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STUDY THE OPTIMAL USE OF SOLAR ENERGY FOR THE FUTURISTIC CAR

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ABSTRACT

The renewable source of energy plays a vital role in the today's world as in near future the various non-renewable sources of energy that we are using at the present time are going to get exhausted. Most of the energy that we are using right now is either consumed by heavy machines or vehicles. Vehicles are not only consuming the energy in high amount but it also pollutes the surrounding environment. The solar vehicle is a important enhance step in saving these non-renewable sources of energy. It can also reduce the pollution level around us. The basic principle of solar car is to work on solar energy that is stored in a battery during the day time. Here in this concept the charged batteries are used to drive the motor which serves as an engine and moves the vehicles. In this system, the electrical tapping rheostat is set so as to control the motor speed. This idea, in future, may help to protect our fuels from getting extinguished. At recent time, the electric vehicles are also available which simply work on the concept of conversion of electricity from one form to another form. And hence, there is a loss of energy during the conversion of electric many losses take place and hence the net output is very less and lasts for shorter duration of time.

Keywords- *Renewable Energy, Solar Vehicle, Motor, Rheostat, Electrical, Electronics*.

INTRODUCTION

The Automation has been the major goal of the modern world. Man has always tried to make things such that his work becomes more fast and efficient. Automation is one of the most basic requirements in the industry. Computer has been a great achievement towards this goal. Computer has contributed a lot in automation. The way in which, the automated machines have manifested in our modern lives is nothing less than the effect the invention of the wheel had on mankind. It has provided a better, time saving and efficient alternative to human labour. This project is a small step towards easy product inventory. They mechanize all the steps that are undertaken at the company while selling a product to its customers. That is why a shopping mart organizes all major steps to perform a smooth transaction.

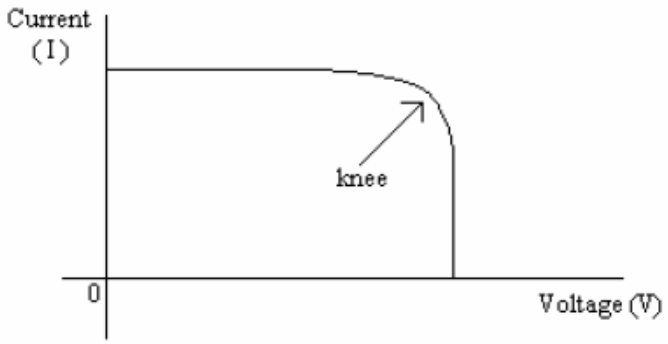

Figure 1. Illustration of a V-I Curve for a Solar Panel

There are three different ways to enhance the efficiency of a photovoltaic (PV) system. The first one is to enhance the efficiency of the solar cell. The second is to enhance the energy conversion from the solar panel. As we know, a solar panel under an open circuit is able to supply a maximum voltage with no current, whereas under a short circuit is able to supply a maximum current with no voltage. In any of the both cases, the amount of power supplied by the solar panel is zero. Here the main key is to develop a method by which maximum power can be obtained from the voltage and current using both together. This "maximum power point" is found by looking at a voltage-current (VI) curve, and pointing the "knee" of the curve. Here, many number of maximum power point tracking (MPPT) algorithms have been developed and employed. Thus we can use the solar energy to run our small vehicles which will be totally

