

# Green Building: An Efficient Use of Natural Resources to Create a Sustainable Environment

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## Abstract

*Zero energy is a common concept adopted by many building designers. It basically combines state-of-art with commercially available renewable sources of energy. A zero energy building returns much more energy as compared to the energy it takes from the utilities. Sustainable building involves the consideration of many issues, including land use, site impact, indoor environment, energy and water use. This paper studied the definition of a green building and the elements associated with the construction of single family home versus office buildings. The development of infra structure is one of the main drivers of growth in an economy. Moreover the infrastructure provides the organizational structure and support to the organization system. It supports either vertically or horizontal system. This paper focus on the key technologies which can be adapted to create a green building which becomes technically fit , commercially acceptable and environment friendly.*

## Keywords:

Green building, Sustainable development, Green Storage

## Introduction

Energy efficient design is one of the greatest challenges that the world is facing today. Energy efficient means by consuming a small amount of

energy if we can achieve our requirements may be in terms of intensity of light or reduced carbon dioxide emission or in terms of money. The main objective is to create a sustainable environment where we can meet our present demand without affecting our future generation to meet their own requirements. More and more number of people are gathering in the urban area to add themselves in the urban race. This affects the environment in a great manner. More number of house are required to meet the demand of these people.. a large amount of natural resources were consumed in designing a house, but the designed house is not environment friendly and economically also not suitable. This leads to the concept of green building. The green building may be defined as a building which uses a very least amount of natural resources and at the same time provide a healthy space for human being and hence environmental friendly by producing less amount of pollution [1].

So in a general sense a green building is a building that uses most environment friendly materials. Most of them are bio degradable which ultimately reduces pollutions emitted to the atmosphere and create a good and highly efficient sustained and healthy environment to the people who are living in that building. To start the concept of green building designing one has to through off the old concept and has to accept the new concept and technology. This leads to a high economic power involvement not only in terms of money but also in terms of skilled man

power also. The value of this product is much more less as compared to the gain in terms if environment benefit in a long run. This creates a lots of job opportunity in near future and also leads to a high level research activity [2].



Fig:-1 Green building Policy

As such the concept of green building involves a lot of advanced technology but in real sense the cost of designing a green building is nearly equal to the cost of designing an ordinary building. May be some of the construction strategy characteristics are less as compared to the ordinary building but as a whole it is more advanced and valuable to the environment. So keeping it in view we can say it is an integrated technology.

### Effects of Modernization

Modernization of urban area took place because of changing life style of the people, their demand to adopt the new technologies. Although modernization helps in the overall GDP growth of the country at the same time it has also some adverse effect on the environment like as follows

- Soil erosion
- More water usage
- High amount of energy consumption
- Changes in monsoon cycle

- Increase in environment pollution
- Increase in primary pollutants
- Change in aquatic life



Fig:-2 Sustainable development

### Characteristic Aspects of Green Building

#### I. Energy

The demand for energy is increasing day by day over the world. The green building should be designed in such a way that it must absorb a least amount of energy in terms of energy efficient appliances, lighting and weatherization. So in this regard the use of alternate resources likes renewable such as solar PV, geothermal power or combustion of biomass acts like a substitute.

#### II. Water

A small reduction in water consumption leads to a great saving of water throughout worldwide. Reduction can be achieved through such measures as reduced flow plumbing fixtures, recycling of waste water and landscaping designed to reduce irrigation requirements. The best use of water can be achieved through landscaping, use of porous materials, green roofs and so forth and use of holding ponds, swales, rain garden etc.

#### III. Waste

Waste from demolition of buildings has a great impact on environment. The chemical properties of the waste produce some

hazardous environment pollutants. Some type of pollutants sometimes leads to some dangerous carcinogenic health problem among humans. However the materials used in green building upon demolition can be recycled and hence environment friendly. Operational solid waste such as paper and foodstuffs can be recycled or otherwise processed to reduce their environment impact.

