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Air Foil Wind Turbine

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Abstract : The use of wind power for energy production, renewable energy one of the oldest method for tapping. Socio-economic development and use of renewable energy is an essential component of economic development. The behavior of the Vertical Axis Wind Turbine present technological state new finding to through modeling work and future direction of VAWT were reviewed. It was observed that VAWT plays an important role in present energy crisis. Different types of wind turbine such as horizontal axis wind turbines and vertical axis wind turbines mostly used for energy extraction. Although the full life cycle accounting shows VAWT are advantages on a cost basis or material basis over horizontal axis wind turbines. Energy production from wind turbines will certainly be affected by geometry of the blades it is using and its orientation in turbine for effective and operational use of turbine both operator must be optimally set and determine.

Keywords: Wind energy, Vertical-axis wind turbine, Darrius rotor, multiple stream tube model, Blade Reynolds number, Energy generation.

I. INTRODUCTION

Renewable energy is the energy that's extracts from renewable source such as sun light, winds, rain, tides, waves, etc. The focus on renewable energy resources has increase significantly in resent year. The wind energy extraction technology has unique technical identity in view of the methods used for design current research technique used now a day are producing stronger ,lighter and more efficient blades for the turbine wind is secondary form of solar energy and is always replenished by sun energy. Wind energy associated with kinetic energy of flowing wind.

A. Wind

The wind is generated due to pressure difference of atmosphere because of atmospheric pressure difference air particle move high pressure end to low pressure end. During the air flowing air molecules are subject to carioles effect except exactly on the equator. The winds are often referring to according to the direction from which the wind blows and force.

B. Wind Power

Wind turbine produce electric power by using the power of wind to drive an electric generator. The wind power is attractive and alternative power source for both large scale and small scale and distributed power generation application.

C. Wind Turbine

Wind turbine are two types of wind turbines. Vertical Axis wind turbine (VAWT) and Horizontal Axis wind turbine (HAWT). Wind turbine blades take some unused kinetic energy is converted into the mechanical energy. The wind turbine blades are move with the air direction.

II. FIGURES AND TABLES

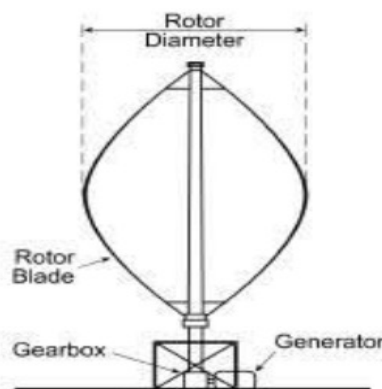


Fig1: Vertical Axis Wind Turbine

The vertical axis wind turbine is define as the system to converted unused kinetic energy of wind into mechanical energy. A vertical axis machine has its blades rotating on an axis perpendicular to the ground.

Georges Jean Marie Darrius designed and fabrication one of the most famous and common type of VAWT. The newly invented led to the realization of a great variety of types and models, both with vertical axis and horizontal axis, with rated power from the few kW of the starting to the 6 MW and more for the latest constructions. In the electricity generation market the HAWT type has currently a large predominance.

In this paper the power is generated by fixing the wind mill on the road high ways when the vehicle is passed through the road at high speed the turbine of the wind mill rotates and generates the power sources. This analysis indicates that the vertical axis wind turbine can be able to attain the air from all the direction and produces the power of 1 kilowatt for a movement of 25 m/s. The efficiency of vertical axis wind turbine can be increases by modifying the size and shape of the blade. Vertical Axis Wind Turbines have been made economical and practical, as well as quiet and efficient too. A vertical-axis wind turbines (VAWT) where the main rotor shaft is set beyond air (but not so if necessary parts are standing) the main part is located next to the base. A vertical axis wind turbine has its axis perpendicular to the wind streamlines and vertical to the ground. Today, it is possible to reduce the costs of today wind energy production is by 80% and it is considered the most wind turbine protects the air in the hub, which changes it into one air coming from the blades of wind turbine through the generator has entered generator by rotational power. Wind turbine means machine converting kinetic energy into mechanical energy when the power is rotated in right place, the machine is called wind turbine or air energy converter. VAWT offers many advantages over traditional copies horizontal axis wind turbine. Wind turbines are classified into two types: Horizontal axis and Vertical axis. A horizontal axis machine has its blades rotating on an axis parallel to the ground. A vertical axis machine has its blades rotating on an axis perpendicular to the ground.



Fig2: Airfoil Wind Turbine

The Vertical-Axis Wind Turbine (VAWT) is a wind turbine that has its main rotational axis oriented in the vertical direction.

All wind turbines essential work the same way with minor modifications depending on size and configuration.

The power in the wind can be computed by using the concepts of kinetics. The wind mill works the principle of converting kinetic energy of the wind to mechanical energy.

The wind turns the blades to spin a shaft which connects to a generator which produces electricity.

