



## A Review on Solar Buildings

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### ABSTRACT

Solar construction is a creative approach to use the sun to our advantage for heating and cooling, based on the architecture of buildings, and is a notion within the expanding green building trend. The thickness of the wall has been increased, the outer wall's geometry has been altered, and engineers have experimented with different building materials in an effort to lessen temperature variations for internal environments in both summer and winter. In order to be comfortable, heating and cooling systems have been installed in residences, workplaces, and public spaces. This has resulted in excessive energy consumption and, as a result, increased environmental pollution.

Keywords: Solar construction, Solar building, environmental pollutions

### 1. INTRODUCTION

Over the last decade, there has been a lot of pressure on energy consumption in domestic households. Industrial and technological innovation, population growth and rapid utilization led to an increase in energy consumption. Dependency on foreign sources of energy and their negative environmental impact have energy efficiency and conservation critical issues. 35-40% of our energy is consumed by buildings and 85% of that is need solely for heating.

A solar energy system is a collection of interconnected components created to gather, store, and release solar radiation energy as needed for a particular purpose. The weather affects how well solar energy systems work.

For instance, in a solar heating/cooling system, the energy demand and the energy gathered are both functions of solar radiation, the surrounding temperature, and meteorological factors. The annual per capita energy consumption, which primarily takes the form of electricity, has consistently increased along with the intensity of energy use.



Fig 1 Solar building

### ***1.1. Solar energy building:***

India is one of the leading generators of solar energy in the world owing to its ideal geographical location. The nation experiences 300 days of annual clear sky and tropical sunlight. IEEFA and JMK Research project that India will have increased residential rooftop solar capacity by 60% to **3.2GW** by March 2023, with Gujarat, Maharashtra and Haryana states leading the way.

Due to their inexpensive installation costs and other money-saving advantages, rooftop solar panels are growing in popularity these days.

Solar panels, an assembly of photovoltaic cells (also known as solar cells), an inverter, AC/DC switches, and electrical conduit are needed to install a rooftop solar system. Building roofs can simply be fitted with rooftop solar panels to capture solar energy.



**Fig 2** Roof top solar panel installation

### ***1.2. Installation of solar panels in buildings:***

Before installing solar panel, we need to consider certain things. They are:

#### **Condition of the roof:**

Rooftop solar panels are mounted on the roof and have a 20–25-year lifespan. The condition of the roof should be carefully examined prior to installation.

#### **Slope of the roof:**

The effectiveness of solar panels is greatly influenced by the slope of a roof. A roof that faces north is ideal since rooftop solar panels installed there will produce the most electricity. The roof's pitch ought to be between 10 and 30 degrees.

#### **Calculation of weight the roof can withstand:**

Every roof has a limit to how much weight it can support before it starts to collapse. Solar panels unquestionably add to the weight on the roof. Therefore, you must ascertain the weight that your roof can support.

#### **Rate of consumption of the building:**

Depending on the appliances, different buildings have varied needs. Therefore, it is wise to assess your building's needs before installing a rooftop solar panel.



**Fig 3** installation of solar panels

### 1.3. Working procedure for solar panels:

- Sunlight struck the photovoltaic (PV) solar panel and was absorbed by semi-conducting materials like silicone.
- The photovoltaic (PV) effect occurs when electrons are dislodged from their atoms, allowing them to move through the material and generate electricity.
- Solar power is converted into direct current (DC) electricity using solar panels.
- An inverter receives the DC power. The inverter converts DC power to 120-volt AC power (alternating current)
- The utility panel in the house is where the ac electricity enters. Then, the load or power is distributed to the home's lights or appliances.
- When extra solar energy is produced, it can be stored as direct current (dc) electricity in a battery and will continue to power your home.
- If your system is connected to the utility grid, the extra electricity can be exported back into it after the battery is full.



**Fig 4 Front view of building**

## 2. FUTURE SCOPE

In the future, passive solar building design will be based on the materials and technology currently in use. To optimize the advantages of passive solar energy, the tactics, and techniques currently in use will be reproduced in a variety of ways based on the region and resources available. One can anticipate that passive solar building designs will evolve to include new technologies as they become available in order to maximize their effectiveness. However, the specific building design in terms of passive solar energy has reached its peak at this moment.

## 3. CONCLUSION

They do not require mechanical or electrical aid to work effortlessly and softly. Heating costs can be cut by up to 40% a year while simultaneously increasing the comfort of living spaces. Simple methods can have a significant impact on comfort and energy usage over time. A well-insulated home will be warmer in the winter and cooler in the summer, and this is the most cost-effective alternative. It is a superior choice.

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