

Implementation of Net Zero Energy Concept on Pimpri Chinchwad Polytechnic Building

Sharli Bhosale

*Department of Civil Engineering
Pimpri-Chinchwad Polytechnic, Akurdi, Pune*

Akanksha Patankar

*Department of Civil Engineering
Pimpri-Chinchwad Polytechnic, Akurdi, Pune*

Pradnya Pawar

*Department of Civil Engineering
Pimpri-Chinchwad Polytechnic, Akurdi, Pune*

Shivani Patange

*Department of Civil Engineering
Pimpri-Chinchwad Polytechnic, Akurdi, Pune*

Vijeta Kundlikar

*Department of Civil Engineering
Pimpri-Chinchwad Polytechnic, Akurdi, Pune*

Abstract

As the name suggests Zero Energy Building it is also known as Zero Net Energy Building, which means that the building that generates as much energy through renewable sources as much as it consumes from the grid. The concept of zero energy building [ZEB] has gained wide international attention during last few years and is now seen as the future target of the designs of buildings. However, before being, fully implemented in the national building codes and international standards, as the concept of zero energy building has been put forth for the Pimpri Chinchwad Polytechnic to reduce its energy consumption [electricity] and also the result for this implementation will be as follows:- High efficiency level - The acceptable renewable energy supply option - Use of natural resources.

Keywords- Solar Panels, Energy Consumption, Structure, Environment, Pollution

I. INTRODUCTION

Zero energy also known as Zero Net Energy Building with net zero energy consumption, which means that the battery less system working in synchronization with the grid power. Also in these buildings consequently do not increase the amount of greenhouse gases in the atmosphere.

After the discussions about the topic the concept of Net Zero Energy is suggested to put forth the proposal for the project on Pimpri Chinchwad Polytechnic to reduce its electric supply from main electric supply power house and also the use of solar panels will act as back bone for the generation of electric power.



Fig. 1: Net Zero Energy concept

II. OBJECTIVES

Zero Energy Buildings are designed to reduce overall impact of built environment on human health and natural environment by:

- Easy way to reduce energy and water consumption
- To decrease electricity consumption in building

A. Necessity

The electric energy is produced from fossil fuels. Fossil fuel is burnt to produce energy which causes pollution to environment. Fossil fuels are also non-renewable source. It will take millions of years to be replenished, so to save these fuels the use of solar energy through the solar panels is essential.

