

## Power Generation by Vertical Axis Wind Turbine

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### *Abstract*

*Electrical power could be a prime necessity for any country for economic development. And power shortage could be a dominant downside, being featured by the foremost of the countries these days. On prime of this, typical fuel sources for generation, i.e., coal, oil deposits square measure quick obtaining depleted. The apparent solution is to shift focus to renewable sources of energy. Statistics reveal that of the big quantity of wind energy. The wind generation created by the motor may be hold on in an exceedingly battery and may later be wont to power the road lights. These wind turbines are transportable and may thus be used on any expressways or busy highways. A system for power generation by utilizing wind draft force from vehicles traveling on route provides a two kind of turbine apparatuses, one sort is for road facet that sits on the facet of a route; another sort is for road center that is put in on at traffic divider line at middle of a roadway. Once vehicle moves at high speed, heaps energy wont to force air in its means, by setting wind turbines on road facet and middle of road, some parts of the wasted energy may be re-captured. The rotary engine may be used commercially for low power applications. The implementation of such a project would scale back the dependence of a corporation or trade on electricity board.*

**Keywords:** *Electrical power, economic, coal, oil deposits, power applications*

## INTRODUCTION

The energy of a body is capability to try and do work. It is measured total quantity of labor that the body will do. Everything what happens within the world is that the expression of flow of energy in one in all its forms. These days each country attracts its energy desires of a spread of sources. We will broadly speaking reason these sources as standard and non standard [1, 2]. The traditional sources embody the fuel, sorts of atomic energy, whereas the nonconventional sources like daylight, wind, rain, tides, and geothermic heat, that area unit renewable. The energy hassle that began in 1973 caused crude provides to decrease and costs to rise diversely. This crisis forced developing countries to scale back or table necessary development programs, in order that they might purchase gas to stay their social science in operation. It created the imperative necessity to seek out and develop energy sources, like alternative fossil fuels (coal, gas), energy, and renewable energy resources.

The consumption of generating energy is direct proportion to the progress of the humanity. With ever increasing population, improvement within the living customary of the human beings, industrialisation of developing countries, the worldwide demand for energy is predicted to extend bright within the few years. The first supply of energy is fuel, but these fuel sources area unit finite conjointly with their quick in nature to use degradation of setting takes place, that causes warming, urban pollution and air pollution, It powerfully recommend that the time is currently come back to alcohol-dependent and use the non-conventional and setting friendly energy sources is important for steering the worldwide energy provides towards property path. This paper describes briefly the non-conventional energy sources and their usage in India.

Energy is the input to drives and improve the life cycle. Primarily, it is the gift of the nature to the mankind in various forms. The consumption of the energy is directly proportional to the progress of the mankind.

With ever increasing population, improvement in the standard lifestyle of the humanity, industrialization of the developing countries, the global demand for energy expected to increase rather significantly in the near future. The primary sources of energy is fossil fuel, however finiteness of fossil fuel reserves and large scale environment degradation caused by their widespread use, global warming, air pollution, strongly suggests that harnessing of non-conventional, renewable and environment friendly energy resources is vital for steering the global energy supplies toward a sustainable path [3, 4].

Wind power is the conversion of mechanical energy into a useful form of electrical energy, such as using wind turbines to produce electricity. Large wind turbines consist of hundreds of individual wind turbines which are connected to the electrical power transmission network. For new constructions, the way of wind is an inexpensive source of electricity, competitive with or in many places less than fossil fuel plants.

Wind power, as an either to fossil fuels, is a renewable, wide distributed, clean, produces no gas emissions during operation and uses little space. The effects on the environment are generally less problematic than those from other power sources. As of years 2011, Denmark is generating more than a quarter of its electricity from wind and 82 countries around the world are using wind power to supply the electricity grid. Wind power has its capacity expanded rapidly to 335 GW in June 2014, and wind energy production was around 4% of total worldwide electricity usage, and growing rapidly.

