

# Application of Green Building Concept to Existing Building

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**Abstract:** *Application of Green concepts to Existing Building is introduced in this report. affordable housing next to the level of performance with More comfortable homes that cost less to operate, last longer, and keep occupants healthy. Conservation of energy and water are most important issues now days. To make Existing Building more efficient, maximum use of natural resources, and to reduce effect of conventional construction on environment, green concepts are applied to Existing building.*

**Keywords:** green building, GHG's, Energy conservation, rainwater harvesting, water conservation, energy saving, green building

## 1. Introduction

### What is Green Building?

Green building, or sustainable design, is the practice of increasing the efficiency with which buildings and their sites use energy, water, and materials, and reducing building impacts on human health and the environment over the entire life cycle of the building. Green building concepts extend beyond the walls of buildings and can include site planning, community and land use planning issues as well.

Green Buildings also called sustainable buildings are responsive to the environment and to lowering energy consumption and its resources. Green Buildings also promote productivity through environmentally healthy buildings.

Finally, initial costs are slightly higher but throughout the life of the building, operational and maintenance cost are greatly reduced. In a broader context, Green Buildings addresses such issues as global warming and recharging the ground water table.

### Why Make your Building Green?

When you build green, you will take affordable housing to the next level of performance. You will give owners and residents more comfortable homes that cost less to operate, last longer, and keep occupants healthy. You will keep current with leading building techniques and gain valuable experience with a team approach that improves design and construction. And of course, you will help improve our environment as your buildings become more efficient, use less resources, and reduce their impact. The proof is already out there: a wide range of projects across the country have accomplished these improvements within the cost of conventional building methods. In fact, green building can even lower construction costs and give you a competitive edge in attracting support for your project.

Conservation of energy is one of the important issues to be addressed today. Construction of energy efficient buildings not only helps in reduction of energy demand globally, but also generates savings in terms of reduced operational and maintenance costs. Energy conservation is one of the biggest challenges today. The world today is facing one of the major energy crises; global warming and climate change. The melting snowcaps in the north and south poles, reduction in the level of water in the seas and oceans and depletion of ozone

layer through carbon emissions in the atmosphere are one of the indications for the climate change and global warming. The government, researchers and practitioners have been trying on innovative ways to control these problems. By reducing the energy consumption in residential, commercial, industrial and transportation sectors is one of the solutions to control the energy consumption. Also, another better solution to help reduction of the energy consumption is by creating awareness among the people about the climate change.

We have heard of climate change. The air is getting warmer - summer comes sooner in most continents including Europe and America. Sea level is rising, - Maldives is sinking. Rivers like the Amazon, the Nile, the Danube, etc., are drying or recede several meters every year. But it's not just happening elsewhere but also happening in India. The glaciers feeding water for the Ganga are melting faster than it should. It means the Ganga could dry up in another about 60 years or so. This would leave over 50 million people thirsty who are living on the banks. Mangrove forests of Sunder ban are the world's most prosperous group of 104 Rainforest Islands. However, it appears that these very unique islands are likely to be wiped out from earth's map very soon or over the period of time. In fact, 15% of Indian side sunders ban and 17% of Bangladesh side of Sunder ban Island are already submerged in the ocean. Now the threat of submerging is looming large on Sagardeep, the 4th biggest of the existing island. It is also on this Island, that the annual Mela of Gangasagar is held and visited by Millions of pilgrims every year. This is all because of the generation of Greenhouse gases (GHG) and sea level is rising.

A third of all Carbon Dioxide emissions produced are absorbed in the oceans. Carbon dioxide dissolved in ocean water becomes a corrosive acid which kills sea life. Thus fish catches are falling, that would leave hundreds of coastal communities hungry.

The coal is burnt in electric power plants, which is a major source of the CO<sub>2</sub> generation and it is doing all the damage - melting the glaciers, poisoning the sea, disrupting the monsoon etc. Alternate source of Energy like Renewable energy - from the sun's rays, wind, seas' waves & geo sources - is clean, doesn't release CO<sub>2</sub> and is not hostage to a resource that will die out.

In India, we are blessed with a tropical sun, fast winds and thousands of miles of sea coast. Renewable energy is thus the answer for all these ills.



