The Use Of Environmentally Acceptable Energies.

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ABSTRACT

This article examines the technologies for the use of solar energy, in particular, on the example of Israel. Methods for improving energy efficiency are analyzed through solar water heaters and passive heating systems. Examples of how to obtain hot water year-round through water heaters and increase the efficiency of devices are given. The importance of building structure and efficient heat saving methods are also discussed in the use of solar energy. The article reveals the importance of innovative technologies in the field of solar energy.

Keywords: solar energy, water heater, passive heating, energy efficiency, Israel, heat accumulator, solar collector.

Hot water for household needs. One of the best-known examples of solar energy use in Israel is water heaters (boilers) that are fired on the roofs of houses anywhere in the country.

The most common device in domestic need consists of a 150 l capacity heat-repellent water reservoir and a 2m2 solar battery flat panel. The battery accumulates solar thermal energy and heats the water, which flows into the reservoir itself without a pump. The average annual efficiency of such systems is about 50%. Thus, such a device allows its owner to save about 2000 kWh per year (that is, the corresponding amount when taking into account the value of electricity).

On a normal day, the device boilers can raise the water temperature to about 300 0C, that is, heat the water to a temperature of 500 0C. In practice, this means that the owner of the device does not use a reserve electric heater (in all boilers it is present) for the main part of the year, since it "frees" hot water for washing. Large capacity systems (pumps are usually used) are used in the provision of water for high-rise buildings, some kibbutzim, as well as many industrial enterprises of the country.

Passive heating of residential premises using solar energy. While the state of Israel is considered a hot country, the winter here is much colder, especially in Jerusalem and other places, including the Negev desert. However, the climate of the country is ideal for passive heating of residential premises using solar energy. Here is the word about the design of residential houses, where heat can be stored in winter at the expense of solar energy.

In this case, the houses will be cool, the alternative option produced in a number of countries-solid heating using solar energy, which requires solar collectors, circulations, electric pumps and heat accumulators, is economically ineffective for Israel, since the winter season in the country does not last long.

Passively heated to its main components - (1) the presence of a coating in which the building retains heat well; (2) the presence of sufficient thermal, which prevents temperature changes and provides heat accumulations during the night period; (3) the presence of sufficient area of Windows protruding to the south.

The structure of the walls of the traditional "house of the sun" in places with cool climates can be as follows: a layer of stucco 1 cm thick, then a layer of concrete 10 cm (provides heat accumulations), a 5 cm heat-retaining layer (penopolyuretan) and finally a decorative material for protecting the heat-retaining layer adopted in this region.

For the roof, a penopolyurethane layer with a heat storage of 10 cm is envisaged; Windows protruding to the south should have a total area of about 15% of the housing area.

In warmer parts of the country, the area of Windows can be reduced accordingly. All windows should have blinds or fences that Hecate the fall of the sun's Rays.

An early passively heated house in Israel was built in the late 70s in Sde-Boker, where a university branch named Ben Gurion is located. Later this idea is used by most of the country's architects.

Mixed heating systems designed for the use of solar energy, developed in rural residential buildings and agriculture. Designed to provide heat to objects. Such systems primarily use water as a heat carrier from solar energy. In such devices, the annual energy consumption can be reduced by up to 10%.

The TRISOL-type individual house heating system consists of a solar energy air collector and a heat pump. On a sunny day, heated air in the collector is used for direct heating. On cold days, cold air is directed to the evaporator of the heat pump when it is not enough to heat the air temperature, and then returns to the Collector. An electric heater with a capacity of 6kW will be started when solar heat and heat pump power are insufficient.

German scientists have developed a method of using solar energy to heat buildings with external walls and a roof covered with glossy thermal insulation, under which absorbent modules are equipped. Modules will be on any floor.

The solar energy they absorb is used in attenuators or amplifiers. In amplification devices, all energy or parts of it are transmitted to a device that unites all modules on the corresponding floor.

In accordance with what the function of the absorption system consists of solar attenuators or amplifiers are used to heat energy or to cool certain rooms.

The system is also equipped with a heat accumulator. Heat transfer from the absorber to the air is high, with little energy loss and less cost, solar collectors are also recommended.

The Absorber will consist of several floors of rye glass. In each part of it, rays falling from above are absorbed, while one part is missed.

The upper layers separate the lower ones, in this way eliminating its heat loss. The collector will be cheap because of the use of a simple Rosewood window. Such a device can be widely used in the heating of air for drying hay and grain in agricultural facilities.

Stiebei eitron (GFR) also recommends a Sol 170 type flat collector and a vacuumed SOL 180 Lux type device, which provide hot water in addition to the varieties of the familiar vacuumed solar energy collectors, which are used to heat water and air in basins during transition periods.

The body of these collectors is made of aluminum, which is resistant to sea water, and the windows are made with a high-strength, 5 mm thick, prismatic coating that serves to strengthen the absorbed solar energy. In vacuumed collectors, solar energy is converted to heat in the most efficient way.

