

# Article

## Green Housing: A introduction to Green Mortgage Lending

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### **1. What is green housing?**

As the term suggests, green housing is a house that focuses on efficient use of energy, water and building material in construction and maintenance of the home; a house which is environment friendly and sustainable. Green homes also reduce the carbon footprints of the user. The green home movement began in 1970s. While the concept environmentally sound designs comes across as a concept for affluent class and multinational companies, it is being adopted for middle and low income buildings as well. The World Green Building Council collates data on the number of green buildings registered and the 2013 Annual Report<sup>1</sup> indicates that there are 140,000 green buildings registered world-over and 1.1 billion square meters of green building area registered globally.

Today the need for developing on the concept of green homes is felt more than ever before owing to the apparent climatic changes, environmental risks, rapid industrialization and so on.

### **2. What are the key features of green housing?**

There are no models or standards that constitute a green house, however conceptually a house that makes use of energy efficient appliances and building materials is a green home. A house that incorporates environmental considerations into every stage of the building design, construction, operation and maintenance is a green house. A quintessential character of a green home is that it stresses on protecting the ecological system.

Key components of a green home include<sup>2</sup>:

- a. **Energy efficient features:** Use of energy saving appliances, use of renewable energy sources, resources used to decrease the energy consumption within a home.
- b. **Water efficient features:** use of fixtures and appliances that reduce the consumption of water and conserve water.
- c. **Resources efficient features:** The design and develop the house in such a manner that there is optimal use of the property; use of renewable material for building, ensuring that there is enough inlet for natural light, air etc.

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<sup>1</sup> [http://www.worldgbc.org/files/4313/8480/2563/WorldGBC\\_Annual\\_Report\\_2013\\_Final.pdf](http://www.worldgbc.org/files/4313/8480/2563/WorldGBC_Annual_Report_2013_Final.pdf)

<sup>2</sup> [http://www.energysaver1.com/national\\_green\\_building\\_standard](http://www.energysaver1.com/national_green_building_standard)



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- d. **Indoor air quality features:** The heating and the cooling appliances in the home should be optimal and properly ventilated.
- e. **Outside the home:** The surrounding of the house should be green and the landscape to have enough greenery.

The National Association of Home Builders (NAHB) have developed NAHB Model Green Home Building Guidelines<sup>3</sup>. The guidelines lay down the guiding principles for developing green homes, the relevant extracts are as below:

- a. **Lot design, preparation and development** – resource efficient site design and development practices help reduce the environmental impacts and improve the energy performance of new housing.
- b. **Resource efficiency** - Creating resource efficient designs and using resource efficient materials can maximize function while optimizing the use of natural resources. Resource efficiency is also about reducing job-site waste.
- c. **Energy efficiency** – Energy efficiency is weighted heavily in a green building program since the environmental impacts of energy consumption are far reaching. Energy efficiency is considered a priority in most green building guidelines or programs
- d. **Water efficiency** – water efficiency relates to reducing the intake of the per capital water usage daily. The mean per capita indoor daily water use in today's homes is slightly over 64 gallons; green homes can reduce the usage to 45 gallons.
- e. **Indoor environmental quality** -- Healthy indoor environments attract many people to green building. After energy efficiency, the quality of a home's indoor air is often cited as the most important feature of green homes. An increase in reported allergies and respiratory ailments and the use of chemicals that can off-gas from building materials have contributed to a heightened awareness of the air we breathe inside our homes. Even though there is no authoritative definition of healthy indoor air, there are measures that can mitigate the effects of potential

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<sup>3</sup> [http://www.energysaver1.com/yahoo\\_site\\_admin/assets/docs/nahb\\_guidelines.353123249.pdf](http://www.energysaver1.com/yahoo_site_admin/assets/docs/nahb_guidelines.353123249.pdf)



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contaminants including controlling the source, diluting the source, and capturing the source through filtration.

