

# Green Building Implementation, Its Economical Benefits and Energy Saving: A Review

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**Abstract-** Due to adverse effects of construction on environment, modern construction started using the Green Building Technologies. Green building is an upcoming concept in the field of construction. Energy efficiency, considered as a key factor in the Green Building movement. It can save more than 70% of energy compared to conventional buildings. The data collected for this study is by observational and questionnaire methods by visiting the sites. This paper had understand the socio-economic and environmental factors underlying green building occupant satisfaction. Concepts like energy conservation, Solar panel Installation, Recycle and Reuse of plastics, Wastewater reuse and recycle, Rainwater Harvesting, solid and Hazardous waste management had discussed.

**Index Terms-** Environment; Green building; Hazardous waste; Solar panel; Wastewater.

## 1. INTRODUCTION

A green building is a structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner. They are designed to meet certain objectives such as protecting occupant health; improving employee productivity; using energy, water, and other resources more efficiently; and reducing the overall impact to the environment. Green Building idea promotes construction of buildings that are healthier for the occupants and healthier for the environment Sustainable. Energy resources and material consumption in buildings can contribute significantly to global climate change.

Objectivities of Green Building are Conserve Natural Resources, Increase Energy Efficiency, and Improve Indoor Air Quality.

Reason to Build Green buildings are to reduced urban island heat effect, reduced building heating and cooling effect, reduced air pollution and greenhouse gases, increased building durability, increased health factor both inside and outside building, increased water conservation.

### 1.1 Guidelines for Green Buildings:

- i. Very basic materials, building techniques and designs distinguish an energy efficient home. Sealing up air-leaks like construction cracks and building cracks should be done.
- ii. Increased attic, wall and foundation insulation, and installing high-performance windows and better doors completes the building "shell".
- iii. Using efficient electric lighting and plug-in appliances, and upgrading to high efficiency furnaces, heat-pumps and boilers further reduces energy

waste.

- iv. A floor plan and building orientation designed to admit winter solar heat, ample day lighting and avoids summertime sun further reduces energy waste.

## 2. CASE STUDY

Few places were selected for the green building study. Rajiv Gandhi International Airport, Hyderabad, RGIA is a green building consciously and efficiently made for transportation keeping in mind sustainability and economic growth.



Fig 1: Aerial View of RGIA Airport

### 2.1 Greening Building Concept at the Airport:

For maintaining ecological balance at Rajiv Gandhi International Airport (RGIA), green belt has been developed in an area of 273 hectares with various plant species and 971 hectares of natural greenery has been left undisturbed. RGIA received the best landscape award from the State Government during the years 2011, 2012, 2013 and 2014.



Fig 2 : Greenery at the parking and Pick up places.

### 2.2 Solar Panel Installation

Solar panel are the equipment that naturally absorbs sun's light and converts it into electric power. Large numbers of solar panel are installed on the roof of terminal building whose power is efficiently used and for 40 to 60% of power to the Airport is from the Solar Panels.



Fig 3: Solar Panels on the Roof top

### 2.3 Recycle and Reuse of Plastics

Plastic and other waste products were collected and recycled for reuse. Dustbin and waste bin (both wet and dry) are installed in the desired places.

### 2.4 Energy conservation

RGIA achieved energy saving of 3.97 million kWh (kilowatt hour) in the last four years from various energy conservation practices, thus reducing carbon footprint by about 3331 tons per annum. The same organization had received "Certificate of Merit" in National Energy Conservation Awards 2011 from Bureau of Energy Efficiency (BEE), Govt. of India and "Excellent Energy Efficiency unit" in National Energy Management Award 2014 from Confederation of Indian Industry (CII) for its achievements.

### 2.5 Lightening System

The Passenger Terminal Building at RGIA has 'Leadership in Energy and Environmental Design' (LEED) certification for its unique design, which allows maximum natural lighting, and other features that enable optimal use of energy and water.



Fig 4: LED lightening system at the Roof of the Shed

**2.6 Environmental Quality Monitoring:**

RGIA is the first airport in the India to commission an integrated online continuous environmental monitoring station. With this facility, the air quality parameters, ambient noise levels and meteorological parameters are monitored on real-time.



Fig 5: water Fountain giving a pleasance look at the Airport

**2.7 Wastewater Reuse & Recycle:**

Wastewater is being treated in Sewage Treatment Plant (STP) at site KG Reddy College of Engineering and Technology, and being reused for flushing and plantation. Sludge from STP is being used as manure.



Fig 6: Sewage Treatment Plant at KG Reddy College of Engineering and Technology

**2.8 Rainwater harvesting:**

At RGIA, the rainwater net recharge is estimated at 1.729 million cubic meter per annum. Surface water use and several water saving measures contribute to water conservation.



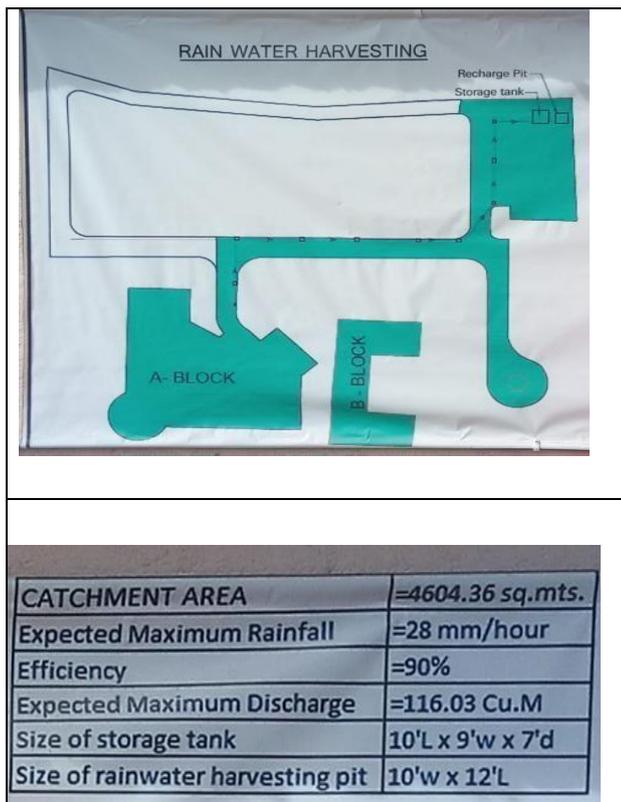


Fig 7: Rain Water Harvesting Structure at KG Reddy College of Engineering and Technology.

### 3. CONCLUSION.

With increasing degradation of the environment by various issues and because of increased energy consumption, environment, conscious building design has become urgent. The construction of such green buildings results in reduced destruction of natural habitats and bio-diversity, reduced air and water pollution, less water consumption, limited waste generation and increased user productivity. Finally, by following the principles of green building concepts the energy is well utilized without causing harm to the environment.

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