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Vertical Axis Wind Turbine with Inverter

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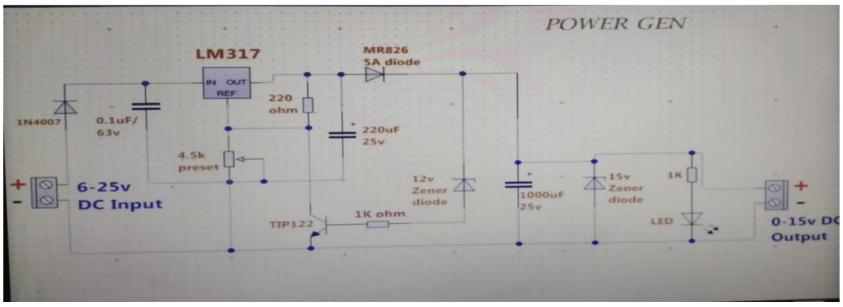
***Abstract:** On the expanding cost of non-inexhaustible assets, sustainable assets are increasingly sought after.In this system, we make utilization of Vertical Axis Wind Turbine for creating energy, for the inverter.A Vertical Axis Wind Turbine is a kind of wind turbine where the principle rotor shaft is set transverse to the breeze while the fundamental parts are situated at the base of the turbine. it comprises of a vertical axis windmill, DC motor, 12V battery, DC inverter and transformer. VAWTS do not need to be pointed into the wind, which removes the need for wind sensing and orientation mechanisms.*
***Keywords:** VAWT, Wind Turbine, Vertical axis, Inverter*



I. INTRODUCTION

The demand for electrical energy is increasing exponentially and relaying on fossil fuel resources will pose a threat to the human-kind as the availability of these resources are getting limited. Hence the focus should be on the renewable energy sources such as solar, wind, tidal etc . These sources have been coined renewable due to their continuous replenishment and availability for use over and over again. The popularity of renewable energy has experienced a significant upsurge in recent times due to the exhaustion of conventional power generation methods and increasing realization of its adverse effects on the environment. This popularity has been bolstered by cutting edge research and ground breaking technology that has been introduced so far to aid in the effective tapping of these natural resources and it is estimated that renewable sources might contribute about 20% – 50% to energy consumption in the latter part of the 21st century. Facts from the World Wind Energy Association estimates that by 2010, 160GW of wind power capacity is expected to be installed worldwide which implies an anticipated net growth rate of more than 21% per year. The main advantage considering the renew-able energy source as a main stream source for energy generation is that they are clean, non-polluting to the environment and its abundance. Although wind has been harnessed for centuries, it has only emerged as a major part of our energy solution quite recently. Before the 21st century, wind was primarily used to pump water from wells and to grind grain, but over the last twenty years the cost of wind energy has dropped by more than 80 percent, turning it into the most affordable form of clean energy.The Vertical Axis Windmill converts the energy of wind into kinetic energy by means of blades, and charges the 12V battery. As the battery is switched on, the inverter changes over DC into AC and the step-up transformer expands the voltage, required to run the device.

II. WORKING METHODOLOGY

In this we have used a 12v-34v DC generator with a maximum speed of 2400 RPM. The generator converts mechanical energy into electrical energy produced by the wind power. As wind strikes on the blades the rotor rotates and simultaneously the generator also rotates. Then the output of generator is given to charge controller A charge controller, charge regulator or battery regulator limits the rate at which electric current is added to or drawn from electric batteries to protect against electrical overload, overcharging, and may protect against overvoltage.This prevents conditions that reduce battery performance or lifespan and may pose a safety risk. It may also prevent completely draining ("deep discharging") a battery, or perform controlled discharges, depending on the battery technology, to protect battery life. The terms "charge controller" or "charge regulator" may refer to either a stand-alone device, or to control circuitry integrated within a battery pack, battery-powered device, or battery charger. With the help of Charge controller battery gets charged. We are using a rechargeable battery to store the energy passed through the charge controller circuit.

