DEVICES USING WIND ENERGY

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Abstract. Wind energy is the most common clean form of renewable energy in the earth's crust. Wind turbines produce electricity by using the force of the wind to drive an electrical generator. The project includes both a gravity configuration like a Savonius wind turbine and a Darrieus wind turbine configuration. The Savonius wind rotor has many advantages over others, as its construction is simple and inexpensive. It is independent of wind direction and has good starting torque at low wind speeds.

Key words: Wind, wind wheel, ANSYS 13.0, generator, propeller, operating speed, Vertical wind generator, Working axis.

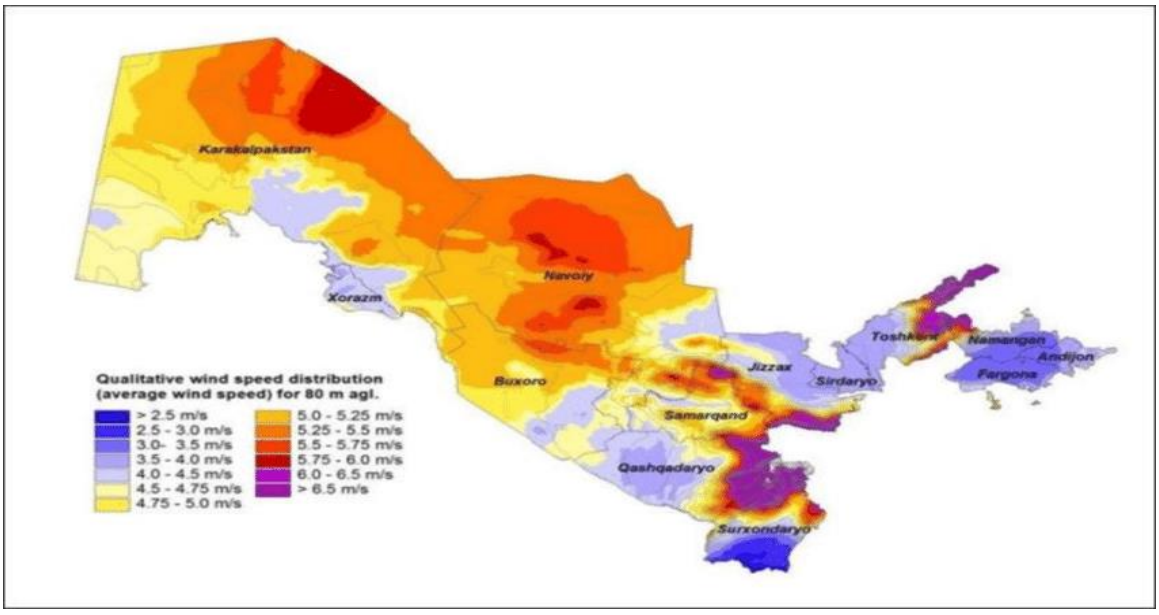

Figure 1. Wind speed in our republic

The experimental research carried out in this article is aimed at studying the effect of the number of Parracks on the performance of the Savonius type wind turbine model. Experiments were used to compare 2, 3 and 4 Blade wind turbines to show the speed ratio, torque and power factor related to wind speed. The simulation using the ANSYS 13.0 program shows the pressure distribution of the wind turbine. The results of the study showed that the number of blades affects the performance of

the wind turbine. The three-bladed Savonius model has the best performance in terms of high speed ratio. Makes the highest flying speed for wind speed. Generator (lat. генератор) is a device that produces any product, generates electricity or converts one type of energy into another. An electric generator is a device that converts non-electric energy types (mechanical, chemical, thermal) into electrical energy. Wind turbines are classified according to wind speed, from class I to class III. Groups A to C indicate the turbulent intensity of the wind.

There are classifications of wind turbines by the number of blades, by the materials they are made of, by the axis of rotation and the height of the propeller.