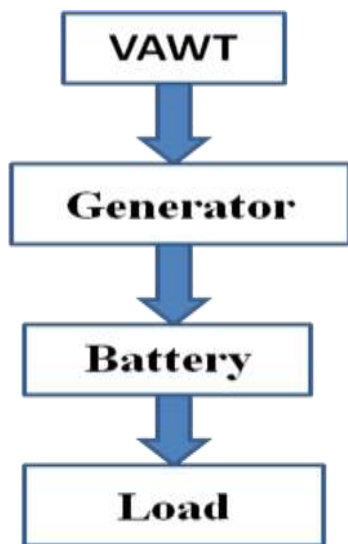
### **Wind Energy-**

Wind power is that the use of air through wind turbines to mechanical power generators for power. Wind power, as an alternate to burning fossil fuels, renewable, wide distributed, clean, produces no gas emissions throughout operation, consumes no water, and uses very little area. Internet effects on the setting square measure thus less problematic than those of alternative power sources.

### Wind Turbine

A turbine is device that converts the energy into current. Wind turbines square measure factory-made in a very two manner of vertical and horizontal axis sorts. The littlest turbines are used for little applications like battery charging, power traffic warning signs. Slightly larger turbines is used for creating contributions to a domestic power provide whereas merchandising uncommon power back to utility provider via the ability grid [5, 6].

### Block Diagram



*Fig. 1: Design of VAWT.*



*Fig. 2: Supporting Rod.*



*Fig. 3: Special Purpose Bearing (Ball Thrust Bearing).*



*Fig. 4: Supporting Structure.*



*Fig. 5: Complete Assembly Model.*

### **Variables**

#### **Wind Speed**

This is important variable of wind turbine because of maximum speed of wind turbine its depends on wind speed and vice versa.

#### **Blade Length**

This is also important variable because of larger the size of blade then larger the capture the air with respect to the production of energy and vice versa.

#### **Shape of Blade**

This is important part because of find out optimum and useful size of blade then productivity of energy is maximum is important.

**Size/Geometry**

The self should be purely mechanical and it will not rely on electronics. It must be solely wind powered, will not run on other source of energy.

**Main Parts of Model**

1. Main Shaft
2. Turbine Blades
3. Bearing
4. Gear Motor

**Main Shaft**

The shaft of VAWT is made up of aluminum having a diameter of 12 mm and 0.8 meter length, these shaft subjected to a four turbine of equal inclination.

**Turbine Blades**

Turbine blades are made up of a GI Sheet for a length of 0.33 meter, and is fixed with the help of rivets.

**Bearings**

Bearing is a mechanical element that support for rotating shaft, and also constrains relative motion and reduces friction between moving parts. Two Special purpose ball thrust bearings of inner diameter 12mm made up of stainless steel used for the project.

**Economics/Human Factors/Safety**

It is not harmful to human health. And it is much economics as compare to the Nuclear and Hydro power plants. As point of safety its maintenance is easy and not to be dangerous.

**Gear Motor**

A geared DC Motor has a gear assembly coupled to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and it is term as RPM. The gear assembly helps in increase in the torque and reduce the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable points. This concept where gears reduce the speed of the vehicle but increase torque it is known as gear reduction. This Insight will explore all the minor and major details that make the gear head and hence the working of geared DC motor.

**Merits**

1. It is also used in carefully designing wind farms using VAWTs can result in power output ten times as great as a HAWT wind farm the same size.



2. Vertical axis wind turbine is easier to maintain.
3. Wind energy is infinity in nature.
4. Wind energy is pollution free and environmentally safe.
5. Renewable energy source are more reliable.

### Demerits

1. Modern designs of VAWTs have overcome the majority of issues associated with early designs.
2. It is having Large Capital Cost.
3. They have relative high vibration because the air flow near the ground creates turbulent flow.
4. They create noise pollution.

### Applications

1. It is used in street lighting purpose.
2. It is used for traffic control.

### CONCLUSION

The implementation of vertical axis wind turbine on road dividers would be a great asset to the ministry of Non-convectonal energy Resources as it would reduce the burden on the consumption of convectonal

energy sources. They can be installed on any highway with the width being the only constraint. These turbines are simple in construction and require less investment.

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