- f. **Operation, maintenance and home owner education** -- Improper or inadequate maintenance can defeat the designer's and builder's best efforts to create a resource-efficient homes. By providing homeowners with a manual that explains proper operation and maintenance procedures, offers alternatives to toxic cleaning substances and lawn and garden chemicals, and points out water-saving practices, a builder can help assure that the green home that was so carefully built will also be operated in an environmentally responsible manner.
- g. **Global impact** – There are some issues related to home building and land development that do not fit neatly into the context of the aforementioned guiding principles; there are certain issues that have a global or generic impact on the ecological space that is put in as a guiding principle called 'global impact'.
- h. **Site planning and land development** – The process of green home development does not stop with an independent house, the builder may also be involved in the development of community, site planning and land development.

### **3. Why green housing?**

With rapid urbanization and concentration of huge populations in urban areas, green housing minimizes environmental impact in these areas.

In developing countries such as India, urban areas are consuming disproportionate amounts of energy and water. This has meant a great stress on providers of such resources as also urban lower and middle classes who must grapple with higher bills. Green housing can help to reduce demand for these resources which are already in short supply.

Moreover, green housing is also an excellent money saving tool- it can in the long term yield savings in the form of reduced energy and water consumption. Also since green homes use building materials and construction details that increase the useful life of the house, it leads to lower maintenance costs and repair costs.



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### 4. What are Green mortgages?

Green mortgages are a method of incentivizing the adoption of green housing methodologies. Such mortgages are also called Energy Efficient Mortgages (EEM) or Energy Improvement Mortgages (EIM).

Incorporating green features into a housing project requires additional money at the time of construction. For example, a solar water heater can cost 4-5 times more than a normal electricity heater- however this additional investment at the time of installation begins to payback in 4-5 years in the form of savings in electricity.

The idea is to encourage the incorporation of such green features by providing a higher-than-normal loan so that builders/home owners are not deterred or put off by high costs at the beginning. Once a green home is made, a home energy rater will inspect the home and issue a Home Energy Rating System Report (HERS) indicating that the house is meeting all the standards.

The justification for providing a higher than normal loan comes from the idea that the saving in utility bills would mean a higher net income for the home owner. From the home owners' perspective, paying a higher EMI gets justified if the saving in utility bills is greater than the additional EMI he/she pays every month. The illustration below is indicative of the long term advantage that green homes may have for the owners:

	<b>Non-energy efficient home</b>	<b>Energy efficient home</b>
Construction cost	100000	100000
LTV	70%	80%
Loan amount	70000	80000
Interest	12%	12%
tenure	8	8 years
Monthly EMI	₹ 1,137.70	₹ 1,300.23
Total Avg monthly utility Bills	350	150
Total monthly expenses	₹ 1,487.70	₹ 1,450.23
Monthly savings		₹ 37.47

In the illustration above, we assume that in case of energy efficient homes there is more loan amount extended and the loan-to-value ratio is higher resulting in higher EMI payment month on month and the interest rates being same as that in case of



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non-energy efficient homes. As is reflective, if the monthly utility bills reduce owing to building an energy efficient home, the owner may still be able to make a saving after the debt servicing and monthly expenditure. Hence despite the higher LTV, the owner may still be able to service the debt easily.

While the governments may be wanting to incentive customers to consider developing energy efficient homes or green homes, they may consider reducing the cost of debt, which may further result in a higher net saving for the owners and in the longer run beneficial for the home owners.

### **5. International experiments in green mortgages - developed and developing countries.**

In the USA, green mortgages or EEM have been around since the 1980s and are offered by central and state institutions.<sup>4</sup> The EEM programme in US qualifies a buyer for bigger loans. Another version of the green mortgage provides discounts on loan fees or interest rates for homes that are certified as energy-efficient. The Federal Housing Administration, Fannie Mae and the U.S. Department of Veteran Affairs each have some version of a green mortgage.<sup>5</sup>

In the UK, various building societies provide green mortgage options.

Among developing countries, the adoption of green mortgages to encourage green housing has seen significant success in Mexico. The agency involved here is INFONAVIT which is autonomous entity with equal representation of the government, labour and corporate sectors. It is involved in providing green mortgages to workers for low-income housing. It financed over 100,000 green homes in 2010.

### **6. What is the situation in India?**

In countries such as India, while the technology and know-how exists on how to transform construction into green construction, there is the problem of under-utilization. The other problem is that of institutional intervention and support.

