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Samuticheva E., Chuprina K.

The Potential of Solar Energy in Belarus

Belarusian National Technical University
Minsk, Belarus

The demand for alternative energy is constantly increasing. In each country this is caused by different reasons. For example, in Africa, this is due to a large amount of heat and a lack of other resources. In addition, there is absolutely no developed solar energy infrastructure. Therefore, the construction of a plant from scratch is much more profitable than the construction of a traditional thermal power plant. It is essential to mention that this initiative toward developed draft programs on the use of solar energy is even supported at the governmental level.

If we consider the countries of America, Asia and Europe, here the demand for alternative energy is also quite high, but reasons are different. These countries are encouraged to build installations by the high cost of electricity. If you invest in solar panels, they will pay off in 2-3 years and will sufficiently provide the house with heat and hot water [1].

The main source of energy is the sun. Therefore, the energy sphere has been actively developing in recent years. Solar energy is used in various activities and its relevance is growing every year. Modern solar panels consist of a chain of solar cells-semiconductor devices that convert solar energy directly into electric current. The process of converting solar energy into electric current is called the photovoltaic effect. This phenomenon was discovered by the French physicist Alexander Edmond Becquerel in the middle of the XIX century. The first active solar cell was created half a century

later by the Russian scientist Alexander Stoletov. Consequently, the photoelectric effect was quantitatively described by Albert Einstein the 20th century. A semiconductor is a material atom of which either have extra electrons (n-type), or vice versa, they are not enough (p-type). Accordingly, a semiconductor solar cell consists of two layers with different conductivity. The n-layer is used as the cathode, and the p – layer is used as the anode. Excess electrons from the n-layer can leave their atoms, while the p-layer captures these electrons. It is the rays of light that "knock out" the electrons from the atoms of the n-layer, after which they fly into the p-layer to occupy empty spaces. In this way, the electrons run in a circle, leaving the p-layer, passing through the load (in this case, the battery) and returning to the n-layer [2].

The largest solar station in Belarus is located in Rechitsa. For the implementation of the project, two land plots have been assigned in the Rechitsky district with a total area of 110 hectares. There are 218,430 solar panels installed here. The total investment in the implementation of the project near Rechitsa is estimated at about 65 million euros. As explained in the State Enterprise "Belorusneft", borrowed funds have been used for the purchase of equipment, and own resources have been used for construction and installation works [3].

The largest productivity of solar panels in terms of electricity output falls on the sunny months: from mid-April to the end of September. Despite this, solar energy can still be generated on cloudy and rainy days, but in smaller amounts. In addition, solar energy is expected not to be produced at night.

Eco-activists advocate to eliminate any sources of pollution of the planet, especially in the air and water. Even though the types of pollution that are associated with solar panels are smaller compared to other types of alternative energy, the solar alternative can still have a negative impact on the environment. For example, in the production of solar panels

and photovoltaic systems, some toxic materials and dangerous products are used, and the disposal process is not always clear. Also, it is worth considering that the transportation and installation of solar panels means the release of greenhouse gases into the atmosphere.

However, the technologies for the production and installation of solar panels are constantly being improved. So, there is an optimistic forecast that over time, the options for recycling solar panels will improve. As a result, the environmental benefits of switching to solar power now outweigh the dedication to legacy utility energy companies. In addition, innovations in the field of quantum physics and nanotechnology can increase the efficiency of solar panels and consequently double the electrical power of solar energy systems. In total, there are 31 solar stations with a total capacity of 41 MW in Belarus. According to the state program "Energy Saving", Belarus will have planned to build at least 250 MW of solar power plants by 2022.

The second-largest station is located near Bragin. Its rated power reaches 18.48 MW. The solar station was built by A1. It covers an area of over 41 hectares and the station itself is estimated at 24 million euros. Belarus has more than 3.8 thousand facilities with an installed capacity of more than 6.2 thousand MW, which produce electric and thermal energy at the expense of renewable energy sources including: 31 solar plants, 17 biogas plants, 66 wind power plants, etc.

By the beginning of this year, the share of RES in the gross consumption of fuel and energy resources in Belarus was 5.5%. In the total balance of renewable energy sources, firewood accounts for 54.1%, fuel chips-25.5%, wood waste-13.1%, water energy-1.7%, wind energy-0.6%. By 2020, the share of RES in the gross consumption of fuel and energy resources is planned to increase to 6% were invested in the implementation of the project [4].

To sum up, the potential of solar energy has been considered together with the advantages and disadvantages of the solar panels. Moreover, the development of this type of energy particularly in Belarus has been analyzed. Thus, our country is currently putting a lot of efforts in the development and encouragement of different programs on the implementation of solar energy. If we use and rely on it, we can conserve our resources and our planet.

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