes". Less than half of the Green Home residents were aware of the concept, among these only 48% were owners. This implies that even among owners of Green Homes, the awareness levels were low.

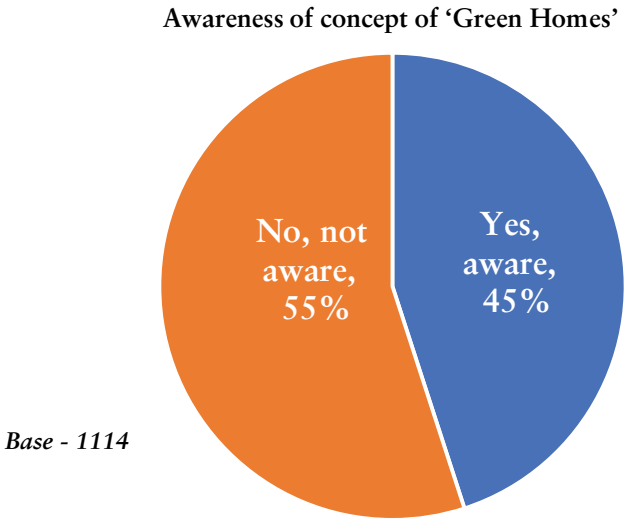


Figure 1. Awareness of concept of 'Green Homes'

B Perceived definition of Green Homes

i. Defining Green Homes

The Green Home residents who were aware of the concept (295) and the Non-Green Home residents who had confirmed on awareness (159) were asked to define Green Homes in their own terms. 50% of these Green Home residents defined Green homes as 'Eco-friendly homes'. 30% Green Home residents and 20% of Non-Green Home residents defined Green Homes in terms of 'water reuse, waste water management, use of solar panels and having a minimal impact on the environments' or in other related terms. While some residents associated Green Homes with environment-related terms, majority of the residents were unaware of these environment specific terms, this signifies that awareness could be lower among the general public.[1]

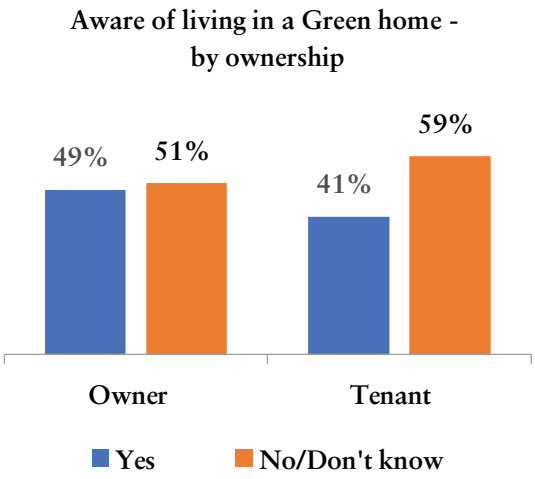
1. The study was conducted through Purposive sampling, i.e., the interviews were conducted among Green home residents in particular and the findings indicate lower awareness among residents themselves. Hence this signifies that awareness levels on the concept of Green Homes could be even lower among the general public.

ii. Awareness of living in a Green Home residence

Among the Green home residents, a little over half of the residents were unaware that they were residing in Green homes. Among the owners of Green Home residents, 51% of the owners were unaware that they were residing in Green Homes. 59% of tenants residing in Green Homes were unaware that they were residing in Green Homes.

All Green Home residents (655) were asked if their builder/ owner highlighted the Green building features during evaluation of the home. 35% of owners of Green Homes have stated that the builder had highlighted the Green building features when the home was evaluated. Among tenants, 33% of the tenants have stated that their owner had highlighted the Green building features. This finding indicates that Green Home features must be highlighted by builders during purchase of new homes and by owners for renting purposes.

