Green Imprint

Eco-friendly buildings emerge as a sustainable development model

By Dolly Khattar

With an annual growth rate of 30 per cent, the Indian real estate sector is one of the fastest growing markets in the world today. According to KPMG, the sector is estimated to reach a market size of $853 billion by 2018, compared to $121 billion in 2013. However, the rapid rate of real estate development will put greater pressure on the country’s energy resources, besides adversely impacting environmental sustainability. The sector, which comprises housing, retail, hospitality and commercial set-ups, is currently responsible for about 30 per cent of the total electricity consumed and an equivalent amount of carbon emissions in the country. This calls for urgent energy conservation measures across the real estate sector. Green buildings, a rapidly emerging concept in the country, are seen as a solution to this mounting problem.

A green building is different from a conventional building in terms of energy consumption and its environmental impact. The technologies and practices employed in a green building are constantly evolving and may differ from one region to the other, but the basic principles of a green building remain unchanged. These include site and structural design efficiency, energy efficiency, water efficiency, materials efficiency, indoor environmental quality enhancement, operations and maintenance (O&M) optimisation, and waste and toxic reduction. According to The Energy and Resources Institute (TERI), the best-rated green buildings are those that strive to optimise demand for electricity, water and other natural resources (in construction, operation and demolition); generate electricity on site through renewable energy sources; cater to water demands through sustainable processes such as rainwater harvesting; and recycle all their waste on site.

Although the concept of green buildings has been around in India for almost a decade, it is gaining momentum only now, with growing pressure to tackle the twin challenges of increasing energy costs and an expanding carbon footprint. In the past few years, entities across various verticals – airports, banks, colleges, convention centres, factories, government agencies, hospitals, hotels, institutions, IT parks, malls, metros, offices, residential buildings, schools, special economic zones (SEZs) and townships – have adopted green building models.

The rapid pace of growth can be gauged from the fact that the number of buildings registered with the Indian Green Building Council (IGBC) has increased significantly, from 134 in 2010 to over 2,700 at present, accounting for over 2.19 billion square feet of green footprint. IGBC aspires for a green building footprint of over 10 billion square feet by 2022. IGBC’s Leadership in Energy and Environmental Design (LEED) rating is one of the two main green building rating systems in India, the second being the Green Rating for Integrated Habitat Assessment (GRIHA). The growth in GRIHA-registered green buildings has also been strong. As of July 2014, over 500 projects were registered under GRIHA.

According to Frost & Sullivan, in 2013, the total market potential for green building material and equipment (including glass, concrete, steel, solar panels, hybrid energy systems, solar water heaters and water harvesting equipment) stood at about $500 million. However, if the use of green building material in non-LEED-certified buildings is included, the market size would rise to approximately $4 billion. This indicates a tremendous opportunity for the vendor community across business domains, including...
energy efficiency, energy conservation and water conservation. The renewable energy sector, especially the solar power segment, is likely to benefit significantly from the emerging opportunities in the green real estate space.

**Background**

The green building movement was pioneered in the UK with a rating system called Building Research Establishment Environmental Assessment Methodology (BREEAM). BREEAM is the world’s foremost environmental assessment rating system for buildings, with 250,000 buildings having received BREEAM certification across 50 countries since it was launched in 1990. This system was later adopted in the US when the US Green Building Council (USGBC) was formed. Loosely based on the BREEAM system, USGBC’s LEED rating system came into existence in March 2000 and has since become the most widely adopted rating system across the world. In India, the green building movement was initiated by the Confederation of Indian Industry (CII) in the early 2000s when it formed IGBC.

The LEED India rating system broadly encompasses five environmental categories – sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. There are broadly four certification levels — certified (32-39 points), silver (40-47), gold (48-59) and platinum (60-80) for projects with interiors; and certified (30-36), silver (37-44), gold (45-55) and platinum (56-75) for projects without interiors.

Meanwhile, TERI conceived GRIHA and jointly developed it with the Ministry of New and Renewable Energy (MNRE). The GRIHA rating system is particularly relevant in the Indian context and is suitable for all kinds of buildings in different climatic zones of the country. The rating system has 34 criteria under various sections, such as site selection and planning, conservation and efficient utilisation of resources, and building O&M. Each criterion has a number of points assigned to it. Different levels of certification (one star to five stars) are awarded.

These building rating systems have been fairly effective in raising awareness and popularising energy efficient building designs. Moreover, these initiatives have led to the emergence of a large network of stakeholders in the green buildings domain, including corporates, government and nodal agencies, architects, developers, builders and product manufacturers and interestingly, green building consultants. IGBC itself has about 1,700 members, 1,200 accredited professionals and 15 chapters across all the major metros.

