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The Use of Solar Power

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Energy is an essential part of our civilization. A million years ago primitive man used only 6,000 (kJ) a day. A hundred thousand years ago, people had learned to make fire and used four times as much energy, the equivalent of 25,000 kJ. In the 21st century, all the stocks of non-renewable fuel are gradually being depleted, so many are looking for new ways to generate high-efficiency electricity.

One of the most popular sources are minerals: oil, coal, gas. Direct energy production from them occurs at thermal power plants and condensation power plants. But if we consider alternative energy sources, the most common is the sun, which can provide energy all year round. The Earth is intercepting a lot of solar energy: 173,000 terawatts. This is 10,000 times more energy than the world's population uses. In this article we will consider whether a full solar switching is possible.

At present, the number of large-scale photovoltaic energy systems is small. The capacity of solar power plants installed annually is about 50 megawatts. Solar panels provide only about 1 per cent of the electricity currently produced, but solar energy advocates argue that the amount of solar radiation reaching the Earth's surface every year, could easily provide energy requirements several times.

In order to consider what pros and cons might be, it is necessary to consider how solar panels are operated and what factors affect performance. First of all, let us look at how solar

panels are arranged to operate with the semiconductor effect. One of the most efficient semiconductors known to mankind is silicon. The silicon plates used for the manufacture of the elements have positive and negative charged electrons and consist of two n-layer (-) and p-layer (+) layers. Excess electrons are removed from the layers by sunlight and occupy empty spaces in another layer. It causes free electrons to move constantly from one plate to another, it generates electricity.

If you consider the operation of a solar cell, you can see that it works effectively only if the sun hits it, which is difficult because of the climate. With constant sun, problems can also arise, for example, if we consider the operation of solar panels in the desert, we can see that the efficiency of high temperatures decreases and the panels deteriorate faster. Despite the fact that the sun sets freely, due to sand and wind, solar panels are covered with dust, and less electricity is supplied, and photovoltaic cells themselves, which are expensive, are damaged. For example, if a light bulb of 25 W at 12 V is needed to illuminate a small area, a suitable solar battery can be purchased for this purpose, costing approximately 2000 rubles. It is possible to connect a small well pump with parameters of— 200 W and 24 V to a non-detachable photovoltaic system. The irrigation system based on it will serve more than 10 years and cost about 12,000 rub [1]. If you consider the plant on a commercial scale, then a station with a capacity of 100 kW, in which the battery price is about \$ 2.5 per watt of rated power would cost about \$250,000 and if you use all the energy you receive to satisfy your own needs, the cost of the installation will be 7–9 years. As a result, we get electricity for \$ 0.5 per 1 kilowatt, while conventional electricity costs twice as much as the cost of a single house.

This price is due to the fact that such electricity pays off for about five years, after which the price of solar energy becomes cheaper. Solar cells are constantly being improved, so

countries that use a large number of solar cells must always buy new ones. Another disadvantage is that they are recycled and recycled, which pollute the atmosphere as well as their production.

Besides, they occupy large areas when considered on an industrial scale. Since solar cell production is energy-intensive and uses fossil raw materials, it does not help to slow down such problems as global warming and pollution. Approximately 600 kWh of energy is used for the production of each square meter of solar cells, which is sufficient to illuminate 1,000 60-watt lamps for 10 hours [2]. Thus, the main disadvantage in using solar panels is that the installation and direct use of solar panels is expensive and heavy to operate. For this reason, many countries give little space to alternative sources in the energy sector, for example, Belarus allocates only 1 per cent to such sources.

Despite the limitations described above, solar energy is the cleanest energy and the most inexhaustible fuel. The solar power plant does not produce carbon dioxide or other harmful substances that could damage the environment. After installation of solar panels, operating costs are quite low compared to other types of electricity generation. Fuel is not required, which means that solar energy can generate large amounts of electricity without uncertainty and fuel delivery costs. There is also a great variety of solar batteries, so if you put solar panels on rooftops, you can reduce the area of solar power plants so that you don't damage ecosystems.

When looking at solar cells, for our country, we see that the electricity produced by solar cells will not be widespread enough in use because of climate variability. Consider this situation in greater detail. The number of sunny days in the Republic of Belarus is about 20-35 per year. This means that only 26 days of uninterrupted electricity will be available, which is insufficient for efficient use of solar panels. The

transition to alternative sources is not even possible by 40-50 per cent because of the lack of constant weather conditions (wind, sun). Therefore, the transition of all countries to alternative energy is not possible due to different weather and natural conditions.

References:

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