

GENERATION OF POWER TO A VEHICLE USING ITS OWN KINETIC ENERGY

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ABSTRACT

The quotient with which we are left in the division of conventional sources of energy is not so luxurious for one to have fun on this modern planet. So, it's the prime duty of every single individual engineer to pave an alternative path for innovative generation of power and smarter utilization of non-conventional energy sources, apart from the utilization of conventional sources like fossil fuels and all other crude oil products.

Some of the main conventional resource consumers on this planet are the vehicles that run with the crude oil products like petroleum, diesel, (CNG) Compressed Natural Gas, kerosene etc. Since the production of such fuels to vehicles is not so easy in future, we should provide a secondary source to our vehicles.

So, by this paper I'd like to put forth my ideas about the smart way of generating power from the kinetic energy that's been possessed by the running vehicle, so that it acts as a backup for the battery and supply power to run the components in the car. Thereby, you can save your money that's invested on the battery of the vehicle. Various methods have been introduced in this paper to put a smart approach on generation of power in a wise manner. I strongly believe these ways of power generation will definitely help us in future when the non-renewable energy sources don't meet the demand of the consumers. Hence, whenever the supply doesn't meet the demand, the system would ultimately crash. This paper helps in digesting some concepts regarding the generation of electrical power in an innovative approach.

Keywords: Dynamo, Application Of Modified Francis Turbine, Generating Principle, Kinetic Energy, Rotatory Motion, Utilization Of Energy That Is Going In Vain, Wind Energy, Wind Turbine

I. INTRODUCTION

This paper provides a clear path in showing the energies those are going wasted without any good purpose, just like useful rivers going in vain mixing up with ocean bodies finally. In this paper, we are going to witness a couple of modified new techniques by which we can generate electrical power. We will also come across illumination methods for earlier vehicles and various modes of transportations. Various designs, manipulations, advantages and disadvantages of different constructions are encountered in this paper work.

Just like a construction of dam over a river to make use of river's benefits, we install an electrical generator (dynamo) in a vehicle to make use kinetic energy that's going in vain.

2.1 Earlier achievements

2.2 Modes of transportation

2.3 Initiations for innovation

1. Energies that go vain in a moving vehicle
2. Sources to generate electricity
3. Generation of electricity from rotatory motion of the wheels of the vehicle
4. Application of windmill technology in vehicles to generate power
5. Development of turbine from the above problems
6. Application of horizontal turbine over the roof of roadway vehicle
7. Application of wind turbine on a waterway vehicle
8. Application of wind turbine on a railway vehicle
9. Principle involved in application
10. Pros of this model
11. Cons of this model
12. Some power requirements
13. Conclusion
14. Acknowledgements

2.1 Earlier Achievements

Under poor ambient illumination on the roads, any bicycle must and should be provided with some illumination. It is cumbersome to carry a torch all the time at nights while riding a bicycle in dark places. Hence, there should be an alternative source of light for bicycle, which is risk-free and easy to handle as well.

Three sources of illumination for a bicycle in past

1. *CHEMICAL ENERGY* - Carrying a lantern powered by any chemical source (kerosene).
2. *ELECTRICAL ENERGY* - Installing an electric bulb powered by an electrical source (battery).
3. *MECHANICAL ENERGY* - Installing an electric light source powered by dynamo driven through mechanical energy of the bicycle.

2.2 Modes of Transportation

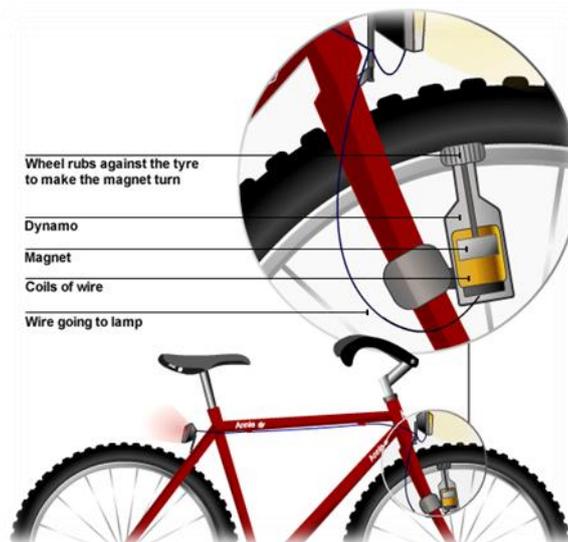
- ROADWAYS
- RAILWAYS
- WATERWAYS
- AIRWAYS



