

Enlil Vertical Axis Wind Turbine

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Abstract -Increasing demand for energy in recent years has seen a rise in development of alternative energy sources. Wind being one of the most abundant and easily available sources is an excellent alternative to conventional energy sources. Due to increasing environmental and economic cost of fossil fuel, alternative sources of energy are required. One such source of energy is wind energy. For generating electricity from wind energy, wind power plants are installed. An alternative approach is small-scale wind turbine (Enlil Turbine) designed specifically to produce electric power from wind. In this an alternator is connected to the turbine for generating electricity and power. The solar panel is also installed in this project for the generation of extra power (auxiliary power generation source).

Key Words: Enlil vertical axis wind turbine, blade, shaft, alternator, dynamo, solar panel.

1.INTRODUCTION

The objective of this project is, the wind thrust produced due to the speeding vehicles can provide enough rotation to the turbine to generate electrical power all day and night without stopping. The energy generated can be transported to places or it can be used for maintenance of roadways. The aim of the project is to utilize the maximum amount of wind energy and hence highway is selected as installation site. The wind turbine will be placed so that the tangential acting air flow from both sides of the road due to moving vehicles will

help to rotate the turbine. The variation of blade angle is made so that to get maximum output and blades are fixed.

1.1 Design of Blade :-

The blade is designed in semicircular shape so as one blade passes another blade comes in the position of blades are used so as to use of maximum utilization of wind from air and moving vehicle.

1.2 Design of Shaft :-

While designing the shaft it should be properly fitted to blade. The shaft is designed in such a way that it can easily fixed in the disc.

1.3 Alternator :-

Alternator is convert the electrical energy into mechanical energy in the form of alternating current. Most of the alternators use a rotating magnetic field with a stationary armature.

1.4 Inverter :-

Inverter is an electronic device that changes direct current(DC) to alternating current(AC). The input voltage output voltage and frequency, and overall power handling depend on the design of the specific device. The dc inverter does not produce any power, the power is provided by DC source. DC sources such as batteries or fuel cell. Wind inverters may have the output of a small wind turbine with a AC voltage that changes the value of frequency and voltage depending on the speed of the wind.

1.5 Solar Panel :-

Solar panel are installed in this project for the generation of extra power. Solar panel are the auxiliary power generation source. These are connected at the top of turbine to generate

extra power. Photo voltaic solar panels absorb sunlight as a source of energy to generate electricity. A solar panels is a collection of solar cell. Lots of small solar cell spreads over a large area can work together to provide enough power to be useful.

1.6 Dynamo: -

A dynamo is an electrical generator that creates direct current using a commutator. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric-power conversion devices were based, including the electric motor, the alternating-current alternator, and the rotary converter.

1.7 Transformer :-

A transformer is static electrical equipment which transforms electrical energy (from primary side windings) to the magnetic energy (in transformer magnetic core) and again to the electrical energy (on the secondary transformer side). The operating frequency and nominal power are approximately equal on primary and secondary transformer side because the transformer is a very efficient piece of equipment – while the voltage and current values are usually different. Essentially, that is the main task of the transformer, converting high voltage (HV) and low current from the primary side to the low voltage (LV) and high current on the secondary side and vice versa.

1.8 LED :-

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. This effect is called electroluminescence. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

1.9 Battery :-

Battery is a specific common law misdemeanor, although the term is used more generally to refer to any unlawful offensive physical contact with another person, and may be a misdemeanor or a felony, depending on the circumstances. Battery was defined at common law as "any unlawful and or unwanted touching of the person of another by the aggressor, or by a substance put in motion by him." In most cases, battery is now governed by statutes, and its severity is determined by the law of the specific jurisdiction

2. BLOCK DIAGRAM

In this project, we create electrical energy using traffic: ENLIL is a vertical axis wind turbine that generates electricity from wind power. It was designed to capture the energy created by modern cities, like wind created from passing vehicles. It also has solar panels to capture extra energy from sunlight. The ENLIL turbine is being tested on

the streets of Istanbul, Turkey. Deveci Tech claims that ENLL can generate 50W of energy per hour, enough to handle the power needs of two homes. Like if you want these in your neighborhood. With the global population rapidly rising, the demand for energy is increasing day by day. Non-renewable sources of energy are running out, so continuing to rely on them is not a viable, long-term strategy. The benefit of the ENLIL wind turbine is that it offers a pollution-free alternative to the burning of gas, oil, and coal for the production of electricity. Many people are using wind turbines in order to simultaneously reduce their energy costs and their impact on the climate.

In this project, wind thrust produced due to the speeding vehicles can provide enough rotation to the turbine to generate electrical power all day and night without stopping. The energy generated can be transported to places or it can be used for maintenance of roadways. The aim of the project is to utilize the maximum amount of wind energy and hence highway is selected as installation site. The wind turbine will be placed so that the tangential acting air flow from both sides of the road due to moving vehicles will help to rotate the turbine. The variation of blade angle is made so that to get maximum output and blades are fixed.