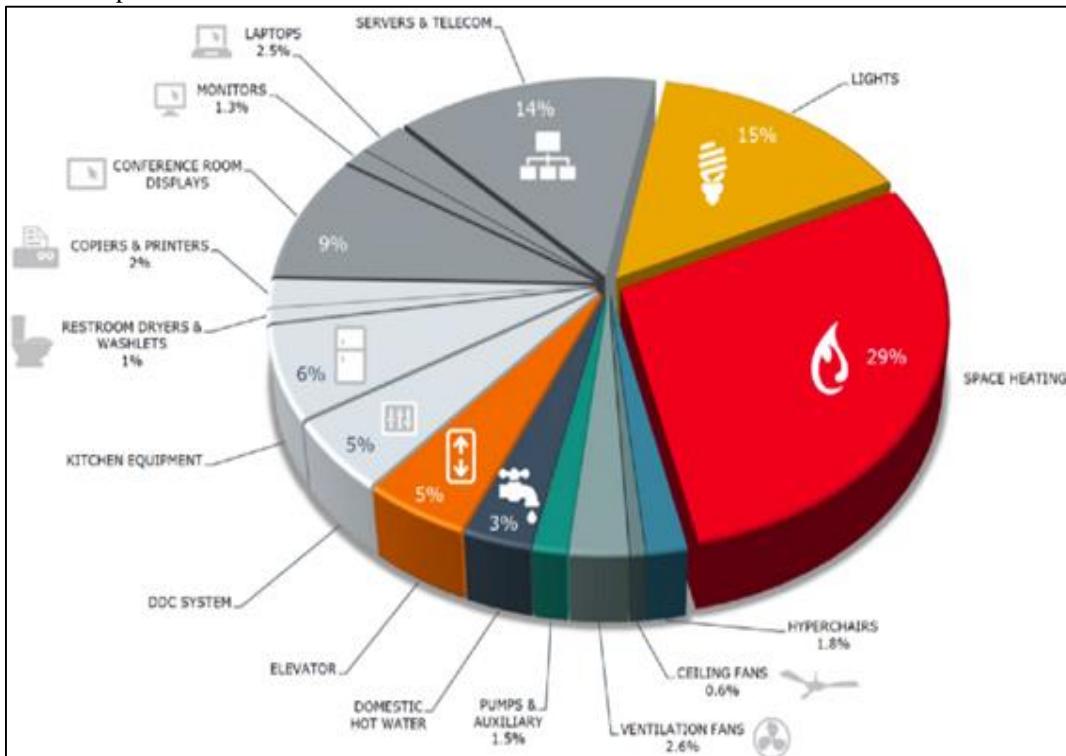


Fig. 2: process of produce energy

III. HISTORICAL DEVELOPMENT

India's first net zero building is Indira ParyavaranBhawan, located in New Delhi. Features include passive solar building design and other green technologies. The electricity grid, the primary source of power in India, has not kept pace with the rising demand.

IV. ADVANTAGES

- Reduce requirement of energy
- Reduce total net monthly cost of living
- Extra cost is minimized for construction
- Reduce total cost of ownership due to improved energy efficiency
- Higher current/lower voltage features enable easier system design

V. DISADVANTAGES

- Initial cost can be higher
- For design purpose skilled labors are required
- Very few designers have knowledge about constructing net zero energy buildings

VI. LITERATURE REVIEW

- The reviewed literature has indicated that there is wide diversity among ZEB definitions, thus definitions are divided into number of groups in order to spot light the most important topics for the discussion before formulating a ZEB definition.
- First approach raises the issue of what should be equal to zero in ZEB definition should it be primary energy, end energy, CO₂ emissions, energy or may be energy

VII. SOLAR PANELS

Solar panels absorb the sunlight as a source of energy to generate electricity or heat. The solar panels are free from maintenance, it does not require maintenance except of cleaning the above glass of panels, which need to be cleaned at certain intervals. Once this panels are fitted there will be no problem till 25years.

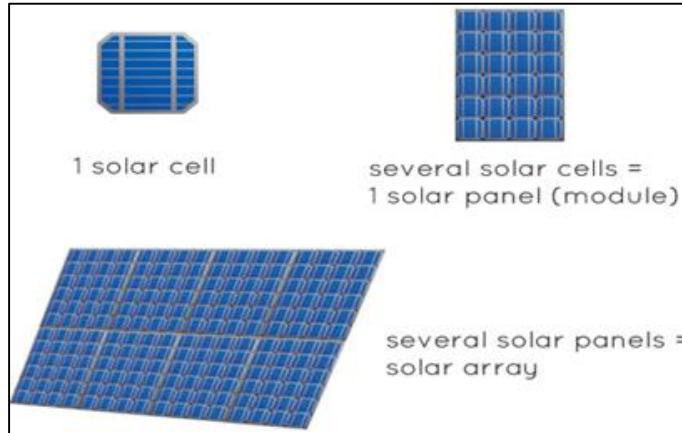


Fig. 3: Solar Panels

VIII. SYSTEM DEVELOPMENT

- We are implementing the idea of Net Zero Energy building on Pimpri Chinchwad Polytechnic building with reference to Indian Railway Institute of Civil Engineering.
- For first we calculated total area of the building and also total energy consumed by each building.
- For calculating total energy consumption by the building we calculated total number of equipment's present in each building.
- The area calculated for 'A' building is 16X12m
- And that area for 'B' building is 44.6X13.05m
- Total number of panels that can be fitted = 516 panels
- After all calculations the total number of panels required = 495 panels.
- And the total cost these panels = 495X25,000/-
= Rs.1, 23, 75,000/-



Fig. 4: Pimpri Chinchwad Polytechnic building with reference to Indian Railway Institute of Civil Engineering

IX. CASE STUDY

- Built up area - 8860 m²
- No. of floors- Stilt + four floor
- Total plot area-108m×68m
- Work sanctioned in WP 2004-05 at a cost of Rs. 3.86 cr.
- During finalization of plan it was decided to construct it as “Green Building”
- Accordingly, a proposal for phase II was initiated at a cost of Rs. 4.855 cr. To include green building features in WP 2007-08



Fig. 5: Green Building

X. CONCLUSION

Zero Energy Building which saves energy and also it comes from renewable resources.

The Zero Energy Building movements and technologies is for the benefit of individuals, society, country and global environmental concerns at large.

- 1) There will be very much chances of installation of this plant as it are based on renewable resources.
- 2) Day by day people are literate so there will be chances of installation of this plant.
- 3) This concept of Net Zero Energy is not completely dependent but acts as a backbone for the consumption of energy.
- 4) As its initial cost is more but its maintenance cost is less and also it is one time investment and there is no further use to pay money.

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