ON A PROMISING WAY TO SAVE ENERGY WHEN HEATING AND VENTILATING LIVESTOCK BUILDINGS USING SOLAR ENERGY

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Annotation: The design of a passive solar system for heating and ventilating livestock buildings is considered.

Key words: Solar energy, passive solar system, ventilation, livestock building.

Introduction. Solar energy has practically unlimited resources, and installations based on it are more environmentally friendly than other energy sources. They are not related to environmental pollution problems.

Every year, the Earth's surface receives energy from the Sun. If we compare this energy with estimates of the energy contained in the explored reserves of natural gas, coal, oil, and uranium, it becomes clear that in one week, the Earth receives from the Sun such a quantity of energy that exceeds all known energy reserves on Earth by more than two times.

Subject of research. In many countries, increasing attention is being paid to the practical use of solar energy, primarily for hot water supply and building heating, and sufficient experience has been accumulated in the development and operation of heat supply systems, in which solar energy is effectively used throughout the year [2].

From an economic point of view, the solar heat supply system should be designed so that it provides only a portion of the annual heat load, and the missing amount of heat is added as needed through an additional energy source [1].

Goals. Currently, specialists' attention is drawn to "passive" solar heating systems, whose main advantages are cost-effectiveness and ease of operation. In buildings equipped with passive heating systems, the absorption, accumulation, and transportation of heat in such buildings occurs naturally using architectural-planning and structural solutions without the use of special expensive heliotechnical and engineering equipment. Along with cost-effectiveness, the implementation of passive systems is a highly effective means of combating environmental pollution. Buildings equipped with passive heating systems, the southern wall of which has one or two-layered glazing. Simplicity and relatively low cost are a solid basis for the widespread use of passive systems. It has been established that passive solar systems can surpass active solar systems in terms of cost-effectiveness and even compete with liquid fuel heating systems. The cost of a building with a passive solar radiation energy utilization system is approximately equal to the cost of an ordinary residential building of the same category.

Materials and methods. The introduction of passive solar energy systems into practice will make it possible to significantly reduce the consumption of thermal energy for heating residential, public buildings and agricultural structures based on widespread use. An agricultural facility using a passive solar heating and ventilation system allows [1];

- reduce heat losses through transparent coating by reducing the temperature of the blackened surface while increasing heat transfer through the heat-accumulating walls;
- the possibility of supplying heated fresh air to the premises during the cold period of the year;
- to improve the ventilation of the premises by natural or forced means.

It should also be noted that the use of solar energy for heat supply has great prospects for widespread use in individual households, where the use of solar energy is already expedient. Widespread and targeted energy conservation will allow for the conservation of fuel and energy resources.

Results. Animal husbandry today acts as a powerful energy consumer. A significant portion of energy expenditure is attributed to maintaining optimal microclimate parameters on farms, which contributes to increased productivity. Optimal air parameters in livestock buildings, temperature +12...16°C, relative humidity 60...70% [4]. The stability of the animal's body's thermal balance depends on the stability of the environment's temperature. When maintaining the required temperature in combination with other necessary room parameters, product yield can increase by 30% [3]. Therefore, livestock buildings must be equipped with an effective ventilation and heating system.

The most common type of heating in animal husbandry is water heating. In some places according to climatic zones and taking into account the duration of the heating season in agricultural facilities, preference is given to air heating combined with inlet ventilation. Boiler houses are built for water and steam heaters, which is not always economically advantageous.

One of the main elements in creating the necessary microclimate in agricultural facilities is ventilation. The presence of an unorganized inflow of cold air into the heated room leads to the need for an additional consumption of 40...62 kJ of heat per 1m3 of cold air [1,4].

Conclusions. In the agriculture of the southern regions of the republic, there are opportunities for the introduction of solar technology (use of solar energy), it is possible to develop and improve construction in agricultural buildings - this will give:

firstly,

- saving fuel for heating the premises,

secondly,

-the cost of the produced products will be lower than that of natural heating.

thirdly,

-the construction of such systems is not more expensive and simple than with heating systems.

To reduce energy consumption for heating and ventilation, it is necessary to purposefully expand the design and construction of agricultural structures not only with

high-quality thermal insulation of building structures, but also with passive solar heating systems with a heat-accumulating wall.

In the future, the heating of agricultural facilities can be replaced by non-traditional renewable energy sources.

Literature

1. Андерсон Б. Солнечная энергия (основы строительного проектирования) М.: Стройиздат, 1982. 376 с.

2. Даффи Дж.А., Бекман У.А. Тепловые процессы с использованием солнечной энергии.-М.: Мир. 1977.-420с.

3. А.Н.Сканави. Отопление.- М: Стройиздат. 1988.-416 с.

4. Л.И.Шпаков, В.В.Юнаш. Водоснабжение, канализация и вентиляция на животноводческих фермах. -М: ВО Агропромиздат. 1987. 146с.