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Increasing the Energy Efficiency of Buildings

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Abstract: In the article, the conversion of fuel into energy, to a greater or lesser extent, releases harmful waste into the atmosphere, damages the environment, intensive use of land, extraction of raw materials, reduction of the number of lands suitable for agriculture, reduction of the natural environment for human habitation.

Keywords: Archaeological data, sunlight, atmosphere, agriculture, architectural construction.

Since the beginning of the earth's surface, man has been using the sun's rays. It is known from archeological data that for living, people chose places that are calm, protected from cold winds, and receive sunlight. Myths were woven about the sun, they deified it. In ancient Egypt, Ra was considered the god of the sun. The statue of Amenkhontepa III of the 15th century before our era can be called the first famous heliosystem. Air and water chambers on the inside of the statue moved a musical instrument covered by sunlight. Helios was worshiped in ancient Greece.

This god's name is the basis of many terms associated with solar energy today. In the ancient Slavs, Dojdbo was deified as the sun, the source of heat and light. There were such mysterious structures in ancient times that we can assume that they were used as solar collectors.The origin of construction architecture in Central Asia, especially in Uzbekistan, dates back to the 3rd century AD. Many buildings and structures built in the 9th-10th centuries and preserved until our time are rightfully considered the pinnacle of construction art.

Buildings and structures built in Samarkand, Bukhara, Khorezm, Tashkent and other cities in the XVI-XVII centuries testify to the high school of architecture and construction, these buildings and structures clearly have an internal and external environment that takes into account the appropriateness of form and spatial composition, natural-climatic and urban planning conditions. The implementation of the Law of the Republic of Uzbekistan "On the Rational Use of Energy" allows determining the issues of conservation and rational use of energy resources, increasing the efficiency of environmental protection, protection of human health, and wide use of alternative energy sources.

It is known that during the conversion of fuel into energy, to a greater or lesser extent, harmful emissions are released into the atmosphere and damage the environment. Intensive use of land, extraction of raw materials, reduction of the number of lands suitable for agriculture, reduces the natural environment for human habitation. It is known that 90% of primary energy is lost during extraction, production, transportation, storage and consumption of energy resources. This leads, first of all, to the fact that raw materials go through many technological processes before reaching the consumer, and to the increase in the cost of traditional energy supply.

Therefore, architects and builders are required to use design solutions that take into account the conservation of natural resources and the efficient use of newly created energy sources and, first of all, solar energy in working projects of the urban structure and individual buildings in the development of concepts for the development of architectural design of the 21st century.

Renewable energy sources include solar energy, wind energy, (river) hydropower, currents, waves, and deep underground energy. In the heat balance of the country, non-renewable sources of energy make up 90%, of which 30% is oil, 40% is gas, and 20% is coal.

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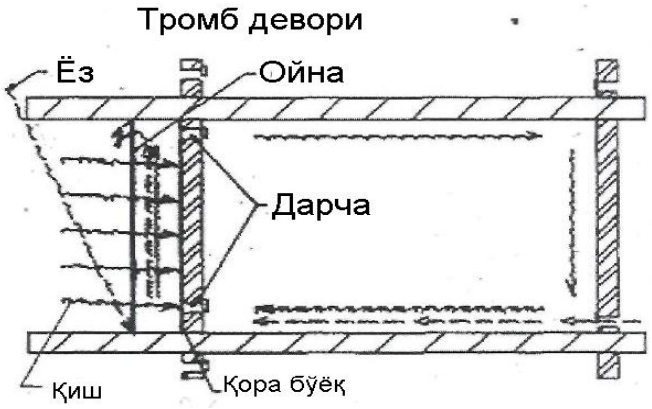
All organic fuels (oil, gas, coal, etc.) are the form of solar energy that has passed through various stages and re-formed and reached us after millions of years. 47% of 100% of the falling power (on average 340 W corresponds to 1 sq.m.) falls on the earth. In residential houses with a passive solar system, heating of the external heat layer is widely used (Fig. 1). A popular variant of this layer is the Trob-Mimel wall, which consists of concrete, brick or stone, is located on the southern facade and is painted dark.



