

# Model House of Green Building

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**ABSTRACT** – With increase in urbanization the natural resources were used in improper ways which leads us towards the implementation of green buildings and the concept helps in making optimum use of natural resources also it emphasis on taking advantage of renewable resources.

The concept of green building can be traced to the energy crisis and environmental pollution concerns. There are numbers of motives for building green including environmental and economic benefit which leads us to the betterment of future generation

The green building is an eco-friendly component, since it is based on the basic rule – “REDUCE, REUSE, RE-CYCLE”. These buildings bring together a vast array of different skills & practice techniques to reduce and ultimately eliminate the impacts on environment and humans.

**Key Words:** Eco-friendly, environment, green building, certification.

## 1. INTRODUCTION

One of the main culprits implicated in the phenomenon of global warming in which India comes on 144<sup>th</sup> position (1.4 metric ton) is carbon emission rating in the world in which buildings account for more than 40% of all global CO<sub>2</sub> emission.

A green building is the one that conserves natural resources, uses less water, generates less waste, optimizes energy efficiency, and provide healthier space for occupants as compared to a conventional building. It refers to both an application of processes and structure that are environmentally responsible and resource efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the contractor, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

## 2. BENEFITS OF GREEN BUILDING

- Low Maintenance and Operation Cost
- Energy Efficiency
- Enhances Indoor Environment Quality
- Water Efficiency

- Better Health
- Material Efficiency
- Better Environment
- Reduces Strain on Local Resources

## 3. REGISTRATION PROCESS

Registration is the initial step in IGBC. The project teams interested in IGBC certification must first register itself by submitting the necessary documents and other important information as required by IGBC. Once the project is registered the team can start preparing for documentation to satisfy mandatory requirements.

### Certification:

To achieve the IGBC rating, the project must satisfy all the mandatory requirements and the minimum number of credit points. The project team is required to provide supporting documents at preliminary and final stage of submission, for all the mandatory requirements and the credits attempted.

The project needs to submit the following:

1. Filled-in Template
2. Narratives and supporting documentation such as drawings, calculations (in excel sheets), declarations/ contract documents, purchase invoices, manufacturer cut-sheets/ letters/ material test reports, etc., for each mandatory requirement/ credit

IGBC would take 30 working days to review the first set of precertification documents. On gaining the clarifications posed in the first review, IGBC would take another 30 working days to award the precertification. A letter and a certificate are provided to projects on precertification.

For the status of the project in IGBC, precertified projects are required, in relation to the rating, once in every six months until the award of the final rating. Pre-certification gives the owner/ developer a unique advantage to market the project to potential buyers.

#### 4. MODEL HOUSE OF GREEN BUILDING



Fig -1: Model of Green Building



Fig -2: Rainwater harvesting system

The eco-friendly model house contains following features which makes the occupant feel comfortable leading to healthy life :-

##### (A) Solar control glazed glass

In hot climates, solar control glass can be used to minimize solar heat gain and help to control glare or even eradicating the need for extra lightening system, reducing running costs of the building and saving energy.

Sometimes high-performance double-glazed glass, which is laminated or coated with special material is used, to moderate interior temperatures by controlling heat loss and gain. The coating filters the heat-producing aspects of solar rays.

##### (B) Geothermal Cooling

During summer season you need to cool your home, geothermal heating and cooling systems absorb the heat in your home and transfers it to the underground loop where that heat is then absorbed by the earth which is cool inside. The geothermal heat pump uses the cool water returning from the earth to create cool, dehumidified air for your home.

Geothermal heat pumps easily move heat into the cool earth, making geothermal cooling significantly more energy efficient and hence requires less energy.

##### (C) Low VOC paints

VOCs paints are unstable, carbon-containing compounds that readily vaporize into the air. When they enter the air, they react with other elements to produce ozone, which causes air pollution and produces health issues including breathing problems, headache, burning, watery eyes and nausea. As paint dries, these harmful VOCs are released into the air at high levels. Some VOCs also have been linked to cancer, as well as kidney and liver damage.

