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USE OF RENEWABLE ENERGY SOURCES FOR HEATING BUILDINGS

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Abstract:
This article aims to reduce energy consumption and save energy through the use of solar energy in building heating. This helps save resources used as fuel.

Keywords: heat, solar energy, wind energy, geothermal energy, biomass, reservoirs, biomass.

We all know that the modernization of the heat supply system in our republic, the reduction of energy consumption, the implementation of effective energy saving measures depend on the rational use of available resources. All over the world, much attention is paid to the use of non-traditional forms of energy. It can become the basis for the development of solar heating systems for buildings and solve quality and reliability problems when covering investments in energy infrastructure. Solar energy is very convenient for power supply of remote and low-energy facilities [1,2,3].

According to the World Energy Council (WEC), at the current level of consumption, oil, coal and gas reserves will last for 40, 250 and 60 years, respectively. The insufficient level of electrification and mechanization of personal subsidiary farms (forage harvesting, cultivation of plots, heating of residential and industrial buildings, heating of water, cooking, etc.) causes high labor costs for these needs of a rural family. Such costs are 2.5 times higher than the costs of wages in the public sector of agricultural production. The average labor costs for maintaining a personal subsidiary farm of one family is 5.4 hours. The time spent on servicing heat sources using only gas and liquid fuels is 0.1. 0.3 hours, for solid fuel - 1.5 ... 2 hours. The above reasons, as well as the rise in the cost of fossil fuels, the upward trend in tariffs for electricity and heat, lead to a wider use of renewable energy sources. The average price of metal flat solar collectors used for the production of thermal energy is 350...1000 US dollars per 1 m^2 (including installation costs). It is expected that in subsequent years their price will drop to 50..400 dollars per 1 m^2 [4,7,12,21].

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The introduction of the widespread use of non-traditional energy sources is limited due to the high cost of equipment and the high material consumption of equipment, as well as the instability of the economic situation. The current legislation does not provide incentives for producers and users of renewable energy sources. Emphasis on non-traditional energy sources can be achieved through the organization of demonstrations of devices for various purposes through networks, as well as through the constant increase in prices for fossil fuels and tariffs for electricity and heat, which will lead to a reduction in the number of renewable energy sources. competitiveness [5,6,9,22,26].

Renewable Energy Sources

Research and development in the field of heating, ventilation and air conditioning (HVAC) is characterized by the potential and practical application of the terms "non-traditional" and "renewable" energy sources, there is a gradual massive transition to education. Interest in these energy sources has existed for a long time, but an intensive search for ways to use them in heating, ventilation and air conditioning systems began after the energy crisis of 1973 and especially in recent years [8,10,11,23,25].

Renewable energy sources are energy resources that are constantly renewed by nature. These include solar energy, wind energy, geothermal energy, biomass, reservoirs and other types of energy [13,15,24].

The main non-traditional renewable energy sources in Uzbekistan include hydro, wind and geothermal resources, solar energy, biomass and solid waste [14,16].

Solar radiation falls on the earth's surface unevenly, and its change in the process of use is associated with high costs. The higher the potential use (efficiency) of the received energy, the higher the costs [17,19] .

The second direction is connected with the conversion of solar energy into electrical energy, which is costly.

Solar heating systems include:

• solar collector - a device that receives solar energy and converts it into thermal energy;

• the first circuit transferring heat from the coolant to the heat accumulator or heat supply system;

• secondary circuit transferring heat from the water cooler to consumers.

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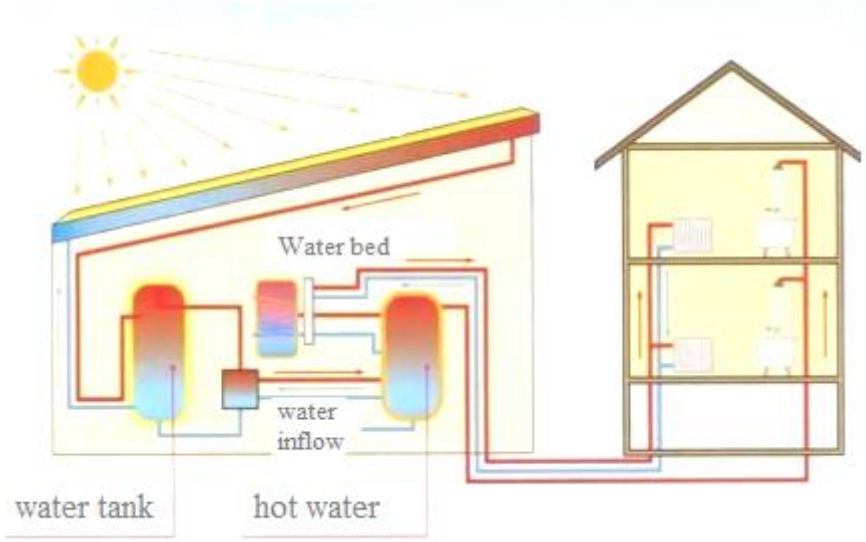

Figure 1. Solar heating system:

It is undesirable, and in some cases technically impossible, to create solar heat supply systems that fully cover the heat load of the building. The missing part of the heat load of the building is received by generators, electric heaters, heat pump units and other heat sources operating on various types of additional fuel. It is usually desirable to cover no more than 50% of the heat supply load with solar energy . The use of heat accumulators to store the received heat plays an important role in increasing the efficiency of solar heating. Heat storage makes it possible to convert thermal energy from a non-permanent source, i.e. solar radiation, into permanent energy. The efficiency of the storage system is determined by the coverage of the heat demand of heat supply facilities , that is, by its heat capacity [16 , 18,20] .

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