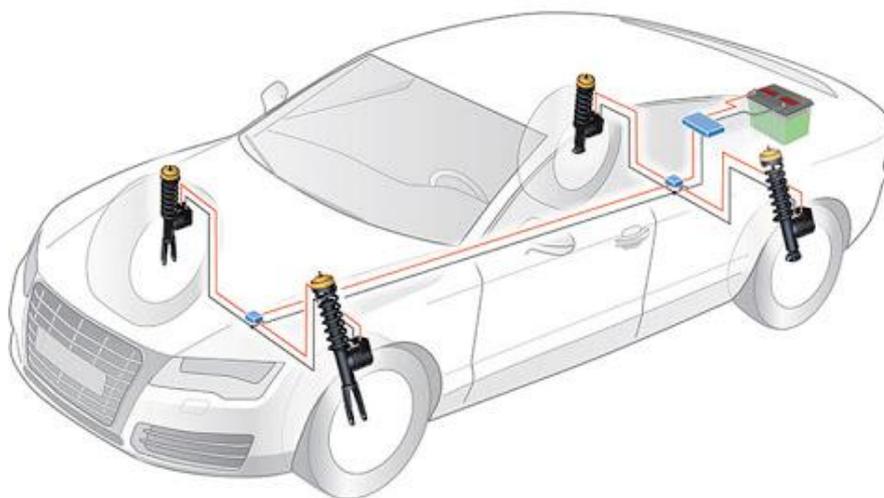
2.3 Initiation for Innovation

The kinetic energy is witnessed in all the above mentioned modes of transportation when they're in motion.

Thus, depending upon the convenience and type of transportation, the user installs a suitable dynamo kit in his vehicle to generate, store and utilize energy.



This Concept Of Illumination In Our Earlier Bicycles, Now Paved A Path For Me To Generate Power From The Kinetic Energy Of Any Running VEHICLE...



It need not be just a car, it can be any running vehicle.

III. ENERGIES THAT GO VAIN IN A MOVING VEHICLE

- The Rotatory Motion Of Wheels Of The Vehicle
- Wind Energy Which Is Opposing A Moving Vehicle

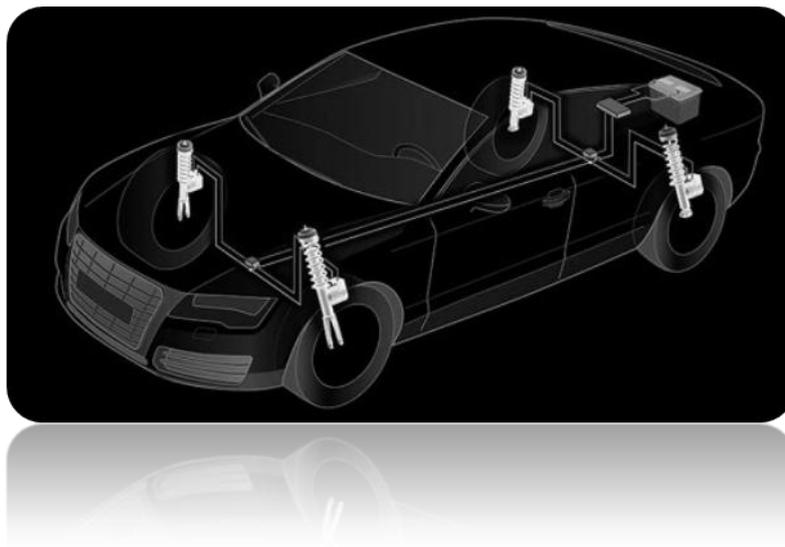
IV. SOURCES TO GENERATE ELECTRICITY

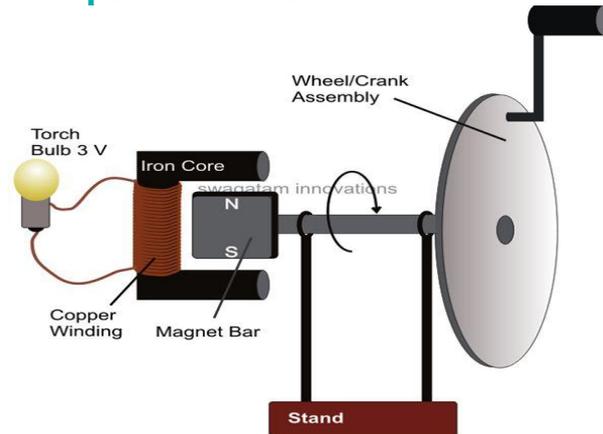
Our main aim is to provide mechanical energy to the dynamo, thereby making its shaft of the dynamo to rotate, creating a “*Generator principle*” to produce power. There are two ways by which we can provide mechanical energy to the dynamo that’s installed and they are as follows