Fig. 2 Awareness of residing in Green Homes



Base (Green Home)
Owner – 307 Tenant - 348

C Awareness of Green Home certifications

i. Awareness of existence of certification of "Green Homes"

The Green Home residents who confirmed awareness of the concept (295) and the Non-Green Home residents who were aware (159) were checked if they were aware that there are certifications that rate/validate Green Homes. 35% of Green Home residents and 68% of Non-Green Home residents were unaware of the existence of certifications. This highlights the need to build awareness of certifications of Green Homes among the general public.

ii. Awareness of type of certifications that the Green Home residence has

Among those Green Home residents who were aware of residing in Green Homes (299), nearly 80% of them were unaware of the type of certifications of their Green Home residences. While the tenants were unaware, the data suggests that even among owners the knowledge of certifications was poor.

iii. Views on Green Home certifications providing trust in a project

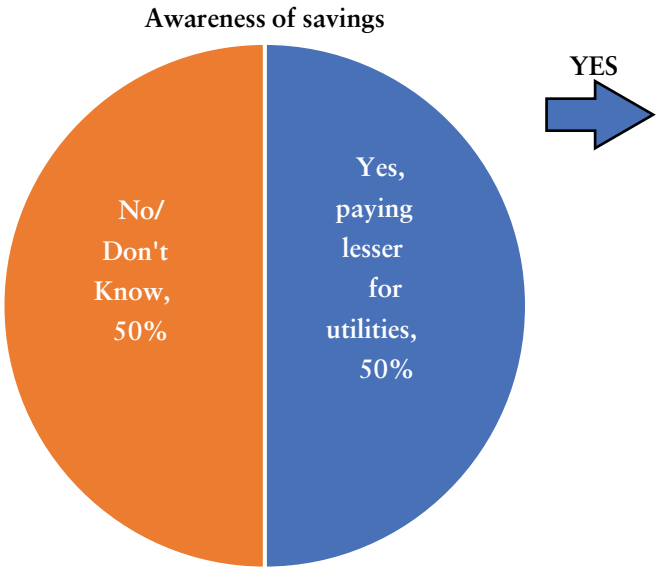
Green home residents (655) were checked on their views if Green Home certifications provided trust in a project. 38% of the Green Home residents responded that Green Home certifications did not provide trust in a project. Specifically, among owners, 44% of the owners did not believe that Green Home certifications provided trust in a project.

D Perceived benefits of Green Homes

i. Awareness of savings

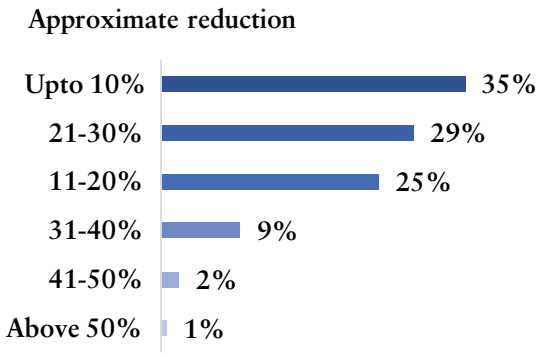
Green Home residents (655) were asked to enumerate if they believed they were paying lesser for utilities (electricity and water) as compared to a Non-Green Home. While 50% of the residents replied that they were paying lesser for utilities, 35% of these residents stated they could save only 10% in utility bills. Among owners of Green Homes (307), a little more than half of them believed they were paying lesser for utilities as compared to a Non-Green Home. However, 37% of these owners (159) could save only upto 10% in utility bills.

