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Research Article

INCREASING THE ENERGY EFFICIENCY OF BUILDINGS USING SOLAR ENERGY

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Abstract

This article is devoted to the application and use of innovative solar devices to increase the energy efficiency of buildings using solar energy.

Keywords

Solar energy, barrier structure, thermal conductivity, helium device, collectors.

Introduction

The construction industry has been developing in the last ten years. Measures to improve heat protection of buildings under construction in countries around the world, energy crises in recent years are driving their development. Since the 1990s, in many foreign countries, the standard size of external barrier structures protecting against heat has increased several times.

The requirements for heat protection materials used today are constantly increasing, the standards of thermal conductivity are accelerating for some construction structures, as well as for all buildings and structures.

A comprehensive approach to energy saving is necessary to reduce heat loss. The main purpose of the compactness indicator is to serve as a coefficient equal to the ratio of the external wall surface to the internal volume of the wall. Cylinder, hemispherical and other non-traditional shapes can be used to decorate the outer wall surface. In order to reduce energy consumption, the standards for the design of building envelope elements are being reviewed, modern protective materials for their heat protection properties, application of standards and elimination of infiltration, ventilation through windows and doors, etc. is being implemented by applying; Also, it is possible to increase the energy consumption of building rooms by differentiating them according to the order of use [1]. It is recommended to place low-heated rooms (closets, warehouses, santuguns, garages, etc.) as buffer elements transversely to the north. It is very important to plan building areas and their proper orientation. In order to effectively use solar radiation, the southern wall or roof of the residence should be exposed to sunlight from 9:00 AM to 3:00 PM even when the weather changes. It is necessary, and measures should be taken against the southern part of the facade of the building to remain in the shade.

Nowadays, helioarchitecture is developing rapidly all over the world. It is known that a two-story house in a sunny area can provide itself with electricity, and can prepare a reserve for the winter. For this, it is enough to equip the roof surface with solar batteries.

Calculation of shading of panels is carried out according to existing methods. Practical recommendations for moving the panels away from shading objects: in the southern regions - 2N; at 400 latitude - to 2.4N; At 450 latitude, it will be equal to 3N. N is the height of the shading object above the panel level.

Scientists are not satisfied with this approach. They are creating third generation helium receivers [2]. When the inventions of the first generation began to be adopted only by the southern population, the second generation - the locator helium receivers - began to be used in experimental trials.

Today, research and experimental testing of the use of solar energy is carried out in two directions:

1. Low-power (low-temperature) heating for providing hot water, for heating civil and agricultural buildings and structures;

2. Medium and high-power thermal technological processes, obtaining various materials for synthesis and melting;

The main reason preventing mass use of solar devices is the height of its comparative price of 1500-3000 US dollars per m3/day, the payback period is also long, in general, the payback of solar devices can be determined according to the following formula [3]: Today, research and

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$$T=S_c/(QCT),$$

Here Sc is the comparative price of the solar system, soum/m2

Q-the amount of annual heat released from the roof of the solar installation Gcal/m2;

CT - traditional energy source issíqlík price, sum/b cal.

The formula for determining the duration of energy compensation for the provision of hot water without additional heating:

$$T\text{Э} = \frac{[\sum(m_r \text{Э})_r - \sum(m_y \text{Э}_y)]1{,}2}{Q_r n}$$

Where $\sum(m_r E_{r)}, \sum(m_y E_u)$ are the total sums of energy capacity and weight of helium devices, solar collectors and auxiliary construction materials;

Qr is the amount of heat produced by the heating plant in the middle of one year and the calculation period of its use.

The coefficient of 1.2 takes into account the energy consumption during the installation of the solar system.

3 building energy payback periods, which are distinguished by wall constructions, heat-absorbing stone and heat protection:

- brass pipe heat-absorbing panel steel thermal protection, energization and DVP beam structure energy compensation period -1.04 years;

- the energy recovery period of the same aluminum heat-absorbing ribs, steel sheet - 1.16 years;

It can be seen from the obtained data that the energy recovery period of the first structure of the collector is shorter than that of the second structure, and this is due to the high energy capacity of aluminum. The results of the calculations also show that the comparison of the price index only with the traditional sources of the supply of helium devices with electricity is not objective [4].

It has been fully proven that these devices are ecologically clean and harmless in modern times. The use of these environmentally friendly solar batteries has developed well in our country, and in the last year, all state institutions have been equipped with these devices.

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