In this, we have three sources which are used to charge batteries and produce electrical energy. Which are as follows:-

1. Turbine .
2. Solar Panel.
3. Auxiliary source.

Firstly, the power is generated from turbine due to speeding vehicles which provide wind thrust. The produced wind thrust is enough to rotate the turbine blades. Now, the energy produced is in form of mechanical energy. This mechanical energy is converted into electrical energy with the help of dynamo.

The converted electrical energy is again converted to DC by using rectifier circuit. Also, with this circuit two LED's are also placed which shows the direction of rotation of turbine. Such as, when turbine rotates in clockwise direction then first LED will glow. Similarly, when turbine rotates in anticlockwise direction then second LED will glow. Now, the rectified energy is stored in battery (it's capacity is 12V and gives 1.2A current).

Second source of this project is solar panel. With the help of solar panel we can generate power to store in battery and for utilization purpose. When, the sun's rays fall on solar plate it generates energy. The solar panel generate approx. 21V of electricity when the intensity is very high. Now, the energy produced by solar panel is step down by transformer, so that it can be easily stored in battery. Also with the solar panel circuit voltage regulation circuit is also there which regulates the energy produced by solar panel so that it can be easily stored in battery.

Third source which is used to produce power is an auxiliary power source. It is used when, there is no availability of sun's rays due to weather conditions or any other reason, in that case, solar panel is not able to generate energy. Other condition arises due to wind turbine, when vehicles are not able to produce that amount of wind thrust that the turbine requires and during night time there is no vehicles on the road so that turbine rotate. So, when energy is not generated from solar panel and turbine then auxiliary supply is used to charge the battery. The transformer is used with the auxiliary power circuit to step down the voltage from 220V to 12V and it is stored in battery.

So, the power which is stored in the battery is sufficient to glow the LED's and bulbs and road lights.

It can be installed near park, sea-shore, rooftops household. These are mainly designed to be located at the roadside and beside railway tracks so that it can generate the maximum amount of electricity by the wind energy getting from the moving vehicles.

The big vehicles like buses, trucks can provide a lot of wind energy, the speeding vehicles on the highway can provide enough energy to drive these turbines in a high-speed the generated energy can be used to power the street lights or it can be transported to some other places also.

With this project we can also install other sensor devices like earthquake sensors, weather condition sensing devices, also instead of solar panel we can use solar tracking system, etc. Then all the sensors readings will be send to control room where specialist can check the data of the weather condition and other sources.

Also, with this project we can also install display LED's at top of this project which consume low amount of energy and can display any kind of information or news to the peoples like about change in weather, about earthquake etc so that people will get alert and take safety measures.

The Enlil Vertical Axis Wind Turbine is still under development phase and the researches on it are going on to improve the design and make it more efficient and durable.

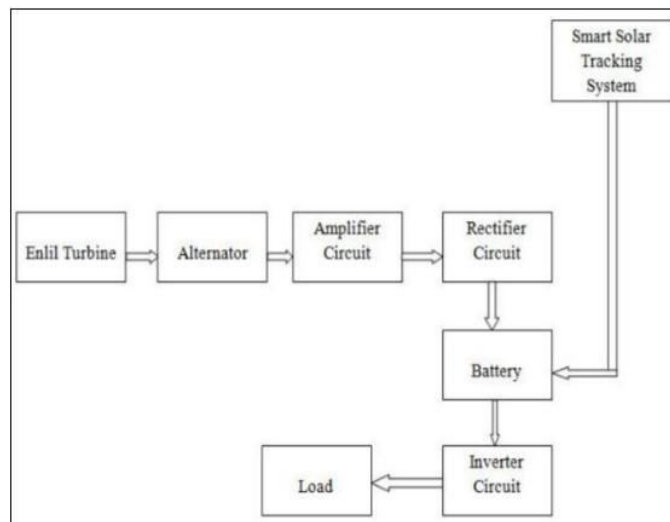


Figure 1:- Block Diagram

3. CONCLUSIONS

If any conclusion can be drawn is that the VAWT technology undoubtedly will be with us in the future, and can be seen all around us, as has happened with other renewable technologies for electricity production, such as HAWT and PV, thus becoming part of the future renewable energy range and the business network, contributing to the reduction of CO2 production and economic growth.

Even after being a subject to which many studies have been devoted, however we still have a long road ahead and certainly there continue to be many areas to experience. That is why, after doing this article, the Department of Energy and Marine Propulsion of University of A Coruña, have determined a preliminary geometry for the development of a new model of VAWT, in which is working out, doing various tests using computational methods in order to obtain optimal morphology and even making a preliminary model prototype, thus doing their bit to the development of this technology.

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