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# Vertical Axis Wind Turbine

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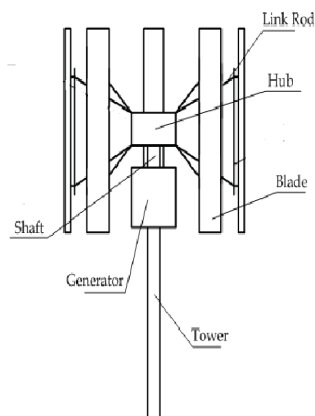
**Abstract:** Level, which makes it easy to conservation. The main purpose of our work is to design and self-starting vertical axis wind turbine. Also, VAWT are Omni-directional, this means that they do not need directed towards the wind power. This paper gives an overview of vertical axis wind turbine. They were observed that VAWT plays important role in the current energy crisis. Wind energy is energy recognized as a favorable renewable option. The behavior of the Vertical Axis Wind Turbine (VAWT), present technological state, new finding through modelling work and future direction of VAWTs were reviewed. From the vast research, according to the current technical states of VAWT china was inspected there are major researchers in the area for the last few years while being European countries serve your location in this research area. Vertical axis wind turbine power generational equipment can be located at ground generation.

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

## I. INTRODUCTION

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.

## II. FIGURES AND TABLES



**Fig1:Component Diagram of Vertical Axis Wind Turbine**

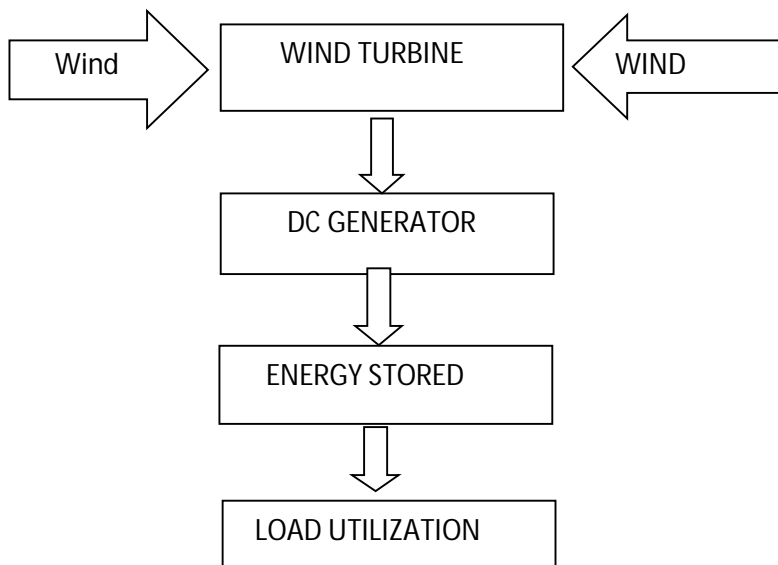
A. Main Components are:

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.

The goal of this project was to design a vertical axis wind turbine (VAWT) that could generate power under relatively low wind velocities. To accomplish this goal, the objectives were to analyze how different geometry of wind turbines 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. They became more and continuously in the first half of time. VAWT led the newly invented a great diversity of realization with both type and model vertical axis and horizontal axis, with rated power few kilowatts to start for 6 megawatt and more latest construction in electricity production market HAWT type is currently a major strength.



**Fig1: Block Diagram of Vertical Axis Wind Turbine**



**Fig3: Air Foil Design 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.

### 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, and 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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