PROBLEMS OF EFFECTIVE USE OF ELECTRICAL ENERGY IN AGRICULTURE AND WATER MANAGEMENT

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Abstract: *Electricity is one of the most consumed resources and the demand is increasing day by day. As the demand for global energy resources increases day by day, it creates a series of problems in the field of energy. These problems are in industrial production, in productions, as a result of economic activities, the economy and people's lifestyles were brought to a bad state, therefore, as a result of research, a new technological system was developed and started to be introduced. Agrovoltaics is a new and effective method in agriculture.*

Key words*: Economy, Agrovoltaics, Low-cost and economical, geographical, light transmittance, energy.*

According to estimates, our country has a potential of 10 gigawatts of agrovoltaics. Electricity is one of the most consumed resources and the demand is increasing day by day. At the same time, the waste released during its production is one of the factors causing the greatest damage to the atmosphere. Fortunately, humanity has made one of the most important discoveries in this regard - renewable energy sources, in particular, man has managed to obtain electricity from the sun and wind, and is now in the process of popularizing it. After all, besides being natural and environmentally friendly, they are also a blessing. According to the analysis, the potential of solar and wind energy in our country is enough to cover the current need for electricity 10-12 times more. Only for this you need to use the available opportunity. In recent years, the scale of use of solar panels has increased

not only in industrial sectors and enterprises-organizations, but also in households. Modern solar and wind power plants are being built in almost all regions. Large-scale programs for the establishment of "green energy" sources have been launched. In particular, the "Sunny House" program was introduced in order to increase the interest of the population. According to it, a system of buying 1 kilowatt of electricity from residents who have installed solar panels for 1 thousand soums has been launched. Currently, about 11,000 apartment owners are effectively using this opportunity.

Many countries of the world are in the process of transition to a "green" economy. This is an effort to replace the fuel sources that we have been using until now, which have a serious negative impact on the environment, with natural, environmentally friendly, and most importantly, renewable sources. Increasing green energy capacity is part of this. Therefore, on February 28 of this year, at the meeting held by the head of our state regarding the priority tasks for increasing renewable energy sources, new tasks in this direction were defined. In particular, it was ordered to accelerate the use of renewable energy sources in areas with high energy consumption, such as agriculture and water management, drinking water supply. Among them is the pilot project of the "agrovoltaic" method, which is planned to be implemented in 6 districts of our country this year. This is a project aimed at installing solar panels on agricultural land, and foreign experience is currently being studied. "Agrovoltaics" or "solar farms" are the installation of solar panels on agricultural land or directly on crops, gardens, which both generate electricity and weather adverse crops. , is a combined system that protects from the harmful rays of the sun and creates favorable conditions for their healthy growth, - says Bahrom Yusupov, chief specialist of the department of the Ministry of Agriculture. — Plants require only 10% of the light energy, and the rest of the sunlight is used to generate electricity. In this respect, "agrovoltaics" is a new method for the agriculture of our country, the development of which will

contribute to the agrarian sector and ecological stability is one of the important prospective possibilities of provision. As for the word "agrovoltaica" itself, it can also be called "agroelectric solar park" or "agroelectric field" in Uzbek. According to estimates, there is 10 gigawatt agrovoltaic potential in our country. This is due to the alternative climatic conditions in our country and the availability of solar energy, which radiates blissfully throughout the year.

Cost-effective and economical.

Recently, I came across a piece of information on the Internet. It says that in 2023, the European Union will have installed a record number of solar panels and wind turbines, producing more electricity than dams and nuclear power plants. Due to this, carbon dioxide emissions from fuel burning have been reduced by 8% compared to the previous year. It is noted that this is the lowest rate in the last 60 years. The countries of the world are boldly moving towards the "green" economy. Because the situation and situation already dictates that. The decades-old predictions of global climate change have become reality today, and humanity is experiencing it. From the daily statistics of air pollution to the resulting water shortages, droughts, and food shortages, not one, but dozens of countries are at risk. According to the UN report, by 2050, the world's population will reach 10 billion. Demographic growth, of course, brings new problems to humanity. It is natural that there is an energy problem among them. Interestingly, alternative solutions to this problem can also solve other problems. This is, of course, related to increasing the scale of renewable energy sources. Just imagine how wind generators, solar panels, and electric vehicles contribute to our environmental protection.

Such a need exists in the agricultural sector as well. That is, alternative sources of energy can help to ensure food security and eliminate difficulties in the production of agricultural products. The combination of science and innovative technologies is paving the way for this. The "agrovoltaic" method we mentioned

above is one of them. The uniqueness of the technology is that the solar panels installed on the ground serve not only to produce electricity, but also to efficiently use the areas under it.

