

DESIGN AND PLANNING OF Net Zero Energy- GREEN BUILDING

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Abstract:-A zero energy building is a building with zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy. Green Building (also known as green construction or sustainable building) refers to both a structure using of processes that are environmentally responsible and resource efficient through a buildings life cycle i.e. From siting to design, construction, operation, maintenance, renovation and demolition. A green building is a major consumer of resources and also a major producer of pollutants. A green building generally comprises of resources such as Water, Electricity and Energy etc. and it is also a major contributor of pollutants leading to pollution of Air, water, noise and energy. This directly leads to Climatic changes, deforestation, rising sea level and also loss of biodiversity.The aim of this study is to learn the various possible techniques and technologies to reduce the consumption of energy and resources by optimum utilization of resources which will leading to a net zero energy green building. Different techniques to reduce Waste and types of pollution are also studied. By combining both theories and practical ideas to plan a better future, by selecting the best and most practical techniques and methods, various service and support systems for the building can be planned.

I.Introduction

Due to the growing population there is a drastic increase in construction industry. In most of the developing countries people are migrating from villages to cities in search of jobs which has increased the no of cities and construction. Due to this there is tremendous increase in use of resources. The earth is dated to be 4.6 billion years old let's take it to a scale of 46 years so we have been here just for 4 hours and our industrial revolution has started just 1 minute ago and we have almost used 50% of our resources already The cities of today are plagued with crises such as Pollution, Waste, Health Problems, Wastage of resources thereby creating a scarcity, Poor transport Infrastructure, Health Issues.

At our current rate of consumption, it is estimated that by 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity and we only have oil for the next 46.2 years The natural gas in proven reserves can meet 58.6 years of global demand and we shall even run out of phosphorus in 50 to 100 years even the reserves of coal can meet 188 years of global production. Our civilizations are contributing to global crisis like Extreme Climate Change, Deforestation, Pollution, Loss of Biodiversity and Rising Sea Levels. Thus, it is high time that our approach to construction is modified. And thus, this project aims at taking next step towards this urgently needed reformation in construction methodology.

II.Green Building Rating System⁽¹⁾

The major green building assessment systems are GRIHA (Green Rating for Integrated Habitat Assessment), TERI (The Energy and Resource Institute), LEED (Leadership in Energy and Environmental Design) and SVAGRIHA (Small Versatile GRIHA). GRIHA assesses a building and provides points on the scale of 0-104, on this basis the building is rated between 0 and 5 Stars. GRIHA was developed by TERI and the Ministry of New and Renewable Energy has adopted it as the national rating system for green buildings in India.

III. Sustainable Building Life Cycle

Construction of a green building is not just confined in the building phase; it starts from selection of materials to reuse of demolition waste i.e. It has to be a cradle to grave approach. The construction of any building can be classified into three phases, The Pre-Building Phase, The Building Phase and The Post Building Phase.

A) Pre-Building Phase

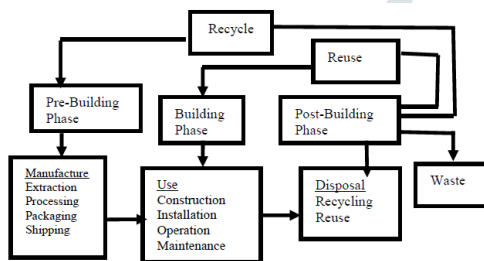
The Pre-Building phase includes planning of structure, materials, technologies and construction techniques etc. In this phase the planner has a very vital role to play as the whole building phase depends on how well the planning is done. From Material requirements to manpower and techniques everything has to be planned to know the environmental impacts. Knowing of this will help in selection of proper materials and technologies in the pre building phase. Understanding of all the aspects is very important the know the collective environmental impact.

B) Building Phase

The Building Phase is the time when the plans come to life, this phase includes selection of materials to minimize construction waste and planning on how the waste can be reused in the later building life cycle. This phase can be referred as one of the most difficult phase. It is the time when all the parts assemble to get us the final product.

C) Post-Building Phase

The post building phase refers to the time from when the building is completed to the reuse or disposal of its demolition waste. This phase includes maintenance of the building, regular servicing of technology, disposal of waste, water supply, Electricity Supply Etc. the waste generated after demolition is also to be considered to minimize the environmental effects.



IV. Compulsion on going green

Green building

saves resources in the entire life cycle of a building. 50% of material resources taken from nature are building related & over 50% waste produced is from the same, 40% of global consumption is related to building & 50% of global greenhouse emission is due to buildings, Green design has benefits for all stakeholders including owners and occupants. With the rapid growth in construction industry the resources are being exploited at a very high rate, which in turn is leading to massive changes in climate and environment. The population is expected to grow from 47% to 70% by the next 20 years. As of the increase in urban population there is also an increase in energy consumption the increase in energy consumption was about 6.5 % in 2016-17. India is en-route in becoming world's second largest emitter of greenhouse gasses. Due to these reasons it has become more important to convert our conventional construction methods into sustainable (Green) methods.

V. Concept of green building

The main concept to be included in designing a green building are Sustainable site planning, Building-Design, optimization of resources, Energy performance optimization, Renewal energy utilization, Water and Waste management, Solid waste management, Sustainable building material and construction technology and Health, wellbeing and environmental quality.

VI. Materials, Equipment's and Technologies.

As we aim to plan a building from its start so the primary steps that is the materials to be used comes into picture the green materials we plan to use are Bottom ash, Copper slag, Ferroch, Fly ash, Foamed Glass Aggregate, G.G.B.S., Quarry sand, recycled concrete and masonry, Silica fumes, Spent fire bricks. The Bifurcation of materials can be done as Cement and Cementitious materials, Sand, Aggregates, Concrete, Bricks and Blocks. In Equipment and technologies, we can use solar panels, wind turbines, solar windows, piezoelectric cells etc. for generating electricity, similarly technologies for rainwater harvesting and water treatment processes for reclamation of water. Solid and Sewage waste management is also one of the important Part in designing a green building.

VII. Green Building Economy and investment

As we know construction of green building consist a need of very huge capital but on a long run the investment is returned, it is predicted that energy efficient buildings can reduce about 7GT Co2 emission by 2050 i.e. about 158 billion dollars per annum globally. Green building is a win-win situation for all investors, developers, builders, policy makers, buyers and environment.

VIII Conclusion

From this study we conclude that green buildings are a necessity of this hour. The sooner we convert our old conventional methods into greener sustainable ones the better will our future be. Green buildings not only will help us reduction of pollution but also help in maintaining better environment. From our study we come to know that by 2050 50% of the buildings will be converted into green buildings.

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