



## Vortex bladeless Wind Turbine

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**Abstract** - (Vortex-Bladeless is Spanish SME whose is to develop a new concept of wind turbine without blades called Vortex or vorticity wind turbine .this design represents new paradigm in wind energy and aims to eliminate or reduce many of exiting problem in conventional generator. As you flip across the pages for this project , you will find that it is structured in a systematic manner so as to provide a sequential flow of the spectator. The intent is to present a precise picture without getting lost in finer points. Beginning with a general introduction to the subject we have tried to fathom the depth of it in quite a brief manner and with a simplistic approach .

**Keywords** – Bladeless wind turbine, Neo Magnet, Vorticity, Vortex, voltage doubler circuit.

### I. INTRODUCTION

Bladeless turbines will generate electricity for 40 percent lesser in cost compared with conventional wind turbines. In conventional wind power generation transportation is increasingly challenging because of the size of the components: individual blades and tower sections often require specialized trucks and straight, wide roads. Today's wind turbines are also incredibly top heavy. Generators and gearboxes sitting on support towers 100 meters off the ground can weigh more than 100 tons. As the weight and height of turbines increase, the materials costs of wider, stronger support towers, as well as the cost of maintaining components housed so far from the ground, are cutting into the efficiency benefits of larger turbines.

The alternative energy industry has repeatedly tried to solve these issues to no avail. But this latest entry promises a radically different type of wind turbine: a bladeless cylinder that oscillates or vibrates .The Bladeless Turbine harness vorticity, the spinning motion of air or other fluids. When wind passes one of the cylindrical turbines, it shears off the downwind side of the cylinder in a spinning whirlpool or vortex. That vortex then exerts force on the cylinder, causing it to vibrate. The kinetic energy of the oscillating cylinder is converted to electricity through a linear generator similar to those used to harness wave energy.

The bladeless turbine currently takes up as much as 30% of the area of a conventional generator, with maximum amplitude around a diameter at the top. It can capture about 40% of the wind power contained in the air, which is a more than reasonable capacity, and at same height as many modern wind turbines. The system does loose some electrical conversion capacity (reaching 70% yield of a conventional alternator), because the design is so focused on avoiding and wear and tear .It aims to be a “greener” wind alternative. The impact on the bird population is expected to be much smaller, because it doesn't require the same type or magnitude of movement as the traditional wind turbine, allowing for higher visibility. With the oscillation frequency of the equipment very low, the impact sound level is non-existent, opening the possibility to make the future wind farms completely silent

### II. AIM

There is a need to find cheap and safe alternatives to conventional windmills. The concept of bladeless

windmill is far less costly and also has less maintenance cost. The bladeless wind mill has lesser moving parts as compared to the conventional windmill. Also it will require lesser wind speed. It requires less space and also is safe for birds. An aerodynamic effect that occurs when wind breaks against a solid structure. The structure star to oscillate, and captures the energy that is produced. This technology works by placing cylindrical bodies in

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normal to wind flow. Flow over this cylinder will generate an irregular vortex pattern which creates alternating high lift forces on the body and pushing it up and down perpendicular to fluid flow. The alternating movement of this body will produce fluctuating kinetic motion which can be converted into electricity.

### III. METHODOLOGY

Vortex shedding is a phenomenon, when the wind blows across a structural member, vortices are shed alternately from one side to the other, and where alternating low pressure zones are generated on the downwind side of the structure giving rise to a fluctuating force acting at right angles to the wind direction. Those fluctuating force is known as vortex induced vibrations. The Vortex wind generator represents a fairly radical break with conventional wind turbine design, in that it has no spinning blades (or any moving parts to wear out at all), and looks like nothing more than a giant straw that oscillates in.