The fact is that "agrovoltaic" is a method of combining energy and food production on one plot of land, - says Bahrom Yusupov. - Simply put, shaded areas under solar panels can be used as fields for growing crops or livestock. Therefore, the density between the panels should not be too high. Crops in particular need space between the panels to get enough sunlight. Due to the transparency of the panels, they can completely cover agricultural land, for example, fields and greenhouses. In doing so, it does not obscure the understory of plants, disrupt natural habitats, or harm the environment. Installing solar panels on fields provides shade and protection for plants, which is especially important in hot regions where high temperatures and sunlight can adversely affect crops. In addition, the use of agrovoltaics can reduce water consumption in agriculture, because evaporation is reduced and soil moisture is preserved for a long time. Most importantly, this device is an environmentally friendly energy source that does not emit any greenhouse gases. In addition, solar panels significantly reduce the energy costs of farmers and ranchers. They can use the electricity generated by the solar panels on their farms for their own needs, such as lighting, cooling or applying irrigation technologies. Installation of agrovoltaic panels does not require any geotechnical works. On the other hand, solar panels are an additional source of income for farmers and farmers, who have the opportunity to sell excess electricity to the state. The use of devices that generate alternative energy sources is beneficial not only for the population, but also for the country's economy. Therefore, in 2012, Japan became the first country to introduce special incentives for agrovoltaics. Later, similar systems were implemented in France, China, the USA and many other countries. In our country, in the following years, many benefits and subsidies are allocated to applicants who will install alternative

energy generating devices. Reliable protection at any temperature. When we talk to farmers, we see that they are increasingly interested in installing solar panels. Most people are interested in the fact that these devices are a cheap and environmentally friendly source of energy, with the possibility of receiving regular electricity without depending on the public grid. After all, there is a great need for electricity even in the fields - most of the devices used are powered by electricity. Therefore, solar panels have started to be installed on agricultural lands and farms in our country. In 2022, we wrote about a farm that was one of the first to implement this in its operations. "Bakhmal fruit growing" farm in Bakhmal district, Jizzakh region, due to frequent interruptions in electricity supply due to frequent wind and rainfall in the area, at first, a wind generator with a capacity of 3 kilowatts, and in March 2022, a capacity of Installed a small 5 kilowatt solar photovoltaic power plant. At that time, the device led to a decrease in the consumption of electricity, while continuously providing a part of the electricity required for the farm. "Frankly, I have been thinking about installing these devices for a long time. Since the technology is new for the conditions of our country, I had concerns and doubts about its effectiveness. But when the wind generator started working, all my doubts disappeared. Not only devices in providing the economy with continuous electricity, but also brings benefits from the material side. They reduced energy costs by 10-15 percent," said Olim Nazarov, head of the Bakhmal fruit growing farm. People are starting to consider getting electricity from solar panels as a normal thing. Many of them are also beneficial to the country's economy. As electricity is obtained from alternative energy sources, natural resources are conserved. The possibility of lightening loads in energy networks, preventing accidents, and reducing technological losses in networks will increase. The main thing is that the process of transition to environmentally friendly, "green" energy will be activated. Now, it is planned to accelerate the use of such solar

panels on agricultural lands in all regions of our country. Several factors are taken into account when choosing the areas where the "Agrovoltaics" method will be introduced. "First of all, the "agro-electric field" is important for regions affected by drought," says Bahrom Yusupov. - Therefore, it is possible to grow agricultural products under solar cells even in hot weather, and the panels protect crops from the sun and ultraviolet rays. In addition, this innovative method can be used by greenhouse complex farms established on large areas in free economic zones, farmers and peasant farms established in areas far from residential areas, where electricity and water supply is difficult, mountain side There is a need to establish vineyards and orchards, greenhouse farms on large areas in the fields and hills. These include areas with frequent power outages or heavy power supply, densely populated areas, and areas where most of the population is engaged in the cultivation of agricultural products on their farms. That is, we will select such land areas at the initial stage. Later, it is planned to introduce this method in all regions of our country. In general, in order to create all scientific and legal bases in this regard, a draft of the Presidential Decree "On the use of power plants based on renewable energy sources with a capacity of 1-20 MW on agricultural land" was also prepared. "Agrovoltaics" is one of the truly new and modern methods. But we are far from thinking that this is a very perfect method, free of all flaws and problems. There are also some problems with the installation of "Agrovoltaics", and the main one is the amount of dust. According to the expert, dusting caused by the landing of dust particles on the surface of the panels is one of the main factors that have a negative effect on efficiency. Unfortunately, since our geographical location is mostly plains, the climate of our country has a lot of dust particles. The location of agricultural works or highways around the location where the panels are installed will determine the level of pollination. If there is light wind in this location, the level of pollination will also be high. Strong wind reduces the amount of dust in exchange for cleaning the surfaces. Therefore, when installing

photovoltaic solar panels, the environment and the characteristics of the dust in that environment are taken into account. In addition, it is necessary to carry out preventive cleaning works on the surface of the panels. As another solution, it is recommended to protect the surface of the panels with hydrophobic and dust-proof transparent layers. In dusty weather conditions, especially in the summer months, it is necessary to wipe the surface 1-2 times a month.

And the winter months can't damage the solar panels as much. The fact is that cases of snow settling on the surface of the panel are rarely observed in the conditions of Uzbekistan. It can be cleaned with simple methods. Even in cases where the snow does not melt, there will be no significant damage to the solar cell. Only, due to the high light transmission of snow, it can reduce the power of the station by 15-20 percent at most. During the rainy season, the surface of the panels is naturally cleaned of dust and washed. Because the panels have special coatings that protect against precipitation and strong water permeability.

In general, solar energy has become one of the most promising sources of renewable energy today. According to the calculations of the experts of the International Energy Agency, by 2050, 45-50 percent of the energy needs of mankind are expected to be provided with the help of solar energy. Therefore, in the coming years, renewable energy sources will be widely used in all sectors.

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