#### IV. Disaster Resistance

The concept of green building is not only fit for environment but also resistant to earthquakes, hurricanes, flood and forest fires, which in turn increases the life span of the building. Efforts such as on-site power generation, photovoltaic and wind turbine and water recycling strategy can be employed to the buildings

#### V. Roof top plantings

Roof and Terraces plantings have significant effect on the performance of buildings. Plants absorb the sun light and provide shade and keep the room cool. It absorbs some air pollutants in its leaves and thus protects the room from dust. It also provides relief to noise pollution occurring in urban areas.

### Designing Aspects

#### I. Wool Bricks

Woolen fibers are added to the clay materials while designing the bricks. The polymer that can be employed may be alginate conglomerate which is a natural occurring polymer. This product is 37% stronger than the ordinary bricks.

#### II. Glazed Window

The glazed window basically a triple layer glass is most suited for buildings. The air gap provides the insulating layers that slow down the heat loss and reduce the opportunity for

condensation. In summer it protects the house from blistering heat and keeps the room cool. The thermal performance of the double glazing can be further improved by filling inert gas such as argon and krypton between two glass panes instead of air.

#### III. Designing of the wall

The wall must be designed in such a manner that a gap must be provided between the two bricks. The small amount of gap acts like an insulator and hence keeps the room cool in summer and warm in winter.

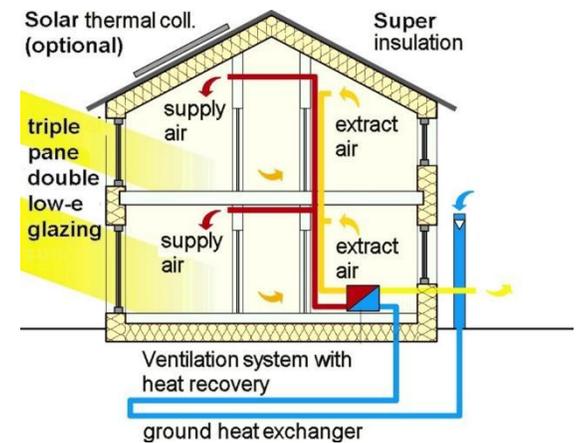


Fig:-3 Extraction of heat from the building IV. Ventilation

Cross ventilation is necessary for those house which are east facing. It increases the indoor air facility and creates a good environment.

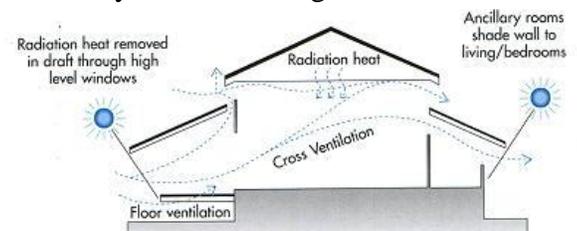


Fig:-4 Cross ventilation of building

### Effectiveness of Green Building

There are some methods which can be adopted for successful construction of green buildings such as.

## I. Photovoltaic

Solar photovoltaic are the devices which uses sun light as a source of energy and through some chemical conversion produces electricity at its terminals. Photovoltaic generation uses some solar panels composed of a number of solar cells containing photovoltaic materials. From an estimation it was found that if the entire world is covered with solar photovoltaic then it can provide the energy requirement of the whole world for at least one year. For a standard house hold system a solar photovoltaic of 1600watt panel can meet the demand for energy for round the clock in a day.

## II. Passive use of Solar

The doors and windows can be designed in such a way that in summer it rejects the solar heat back to the environment and spread it across the room and keeps the room warm and healthier. The name is passive because it does not involve the use of mechanical and electrical devices for its conversion.

## III. Rain Garden

Rain garden involves accepting and collecting the rain water over the top of the roof and make them use for harvesting the electricity through micro hydro turbine. In addition to the energy generation the same water can also be used for garden plant and if properly recycled can also be used for toilet purpose. The main purpose of rain garden is to improve the water quality.

## Conclusion

With the need to reduce the green house gases emitted in to the atmosphere and to make more efficient use of expensive fossil fuels building design is necessary throughout the world. The proposed system have some useful advantages such as minimum consumption of energy, minimum purchase

from the utility resulting in cost saving of the user, green energy storage and no disposal of waste and better energy utilization due to smart energy management. In near future with the increasing in the energy consumption of electricity by the user utility may not be able to complete the user demand. Therefore such micro grid enabled system solves such concerns.

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