At a distance not too far from the wall (about 600 mm) glass coating is processed. The heated air between the wall and the coating acts as a heat carrier and in turn heats the wall, the wall gradually transfers the received heat to the room (the temperature can increase by 3-5oC). Thus, in this design, the functions of the collector and the accumulator are combined. Special valves or windows are used for air circulation. Air intake ducts are allowed in the basements, then this system can be used for summer cooling of the room. (there is a possibility of lowering the air temperature by 5-7oC). Volumetric heating is actually a direct heating modification. Greenhouse, atrium, orangery glass volume can be connected to the southern facade of the house or built inside it.

The heated air in the greenhouse is spread to other rooms by means of natural convection, mechanical ventilation ducts and a simple equipment system. Usually, when the temperature in the greenhouse reaches a sufficient level, a thermostat is activated, which tells the valve to open. Heat storage is carried out by the internal thermal array as described above. This heat can also be used to meet the needs of the population when the usage is properly organized. An important element of a sunny house is the atrium (winter garden), which acts as a buffer between the interior of the room and the outside environment.

During the summer, it is necessary to protect the south-facing windows with barriers that can be adjusted depending on the position of the sun. In the construction of wall and floor constructions, which are heated by sunlight, rapidly absorbing and heat-retaining building materials are used. It is possible to install a two-layer, brick and glass wall covered with absorbent material. It is intended to leave a gap of 2-15 cm between them, and warm air will circulate in this gap.

Most of the heat in buildings is lost through light windows (30-40%). The thermal protection of windows can be increased by increasing the number of windows, using special heat-reflective glass, shutters, screens, blinds, etc. On the other hand, skylights can be used to let sunlight in to heat rooms.

To increase the efficiency of the windows, the space between the glasses can be made with a means of ventilation. In this case, the temperature of the ventilated air increases, which increases the comfort of the thermal situation in the room, and reduces the heat entering the room from solar radiation.

In addition to saving heat from the sun, the transmission can save up to 30% of heat, which is mainly lost by external barriers when transversal-longitudinal ventilation is carried out through windows. In addition to thermal efficiency, clean heated air enters the upper part of the room and new negatively charged ions necessary for humans are preserved, and hygienic efficiency is also achieved. By passively using sunlight in compliance with all regulatory requirements, it is possible to create and maintain favorable conditions for people's life activities in civil buildings.

Active heliosystems use special devices to capture and process solar energy. Special solar cells and other phytoelectric devices are used to convert sunlight into electricity. To convert solar energy into thermal energy, special equipment is used - collectors, and for distribution to rooms - gaseous (air) or liquid (water, oil, antifreeze) heat carriers. Depending on the type of collector, heat supply is low and high temperature. Flat collectors in low-temperature systems use the same greenhouse effect as in passive solar systems.

High temperature systems use special equipment such as focusing collectors or heat pumps and conventional cooling and heating systems. The equipment of high-temperature heliosystems is expensive and difficult to use. With the help of active heliosystems, it is possible to organize heating, cooling and hot water supply of the building. The service of a flat collector is based on the absorption, processing and preservation of materials from sunlight. Depending on the type of material and the condition of its surface, the absorption can reach 0.80...0.98, this amount is taken in relation to the energy of the incident light flux (the rest of the light is reflected by the material).

Figure -1. Energy economic building

Absorbed solar energy is converted into thermal energy, a part of which goes inside the material, and the rest goes out to the environment by means of radiation and convection. The amount of outgoing heat is directly proportional to the difference between the surface temperature and the ambient temperature. If the radiating surface is covered with glass and an air gap of 20...30 mm is left, the heat loss will be much reduced, and the decrease in the amount of absorbed heat is almost not noticeable. Glass transmits high-temperature short-wave solar radiation well, heat sink does not transmit long-wave infrared radiation. At the same time, glass dramatically reduces heat loss due to convection.

CONCLUSION:

As a heat-receiving element, tubular metal plates or ordinary pipes, painted black and placed on a heat-resistant panel, can be used. The side of the panel facing the sun is covered with glass or light transparent material. A heat carrier is passed through the pipes. There are proposals for special coatings with a heat-absorbing surface that prevents heat loss and increases the percentage of solar absorption. The efficient operation of collectors depends on their installation location, area, optimal direction and slope, no shadow, and capturing as much solar energy as possible.In conclusion, it

should be emphasized that the heating of the buildings under construction in Uzbekistan using solar energy has a good effect. However, it is a natural heating agent.

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