- By The Utilization Of Rotatory Motion Of Wheels Of The Vehicle
- By The Utilization Of Wind Energy Which Is Opposing A Moving Vehicle

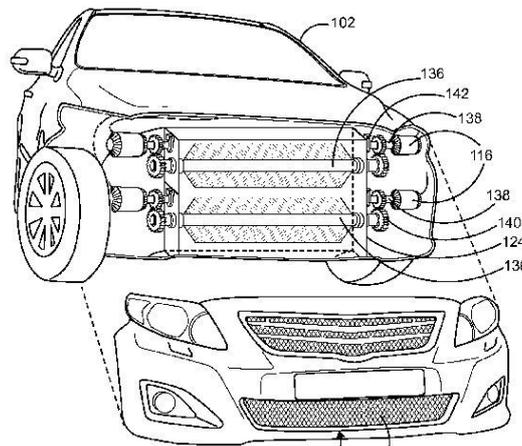
V. GENERATION OF ELECTRICITY FROM ROTATORY MOTION OF THE WHEELS OF THE VEHICLE

As we know earlier, moving vehicle possesses some kinetic energy in it. Where the wheels of the vehicle rotates even they possesses some kinetic energy within them as they are in motion. On other hand we have a dynamo whose shaft has to be provided with some mechanical energy to cause a relative motion between the conductors and its internally built magnetic field. So, what we do now is just similar to the way we extracted energy from our earlier bicycles using a dynamo which is connected to its one of the (or two) wheels, which on rotation of the wheel rotates the head of the dynamo shaft causing a relative motion between the magnetic field and conductors of dynamo, resulting in the generation of electrical energy from the mechanical energy. That generated electrical energy is fed to the electrical lamp for the illumination.





Thus, in a similar fashion, we are going to provide 3 or 4 dynamo sets to a roadway vehicle, depending upon the number of wheels of the corresponding vehicle. Thereby, we're making use of the energy that's been going in vain in the motion of a vehicle. Thereby, generates power by driving a dynamo driven by the rotatory motion of the vehicle that's been in motion using a simple **GENERATOR PRINCIPLE**.



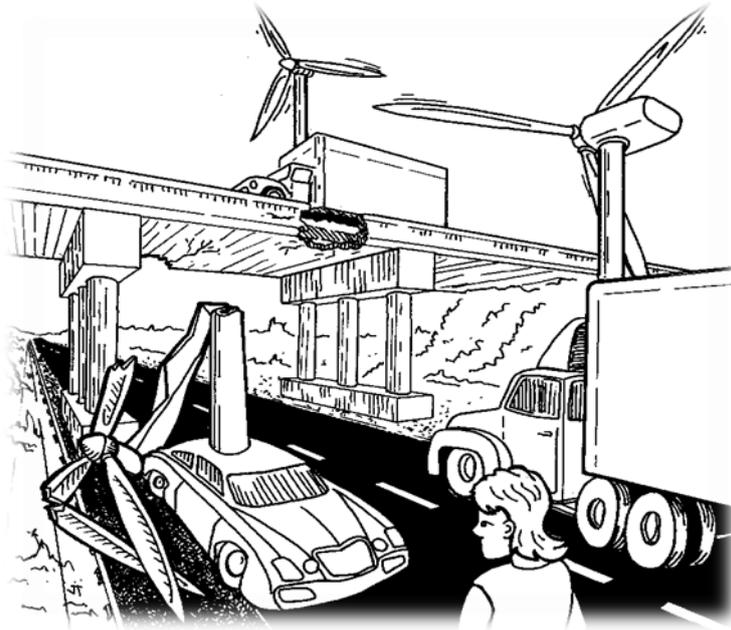
As shown in the figure, the crank wheel assembly is analogous to the rim of the dynamo which will be in contact with the wheel of the vehicle.

Magnetic material and shaft is analogous to the dynamo itself.

Electric lamp will be analogous to the equipment to which the power generated is connected or on contrast the power generated can be stored in a suitable for alternative usage in future, backing up original battery.

This technique of generating power can also be employed in a railway mode vehicles like locomotives (trains) with perfectly specified dynamos and batteries.