According to the number of wings

• Two-bladed and three-bladed wind turbines

• Multi-bladed wind turbines

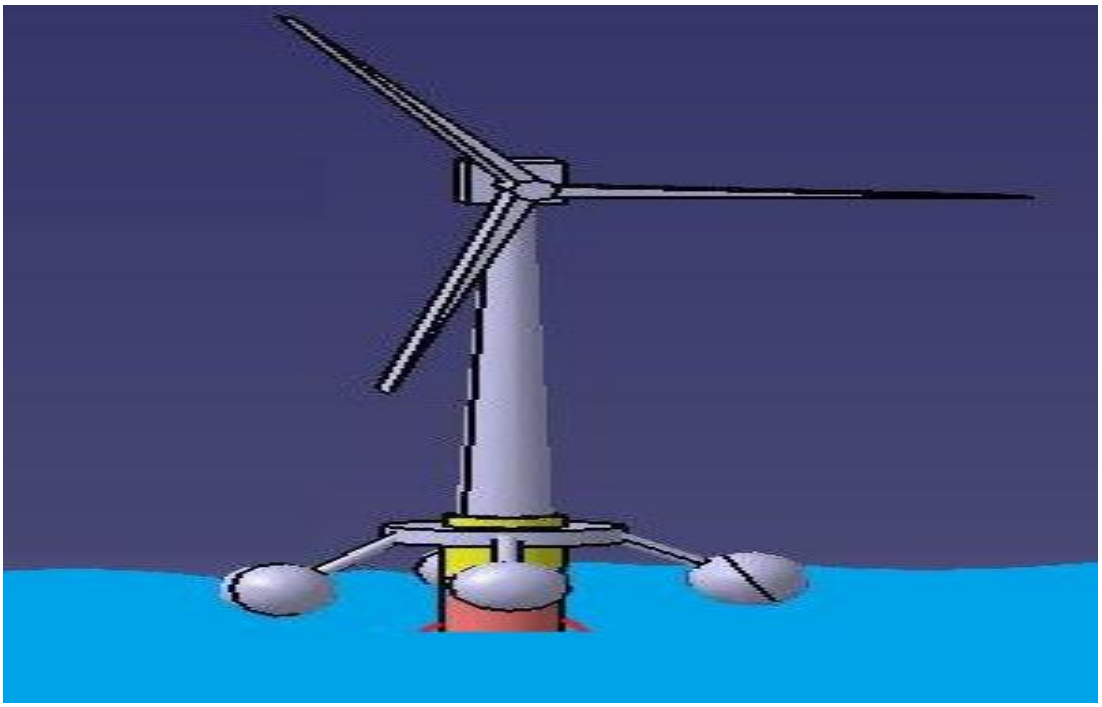

Figure 2. Hybrid wind hydro device.

Multi-bladed wind turbines actually spin at a lower speed than two- and three-bladed ones, but the electricity output is higher. Getting out at the right speed is important. Each additional blade increases the total driving force of the wind wheel, making it more difficult to get the generator up to speed and increasing the required power rate.

So, many blades spin at really low speeds, but they are used more where the actual spin is important, such as water hauling or other similar operations. The design

of the wind generator will be complicated, and secondly, the gearbox will have additional voltage.

Figure 3. Hybrid solar-wind device with vertical axis.

The blades are made of solid fiberglass and are much less expensive and easier to manufacture than metal. But this affordability can turn into a big expense. At the operating speed of the generator (400-600 rpm) and the blade tip of the turbine with a diameter of 3 meters moves at a speed of 500 km/h. Even under ideal conditions, this is a serious test, and if you always take into account the presence of dust and sand in the air. Even hard coats require annual maintenance. The ends of the blades are covered with anti-corrosion films. Without maintenance, the hard drive will continue to work but will lose some of its performance. A full replacement may be required after the first strong winds, not after a year. Therefore, the components of the system are adapted for autonomous power supply, which requires significant and reliable.

The working principle of wind turbines with a vertical working axis.

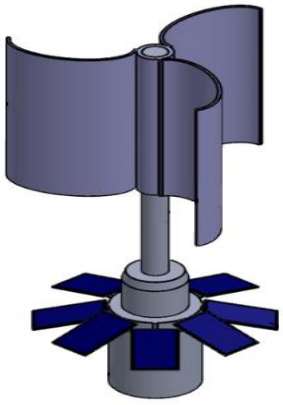

Figure 4. Hybrid solar-wind device with vertical axis.

Vertical wind turbines do not really require a specific wind direction, but any vertical wind turbine will operate at a lower efficiency than a classic horizontal wind turbine with a uniform wind field. This means that twice the size of the wind turbine is needed to produce the same amount of power. In addition, a certain part of the wings moves against the wind.

This significantly increases the movement of the wind turbine, which increases the operating wind speed. A vertical wind generator has all the advantages for an autonomous power supply, given that the wind direction of the vertical wind generator is sufficient. The variable step of the base allows to increase the speed of effective work. But the introduction of this mechanism inevitably leads to the complexity of the structure of the wind turbine, the decrease in the overall reliability of the wind turbine, the increase in the weight of the wind turbine, which means the need to strengthen additional structures. All this leads to an increase in the entire system both during acquisition and during operation. Anemometer (from Greek anemos - wind, metero - measure) is a device that measures wind and gas speed (sometimes direction). The speed of wind and gas is determined by the number of revolutions of the rotating bowls under their influence. Wind and gas velocity can be determined either manometrically or electrically.

Vortex is a new wind generator with different features than normal wind turbines. This can improve the utilization of clean wind energy source. Wind-elastic resonance phenomena are generally considered a problem, but they can also form the basis of wind energy conversion technology. It avoids the use of racks or shafts.

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