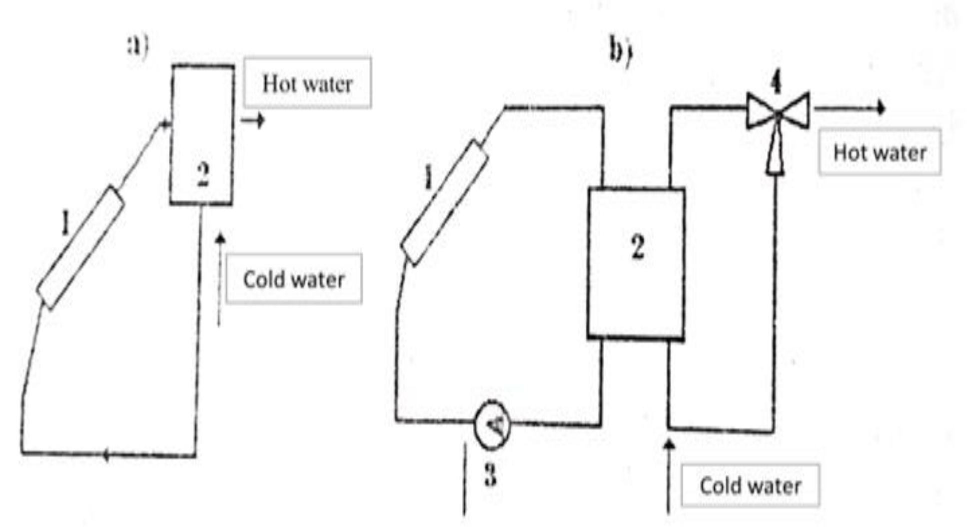
Self-powered buildings that do not require natural gas mains to be pulled, without heating boilers, are offered by the fraungofer Institute of solar energy systems Germany.

The thick walls of the building on the 30 cm thick arc-shaped front serve as a heat accumulator that absorbs straight and diffused rays, while the upper walls, floor and roof of tsokollar Highlands, with double glazing, were used as strong thermal insulation. The energy use coefficient is 85%.

To provide heating and hot water, a solar thermal system is also proposed, in which a heated water-collecting base or a head-collecting filler made of flexible material is placed in a rigid bath, and the solar energy collector is connected to the first contour of the solar device. Above the main collector in the device is a container for replenishing the water in the system, with the first contour and heating what a hot water supply system a exchanger is placed in the building. The water consumption in the first contour is controlled by the water temperature in the head collector.

Solar hot water supply system (QISTT). There are basically two types of QISTT, natural heat transfer (la-figure) and circulatory (Figure 1B) types, which force the heat carrier. If solar energy is water in the Collector contour and heat bak-accumulator, the QISTT is performed in a one-contour scheme. In order to prevent the heat carrier from freezing, antifreeze can be used in the QEK contour, which is then transferred from the antifreeze to the water via a heat exchanger (teploobmennik), and the QISTT is performed through a two-contour scheme. (Figure 2a).

The first type of QISTT is usually used when there are not many consumers, then the heat bak-battery should be placed in the ground above the solar energy collector. If the amount of Istemol is large, it will be necessary to install a pump for hot water circulation. (Figure 2b



1- fig.The principle scheme of the Free (A) and forced (b) circulation of the carrier in solar water heating devices.
1-solar energy Collector, 2-hot water bak-battery, 3-pump, 4-mixed traction valve.

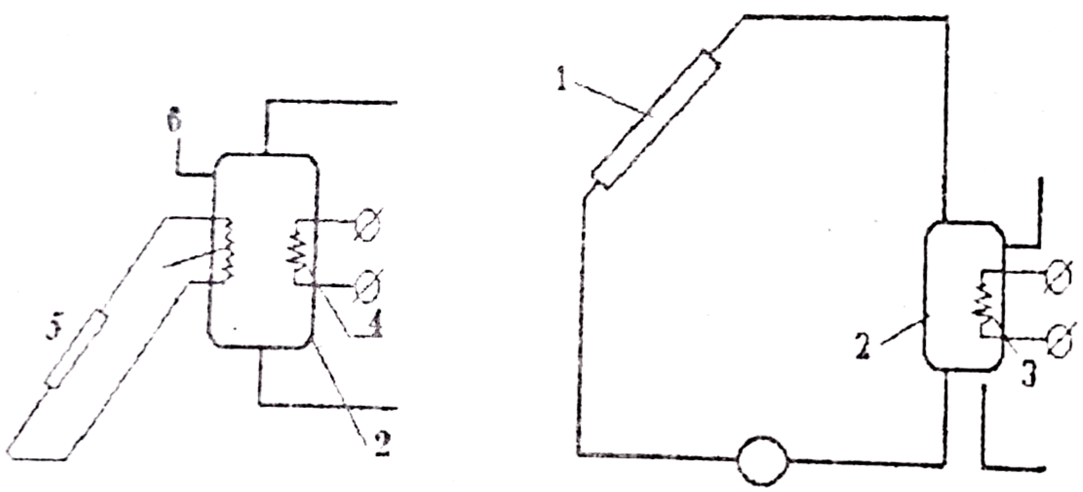


Figure 2. The principle scheme of the Free (A) and forced (b) circulation of the carrier in solar water heating devices.
1-solar energy Collector, 2-heat accumulator, 3-heat exchanger, 4-additional heat source, 5-pump, 6-storage valve.

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