VI. APPLICATION OF WINDMILL TECHNOLOGY IN VEHICLES TO GENERATE POWER



There in case of wind turbine, the turbine is stationary and the wind is striking the turbine. But, here in our application the moving turbine strikes the wind. However, the air foiled blades or propellers of the turbine rotate which helps in providing the mechanical input to dynamo. Thus, the dynamo takes in the mechanical energy and gives out electrical energy.

This looks really absurd and awkward carrying a generally seen wind turbine of mini size on the roof of the vehicles. It creates many problems relatively comparing to the output which we are provided with.



- Looks really funny for modern vehicles.
- Adds more weight to the vehicle.
- Low altitude obstacles may damage turbine.
- Reduces the speed of the vehicle.
- Cause damage to fellow vehicles if the turbine breaks.

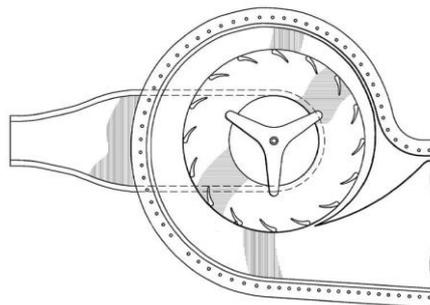


Hence, we come across the utilization of less spaced turbines that overcomes all the problems which are shown in above scenario. The principle of generating power is no change here too. The only change here from the previous is the construction of turbine, which is a major problem in the previous version's design and construction.

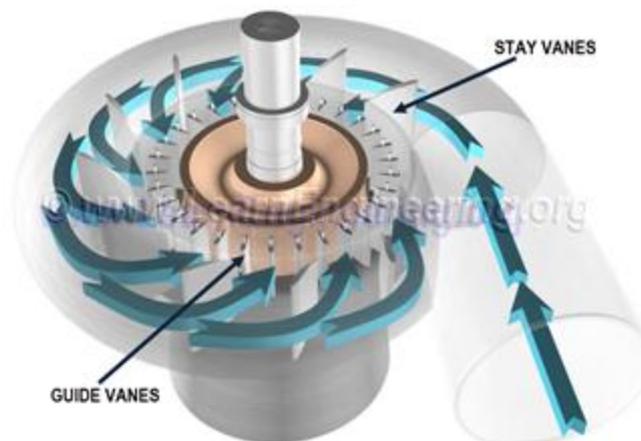
Features are as follows comparing to previous:

- A turbine over the roof of the vehicle.
- Relatively reduces the weight of the vehicle.
- Create no problems even under such low altitude bridges.

VII. DEVELOPMENT OF TURBINE FROM THE ABOVE PROBLEMS



From the above, it is witnessed that the kinetic energy of the wind is striking the blades of propeller in parallel. Due to this construction, there are many disadvantages. First and foremost thing is that it's occupying much space. Due to that, the vehicle is looking awkward in above two cases.

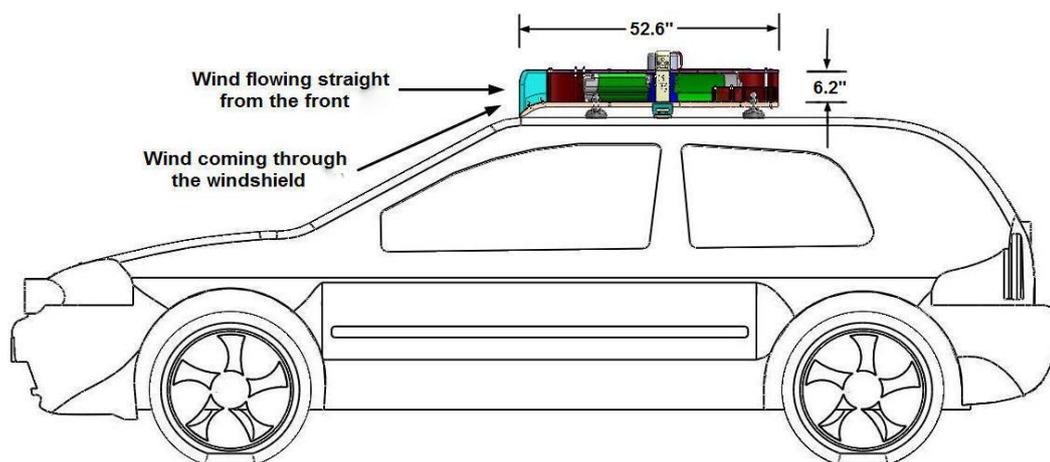


We can overcome those disadvantages by using Francis model turbines. Francis turbines are the most preferred hydraulic turbines. They are the most reliable workhorse of hydroelectric power stations. It contributes about 60 percentage of the global hydropower capacity, mainly because it can work efficiently under a wide range of operating conditions. This image is aimed at giving a conceptual overview of working of Francis turbine.

