

A Review on Highway Wind Turbine For Electricity Generation

D. G. Vyawahare^{1*}, Rushikesh J. Patil², Sudhir S. Helode³

^{1,2,3}Computer Science and Engineering, Anuradha Engineering College, Sant Gadgebaba Amravati, Chikhli, India

*Corresponding Author: dhiraj.vyawahare@gmail.com

ABSTRACT

The demand for electricity is far higher than its production, so the main goal of our project is to produce electricity at a low cost without affecting the environment. Electricity is generated using the air power generated by the moving vehicle on the highways. Significant amount of wind energy is generated by the difference in pressure created by vehicles moving on highways. This wind energy can be used to generate electricity through a vertical axis through wind turbines. The average electricity generated by highway Turbine is about 0.67kWh/day. This is a unique new method of low energy production in low cost. We use the vertical axis layout for power generation, called turbine power generation. These turbines are mounted in the middle of the highway to mediate wind from both sides of the turbine in the opposite direction, thereby increasing the strong wind speed acting on the turbine. The wind power used by this method can be used for street lighting, traffic signal lighting, charging, etc.

Keywords : Blades, Generation, Turbine, Vehicle, vertical axis, Wind energy

I. INTRODUCTION

Wind energy is the fastest growing source of clean energy in the world. There is a big problem due to the fluctuation of the wind sources. Due to various increase in the todays traffic there is an approximately permanent source of wind power on highways due to high-speed cars. The motive of this project is to contribute global trend towards clean energy. Most of the wind turbines used today are conventional windmills in the form of three air conditioners blades around the horizontal axis. These turbines need to be turned into the direction of the wind and generally require significant air velocities. Another style of turbine is where the blades are mounted vertically or transversely to the axis rotation. These turbines

always rotate in the same direction, regardless of the fluid flow. Because of their independence from the flow of fluid, these turbines have have found applications in tidal and surface flow streams. In the 20th century there was a big problem of insufficient storage or supply of electricity, so there is a need for development of various sources of power generation with the help of renewable energy at Low Cost Due to such problems, more renewable sources such as sunlight, wind and biomass are also needed in the current century. Energy is very important for the development of any nation. Currently it is over 65% electricity is produced by biothermal power plants where fossil fuels are used. Because we realize that as the fossil fuels are been used, we try to develop other means for generating electricity. Wind energy is an

easy source to generate electricity compared to other means of energy as it is never lasting form of energy.

II. LITERATURE SURVEY

The idea of using wind turbines on highways is not entirely unique. There have been various attempts made by some individuals and groups to recycle energy from the YouTube video that is "Highway Helical Wind "Turbine project (next generation highway potential for wind power). Basically, vertical wind turbine works on the simple basics of wind pattern created by the vehicles passing on both side of the highway, this is the most clean and simple way of energy creation.

III. PROBLEM STATEMENT

In day to day life there is a huge need of electricity. Mostly electricity is generated from non- renewable resources such as water, coal. By using non-renewable resources for creating electricity we are destroying natural resources. Electricity generation is not meet the need of today world because there is less generation of electricity at the powerplant, hence wind turbine is created. In old wind turbine there was need wind energy to rotate the turbine. Design should be durable and environment friendly and use to save energy when used.

IV. ARCHITECTURE



Fig 1 : Arizona State University Student Realistic Design.

The figures 1 show the different wind turbine designs on the highway. Each has its own design pros and cons. cabinets. This design is particularly difficult as spare parts must be installed vanes so that the wind produced by the vehicles reach the turbines. Chart shows the cheap design of the wind turbine. This design was not selected for safety reasons Remarks Parts are small and can be easily scrapped. Numbers shows the wind turbines offered by a student at the University of Arizona. This design: has been rejected because it requires the construction of special auxiliary stations.

PROPOSED DESIGN

Our team proposes to design a vertical axis wind turbine for use in the wind is produced by moving vehicles to generate electricity. These turbines will be mounted along roads that have high volumes of fast-moving traffic. The electricity produced at that time is stored in batteries. Since the electricity produced will be direct current (DC), it must be converts to alternating current (AC) before it can be used to light street lamps, sold past or sold to anyone in the ways we use electricity today. This means DC the current must be pre-installed with an inverter before it can be used. Figure 8 shows a sample 12 vertical axis wind turbine, but with part labels; the turbine we have designed is likely to be reflect the design in Figure 9 by TAK studios.

Fig 2 : LABELED PARTS OF A VERTICAL WIND TURBINE.

When we choose the turbine height in large quantities, they do not have the effect of air or air conditioning. When we choose the turbine height too short, the turbine should not rotate correctly. Thus, the height of the turbine must be accurate and therefore an important parameter.