Fig. 3 Are you paying lesser for utilities (electricity & water)



Base (Green Home) - 655

Fig. 4 Approximate reduction in payments of utility bills



E Perceived features of Green Homes

i. Perceived features of Green Homes - Green Home residents

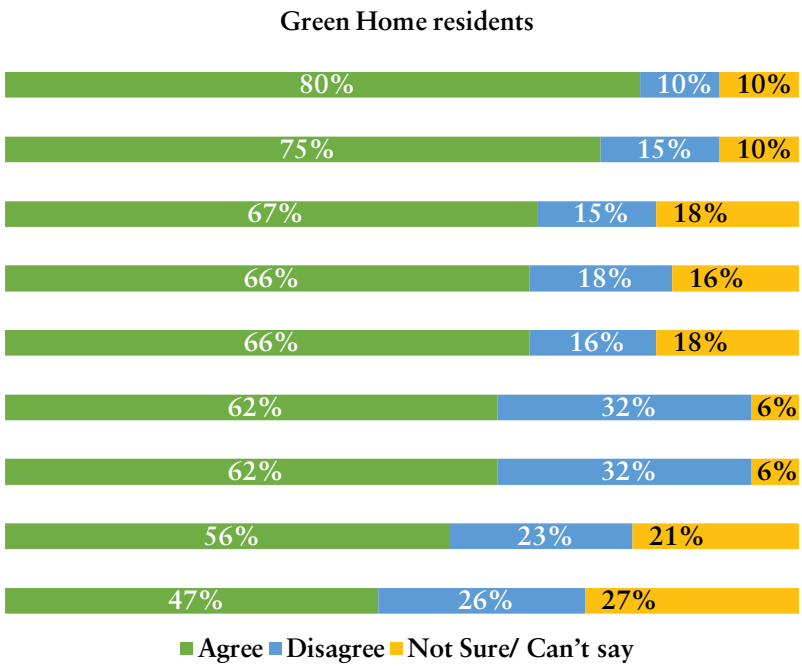
Reduction in water utilization and presence of wastewater treatment plants resonated with 75%-80% of residents. However, the other features resonated only among 45%-65% residents.

This could imply that apart from doubts on costs, there was a needs gap for these features or that the novelty factor had worn off among the Green Home residents.

Fig. 5 Opinions on features of Green Homes among Green Home residents

Reduces water use
Recycles water by wastewater treatment
Uses construction materials with lesser impact on environment
Electricity bills in Green homes are less as compared to normal residences
Uses high-performance materials for indoor environment comfortable
Makes use of solar panels to generate electricity
Makes use of solar energy for hot water
Annual maintenance charges are less as compared to normal residences
Green homes cost the same as Non-Green homes

Base (Green Home) - 655



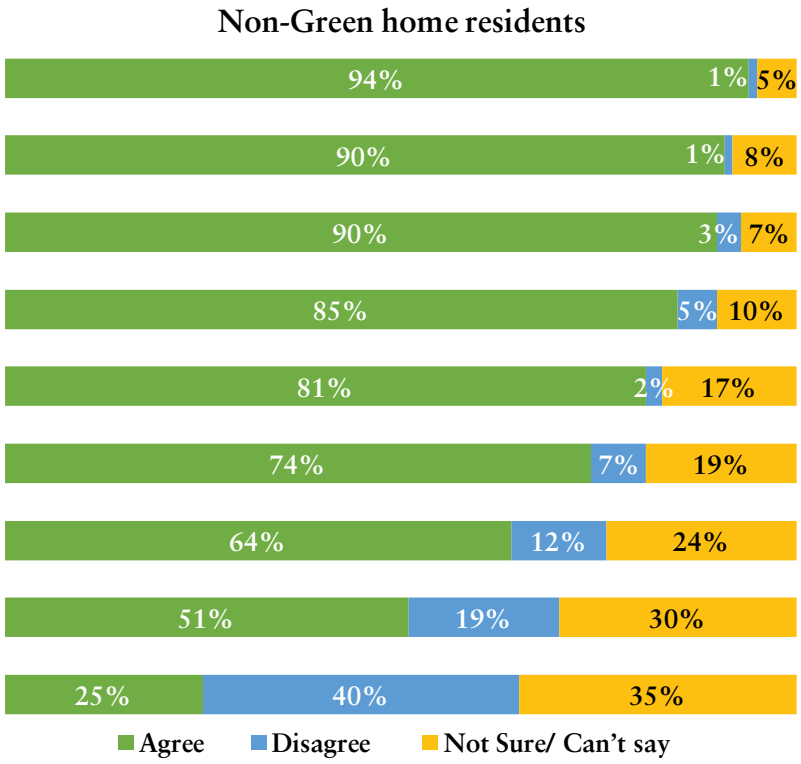
ii. Perceived features of Green Homes - Non-Green Home residents