In this modified model, we use a Francis type model of turbine to drive the dynamo of the car. Unlike in the above two cases, here the wind strikes the blades of the turbine almost perpendicularly. Many advantages using this type of turbine

- Relatively effective input to dynamo
- Less space occupied comparatively
- No breakings and less damages relatively
- Doesn't much effect the beauty of the vehicle

VIII. APPLICATION OF HORIZONTAL TURBINE OVER THE ROOF OF ROADWAY VEHICLE



Francis type model of turbine is installed over the roof of the vehicle to drive the dynamo that can charge up the required battery to supply power to the components of the vehicle. Unlike the above two models, it is comparatively better in all aspects.

Whenever the vehicle moves forward, it is opposed by the wind as we know. This opposing wind drives the turbine in an eminent way with less loss of input comparing to above mentioned modes.

IX. APPLICATION OF WIND TURBINE ON A WATERWAY VEHICLE

Thus, we can employ a wind turbine on a water way vehicle with related power specified equipment to generate power to it. Ships built with this technology till date



- JIM BATES ' TE WHAKA
- LINDSAY OLEN'S THRIPPENCE
- PETER WORSLEY'S WINDMILL-DRIVEN BOAT
- JIM WILKINSON'S REVELATION 2

X. APPLICATION OF WIND TURBINE ON A RAILWAY VEHICLE

Thus, with the same technique, even a locomotive can also be provided with a dynamo in a harmless construction and draw power from the dynamo which is run by the opposing wind that is produced when it possesses kinetic energy on its motion.

Care should be taken while constructing a turbine on a locomotive, such that it doesn't hit the low altitude arches and bridges, which may put the vehicle in trouble.

Therby, the train need not completely rely just on the overhead high voltage cable supply. Atleast, small wattage components can be powered with this generated power.



XI. PRINCIPLE INVOLVED IN APPLICATION

Principle of Generator

There are two types of generators, one is ac generator and other is dc generator. Whatever may be the types of generators, it always converts mechanical power to electrical power. An ac generator produces alternating power. A DC generator produces direct power. Both of these generators produce electrical power, based on same fundamental principle of Faraday's law of electromagnetic induction.

According to this law, whenever a conductor moves in a magnetic field, it cuts magnetic lines of force, due to which an emf is induced in the conductor. The magnitude of this induced emf depends upon the rate of change of flux (magnetic line force) linkage with the conductor. This emf will cause an current to flow if the conductor circuit is closed.

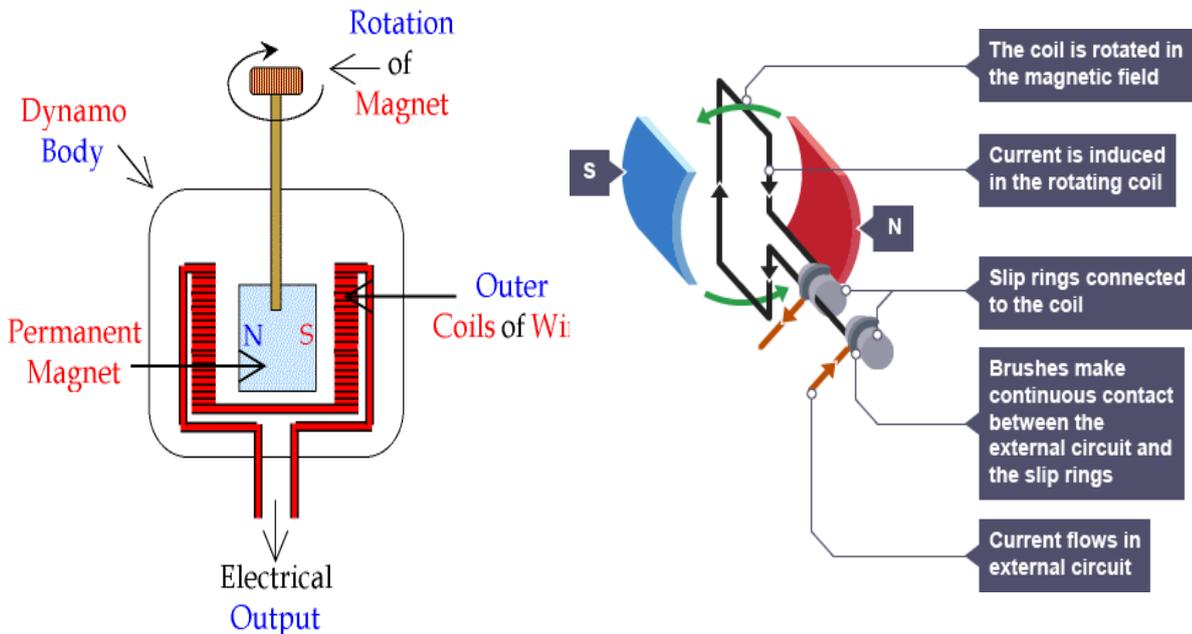
Hence the most basic essential parts of a generator are

