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**The Use of Wind Generator**

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Today, when environmental problems are gradually becoming one of the main concerns of humanity, the use of different energy sources is considered to be not only effective, but also influence positively. Energy production, which is a necessary means for the existence and development of mankind, has a great impact on nature and the human environment. On the one hand, heat and electricity have become firmly embedded in human life and production activities that a person cannot even imagine his existence without it and consumes inexhaustible resources. On the other hand, people are increasingly focusing on the economic aspect of energy and demanding environmentally friendly energy production. This indicates the need to address a range of issues, including the redistribution of funds to cover the needs of humanity, the practical use of achievements in the national economy, the search and development of new alternative technologies for generating heat and electricity, etc.

Today, all scientists in the world face the problem of finding and developing new alternative energy sources. In this article, we will consider a method for generating electricity by means of wind turbines. A wind generator is a device that uses wind energy to generate the electric current. Airflows that move freely in the atmosphere have a gigantic energy and completely free of charge. Wind energy is an attempt to extract it and turn it to good use [1].

The use of diesel or gasoline power plants is unprofitable due to the constant increase in the cost of fuel and the significant damage that is caused to the environment when using this method of energy production. At the same time, wind energy uses absolutely free and inexhaustible energy without harming the environment and changing the surface relief. Therefore, it is necessary to implement while creating a hydroelectric power station.

The movement of airflows has a high-energy potential and should be used to produce electric current. Those regions that do not have the capacity to use other methods, intensive research and development in this area is being carried out having its results in the form of large wind power stations. They consist of separate wind turbines with high power and are combined into a single power system.

The wind with its pressure rotates the wheel with blades, which, by means of a gearbox, transmits the resulting torque to the shaft. The paddle wheel converts the kinetic energy of the wind into the mechanical energy of the rotor. The shaft with the rotor of the wind generator, rotating in its stator, generates a constant electric current for us. The power of the wind generator can be from 5 kW to 4.5 MW. Modern devices generate energy even very weak wind-from 4 m/s [2].

The advantages of wind turbines include self-start at a wind speed of 1.5 m/s and self-spin at a wind speed of 3.5 m/s, smooth operation due to the displacement of the blades fixed on the top cover of the wind generator relative to the monolithically fixed box. The blades are fixed on the top cover of the generator, which is easily displaced relative to the body due to neodymium magnets hovering over each other (these magnets act as bearings). Due to the lack of friction between the magnets, it is easy for the blades to unscrew the generator cover which neodymium magnets are also attached to from the

inside. It is important to mention that there are coils made of copper between the poles of sliding blades.

There have been a huge number of developments for generating electricity using wind energy so far. Moreover, independent inventors achieve the most successful results in this field. The focus is placed on achieving maximum performance and sensitivity of the rotor, stability of rotation and resistance to overload.

The issue of energy security has always been one of the most urgent for Belarus. The country's own fuel and energy resources cover only 15 % of total consumption. In order to promote the development of renewable energy sources and the use of local fuels, the national program for the development of local and renewable energy sources for 2011-2015 and the strategy for the development of the energy potential of Belarus until 2020 have been developed. One of the most promising areas for implementing the goals of these projects is the development of Belarusian wind energy. Belarus has significant wind energy resources estimated at 1,600 MW and an annual electricity generation of 2.4 billion kW·h. On the territory of our country about 1,840 places have been identified that can provide a suitable and reliable site for placing wind turbines and wind farms. These sites are mainly rowings of hills with a height of 250 m. above sea level where the average wind speed ranges from 5 to 8 m/s. Each of them can accommodate from 3 to 20 wind turbines. As of January 2011, the total installed capacity of wind power plants in Belarus is 1.56 MW.

The development of wind energy in Belarus is promoted by state programs and plans aimed at stimulating the use of renewable energy sources. At the same time, there is a need to attract external investment, to intensify the search for ways to reduce the cost of wind turbines. It is necessary to train qualified personnel, expand the legislative framework

regulating the issues of tariff and tax policy, design and operation of wind turbines and wind farms, as well as to assess the impact of wind turbines on the environment. Guaranteed production of recycled wind energy from 7% of the territory of Belarus will amount to 14.65 billion kW·h. The use of zones with high wind activity guarantees the production of wind generator energy up to 6.5-7.5 billion KW·h with a payback period of 5-7 years [3].

Based on the wind energy potential only in the Minsk region there are 1076 construction sites for the placement of 3 to 10 wind generators with a capacity of up to 1000 kW each. Accordingly, the average annual saving of liquid fuel will be more than 800 thousand tons. The payback period for capital investments in wind power engineering is comparable to the payback period for small hydroelectric power plants, combined-cycle or gas-fuel-oil power plants and is significantly lower than these terms for coal, nuclear and diesel power plants

Today, wind turbines are a high-tech product with a capacity from 5 kW to 4.5 MW of single power. Wind generators of modern designs allow using economically efficient energy of even the weakest winds-from 4 m/s. With the help of wind generators, today it is possible not only to supply electricity to the "grid", but also to solve the problems of power supply to local or island facilities of any capacity. Wind turbines are used in a wide variety of places. These are open areas with good wind potential, fields, islands, shallow water, and mountains. Wind generators can operate either singly (a single complex) or in groups (a wind farm). Often, one or more wind turbines operate in parallel with diesel generators as a means of saving diesel fuel costs.

To sum up, we have considered the operation, types and application of wind generators. After having studied the

advantages of wind turbines they seem to be a powerful and reliable source of energy.

References:

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