

Generation of electricity using road transport

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Abstract: *The main objective of this project is "Generate electricity on road by Solar panels and Vertical Axis Wind Turbine" wherein, design of the components and their analysis has been carried out and, the fabrication of the model has been done as per the calculations that have been obtained from the design and analysis. Electricity has helped in reducing physical efforts to a very large extent, but, the way in which it is produced is quite a matter of concern. Even today, most of the electricity that we use is produced through conventional methods. These conventional methods commonly use fossil fuels to produce electricity. Not only are these methods expensive, but also cause grave damage to the environment. The use of fuels for the generation of electricity results in increased costs and emissions of hazardous pollutants. The only alternative is a new method that is not only cheap and efficient, but also eco-friendly.*

1. Introduction

Energy is the primary force in the universe. Energy defines the Earth's biomes and sustains life. All life, from the single-celled microbes to blue whales, exists in a continuous process of consuming, using, and storing energy. Human communities work in the same way as other communities with regard to energy management. Any community consumes the fuel to produce energy, but the community must also conserve some of the fuel for the next generation. This conservation of the energy sources from one generation to the next is the principle behind sustainability, the process by which a system survives for a period of time. No system in the biology lasts forever, and this is also true for sustainability. Sustainability prolongs the time that living things can survive, but it cannot ensure that life will go on forever. The Earth's resources can be called its the natural capital. Capital is any asset that has value. Natural capital, meaning things in the nature such as trees, rivers, coal, and wildlife, must be managed in the same way that responsible people manage their money. A person who possesses \$10,000 but spends every penny of it in a single month has not conserved monetary capital. That person certainly will not be able to sustain a comfortable life style. By keeping a budget and making prudent purchases, the same amount of money will last far longer; this is conservation. A savings account containing \$10,000 with no other form of income represents a nonrenewable resource. Once the money has been spent, no more money will magically appear. In terms of natural capital, Earth's main non renewable resources are oil, natural gas, coal, metals, minerals, and land. Nonrenewable resources can be thought of as depleted when the energy needed to extract them from the Earth costs more than the energy value of the resource itself.

2. Related Work

Niranjana. S.J[1] investigated the power generation by vertical axis wind turbine. In this paper the power is generated by fixing the wind mill in the road highways. When the vehicle is passing through the road at high speed the turbine of the wind mill rotates and generates the power sources).

Robert Howell (2006) [2] presents a combined experimental as well as computational study into the aerodynamics and performance of a small scale vertical axis wind turbine blades.

Abmjit N Royetal [3] analyzed the design and fabrication of vertical axis economical wind mill. This paper indicates that vertical axis wind mill is one of the most important types of wind mill. In this main rotor shaft is connected to a wind turbine vertically with the generator and the gear box which can be placed near the ground.

D.A. Nikam et al [4] analyzed the literature review on design and development of vertical axis wind turbine blade. This paper explains that the wind mill such as vertical and horizontal wind mill is widely used for energy production.

3. Methodology

Wind Energy :-

Wind Energy is used to drive the wind turbines to mechanically power generators for electric power. Wind power, as an alternative to burning fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, consumes no water, and uses little land. The net effects on the environment are far less of a problematic than those of non-renewable power sources.

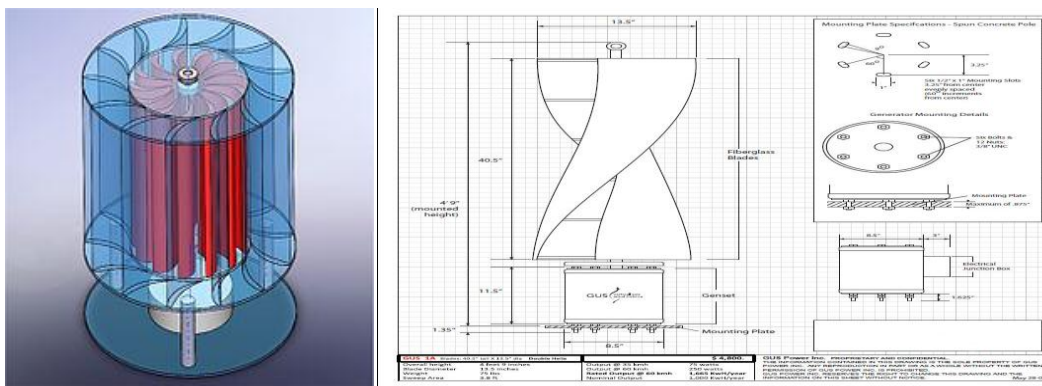
TYPES OF WIND TURBINE

1] Vertical Axis Wind Turbine

2] Horizontal Axis Wind Turbine

1] VERTICAL AXIS WIND TURBINE

Vertical-axis wind turbines (VAWTs) are the type of wind turbine where the main rotor shaft is set transverse to the wind (but not necessarily vertically) while the main components are located at the base of the turbine. This arrangement allows the generator and the gearbox to be located close to the ground, facilitating service and repair.