While sustainable building practices have been used for centuries in India, there is little support from the government to adopt them. For example, rain water harvesting has been used for centuries in the desert region of North-West India, but precious little additional support or incentive is available to adopt such practices.

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<sup>4</sup> <http://www.mortgageloan.com/environment/>

<sup>5</sup> <http://www.bankrate.com/finance/mortgages/green-mortgages-save-on-energy-loan-costs-1.aspx>



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There are however a few private/individual efforts with limited effect. The Centre for Vernacular Architecture operating from Bangalore is an example and attempts to use traditional indigenous knowledge and local materials to build eco-friendly homes.

What is also important is the adoption of some standards and accreditation mechanisms so that buyers can easily assess the 'greenness' of the housing they might be buying. IFC has come up with a standard called EDGE (Excellence in Design for Greater Efficiencies). This standard factors in local factors such as climate and utility costs along with a weighted importance given to water efficiency, energy efficiency and the nature of construction materials employed. Hence this standard is quite comprehensive and perhaps might provide us the standard we need.

In July, 2013, the NHB signed an MoU with CII to promote the building of green homes.<sup>6</sup> It is now estimated that now 4,50,000 dwelling units under construction have been made environment-friendly.

### **7. Have there been any government efforts or banking policies to promote green mortgages in India?**

#### **Government Efforts**

The Ministry of New and Renewable Energy (MNRE), Government of India has introduced a Scheme on "Energy Efficient Solar/ Green Buildings" for implementation during 2013-14 and rest of the 12th Five year Plan period.<sup>7</sup>

The main objective of the Scheme is to promote widespread construction of energy efficient solar/ green buildings in the country through a combination of financial and promotional incentives, and other support measures so as to save a substantial amount of electricity and other fossil fuels apart from having peak load shavings in cities and towns. Various financial incentives have been provided for capacity building and awareness activities, urban and local bodies and the architects and design consultants.

MNRE has also introduced schemes for establishing solar cities in the country to curb the electricity consumption in those cities.

The Government of Tamil Nadu has launched a scheme on Solar powered Green House. Under this scheme 3 lakh houses will be constructed with solar powered lighting systems over a period of 5 years from 2011-12 to 2015-16 for the benefit of

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<sup>6</sup> [http://articles.economictimes.indiatimes.com/2013-07-12/news/40536718\\_1\\_mou-igbc-green-homes-cii](http://articles.economictimes.indiatimes.com/2013-07-12/news/40536718_1_mou-igbc-green-homes-cii)

<sup>7</sup> <http://www.mnre.gov.in/file-manager/dec-green-buildings/MNRE-scheme-green-buildings.pdf>



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poor in rural areas. Out of the Rs. 180 crore estimated cost, approx. 42.6 crores will be provided as subsidy from the Government.<sup>8</sup>

### **Banking Policies**

Banks such as Citigroup Inc., Bank of America, and JP Morgan Chase & Company are just a few of the mortgage lenders offering special discounts on mortgages used to build or update buildings and homes to be more green.<sup>9</sup>

The State Bank of India charges lower interest rates on the loans taken to purchase properties in green projects which reduce carbon emissions and promote renewable energy for the first 3 years.<sup>10</sup>

### **8. Are there any green buildings certifications or accreditations done to distinguish between green homes and normal houses?**

Yes. There are various types of certifications that declare a home 'green home.' The International Finance Corporation has introduced a certification system called "Excellence in Design for Greater Efficiencies" or the IFC EDGE Green Building Certification System which was unveiled in July, 2013, in partnership with the World Green Building Council to scale up construction of green buildings in emerging markets.<sup>11</sup>

LEED (Leadership in Energy and Environmental Design), BREEAM (BRE Environmental Assessment Method) and Green Globes are popular green building assessment and rating systems used around the world.