You are going to maintain a better level of air quality within your home by using low VOC. Painting process is safer and air will not be polluted with strong odors. It is cost effective. Durable as well as long lasting. Low VOC paints are easier to clean up by using just soap and water.

##### (D) Water optimization

Low-flow water fixtures can provide the homeowner with significant savings and be a sustainable measure.

Low-flow showerheads with a flow rate of less than 2.5 GPM at a water pressure of 80 pounds per square inch are advised to install.

Low-flow toilets and ultra-low-flow toilets have been designed to use half the amount of water of traditional toilets. Many low flow toilets are also designed to reduce clog problems because their drainage passage is wider.

Old sink faucets can also be wasting a lot of water and money. You should consider replacing your faucets if it uses more than 2.5GPM. You can choose whether to replace it with a new faucet, normally with less than 1.5GPM or by installing an aerator.

##### (E) Turbo ventilator

Turbo ventilator are a ventilator that is powered by the wind to create effective ventilation for different industries. When it comes to roof top ventilators, they have many advantages which include that they do not need to be powered by electricity, they are located such that they exhaust the hottest air first, they do not cause any harm to the

environment. They tend to save a lot of money as there is no operating cost plus they are maintenance free.

#### (F) Rain water harvesting

Rainwater harvesting is the collection of rainwater, which falls freely from the sky, for use as a substitute for potable water. The collected rainwater is usually stored in a tank in the basement (or underground) and then pumped to a higher level tank from which the water can flow by gravity for use.

In homes and larger buildings, rainwater may also be used for many purposes for which pure drinking water is not required. Besides landscape maintenance and other outdoor uses such as cleaning, these include flushing toilets, washing laundry, and operating mechanical heating and cooling equipment that use water.

#### (G) Ground water recharge

As the roads are built sloped towards the sides, rainwater falling on the road is guided to the side drains. When it rains, water flows from the apex to the sides and collects in the sidewalk area and subsequently flows to the storm water drains.

To increase ground water recharge by percolation and decrease the flooding of storm water drains, an infiltration trench has been built by the side of the drain all along the road, with a top layer of coarse river sand. As the rainwater from the road flows into the infiltration trench, water percolates into the ground.

#### (H) Drip Irrigation through porous pipes

The biggest benefit of drip irrigation systems is that less water is used to irrigate plants and it is used more efficiently. The water is delivered uniformly at the soil level to the roots, where it is needed. Overhead watering creates wet leaves, which could lead to potential mold and disease problems that do not occur with drip irrigation. Some gardeners also experience less weeds when using drip irrigation since only the desired plants are being watered, not the weeds that grow in between rows.

#### (I) Swimming pool

An automated pool cleaner has been installed which acts as a vacuum cleaner which is intended to collect debris and sediment from swimming pools with minimal human intervention.

#### (J) Biogas digester

Generating Bio-Gas by using Bio waste from garden, houses and plants, resulting in a natural organic manure. The Bio Gas also reduces the dependency on use of fossil fuels by using renewable energy source to generate the Green Power. For Sustainable development it is a perfect Eco-device.

#### (K) Solar street light

Unlike ordinary incandescent bulbs, LED bulbs don't have a filament that will burn out. They are illuminated solely by the movement of electrons in a semiconductor material, and they last just as long as a standard transistor. Use of LED lamps gives equal lux using very less energy resulting Energy saving up to 50%. The street light load will be taken up by the electricity generated through methane gas generated by gasifier plant.

### 5. CONCLUSIONS

- This study hence shows that most of green building studies focus on environmental aspects of sustainability such as energy consumption, water efficiency and greenhouse gas emission together with the technical solutions.
- The studies on social and economic aspects of sustainability are comparatively lean, despite a large number of literatures emphasizing their importance.
- Many building materials and renewable energy sources exist to lessen one's impact upon the environment.
- Through educating, making environmentally products more readily accessible and reliable, and by providing government incentives it is possible to encourage more people to adopt green building and all of the benefits that come along with it.

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