The findings suggest that Non-Green Home residents had a more positive opinion on features of Green Homes. 90% of Non-Green Home residents believed that Green Homes had solar panels, used solar energy and recycled water. However, 75% of the Non-Green Home residents disagreed that Green Homes cost the same as Non-Green Homes or were not aware on the cost of Green Homes.

Fig. 6 Opinions of features of Green Homes among Non-Green Home

Makes use of solar panels to generate electricity
Makes use of solar energy for hot water
Recycles water by wastewater treatment
Reduces water use
Uses construction materials with lesser impact on environment
Uses high-performance materials for indoor environment comfortable
Electricity bills in Green Homes are less as compared to normal residences
Annual Maintenance Charges are less as compared to normal residences
Green Homes cost the same as Non-Green Homes

Base (Non - Green Home) - 459



iii. Views of the facility managers

7 of the 10 facility managers (interviewed) of Green buildings were not provided training on specific Green features in the buildings. 5 of the managers believed that the maintenance level was higher compared to conventional buildings. Most of the facility managers (7) agreed that common areas had energy and water savings.

While Green home buildings features such as rainwater harvesting, water treatment plants and solar water heaters were said to be available in Green Homes; features such as occupancy sensors were unavailable. A general observation is that the facility managers wanted resident-friendly features such as shops, pharmacies in the complex; more greenery and security staff.

F Factors that influence choosing a home

i. Aspects that influence purchase of homes

All residents (Green Home residents - 655; Non-Green Home residents - 459) were asked on their willingness to purchase a home in future. 73% Green Home residents and 69% Non-Green Home residents expressed their willingness to purchase a home in the future. However, the importance of aspects that would influence the purchase of homes varied among Green and Non-Green Home residents.

- Owners of Green Homes ranked location of the home in the city (75%), reputation of builder (65%) and cost of the house (61%) as the top 3 evaluation factors while purchasing a new home.
- Tenants of Green Homes ranked location (71%), cost of the house (63%) and reputation of builder (51%) as critical influences.
- Non-Green Home owners cited location of the home (82%), cost of the home (74%) and reputation of builder (54%) as the top 3 influencing factors.
- Among Non-Green Home tenants, location in the city/town (82%) was followed by cost of the house (78%) and reputation of builder (55%).

ii. Critical factors to choose Green Homes

Green Home residents (655) and Non-Green Home residents (459) expressed their views on the critical factors to choose Green Homes. Price of the home was the most critical factor among Green Home residents (28%). Following this, Green Home residents opined that eco-friendly features such as Solar panels in the building for heat/electricity (25%) and water treatment facilities (22%) were crucial factors to choose Green Homes. These were closely followed by economic benefits such as reduction in utility costs, lower annual maintenance and long-term savings (20%). Very few Green Home residents chose availability of fresh air and spacious buildings as factors to choose Green Homes (13%). Location/convenience was mentioned only by 2% of Green Home residents as critical factors to choose Green Homes.

Among the Non-Green Home residents, cost of the project or affordability was the most critical factor (30%). This was followed by reputation of builder and Green Home certification (15%). Provision of solar panels, rainwater harvesting, lower maintenance costs and proper waste disposal were mentioned as well (12%). Location/ convenience was mentioned only by 1% of Non-Green Home residents as critical factors to choose Green Homes.

