

What are energy-saving buildings?

Energy-saving buildings (ESBs) are attracting extensive attention as intelligent architectures capable of significantly reducing the energy consumption for heating, air-conditioning, and lighting. They provide comfortable working and living environment by regulating and harnessing solar energy.

Can solar energy save energy?

As it is known that the sector of buildings is responsible for about 35% of the final energy consumption and for the 40% of the gas emissions, it is estimated that the saving of energy can arrive at 60% when solar energy systems are used for heating and cooling purposes.

Can solar energy be used as a building energy system?

In solar planning for building energy systems, either solar photovoltaic (PV) or solar thermal collectors (STC) can be considered. One primary issue associated with solar energy is the need of energy storage to cope with its unstable nature and seasonal cycles that mismatch the demand cycle.

Why do we need solar energy?

Accelerating the transformation of energy consumption structures and developing renewable and new energy sources are paramount. Solar energy, as a renewable resource, stands out for its abundance, ubiquity, and cleanliness, making it increasingly valued in energy-efficient building applications.

Can a photovoltaic roof save energy?

These roofs can utilize either building material-integrated photovoltaics or standalone photovoltaic installations to achieve their energy-saving objectives. Since the 1970s, numerous developed countries have pioneered the integration of photovoltaic components onto building rooftops.

Can solar energy help in renewable planning in the studied climate?

The results can help in renewable planning in the studied climate. Solar energy application in buildings is expected to play a major part in the global effort of carbon reduction considering that the global building sector accounted for 36% of energy consumption and 37% of CO₂ emissions in 2020 (IEA 2021).

As the energy use in buildings encompassing indoor heating, air-conditioning, lighting and ventilation accounts for 40% of global energy consumption, the construction of energy-saving buildings (ESBs), an intelligent system that can improve resource utilization and building efficiency to minimize the energy consumption via regulating and harnessing solar ...

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What is Energy Efficiency in a Building? The energy efficiency in a building can be explained by its main aspects, which are discussed below: 1. Nearly Zero-Energy Passive Building Design. The design of a nearly zero-energy passive building involves adopting all solar passive strategies at the design stage before actual construction begins.

Buildings consume about 40% of the global energy. Therefore, the building sector plays a key role in achieving the goals of carbon peak and carbon neutrality. Various energy-saving technologies for buildings, such as building envelopes, mechanical systems, and energy resources, have been developed to help to achieve zero- or even net-energy buildings while ...

The depletion of global resources has intensified efforts to address energy scarcity. One promising area is the use of solar photovoltaic (PV) roofs for energy savings. This study conducts a comprehensive bibliometric analysis of 333 articles published between 1993 and 2023 in the Web of Science (WOS) core database to provide a global overview of research on ...

1. Introduction. Energy is one of the most important resources in modern society, and the energy consumption of the construction industry accounts for ~40% of the global energy consumption [].With the continuous ...

This paper proposes an energy-saving strategy with assistance from solar thermal compensation for building energy systems. The target of the control strategy was to ...

They are designed to provide the same level of performance as traditional appliances while consuming less energy, making them an ideal choice for energy-efficient buildings. 8. Promote Energy-Efficient Behaviour. ...

When the sun shines on a solar panel, solar energy is absorbed by individual PV cells. These cells are made from layers of semi-conducting material, most commonly silicon. The PV cells produce an electrical charge as they become energised by the sunlight.

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