The green building certification programme is being undertaken by the United States Green Building Council under its LEED Certification Programme.<sup>12</sup> LEED is a green building tool that addresses the entire building lifecycle recognizing best-in-class building strategies. It provides third-party verification of green buildings and those building projects which satisfy the prerequisites, earn points to achieve different levels of the certification. LEED certification is available to projects that would like to earn the name recognition associated with the U.S. Green Building Council and/or are required to complete LEED items for other funding sources. *In*

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<sup>8</sup> <http://www.teda.in/site/index/id/8V8D7T2N1K>

<sup>9</sup> Based on an article titled: Green Banking: An Innovative Initiative for Sustainable Development by Mridul Dharwal and Ankur Agarwal.

<sup>10</sup> <http://businesstoday.intoday.in/story/eco-friendly-homes-help-save-money-in-long-term/1/18835.html>

<sup>11</sup> [http://www.ifc.org/wps/wcm/connect/Topics\\_Ext\\_Content/IFC\\_External\\_Corporate\\_Site/CB\\_Home/Sectors/Green+Buildings/Edge](http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/CB_Home/Sectors/Green+Buildings/Edge)

<sup>12</sup> <http://www.usgbc.org/leed>





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*India, it is known as LEED India certification which is awarded by the Indian Green Building Council.<sup>13</sup>*

In India, the institution offering green housing certification is the Association for Development and Research of Sustainable Habitats (ADaRSH), which is a joint initiative of Teri and the Ministry of New and Renewable Energy. The Green Rating for Integrated Habitat Assessment (Griha) by ADaRSH analyses buildings and gives them ratings based on parameters such as design, construction materials, energy efficiency, ventilation, lighting, and water and waste management.<sup>14</sup>

### **9. What are the factors that are taken into account for such certification?**

The U.S Department of Energy has laid down certain factors<sup>15</sup> for such certification and are as below:

- a. Integrated Design (Guiding Principles)
- b. Commissioning (Guiding Principles, EISA)
- c. Indoor Water (Guiding Principles, EPAct, EO 13423, EISA, EO 13514)
- d. Process Water (Guiding Principles, EPAct)
- e. Outdoor Water (Guiding Principles, EO 13423, EISA, EO 13514)
- f. Storm Water (Guiding Principles, EISA, EO 13514)
- g. Water-Efficient Products (Guiding Principles, EO 13514)
- h. Energy Efficiency (Guiding Principles, EPAct, EO 13423, EISA)
- i. On-Site Renewable Energy (Guiding Principles, Executive Order 13423, EISA)
- j. Measurement and Verification (Guiding Principles, EPAct, EISA)
- k. Benchmarking (Guiding Principles)
- l. Recycled Content (Guiding Principles, Resource Conservation and Recovery Act, EO 13514)
- m. Biobased Content (Guiding Principles, Farm Security and Rural Investment Act, EO 13514)
- n. Environmentally Preferable Products (Guiding Principles, EO 13514)
- o. Waste and Materials Management (Guiding Principles, EO 13514)
- p. Ozone Depleting Compounds (Guiding Principles, Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990)
- q. Low-Emitting Materials (Guiding Principles, EO 13514)
- r. Ventilation (Guiding Principles)
- s. Thermal Comfort (Guiding Principles)
- t. Daylighting (Guiding Principles)
- u. Environmental Tobacco Smoke Control (Guiding Principles)

<sup>13</sup> <http://www.igbc.in/site/igbc/testigbc.jsp?desc=22968&event=22869>

<sup>14</sup> <http://www.grihaindia.org/>

<sup>15</sup> [http://www.gsa.gov/graphics/ogp/Cert\\_Sys\\_Review.pdf](http://www.gsa.gov/graphics/ogp/Cert_Sys_Review.pdf)



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- v. Protect Indoor Air Quality during Construction (Guiding Principles)
- w. Moisture Control (Guiding Principles)
- x. Acoustic (EISA)
- y. Building System Controls (EISA)
- z. Siting (EISA)
- aa. Greenhouse Gas (EISA)

The list is just indicative of the factors that may be considered for such certification and would vary for each country.

### **10. Conclusion**

While diffused individual efforts will always be around, they are certainly not going to be enough to bring about an appreciable change in the situation. What is needed is intervention from government institutions- both in terms of providing knowledge and awareness as also providing incentives. Only this can bring about a measurable shift to green practices.

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