



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## “Zero Energy Building”

<sup>1</sup>Kalpesh Memane, <sup>2</sup>Rutuja Bagal, <sup>3</sup>Kirti Yadav, <sup>4</sup>Saurabh Tahmane, <sup>5</sup>Aditya.Dhekale

<sup>1</sup>Student, <sup>2</sup>Student, <sup>3</sup>Student, <sup>4</sup>Student, <sup>5</sup>Guide

Department of Civil Engineering  
Jayawantrao Sawant Polytechnic,  
Pune, India

**Abstract:** The main objective of this paper is to study and design the zero-energy residential building. Building with zero energy consumption, measure the total amount of energy used by the building on an annual basis is roughly equal to amount of renewable energy created on the site. According to the survey a major effect of building on the total worldwide energy consumption level i.e. around 40% of the total energy is used by the building.

### I. 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 zero energy building becoming more and more feasible.

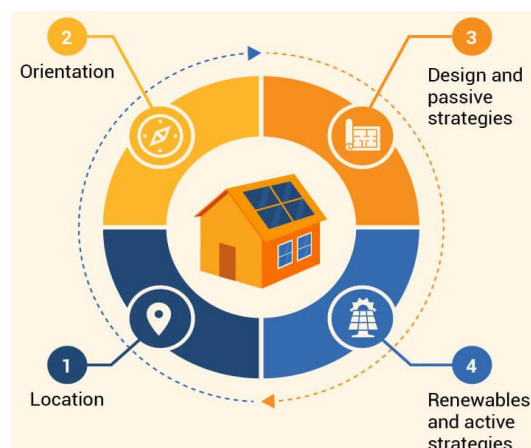
### II. AIM

To create energy efficient building by using natural resources.

### III. OBJECTIVE

- 1) To promote energy efficient building design, i.e. to minimize energy use and negative environment effect of building.
- 2) To maximize use of renewable and natural resources in building environment.
- 3) Thermal comfort for the inhabitants.

### IV. METHODOLOGY



Methodology.

- **Location**

The site should be free of obstructions

- **Orientation**

1. Be flat or south –sloping
2. south – Facing walls for maximum solar energy gain
3. High level windows captures winter sun and crats colling currents in summer.
4. North is the preferable direction to position windows and living areas

- **Design and passive strategies**

Passive design strategies are decided on the climate of the place. Temperature and humidity mainly determine the type. Passive design strategies help us maintain thermal comfort inside a building without the use of electricity as heating and cooling require the most.

- **Design and Active strategies**

In Active strategies energy consumption through the use of renewable energy strategies; Such as photovoltaics, wind power, solar power, solar thermal and wall insulation.

- **ADVANTAGES.**

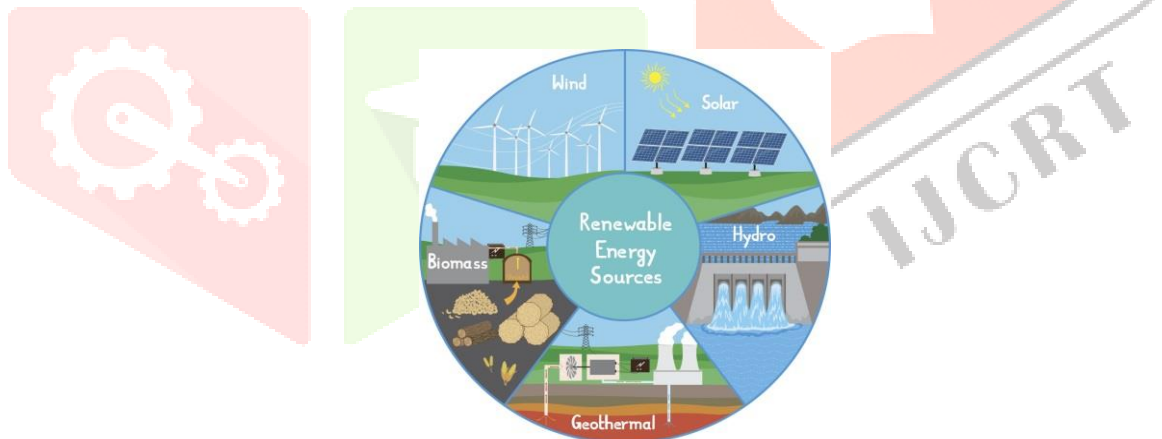
1. Isolation for building owner from future energy price increases.
2. Increased comfort inside the house.
3. Reduced requirement for energy.
4. Minimized extra cost.

- **DISADVANTAGES.**

1. Initial costs can be higher.
2. Lack of skills or experiences to build ZEB.
3. ZEB may not reduce the required power plant capacity.

## V. RENEWABLE ENERGY RESOURCES

Renewable energy, often referred to as clean energy, comes from natural sources or processes that the constantly replenished. And the renewable energy resources include solar energy, wind, geothermal, biomass, waves and tides.



RENEWABLE ENERGY RESOURCES

## VI. SUN AS RENEWABLE SOURCE OF ENERGY

Active solar include the use of photovoltaic system, solar power and solar water heating to harness the energy.

Solar panels are placed on the rooftop or windows of the building, or anywhere maximum solar energy is received through year.