**Figure 1.1**

Similarly, building Industry is producing second largest amount of Demolition Waste and GHG (almost 40%). Buildings have major environmental impacts over their entire life cycle. Resources such as ground cover, forests, water, and energy are depleted to construct and operate buildings. Resource-intensive materials provide the building envelope and landscaping add beauty to it – in turn using up water and pesticides to maintain it. Energy-consuming systems for lighting, space conditioning and water heating provide comfort to its occupants. Hi-tech controls add intelligence to ‘inanimate’ buildings so that they can respond to varying conditions, and intelligently monitor and control resource use, security, and usage of fire systems etc. in the building. Water is another vital resource for the occupants, which gets consumed continuously during building construction and operation. Several building processes and occupant function generate large amount of waste. These all are polluting the environment and increasing (GHG).

## 2. Objectives of Work

### 2.1 Review Stage

The objectives of this study are;

1. To calculate the annual energy consumption for Existing sample building.
2. To calculate the annual water consumption for Existing sample building.
3. Application of Green Building Products and Materials to Existing sample buildings.
4. Comparison between present rating of existing sample buildings and rating of existing sample buildings after application of green concepts.

### 2.2 Scope of Study

Construction has been accused of causing a variety of environmental problems ranging from excessive consumption of global resources, both in terms of construction and building operation to the pollution of the surrounding environment. Research on green building design and materials is already well established and different organizations and research groups have contributed to the development of separate green building assessment standards to evaluate the environmental friendliness of the building facilities. This study aims at comparing the scope of prominent and developing green building

assessment standards to analyze any gaps and to identify the future trends. The comparison will help planners make informed decisions during the design and certification stage of the Existing green building project.

Green practices in the existing buildings can help address national issues like water efficiency, energy efficiency, and reduction in fossil fuel use in commuting, handling of waste and conserving natural resources. Most importantly, these concepts can enhance occupant health, happiness and well-being.

Against this background, the Indian Green Building Council (IGBC) has launched ‘IGBC Green Existing Building O&M Rating System’ to address the National priorities. By applying IGBC Green Existing Building O&M criteria, existing buildings can be sustainable over the life cycle of the building. This rating program enables the building owner / developer to apply green concepts and criteria, so as to reduce the environmental impacts, which are measurable. The program covers methodologies to cover diverse climatic zones and changing lifestyles. IGBC Green Existing Building O&M is the first rating program developed in India, exclusively for existing building stock. It is based on accepted environmental principles and strikes a balance between known established practices and emerging concepts. The system is designed to be comprehensive in scope, yet simple in operation.

## 3. Methodology

### Research Methodology

The work is to carry out to accomplished the objective of the study, for the study I have followed the following methodology:

1. Selection of Existing sample buildings as a case study.
2. Finding out the annual energy consumption and water consumption for Existing sample buildings. And compare energy and water consumption of same buildings after applying green concepts.
3. Application of Green Building Products and Materials to Existing sample buildings.
4. Comparison between present rating of Existing sample buildings and rating of same Existing sample buildings after application of green concepts.

### Research Statement

The first step of the research is to formulate a Research statement that describes the objectives, and the research scope. The details such as research background, Scope of the study, objectives of study were addressed in Chapter 1.

### Research Objectives

The objectives of this research were discussed in Chapter 1.

### Literature Review

A literature review was done before finalizing the research methodology. The information was compiled by reviewing a series of Research papers, conference proceedings, and

books. This review is described extensively in Chapter 2. Selecting the Existing sample buildings and Data Collection

Identifying the Existing sample buildings is one of the major steps of this study. By Means of the literature review and a series of discussions, it was decided to collect the data of campus of Shivajirao S. Jondhale College Of Engineering And Technology, Asangaon, Dist. Thane.

### Data Collection

For this study, the data was collected from the Management office department of Shivajirao S. Jondhale College of Engg and Technology Asangaon, Dist. Thane.

The data consisted of a sample size of 6 college buildings, all buildings are conventional. The data provided for the study included the year of construction of the Existing sample buildings, were constructed in the years 2008, 2009, 2010, 2011.

Data for energy consumption and usage of energy in terms of costs of these buildings in terms of previous electric bills per month is provided in Appendix.

### Data Processing

The data collected were including previous per month Electric bills data. The energy consumption was in terms of watt. As well as it is in Indian Rupees, the area of all the buildings was measured in square meter.

### Conclusion

Solar Photovoltaic System in green building concept reduces the energy consumption of conventional building over its life time period. Strategically placing of windows and skylight can eliminate the need of Electrical lighting during the day.

Application of Solar Photovoltaic System is the one time investment which provides its benefits at very low maintenance cost without using any artificial resource.

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