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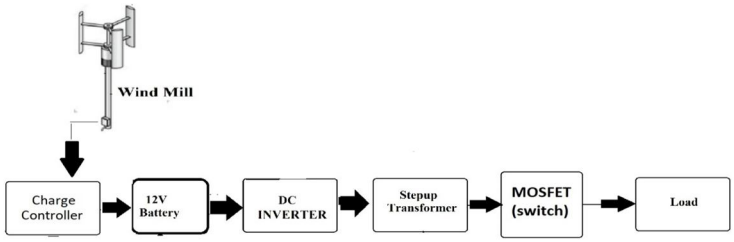
III. BLOCK DIAGRAM

In this project we have used some known & popular hardware such as Generators,12v DC Battery, Step-up Transformer, jumper wires, 3-9V DC motor, 100pf capacitor, 12V DV Adaptor. Below fig shows the block diagram in which all the components are connected



IV. DESCRIPTION OF HARDWARE

A. Generator

Mitsumi DC 12V to 34V ,2400 RPM generator.The generator converts mechanical energy into electrical energy produced by the wind power. As wind strikes on the blades the rotor rotates and simultaneously the generator also rotates.

Fig. 2 Generator

B. Charge Controller

Charge regulator or battery regulator limits the rate at which electric current is added to or drawn from electric batteries to protect against electrical overload, overcharging, and may protect against overvoltage.This prevents conditions that reduce battery performance or lifespan and may pose a safety risk. It may also prevent completely draining ("deep discharging") a battery, or perform controlled discharges, depending on the battery technology, to protect battery life. The terms "charge controller" or "charge regulator" may refer to either a stand-alone device, or to control circuitry integrated within a battery pack, battery-powered device, or battery charger.

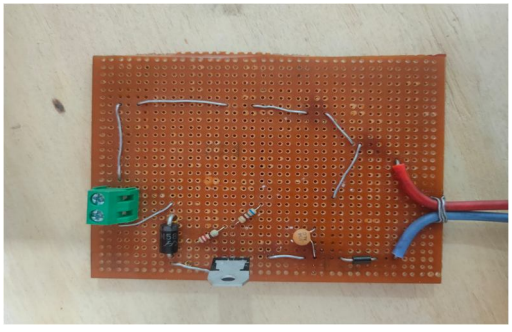


Fig. 3 Charge controller Circuit

C. Rechargeable Battery

In this project we are using 12v 1.7AH DC Rechargeable Battery to store the energy supplied from charge controller circuit

Fig. 4 Rechargeable Battery

D. Inverter

Invertor is a power electronic device or circuitry that changes direct current to alternating current (AC). The resulting AC frequency obtained depends on the particular device employed. Inverters do the opposite of "converters" which were originally large electromechanical devices converting AC to DC.In this project we have designed a 12v dc to 12 ac Inverter

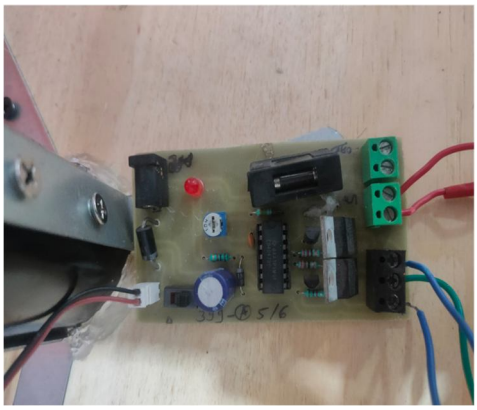


Fig. 5 Inverter

E. Step-up Transformer

In this we will be using a step up transformer to step up the voltage upto the required value to run the load.Transformer will step up the AC voltage converted by using the DC Inverter Circuit. The rating of the transformer used is 12-0-12 Volt. The step up transformer will step up the output given by inverter which is 12v AC into 230v Ac

Fig. 6 Step-Up Transformer

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V. RESULT & OUTPUT

According to the proposed plan the final outcome of this paper leads to the development of a Vertical axis wind turbine with inverter. Through this project, an power generation system has been created so that we wind pressure created in Highway or tunnels can be used and power can be easily generatedr. One of the objectives of this project is to design low cost Power generation. . By varying the slider or setting the speed in SCADA desired speed is obtained and the change in speed can be observed in SCADA software.