**Early adopters**

The growth in green construction has come mostly from commercial, corporate (SEZ) and industrial buildings, both in the public and private sectors. ITC and Godrej have been among the early adopters of green buildings. Some of the prominent corporate office buildings that are green-certified are the Sohrabji Godrej Green Business Centre in Hyderabad; Suzlon One-Earth, Suzlon’s campus in Pune; the Chennai Developmental Centre; Wipro Tech Park in Visakhapatnam; the Dabur India Building in Chandigarh; and Thermax’s corporate office in Pune. Some organisations are going the extra mile by opting for the top category of certification. For instance, IT firm Infosys has invested in only LEED-rated platinum buildings in the past six to seven years. Built as per LEED specifications, Infosys’ per capita energy consumption has gone down by 50 per cent since 2007 and water consumption by 30 per cent. All the company’s facilities in Hyderabad, Mysore, Mangalore, Thiruvananthapuram and Pune are LEED platinum-certified.

### Role of BEE and MNRE

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<th>Two key government initiatives to improve energy efficiency and promote the use of renewable energy in the buildings sector are as follows…</th>
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<td><strong>ECBC</strong>: BEE introduced the ECBC in 2007 on a voluntary basis. The code, which acts like a cross-check for building designs and specifications to reduce energy consumption, sets the minimum energy standards for new commercial buildings with a connected load of 100 kW. It also covers old buildings that are being renovated and/or extended. While the ECBC has been developed by the BEE, its enforcement lies with the state governments and urban local bodies through notification within their states as per their regional requirements. So far, seven states have notified the code, while 15 are in the process of doing so. The government aims to make it mandatory for all states to adopt the code by the end of the Twelfth Plan.</td>
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<td><strong>Energy efficient solar/green buildings scheme</strong>: The key objective of this scheme is to promote widespread construction of energy efficient solar/green buildings through a combination of financial and promotional incentives. At the initial stage, this is being done by providing promotional incentives for creating awareness programmes, workshops, seminars, etc. A budget of Rs 100 million has been allocated for implementation of the scheme during 2013-14 and the remaining period of the Twelfth Plan.</td>
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**Need for certification**

Certification is a voluntary process and project developers could go ahead and incorporate the green features without having to certify them. Then, why is there an emphasis on certification? There are several reasons. A key one is that it is a means of validating and rating the features incorporated in a project by an independent body. The overall benefits of green buildings depend on the extent to which sustainable features are included at the initial planning and design stage. In some cases, such features can also be incorporated after the building is complete. However, the point is that a few green features do not qualify a building as environmentally sustainable. Hence, the role of a rating agency, which has defined a set of performance standards for certifying a building, that is, the level at which it is accredited or endorsed as “green”, is crucial. The process of certification by a rating agency begins at the design stage, so that its feedback can be incorporated at the appropriate time and improvements made. Further, to ensure that a genuinely green
“IFC has invested $400 million in green buildings globally”
Prashant Kapoor, Principal Industry Specialist, Climate Business Department, IFC

What are the key challenges in devising and implementing an effective green buildings code for India?
The Indian administration has introduced an energy efficiency code focused on new, large commercial buildings. The code is comprehensive and elaborate. If the code is adopted by the states proactively, much progress can be made in achieving energy efficiency goals country-wide. However, there are capacity constraints at the local level. States and municipalities need to be motivated to implement the code in addition to building capacity and dedicated expertise. We expect that, with time, many progressive states would demonstrate compliance and define the path forward for others to follow. Indeed, this is a great opportunity for public and private players to come together and evolve effective solutions for green buildings.

What measures do you recommend for fast-tracking the implementation of the building code?
We need to demonstrate the efficacy of the code by increasing market awareness through demonstration projects. Simple and affordable performance-based systems such as Excellence in Design for Greater Efficiencies (EDGE) will make it easier for developers to adhere to resource efficiency standards, and for certifying agencies to confirm compliance.

EDGE is a building design software that empowers the discovery of technical solutions at the early design stage to reduce operational expenses and environmental impacts. Based on the user’s information inputs and selection of green measures, EDGE reveals projected operational savings and reduced carbon emissions. This overall picture of performance helps to articulate a compelling business case for green buildings.

What has been the progress so far on IFC’s initiatives in this area?
Last year alone, IFC invested nearly $400 million in green buildings globally. We also helped establish green building codes in Colombia, Panama, the Philippines, Vietnam, Indonesia and Bangladesh.

In India, our green building investments include Fortis Healthcare, Value Budget Housing Corporation (VBHC) and DHFL. Our future plans include working with governments at the central and city levels in India, as well as financial institutions such as DHFL which also now provides green mortgages among other products. Major developers such as VBHC, whose apartment project in Bengaluru was recently EDGE-certified, will hopefully have a demonstrative impact on the market.

