



The Green Building Movement in India

The CII-Godrej Green Business Centre in Hyderabad is platinum rated and is the third building in the world and the first outside the USA to achieve this distinction.

Introduction to Green Buildings

By Dr. Prem C. Jain

Chairman

Indian Green Building Council

A Green Building is one that encompasses the following important sustainable features:

- Site selection with full respect to the ecology of the area and existing environment.
- Minimum consumption of energy by the building.
- Minimum use of fresh water from external sources.
- Maximum use of non toxic, recycled and renewable materials.
- Highest indoor air quality without affecting energy consumption.
- Integrated building management system for control & monitoring, measurement & verification.
- Innovation in design and construction techniques.

India's construction industry is witnessing unprecedented growth, putting tremendous pressure on the country's resources, both energy and water. It is important that the construction industry adopts green measures to minimize

the impact on the environment and on natural resources.

We are all experiencing the effects of global warming. The entire planet and its every inhabitant are threatened by its dire consequences. Global warming does not recognize the geo-political boundary of countries. It is all one Planet Earth and collectively the entire human race owes to the future generation, immediate corrective measures to reverse the trend. The Green Building movement is one such action in that direction.

We must bear in mind that 40% of all energy usage is by the buildings. The balance, of course, is by industry, transportation and other amenities. A Green Building can cut down the energy consumption to less than 60% of a conventional building. Hypothetically, if all future buildings were to be Green and the existing buildings were to be retrofitted to become Green, and power generation across the globe was to be shared, we may need very few additional power generat-

ing plants for the whole world.

Green Building puts emphasis on use of Green Power which means power generated from sources other than coal. The biggest culprit in the Green House Gas emissions has been the coal-fired power stations which belch out unburned carbon, carbon dioxide, nitrous oxide and all other pollutants into the atmosphere. Technologies are being developed to clean the coal and minimize the emission. The less polluting options are gas turbines and co-generation to provide steam / hot water and chilled water for the whole district. This is especially applicable in new SEZ projects being planned all over the country. Another option is hydroelectric power.

The greener power options will be wind power, geo-thermal power and finally solar power. Since the cost of these alternatives is prohibitive, a very tiny fraction of generated power is from

About the Author

Dr. Prem C. Jain is the president and founder of Spectral Services Consultants and holds a doctorate in mechanical engineering from the University of Minnesota, USA. He is the founder president of ASHRAE India chapter and also the founder member and president emeritus of ISHRAE.

these renewable sources. Vast amount of research and development work is being undertaken by many countries of the world to bring down the cost of power from the renewable resources. Till that time, we have to learn how to conserve the power available from present sources.

The three major advantages cited by occupants of Green Buildings are:

- operational savings of 40-50% energy & 20-30% water
- day-lighting and views that soothe the mind through connectivity to external environment
- healthy indoor environment through constant input of treated fresh air on demand and through use of interior materials with low volatile organic compound (VOC) emissions.

The term 'Green' implies complete recycling which has been the Indian way of life for centuries. Even the human body is cremated by a large section of the population, thereby recycling it back to air, fire, water, ether and earth. We have been brought up in homes where parents and grand parents sorted out paper, plastic, bottles and organic waste. All these were sold and recycled by different agencies. Consequently the carbon footprint on the earth was very small. This is not the current practice. Nearly 200 years ago, we learnt the modern way of life that brought to us a lot of convenience, alas, accompanied with production of huge solid waste. Modern industry has not only polluted our rivers but also the land, which is covered with plastics and inorganic materials which are not bio-degradable.

Our ancient forts and *havelis* were built with locally available stone. These are the finest examples of Green Buildings in terms of very little maintenance, minimum energy & water consumption and excellent indoor air quality through filtered fresh air across wetted aromatic khus screens. Our ancient temples are similarly entirely Green, taking very little from the earth's resources and blending with the natural environment. However, we have had no system of measuring how green is our green.

For the last 15 years, many systems have evolved for measuring the Green aspect of the built environment. Some of the popular systems are LEED, BREEM, Energy Star, Griha etc. However, LEED has become more universally accepted because of its greater scientific accuracy and reliance on internationally adopted ASHRAE Standards. The LEED rating system was started by the US Green Building Council (USGBC) in the year 1993 and is constantly upgraded through the published revised versions; the current version being 2.2.

Past president of the United States, Bill Clinton, during his visit to India in the year 2000 introduced the concept of the LEED rating system to the Confederation of Indian Industries (CII). In the year 2001, the Indian Green Building Council (IGBC) signed an MoU with the USGBC for propagating the LEED rating system for Green Buildings in India.

The MoU with the USGBC has given us a head start in developing our own tools for labeling new Indian Green Buildings through the use of the learnings and the experiences

of the USGBC over the last 15 years. With USGBC endorsements, we have already prepared detailed guidelines for "New Construction" which implies completely furnished buildings. We have also evolved abridged guidelines for "Core & Shell" which implies developers' buildings where fit out for leased/rented spaces are done by the occupants. The basic features in Indianization of the USGBC guidelines are as follows:

1. Scarcity of water is a major issue in India. Water has been given more importance in the LEED India rating system
 - LEED India encourages the use of recycled water for airconditioning make up
 - LEED India encourages 100% waste water treatment, whereas LEED of USGBC specifies only 50%
2. Considering heavy investment involved in installing renewable energy, slight changes have been made to reduce the percentage of renewable energy component.
3. Since the market for Green Building materials is still in the nascent stage in India, the percentage of recycled content in materials has been reduced.
4. Indian codes have been adopted wherever applicable like, the National Building Code, Energy Conservation Building Code etc
5. Certain provisions of the LEED rating system, which are not relevant in the Indian context, have been removed, like providing for bicycle storage and showers in office complexes
6. LEED of USGBC encourages the use of "Green e" program which is a separate grid for renewable energy in the United States. LEED India has redefined the requirement under green power, which specifies investment in offsite renewable energy sources to the tune of 50% of the building power consumption

It must be understood that these are only initial steps for the Indianization of LEED USGBC guidelines. We are constantly requesting users, developers, architects and consultants to give us their feedback on how to improve our guidelines further. Like the USGBC, updated version of the LEED India guidelines will be issued to members from time to time, to keep these in line with the current practices by including the comments which are pertinent. The entire LEED system is consensus driven.

It is also planned that in due course, similar "LEED India" manuals and guidelines will be prepared and issued for other applications, like "homes" including residential complexes, for "commercial interiors", for "mixed use developments" and for "existing buildings". Presently, we fall back upon USGBC guidelines for these applications.

We are also working with USGBC to start within the country, an online examination for IGBC accredited professionals for a modest fee, which will be similar to the examination for LEED (USGBC) accredited professionals. This will permit us to enhance awareness and interest among architects, engineers, developers and construction professionals to design and build Green Buildings. ♦