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Comparative Study of Conventional Building and Green Building

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ABSTRACT

A green building uses less energy, water and natural resources, creates less waste and is healthier for the people living inside compared to a standard building. There is a rapidly expanding market for green building materials. Green building provide suitable environment by controlling solar radiation temperature, energy efficiency, water conservation using domestic treatment plant and indoor air quality. The main aim of green buildings is to reduce the environmental impact of new buildings. The sustainability in the environment can be well achieved by reducing the energy emission and consumption by the buildings. Sustainability means using the energy efficiently. Green Building refers to a structure that is environmentally responsible and resource-efficient throughout a building's life-cycle. The aim of this project is to conduct a comparative study on conventional and green residential building. Data regarding temperature details are represented in energy simulation software – Energy 2D. A study on various green building rating system is to be conducted. Rate of water consumption and electricity consumption, waste generated in the selected building were collected for grading the building using LEED certification. A model showing all elements of green building such as rainwater harvesting plant, biogas plant, grey water filter, cooling.

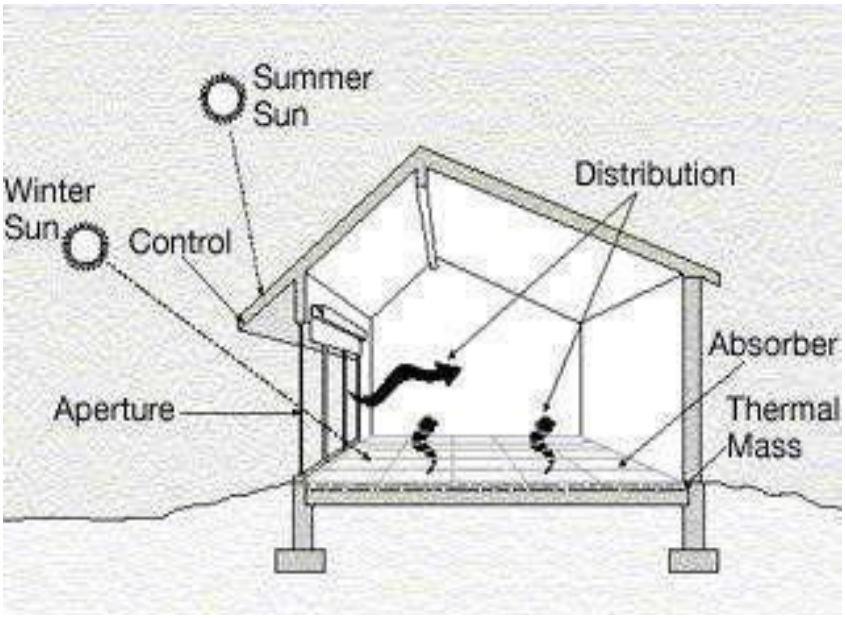
INTRODUCTION

India is a fast growing country. Rapid industrialization, increasing population, infrastructure development and destruction of natural resources lead to construction of green building. Green building is a structure that is environmentally responsible and resource efficient throughout its life cycle. Green building is also known for its sustainability and high performance. Thermal comfort studies on traditional residential buildings of Trichy that is known for its use of natural and passive methods for a comfortable indoor environment, are under progress. Passive methods of achieving thermal comfort inside the buildings are the best solution to provide a healthy and energy efficient indoor environment. This is of supreme importance for buildings in the tropics where mechanical systems with high energy consumption are used to condition the indoor environment for thermal comfort. The people are forced to depend on such systems because, majority of the buildings are designed without giving adequate importance to passive methods for controlling the indoor environment. In many cases, failure to provide the required thermal conditions has resulted in discomfort, ill health and productivity loss. Presently, there is a constant need to evaluate the thermal conditions of the indoor environments to learn further and proceed with the research in passive design. Water is a critical and finite resource. It covers over 71% of the Earth's surface and is essential for life, playing a key role in the production of food, human health and sustaining the natural environment.

OBJECTIVE

- To select and study the energy consumption of an existing residential building. Assessment of the selected building using green building assessing tools.
- To adopt techniques to convert the selected building into green building. To prepare a 3D model structure showing the green concept to be adopted