C. Shape of the blade

Choosing a blade is one of the key steps in designing a wind turbine. The blades convert kinetic energy from the turbine shaft's rotational energy. The blades are a difficult part of the design as they have to move in any direction with the wind. To the air flow from the nearest vehicles as far as possible. The blades should also be stationary. The design of the central column is relatively

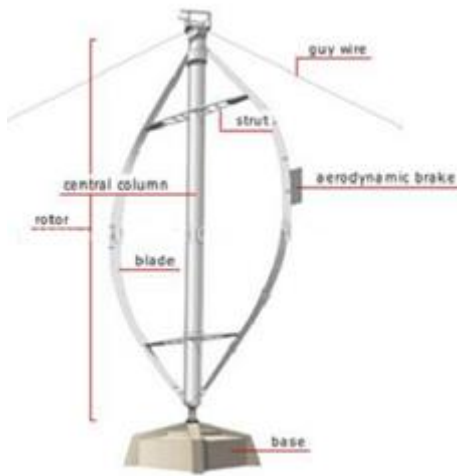


Fig 3 : TAK STUDIO DESIGN

V. WORKING PRINCIPLE

1. Capture of wind due to moving vehicles
2. Direction of penetrating wind in the direction of the wind turbine.
3. Wind energy converting to mechanical energy using a wind turbine.
4. To convert this mechanical energy into electrical energy using a generating device.

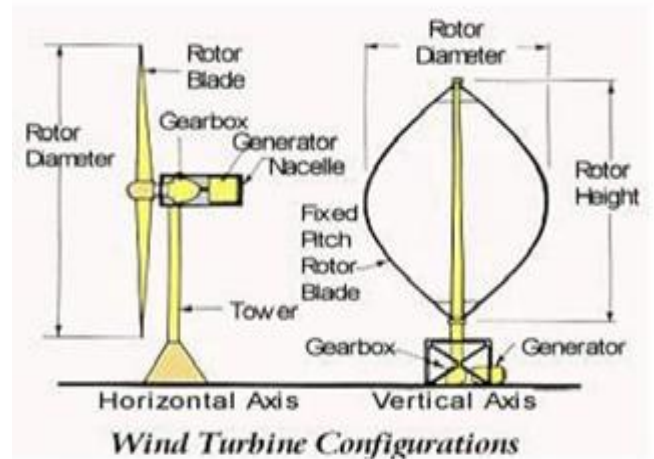


Fig 5 : WIND TURBINE CONFIGURATIONS

A. Speed of wind

Air velocity is a very important parameter. Because windmill we use the wind as a raw material for electricity production.

B. Height of turbine simple.

It is a hollow tube On which the plates are attached. It should be large enough to illuminate the width of the streetlights.



Fig 6 : VERTICAL BLADE DESIGN

The Blade converts the kinetic energy of air from a fast-moving machine into a rotational shaft rotational energy. Rotate The shaft movement in the battery through the PMDC (DC permanent magnet) motor and the power storage converts it into electrical energy. The energy received by moving vehicles may not be continuous as they may be idle. Without traffic and the turbine may need to stop and start frequently. So, start the property itself in the case of highway wind turbines is one of the important parameters. For high efficiency we used FRP (Fabric Reinforce Plastic) material, so the blade has the least weight of the mouth. The blade shape is made of fruit so it will allow maximum air velocity and will give high rotation. To achieve high rotational movement, the extreme edge of the blade is overweight. This will help develop centrifugal force will help to achieve maximum results.

VI. ADVANTAGES AND LIMITATIONS

ADVANTAGES:

- ✓ Energy created without environmental pollution is harmful to the environment.
- ✓ Until now, waste energy can be used for development.
- ✓ Installation and service fees are not very high.
- ✓ No harm to birds or animals.
- ✓ Can be used to generate free electricity.
- ✓ Can be used to pump water and develop a well-maintained irrigation system.
- ✓ Compare horizontal turbine vertical turbine has fewer rotary parts which do not were out or break down.
- ✓ Air flow direction is not a major issue in this turbine rather than horizontal turbine.

Since vertical wind turbine are been lower to the ground, they can't experience the high flowing wind.

- ✓ Blades present in this turbine do not produce same amount torque.
- ✓ Some times vibration may be issue for the noise produce into turbine.
- ✓ Vertical wind turbine produces less power compare to horizontal wind turbine but it is good for various applications which work on less electricity.

VIII. CONCLUSION

Wind energy generated by vehicles moving on highways can be used to generate electricity which can be stored in the battery and used for various purposes such as street lighting, charging an electric car, and so on. This is the design concept meant to be sustainable and environmentally friendly. If these turbines can be installed at high speeds for a long-time express highway, such as the golden rectangle, can generate significant amounts of electrical energy, which can largely address the energy crisis.

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Author Profile

Prof. Dhiraj G. Vyawahare M.E. (C.S.E). He is currently working as Assistant Professor in Department of Computer Science & Engineering, at Anuradha Engineering College Chikhali Since September 2007 M.S. India



Mr. Rushikesh J. Patil pursuing Bachelor of Engineering in Computer Science & Engineering Department from Anuradha Engineering College of SGBAU Amravati University Maharashtra



Mr. Sudhir s. Helode pursuing Bachelor of Engineering in Computer Science & Engineering Department from Anuradha Engineering College of SGBAU Amravati University Maharashtra