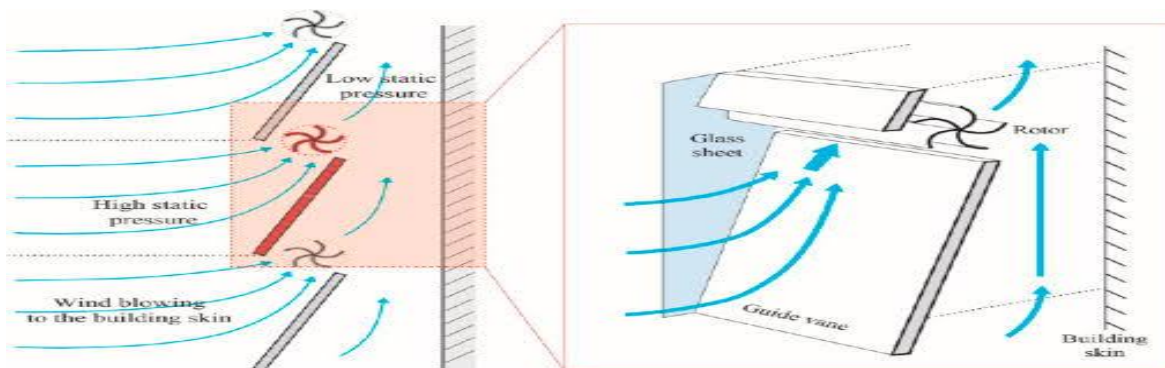
2] HORIZONTAL WIND TURBINE

The horizontal axis wind turbine (HAWT) is widely used for higher volume of production which requires huge investment and occupies more space for the installation compared with vertical axis wind turbine (VAWT). The rotational axis of the horizontal axis wind turbine is parallel towards the direction of wind in order to generate electricity.

Routing the induced wind in the Direction of the Wind Turbine

If this wind is properly directed towards the wind turbine blades, optimum electricity may be generated. The desired direction of wind is obtained by a means of for channeling wind, in the direction of the wind turbine. Channeling of a wind in the desired direction may be obtained by, at least one truncated or pyramid sloped housing or a pair of planar members converging towards the blades of the wind turbine.

Aerodynamics is the science and the study of the physical laws of the behaviour of objects in an air flow and the forces that are produced by air flows. The shape of the aerodynamic profile is the decisive for blade performance. Even minor alterations in the shape of the profile can be greatly alter the power curve and noise level. Therefore the blade designer does not merely sit down and outline the shape when designing a new blade.



4. Results

Table 1 showing speed of Indian national highways

State	Motor cycle	Light motor vehicle (cars)	Medium passenger vehicle	Medium goods vehicle	Heavy vehicle/Articulated vehicle	Vehicle pulling 1 trailer	Vehicle pulling multiple trailers	All other vehicles
Andhra Pradesh / Telangana State ^[2]	50	No default limit (65 for transport vehicles)	65	65	40/50	60 (50 if trailer > 800 kg)	50	30
Maharashtra ^[3]	50	No default limit (65 for transport vehicles)	65	65	65	50	50	50
Delhi ^[4]	30-70	25-50	20-40	20-40	20-40	20-40	20-40	20-40
Uttar Pradesh ^[5]	40	40	40	40	20-40	20-40	20-40	
Haryana ^[6]	30/50	50	40/65	40/65	30/40	35/60	40/60	20/30
Karnataka	50	No limit (60 for cars in Bangalore except in Airport)	60 (KSR TC)	60	60	40/60	40/60	

State	Motor cycle	Light motor vehicle (cars)	Medium passenger vehicle	Medium goods vehicle	Heavy vehicle/Articulated vehicle	Vehicle pulling 1 trailer	Vehicle pulling multiple trailers	All other vehicles
		road where it is 80, 100 for cars only on NH 66 between Mangalore and Udupi) ^[7] (65 for transport vehicles)						
Punjab ^[8]	35/50	50/70/80	45/50/65					30
Tamil Nadu	50	60						

5. Conclusion

This system is environmental friendly. The working model of our project is combined energy source with solar system and vertical axis wind turbine system which is a good and effective solution for power generation, basically this system involves the combination of two energy system, suppose anyone source fails to generate another source will keep generating the electricity and will give the continuous power to the load. The renewable energy sources such as solar and wind energy are used to generate the electricity.

By using this technology all the highways can be lightened without use of non-renewable energy resources. Also, if this method is implemented in all national highways it can able to produce large amount of power. And it can also provide job for

many educated fellowship. By increasing numbers it can develop more energy & light up the highways so that the percentage of accidents gets minimized.

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