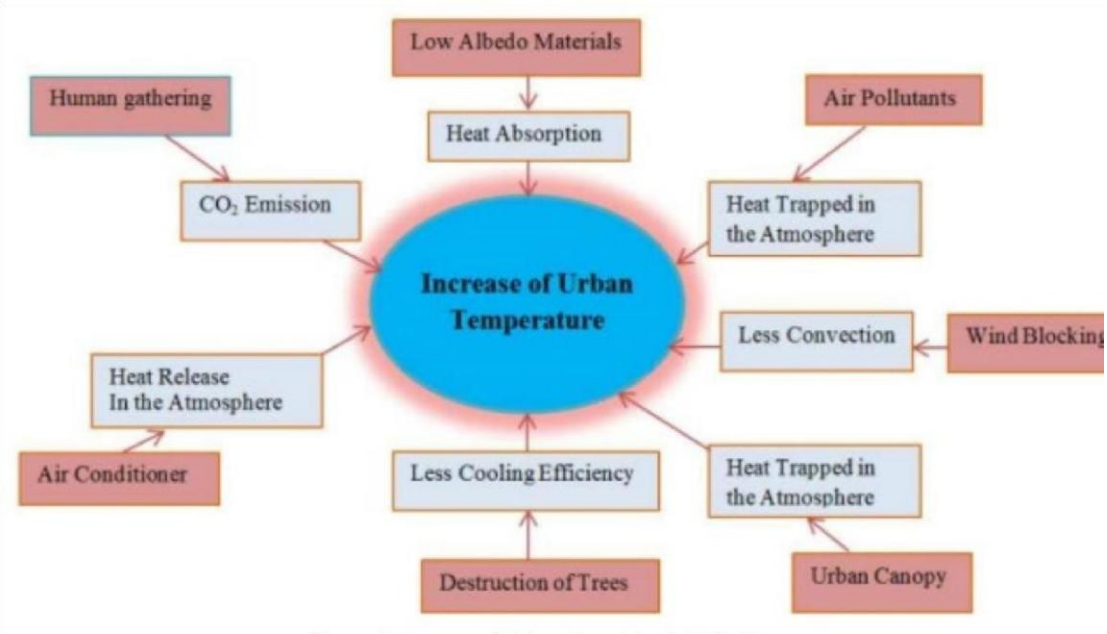
- To compare the conventional and green residential building in terms of passive design, material, energy, water use and energy simulation.
- To conserve the natural resources, reducing the soil waste or zero discharge of waste, improved air and water quality, protection of ecosystem and biodiversity thus mitigating the adverse impact of the built environment on human health.



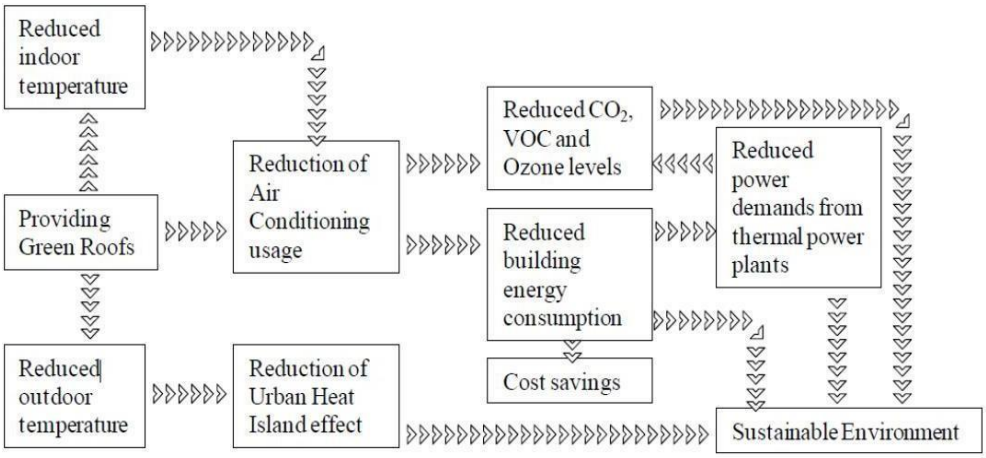
Three Primary Rating Systems For Green Buildings In India

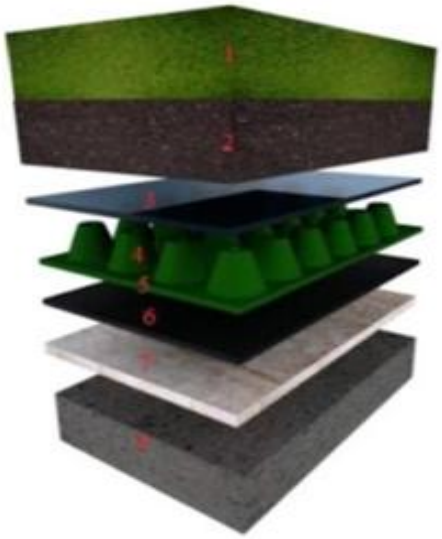
- GRIHA
- IGBC
- BEE

URBAN HEAT ISLAND (UHI) FORMATION



BENEFITS OF GREEN ROOF





1. **Vegetation**
2. **Earth**
3. **Filter medium**
4. **Drainage layer(projection)**
5. **Drainage layer(base)**
6. **Water proof membrane**
7. **Retention mat**
8. **Roof slab**

Table 1: Parameters of components of building

S. No	Category	Description	U-Value
1	Roof	100mm RCC + 50mm lime Concrete	2.78
2	Exterior Walls	Masonry wall-9 inches	0.4150
3	Interior Walls	Masonry wall-4.5 inches	0.4800
4	Ceilings	Concrete	1.3610
5	Floors	Vinyl flooring, no insulation	2.9858
6	Slabs	Concrete slab, un insulated	0.7059
7	Doors	Wood; metal	0.64; 1.20

CONCLUSION

As it had been discussed, the green roof proves to be more efficient both in terms temperature reduction and energy efficiency of a building.

The process of this project starts from creating 3D Residential building model and then simulating it with help of the softwares. Finally the temperature reduction and energy efficiency difference from the convention roof building has been found out.

The effect of temperature got reduced by nearly 20 KWh/m2/yr when the green roof was installed in the residential building.

Also considering other green concepts made the energy consumption to reduce many folds from 450.98-407 KWh/m2/yr

FUTURE WORK

The Life Cycle analysis(LCA) of all the materials can be made to estimate the CO2 emissions.
The same study can be made in different climatic zones of India.
The same study can be made in different types of building..
Photo voltaic panels can be installed in addition to green roof for better energy efficiency.

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