A. Main Components are:

DC Generator

Battery

- 1) *DC Generator:* The generator is an important component in a wind turbine, since it converts the mechanical energy in the rotating wind turbine to electricity. The DC motor is capable to generate the 9V to 12V in properly running condition.
- 2) *Battery:* All lithium ion batteries work in the same way. While battery is charging, lithium-cobalt oxides, positive electrodes leave some of their lithium ions, which move from electrolyte to negative, graphite electrodes are remain there. During this process the battery takes powers and stores the lithium ion batteries more life and more efficiency as compare to lead acid battery.

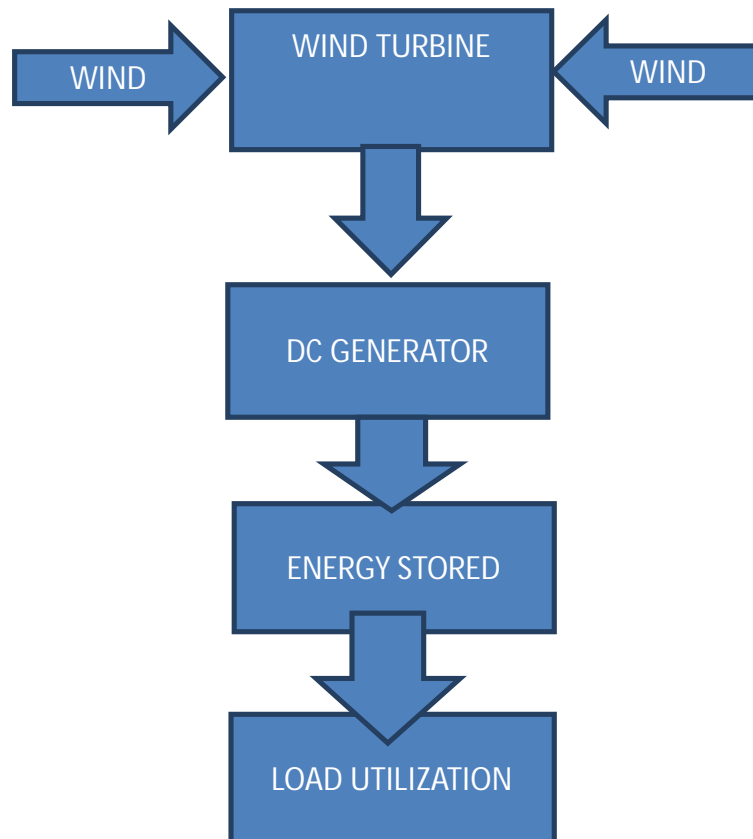


Fig1: Block Diagram of Vertical Axis Wind Turbine

The power in the wind can be computed by using the concepts of kinetics. The wind mill works on the principle of converting kinetic energy of the wind to mechanical energy. Wind machines intended for generating substantial amounts of power should have large rotors and be located in areas of high wind Speed.

III. CONCLUSION

In conclusion, a wind turbine is a machine that converts the wind kinetic energy into electricity. The major components of a wind turbine are: the rotor, the gearbox, the generator, the control and protection system, the tower and the foundation. Wind turbines are classified into two types of category: horizontal axis wind turbine and vertical axis wind turbine. The major advantage for a HAWT is the high efficiency it has; the disadvantage is the maintenance and repair at high altitude. The advantage of a VAWT is that the wind can come from any direction; the disadvantage is the height limitations

REFERENCES

- [1] S.Eriksson, H. Bernhoff, nd M.Leijon, "Evaluation of different turbine concepts for wind power," Renewable and Sustainable Energy Reviews, vol. 12, no. 5, pp. 1419-1434, 2008.
- [2] F.Ottermo, and H. Bernhoff, "An upper size of vertical axis wind turbines," Wind Energy, vol. 17, no. 10, pp. 1623-1629, 2013.
- [3] J. Kjellin, "Vertical Axis Wind Turbines: Electrical System and Experimental Results," Ph.D. thesis, Uppsala University, 2012.
- [4] H. J. Sutherland, D. E. Berg, and T. D. Ashwill, "A retrospective of VAWT technology," Sandia National Laboratories, 2012.
- [5] J. F. Manwell, J. G. McGowan, and A. L. Rogers, Wind Energy Explained: Theory, Design and Application: Wiley, 2010.
- [6] T. Ackermann, and L. Söder, "An overview of wind energy-status 2002," Renewable and Sustainable Energy Reviews, vol. 6, no. 1-2, pp. 67-127, //, 2002.
- [7] G. J. M. Darrieus, Turbine having its rotating shaft transverse to the flow of the current, Patent no. 1835018, U. S. P. Office, 1931.
- [8] S. Peace, "ANOTHER APPROACH TO WIND-Vertical-axis turbines may avoid the limitations of today's standard propeller-like machines," Mechanical Engineering, vol. 126, no. 6, pp. 28-31, 2004.



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