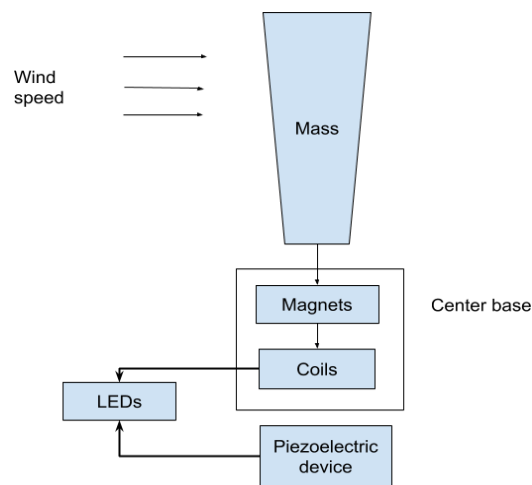


Fig.1- Block Diagram Of Vortex Bladeless Wind Turbine

- **Center base-**  
Base is made up of the rigid pipe angular structure. The base provides equidistant point for the position of the mast. It is capable of tolerating the mechanical stress acting on it. This provides the strong foundation to the mast and spring.
- **Spring:-**  
Spring is mounted at the center of the mast which provides the oscillation of the mast in any of the direction. This spring is capable to withstand the weight of the mast
- **Mast:-**  
The mast is a conical shaped, rigid structure which oscillates when subjected to wind. The Mast is lighter in structure in order to increase the oscillations also decrease the mechanical stress on the suspension spring as well as the base.
- **Magnets-**  
The polarity of the induced emf is such that it produces a current whose magnetic field opposes the change which produces it. The induced magnetic field inside any loop of wire always acts to keep the magnetic flux in the loop constant.
- **LED**  
In electronics, an LED circuit or LED driver is an electrical circuit used to power a light-emitting diode (LED)
- **Load:-**

When the generated voltage is less than 5V, the power has to be dumped. Therefore a dummy load is connected. The load consists of LED bulbs.

- **Using Piezoelectric Material:-**

When wind flows at some specific speed oscillations surrounding the pole of windmill. Due to this the rod will oscillate. These oscillations will be applied to the steady part of the windmill which is placed at the bottom. In the steady part we have placed either piezoelectric material. Due to oscillation produced by the rod, vibrations

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will create in piezoelectric material. Due to vibrations there will be production of voltage which is dc in nature. We have to convert it into the ac voltage and step it up and then will give to the load. There will be production of voltage which is ac in nature. This bladeless windmill has very high efficiency as there are minimum losses and this windmill will start energy production at very low speed of wind. This windmill will start to produce energy at speed of 1.3 meters/sec. i.e. 4.6 km/hour. At this much low speed of wind the bladeless windmill starts to produce the energy. So the efficiency of this windmill is around 50% higher than the normal windmill.

• Using neo magnets:-

The new Vortex is designed to vibrate as much as possible. At the base of the cone are two rings of repelling magnets, which act as a sort of nonelectrical motor. When the cone oscillates one way, the repelling magnets pull it in the other direction, like a slight nudge to boost the mast's movement regardless of wind speed. This kinetic energy is then converted into electricity via an alternator that multiplies the frequency of the mast's oscillation to improve the energy-gathering efficiency. The energy generation is ac in nature.

• WORKING PRINCIPLE –

It's based on faraday's first law Faraday First Law of Electromagnetic Induction state that whenever a conductor are placed in a varying magnetic field emf are induced which is called induced emf, if the conductor circuit are closed current are also induced which is called induced current.

•Voltage Doubler Circuit Working :-

A **voltage doubler** is an electronic **circuit** which charges capacitors from the input **voltage** and switches these charges in such a way that, in the ideal case, exactly twice the **voltage** is produced at the output as at its input

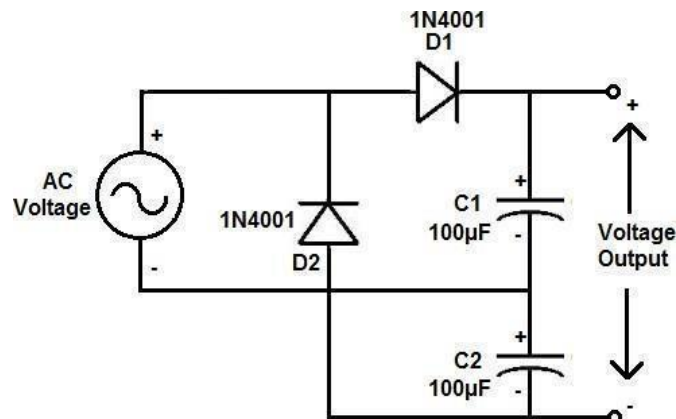


Fig.2- Circuit Diagram Of Voltage Doubler Circuit

#### IV. CONCLUSION

The bladeless wind generation system configuration has been considered and the obtained results appear to be very encouraging, even though they are based on simulations and model taken from the literature, which certainly can give only approximate description of involved dynamics. Tapping the wind for renewable energy using new approaches is gaining momentum in the recent years. The purpose of this project is to provide some fundamental results on the bladeless wind system and serve as stepping stones for the future development of bladeless wind power generating system. The forces that is beneficial or useful to generate power in bladeless are different from those in conventional horizontal axial wind turbines. Our device captures the energy of vorticity, and aerodynamic effect that has plagued structural engineers and architects for ages (vortex shedding effect). As the wind bypasses a fixed structure, its flow changes and generates a cyclical pattern of vortices. Overall the project has been a success with all of the project requirements achieved. As the wind energy is powerful and consistent, the usage of conventional wind turbine for utilizing the wind energy in lesser area and cost is not possible. Hence bladeless wind energy helps us to achieve these criteria.

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