G Opinions on aspects that would make homes more environmental friendly

All residents (Green Home residents - 655; Non-Green Home residents - 459) were asked to express their views on the aspects they would change about their home to make it more environment friendly. Among the Green Home residents, aspects such as 'Solar energy for heating or electricity' (40%), 'waste water treatments' (20%), 'plantation of more greenery' (18%) and 'proper maintenance of features' (5%) are a few that emerged. This indicates that some of the Green Home residents were not aware or / unsatisfied with these eco-friendly amenities in their projects. Some Green Home features such as 'auto shut off lights' and 'low impact construction materials' were mentioned by few Green Home residents (1%), signifying that only few residents had knowledge on such features.

Non-green residents opined that the 'use of solar energy' (28%), 'more plantation of trees/greenery' (18%), 'waste water recycling / proper rain water harvesting' (15%), 'proper ventilation' (7%) and 'heat reflective glass' (5%), will make their homes more environmental friendly.

4. Recommended communication cues

I Improve awareness of concept of Green Homes

- Promotions should define "Green Homes"
  - Any promotions/ campaigns for Green Homes should define 'Green Homes' terms that would resonate with the general public.
  - In addition, the term 'Green Homes' can be linked with expressions such as:
    - 'Eco-friendly homes'
    - 'Homes with minimal environment impact'
    - 'Homes that encourage sustainable living practices'
- Promotions to provide clarity on Green Building Certifications
  - Specifying what Green Home certifications are.
  - The campaign content should identify the authorized certification bodies that certify Green Homes.
  - The ratings and grades of Green Home certifications need to be specified as well.
  - Campaign must highlight the necessity to be more responsible as citizens and conserve the environment for the next generations.

II Strengthen association of Green Homes with savings

- Awareness campaigns should link level of monetary benefits to Green Homes
  - Highlight the level of savings and long-term benefits possible through a certified Green Home.
    - Provide examples of reduction in electricity bills, water bills as compared to conventional residences.
    - Educate consumers with examples of lower annual maintenance costs compared to normal residences

III Advertising/Promotions of Green Home features

- Promotional campaigns to highlight the special features that accompany Green Homes
  - Establish that Green Homes utilize cost-effective and eco-friendly features such as solar water heaters, solar panels and waste-water treatment plants.
  - Highlight also the availability of environment-friendly construction materials, high performance glass, non-toxic paints etc., in Green Homes.

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ABOUT ECO-CITIES INDIA PROGRAM

Eco-Cities India is a multi-year technical advisory program under the EU-India Cooperation on Clean Energy and Energy Efficiency that is focused on five Indian cities – Bengaluru, Bhubaneswar, Chennai, Mumbai Metropolitan Region, and Pune Metropolitan Region. The Program aims to regulate the efficient use of resources and promote the acceptance of clean energy for a sustainable future. The program has advisory interventions in four key sectors of city urbanization - transport, green buildings, water and waste management, and energy efficiency and renewable energy.

ABOUT SUSTAINABLE HOUSING LEADERSHIP CONSORTIUM (SHLC)

IFC, as an integral part of the Eco-cities India Program, convened a voluntary, collaborative initiative with leading Indian housing sector companies, namely, Godrej Properties, Mahindra Lifespace Developers , Shapoorji Pallonji Real Estate, Tata Housing Development Company and VBHC Value Homes to form the industry-led, Sustainable Housing Leadership Consortium (SHLC).

The SHLC members have committed to make 100 percent of their own housing portfolio sustainable through applicable green building certifications and also provide leadership and advocacy for broader industry and government policy actions to make 20 percent of India's new housing construction sustainable by 2022.

ABOUT INTERNATIONAL FINANCE CORPORATION (IFC)

IFC, a member of the World Bank Group, is the largest global development institution focused on the private sector in emerging markets. Working with more than 2,000 businesses worldwide, we use our capital, expertise, and influence to create markets and opportunities in the toughest areas of the world. In FY17, we delivered a record $19.3 billion in long-term financing for developing countries, leveraging the power of the private sector to help end poverty and boost shared prosperity. For more information, visit www.ifc.org

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