

Zero Energy Building

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Abstract: A zero net energy building (ZEB) is a commercial or residential building with much lower needs through energy obtained such that the balance of energy needs can be contributed with renewable technologies. It is reported that 30 to 40% of the primary energy used worldwide in buildings. The use of high energy may affect the environment directly or indirectly also it originates climatic change degrading the environment and expand the air pollution. Hence it's important to make smaller energy use in building great environmentally sustainable. To overcome this problem zero energy building concept is developed. In this paper we have to study and analyse the performance of zero energy building and also give an overview on an existing building to make it a proper net zero energy building.

Keywords: Energy consumption, Building, Climatic change, Zero energy building.

1. Introduction

The term zero energy residential building is defined as a building with zero net energy consumption that is the building utilizes the total amount of energy on yearly basis is nearly equal to the total amount of reusable energy produced on the site. Our country India is a developing country and becomes the largest energy consumer in the world. This is because of increase in industries and globalisation which also enlarges the energy demands of the consumer. It is declared that the urban area contributes 70% and the housing construction and estate development contribute 40% of the greenhouse gas emission (GHG). Few researchers reported that the building contribute approximately 50% of the world's air pollution, 42% of greenhouse emission, 50% of water pollution and 48% of solid waste to the environment. Recently there are only few number of highly efficient buildings that fulfil the criteria to be called net 0. As a result of uses of modern technologies in construction, reusable energy system and academic research producing net 0 energy building becoming more and more feasible.

2. Literature Review

A statistic given by the ministry of statistic and program implementation, Government of India gave information that per capita energy consumption expanded about five times in three decades during 1980 to 2010. This is because of increasing urban living standards. In India the energy used in buildings or reusable for at least 32 to 40 % of total energy usage and the energy consumption demand is increasing per year at 11 to 12

% . Maximum energy is used for heating, cooling and for other appliances. Primary generators of greenhouse gases or buildings thus give warning to the environment also becomes warning issue and hence it is important to develop energy efficient building which would facilitate the reduction of energy usage and minimize greenhouse gases. Nowadays India is designing the building to minimize the energy consumption water requirement and technologies developed to recycle used water for secondary usage.



Fig. 1.

Nicolae Bajenaru et al taken out a work related to the design of a net zero office building with mixed more ventilation system which assures the thermal comfort of the habitant according to the ASHRAE 55/2010 standard in India with the rational use of energy and a minimum environment impact. The study depends on the use of easily assessable material of the building and customary air conditioning equipment's in order to fulfil the requirements.



Fig. 2.

Isamuhta et al proposed that the idea of zero lcc O2 whom is to minimize the early use of energy and improve solar energy use so that photovoltaic energy generation substantially exceeds the total energy usage of the building. He describes the early

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carbon dioxide omission owing to energy use. He imitated the yearly use of energy and carbon dioxide balance the house and evaluate the personified carbon dioxide of the house using and input output analysis and accumulation method. He describes that the material added for the efficiency of the energy and carbon dioxide emission during the manufacturing and construction period have a positive impact on minimizing the Lcc O₂ of the home.

Reshmi Banarjee proposed that the net zero energy building do not increase the amount of greenhouse gases in the environment. In the building grid interaction, the net zero energy building become an active part of the renewable energy infrastructure and he noticed that raising number of building are meeting this standard, increasing confidence that a net energy goal is realistic given building technologies and approach.

Masa N Noguchi et al create eco para housing proto type which was made to be energy efficient to reduce negative effect on environment. The examination shows that the house experiences about net zero energy use and the housing gives its resident with comfortable and healthy indoor living environment.



Fig. 3.

Mansi Jain work goals to evaluate the Governance context for acquiring and uptake of net zero energy building through Niche formation in India. They announce that the governance context is slightly supportive towards net zero energy building Niche formation and this is because of qualities and flexibility, average extent and intensity. They also announce that the equipment and plans related to energy efficiency and integration of reusable energy in buildings are present. Although they are not part of entire programme. The energy usage of residential buildings has rapidly grown in the recent years, thus increasing a challenge on zero energy residential building system which aims at substantially decreasing energy usage of residential buildings. Thus how to ease zero energy residential buildings has become a hot but difficult topic. In the paper, I proposed overall design principal of zero energy residential building based on the examination of the system in luxury demand. In particular, the framework for both schematic design and passive technology is maximized and both energy simulation examination and energy balancing examination are executed, followed by the carryout the selection of high efficiency devices and reusable energy resources for ZERB. Also the old Chinese residential building has been explored in the suggested case in which sum of the important factors like

building maximation, passive design, PV panel and HVAC system combine with solar water heater, phase change materials, natural ventilation etc. has been taken into account.

3. Materials and Methodology

In this work we want to study and examine the zero energy building present in India. The work we done will be taken on the basis of requirement of zero energy building and methods adopted minimize the building energy usage and energy preservation. We have recognized zero energy building in India for our work. The building is energy sufficient building and consume reusable sources for heating and solar passive energy to control and functioning the electrical and electronic appliances.



Fig. 4.

4. Result and Discussion

Indira Paryavaran is India's first energy efficient home with a total plinth area of 31488 sq. m. It covers only 30% of the total area, while more than 50% area outside a building is a soft area with plantation and grass. The paryavaran is designed such that this building reduces the usage of electricity and water. The building is designed by CPWD by using an integrated design approach with the help of multi-disciplinary field experts like Architect, electric consultant, HVAC sub missioning authority landscape consultant, structure consultant and other project team members. On site SCC with SAB/MBBR technology constructed to reuse the total amount of water to make zero waste water. Water usage has been minimized by 64% by giving water efficient fixtures. Top of the building, courtyard and corners are fully rapid by the solar PV panels which makes the building shaded and make the micro climate cooler. In this building there is solar PV system installed in a 6000 m sq area of mine 30 QW capacity this also helps to reduce the usage of energy.

5. Conclusion

The zero energy concept will minimize global warming and also reduces the future energy demand. The strong point of zero energy building Indira Paryavaran is that the entire building is made keeping sustainability and green building in mind. Every point of the building was designed and organized with green point of view, showcasing the latest in HVAC technologies close to the alongside reusable materials. Also it is important to maximize the consumption of water, cold water, hot water and STP and solar energy changing using acceptable energy

changing devices The building automation system will help out in maximizing the above said variables. The zero energy building is also ecofriendly, in this there is geothermal heat exchange system, also there are grass pavers in surrounding areas. All the features of the zero building are Ecofriendly like regenerative, lifts, terrace garden, energy efficient, air conditioning system and lighting.

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