What are IFC’s future plans in the green buildings’ space in India?
For India, our strategy is to come up with a comprehensive set of solutions, which involves working with the government as well as the private sector. We are planning to launch a certification programme that is simple to use, quick to get done, and extremely affordable. Besides that, it will be analytical in the sense that it will provide people with solutions. We are also in discussions with various banks to come up with financial products to create a market for green building solutions besides making our own investments here.

residential project is not mistaken for one of the many projects that are touted as green, it is important for the developer to obtain accreditation. With increasing interest in this concept by home buyers, many developers have begun promoting projects as “eco-friendly” without meeting green building benchmarks.

Certification is also essential to avail of financial incentives offered under various government schemes and interest rate exemptions by banks. For instance, the State Bank of India provides the following benefits to customers buying IGBC-certified green homes: a 5 per cent reduction in margin; a 0.25 per cent interest rate subsidy; and exemption from processing fees. The Pune Municipal Corporation (PMC) offers a 10-50 per cent concession on the total premium paid by builders, depending on the project rating achieved by a certified eco-housing project. Further, several municipalities provide benefits to buildings certified under the GRIHA rating system. These include 90 per cent reimbursement of the registration fee, rebate in property tax, concession in electricity and water charges, and concession in municipal corporation taxes.

**Government support**
Along with private players, the government too is taking various green initiatives in the real estate space. For instance, the Bureau of Energy Efficiency (BEE) has introduced the Energy Conservation Building Code (ECBC). While its impact will be fully realised only when it is mandated, it is a move in the right direction. However, what is paramount for success in this area is consistency and effectiveness in both legislation and incentives. Efforts need to be made at the urban local body level to undertake cost-benefit analyses of mainstreaming green initiatives/technologies, and devise incentives to spur demand for green developments. These need to be viewed from not just the perspective of city-level infrastructure (transport, roads and intelligent technologies) but also individual developments (residential, commercial office, retail and industrial). Besides, an incentive mechanism needs to be devised to boost consumer demand for green real estate. Such incentives have already been introduced in some parts of the country. For example, the Noida municipality allows an additional 5 per cent built-up space for gold-rated buildings as compared to the
normal floor area ratio or floor space index (FSI) allowed for conventional buildings. According to IGBC, this incentive has had a positive impact on green development in Noida. In yet another instance, the Greater Hyderabad Municipal Corporation provides a 10 per cent concession on property tax for using solar water heating (SWH) equipment, and an additional concession of 10 per cent for providing water harvesting infrastructure. However, the response to this has been mixed so far with several gaps in implementation.

**Economic viability**

The incorporation of basic green features, if undertaken in the preliminary phase, will not impact overall project costs in a major way. In fact, with technological advances, the costs have come down gradually. While green buildings used to cost 15 per cent more than conventional buildings in the late 2000s, the cost differential has now come down to 2-3 per cent for an average-rated green building. In fact, the cost differential for platinum-rated green buildings has also come down from 15 per cent about eight years ago to 9-12 per cent today. Some project developers claim no increase in the initial project cost because of effective planning.

However, initial costs are only a one-time expense. The returns on green building investments must be calculated on the total cost of ownership (initial cost and recurring O&M costs) rather than on the initial costs. Typically, more than 90 per cent of the total cost of ownership of a building is attributable to its O&M costs, and energy alone accounts for about 50 per cent of O&M costs.

In fact, the main motivator for commercial developers to invest in green projects is the reduced lifecycle costs associated with them. Since a green building typically saves 50-60 per cent in energy consumption costs and 35-55 per cent in water usage in the long run, a higher initial investment in such energy efficient systems and technologies allows developers to recover costs quickly. It is estimated that the average payback period is two to four years.

### Opportunity for renewable energy vendors

Based on various growth estimates, green buildings will be an opportunity worth over Rs 5 trillion over the next 10 years. Given that the main emphasis in most green buildings is on reducing energy costs, renewable energy solutions are likely to play a key role in this space. Building owners opting for green systems are increasingly adopting renewable energy solutions including solar air-conditioning, solar water heating, building integrated photovoltaics; geo-thermal cooling, wind-solar hybrid, micro wind turbines, and biogas plants. In fact, solar rooftop systems have become fairly common in the past few years. Building owners, from corporates to home owners, are increasingly adopting these systems to save on energy expenses. The decline in solar power equipment costs and increase in grid power tariffs have been the key reasons for the growing uptake of these systems.

### Long road ahead

Much to the credit of agencies like the CII and TERI, and organisations like Godrej and ITC, India has over 3,000 registered green building projects and over 60 LEED platinum-certified constructions. While India is amongst the few countries spearheading the green building movement worldwide, the achievement so far is minuscule when compared to the current and expected area under construction in the country. By 2030, the Indian building stock is expected to reach 100 billion square feet, up from 25 billion square feet at present. Therefore, both industry and government efforts need to be speeded up if any sizeable results are to be achieved. According to TERI’s estimates, if all buildings in the urban areas were made to adopt green building concepts, the country could save more than 8,400 MW of power, which is enough to light 550,000 homes a year. ■