Fig. 7 Actual Image of the project

VI. CONCLUSION

The vertical axis wind turbine is successfully developed and gives constant supply. It's cost effecient the main purpose & application of this model is to use the vaccum and pressure created by high speed vehicles passing through a tunnel to rotate the turbines and as above fig.7 shows we have successfully created our VAWT

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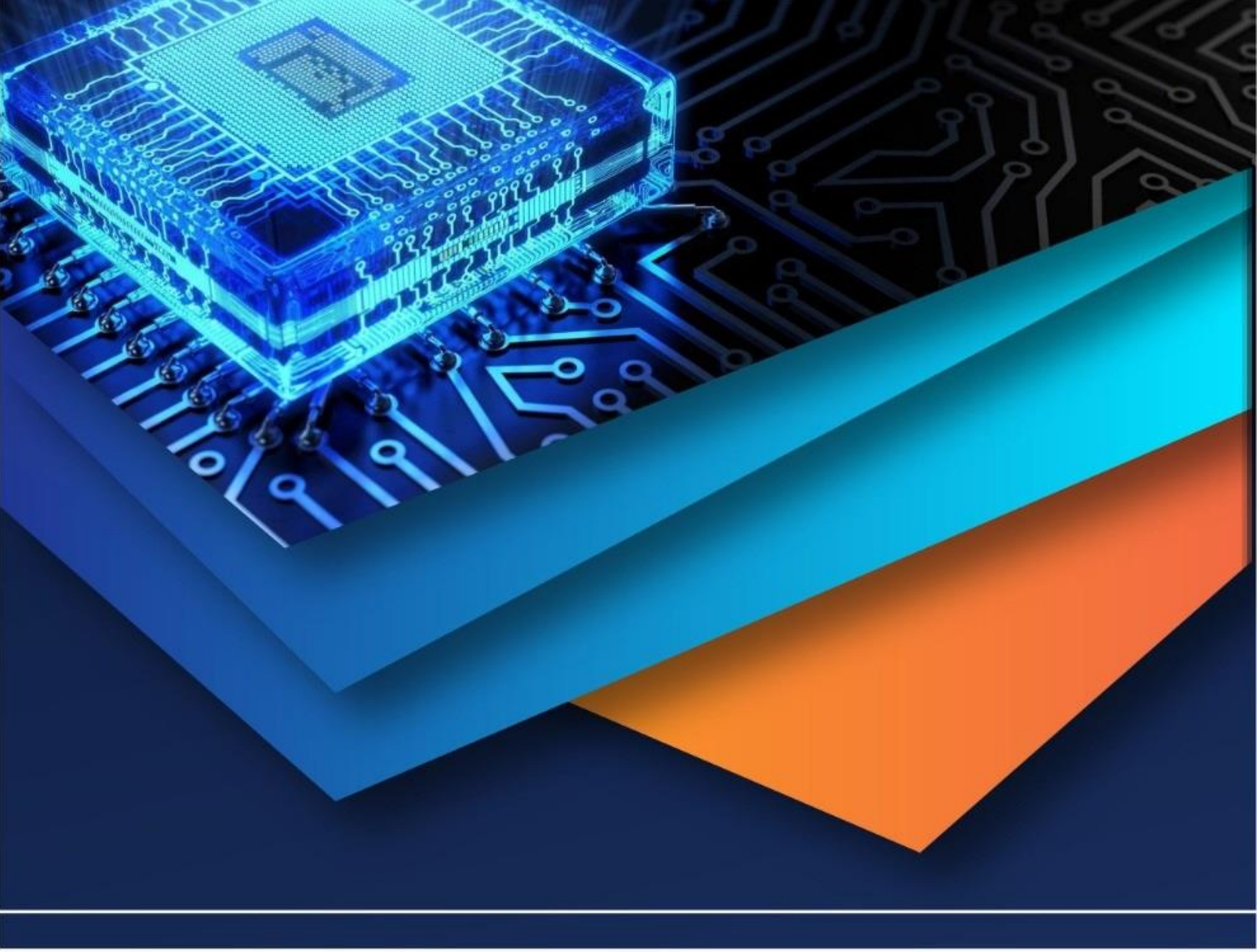

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