SUN AS RENEWABLE SOURCE OF ENERGY

## VII. WIND AS RENEWABLE SOURCE OF ENERGY

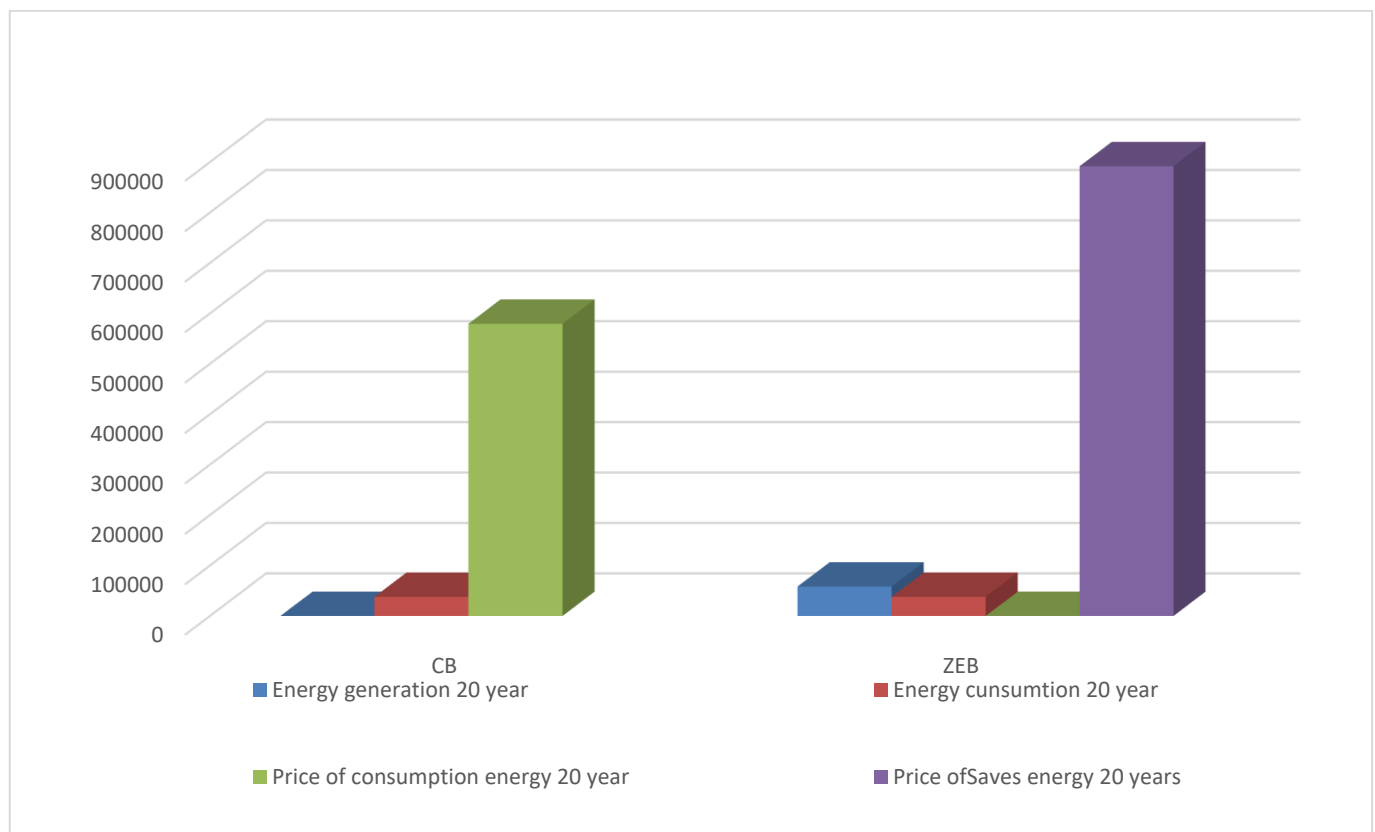
Wind energy is a source of renewable energy. It does not contaminate, it reduces the use of fossil fuels, which are the origin of greenhouse gases that cause global warming



WIND AS RENEWABLE SOURCE OF ENERGY

## VIII. Result

Building type	Energy generation 20 year	Energy consumption 20 year	Price of consumption energy 20 year	Price of Saves energy 20 years
CB	0	37996 kW	579562 Rs	0
ZEB	58400 kW	37996 kW	0	+891988 Rs



Using 30% to 40% of all energy resources, housing stock can reduce it. According to the above calculation, we can save and generate electricity by using natural resources but it will be 58400 kwh in 20 years.

And save Rs. 891988, as well as source of co2 emission factor data base (CEA) emits 0.85 kg co2 per kwh co2 so we can save a total of 49640 kg carbon emissions in 20 years and greatly reduce the stress on electricity in our country.

#### IX. CONCLUSION.

The zero-energy building concept will help to reduce the Global warming and helps to retain the nature. In zero energy building using solar energy is the best energy source to save the energy and cost efficiency. The installation of solar panels initially will be costly, but as we know that it will reduce the energy consumption so the owner of the building in future, they can save money on their electricity bill. The solar panels that would be installed on the back side of the building, which should be facing south.

#### X. REFERENCES

1. P. Torcellini, S. Pless, M. Deron, D. Crawley "Zero energy buildings: a critical look at the definition. "National Renewable Energy Laboratory and Department of Energy, US (2006)
2. National Renewable Lab [www.nrel.gov/docs/fy06osti/38601.pdf](http://www.nrel.gov/docs/fy06osti/38601.pdf)
3. [www.energy.ca.gov/title24/2005standards/archive/rulemaking/documents/td v/](http://www.energy.ca.gov/title24/2005standards/archive/rulemaking/documents/td_v/). Sacramento, CA: California Energy Commission