OPEN ACCESS Freely available online

Journal of Fundamentals of Renewable Energy and Applications

Commentary

Present Criteria and Working Principle of Wind Energy

Krishna Jayanth Behara*

Department of Mechanical Engineering, Sarada Institute of Engineering, JNTUK University, Srikakulam, Andhra Pradesh, India

DESCRIPTION

The power produced by using wind energy is called wind power. The wind is having kinetic energy when it is in motion. The group of wind turbines is called wind farms. A wind farm may consist hundreds of individual wind turbines. The land between the two wind turbines is can use to agriculture. Gansu wind farm is the largest wind farm in the world located in China. The general principle behind the power production from wind energy is a wind fan is also called wind turbine. The energy conversion process involved in this wind power is wind energy is converted into mechanical energy and this mechanical energy is converted into electrical energy in generator. The wind turbine is place at certain height with the supporting, the supporting object is called wind tower. When the wind spins the turbine blades the rotor is rotated and the rotor shaft is connected to the generator shaft where the electricity is produced with the principle of electromagnetic induction. The main parts in the wind turbine are rotor with blades, electromagnetic brakes, mechanical brakes, gearbox, generator flap or tail vane, shaft and Yaw control mechanism. The rotor shaft is connected to a high speed gearbox. There is no unique speed of the wind, there is always fluctuations in the wind speeds. To avoid these fluctuations in wind speeds gearbox is helpful to maintain unique power production in generator. An exciter is used to give required excitations to the magnetic coil. There is a need to use alternator to convert the DC output to AC output. The AC output is fed to electrical transmission or transmission grid with help of step up transformer. And some of the power is used to run the accessories included in the wind turbine setup like motors, battery and indicator lights etc.

In modern big wind turbines there is other two mechanisms are used, they are.

- Controlling the orientation of the turbine blade.
- Controlling the orientation of the turbine face.

The turbine blade orientation is governed from the base hub of the turbine blades. With the help of a rotating arrangement through gears and small electric motor the blades are attached to the central hub. This system is either mechanically or electrically controlled depends on its design. When the speed of the wind changes from high to low or from low to high then the blades are tends to swivel. To control this swiveling the technique use is called pitch control, and this is help to optimize the wind power [1].

The second control mechanism is works on turbine face. The direction of the wind along its speed is measured with the help of an instrument is called anemometer. This anemometer is placed at back top of the nacelle. The sensed value of wind speed is fed transferred to an electronic microprocessor-based controlling system which governs the yaw motor which rotates the entire nacelle with gearing arrangement to face the air turbine along the direction of the wind.

In 2020 by using wind energy almost 1600 Kilowatt hour power is supplied. Initially people used this wind power sailing ships. After that wind power is used to grind grains and pump water from down ground sumps or wells [2]. In 1887 first windmill for electrical power production is built in Scotland. In 1973 oil crisis started the changes in investigations in wind energy power production. Now the capacity factor in production of wind energy is not constant, it is sometimes decreasing and sometimes increasing in some countries. China is in first place of wind power production with the capacity of 26,155 Megawatts.

Wind power is completely renewable and with zero pollution. And the operating cost is very low. Land used for wind farms is also used for agriculture. Prediction in wind power is possible but, prediction is only for short time periods. Most suitable places for wind farms are sea shores.

The wind power industry has experienced a huge growth the past years. The growth mainly targets on a growing market, higher economic conditions for wind power because of political selections and also the development of enormous wind turbines and offshore farms [3].

A goal is to extend reliability for turbines. The subject is even important for offshore farms where service is tough and costly. In the wind energy sector, maintenance management plays a central role. Wind turbine maintenance refers to the operations that fundamental to the proper functioning of the wind farm

Correspondence to: Krishna Jayanth Behara, Department of Mechanical Engineering, Sarada Institute of Engineering, JNTUK University, Srikakulam, Andhra Pradesh, India, E-mail: krishjay305@gmail.com

Received: December 02, 2021; **Accepted**: December 16, 2021; **Published**: December 23, 2021

Citation: Behara KJ (2021) Present Criteria and Working Principle of Wind Energy. J Fundam Renewable Energy Appl. S2:004.

and to the accomplishment of a good energy production. In general, a turbine contains a lifespan of twenty to twenty five years.

REFERENCES

1. Castelletto S, Boretti A. Simulations of energy storage requirements of wind energy facilities. Energy Storage. 2021;3(5):e259.
2. Feustel J. Possibilities and limitations of wind energy utilisation. Int J Amb Energy. 1981;2(4):197-205.
3. Gormo VG, Kidmo DK, Ngoussandou BP, Bogno B, Raidandi D, Aillerie M. Wind power as an alternative to sustain the energy needs in Garoua and Guider, North Region of Cameroon. Energy Reports. 2021;7:814-829.