- a magnetic field
- conductors which move inside that magnetic field
- simple load to utilize energy
- a fan to rotate shaft

To be practical, the relative motion between the conductors and the magnetic field produces the electrical energy. Therefore, there can coils kept moving or magnetic field but not both simultaneously.

This is how a device that's capable of generating electrical energy from provided mechanical energy works whatever the size and specifications may be.

ROTATING MAGNET - MAGNETIC FIELD AND ROTATING COIL - MAGNETIC FIELD



XII. PROS OF THIS MODEL

- Environment goes clean and green.
- Making use of the energy that's going in vain is the highlighted scenario witnessed here.

- Technical advancement.
- No toxic outlets from the generation point of view.
- Running cost is less.
- User friendly and anyone can understand it.
- Easy to install.
- Atleast, small electrical components in that particular vehicle can make use of the energy generated in this process.

XIII. CONS OF THIS MODEL

- Acceptance by the society cannot be guaranteed.
- Shape of the vehicle may look weird if care is not taken while constructing.
- Chances of reducing the speed of the vehicle.

XIV. SOME POWER REQUIREMENTS

Bibliographic Entry	Result (w/surrounding text)	Standardized Result
Serway, Raymond A., Beichner, Robert J. <i>Physics for Scientist and Engineers with Modern Physics</i> . 5th Ed. Orlando: Saunders College Publishing, 2000: 895.	"An automobile battery has an emf of 12.6 V and an internal resistance of 0.080 ohms. The headlights have a total resistance of 5.00 ohms (assumed constant). What is the potential difference across the headlight bulbs when they are the only load on the battery?"	30.76 W
Honda Motor Co. <i>Civic 1999 Owners Manual</i> . Detroit: Helm Incorporated, 1999: 265.	<u>Lights</u> Headlights 12V - 60/50 W (HI/LO) (HB2)	50 W, 60 W
Job, Ann. <u>Bright Headlights Big Future</u> . MSN Auto, 2005.	"Thus Corvette's HID's use a power saving 42 watts for the low beam as opposed to a halogen's 55 watts."	42 W, 55 W
Klipstein, Don. <u>Automotive Xenon Metal Halide HID Lamps</u> . 1996-03.	"D1 and D2 type lamps are 35 watt lamps ... the ballast must deliver 35 watts to the lamp."	35 W
Kerr, Jim. <u>Headlight Aiming</u> . Canadian Driver Communications Inc., 2005.	"There are wattage standards for each type of headlamp system, but typically, high beam headlamps should use no more than 70 watts and low beam no more than 60 watts of power."	60 W, 70 W

After the generation of power, it is either used directly as soon as it is generated or will be stored in a compatible battery. Battery is generally a secondary battery which is a re-useable one. Above mentioned are some power specifications and requirements for different types of lamps used in different types of vehicles. This clears that depending upon the load requirement and supply provided i.e. kinetic energy of vehicle, the dynamo is selected and is used for perfect generation and utilisation of power.

XV. CONCLUSION

By this paper, I put my idea on- Generation Of Electricity From The Kinetic Energy Of A Vehicle of any mode of transportation i.e. roadway, railway, waterway . I tried to make you witness how to generate power from the rotatory motion of the wheels of a vehicle and the wind that is going in vain, while the vehicle is possessing some kinetic energy.

Let the non-renewable sources of energy be saved for our future generation and make use of techniques like these and work on such so as to *GO GREEN*.

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XVI. ACKNOWLEDGEMENTS

I would like to express my sincere gratitudes to my brother and his vital support whithout whom this idea and work wouldn't have come forth. I also thank each and every single faculty member who contributed their best to make me shine ever since from my schooling.