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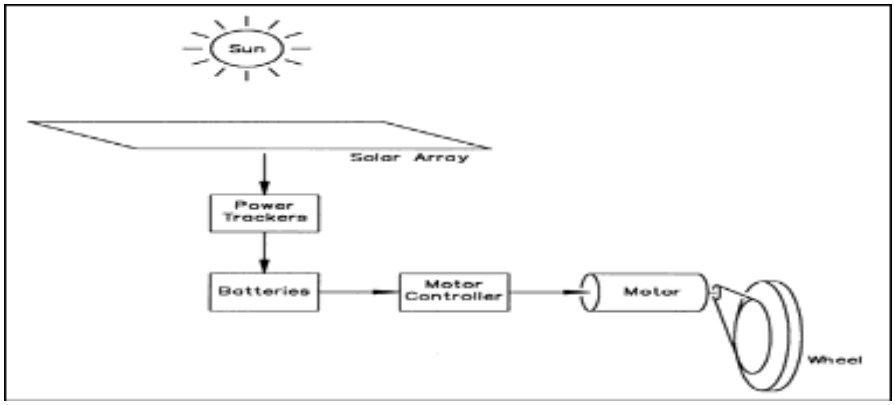
dependent on solar energy which we get from sun, the energy we get from sun will charge our battery and the motor of the car will run from the energy stored.

The third and last method is to enhance the efficiency of a PV system that employs a solar panel tracking system. The effective solar panel tracking systems can make the whole working system highly effective. As the sun moves across the sky during the day, it is good to have the solar panels track the location of the sun, such that the panels are always perpendicular to the solar energy radiated by the sun. This will tend to maximize the amount of power radiated by the sun. It has been estimated that the use of a tracking system, over a fixed system, can increase the power output by 30% - 60%. When tracking the sun, it is noted that the direction of the sun, as seen by the solar panel, will vary in two directions. The azimuth angle is the horizontal direction from the observer to the sun. There is also an altitude angle, which represent the vertical direction from the observer to the sun.

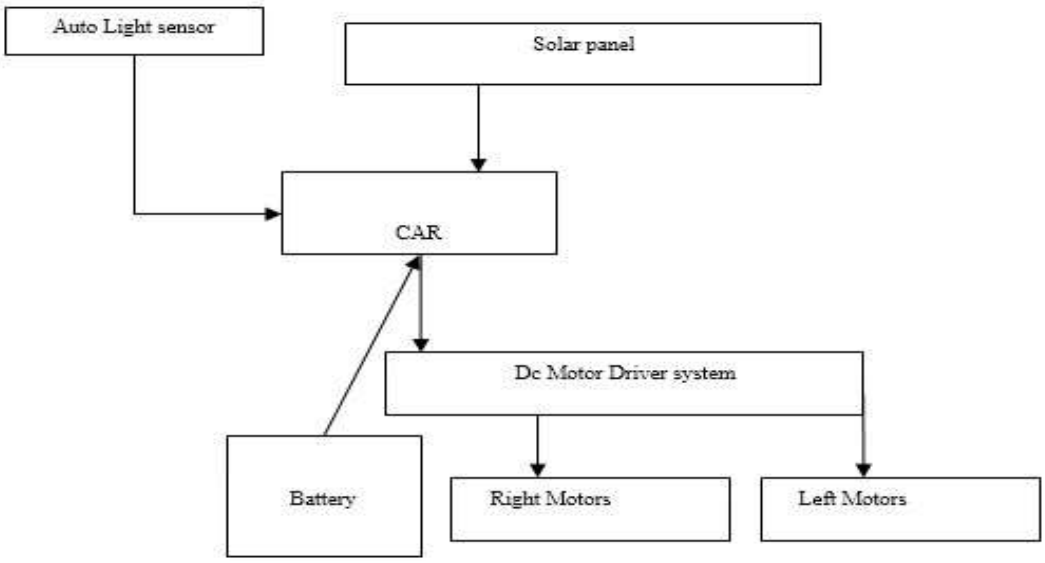
WORKING PRICIPLE

The solar powered vehicles work on the principle of the conversion of solar energy into electrical and then further into mechanical energy with the help of circuit of electrical and mechanical components. Here the solar cell is used to convert solar energy to electrical energy and various motors are used to convert this electrical energy into the mechanical energy which is further used by the solar vehicles. The solar cell contains the photovoltaic (PV) that convert the sun's energy directly into electric energy. The term "solar vehicle" usually implies that solar energy is used to power all or part of a vehicle's propulsion.



BLOCK DIAGRAM AND COMPONENTS OF SYSTEM

Block Diagram of Working System



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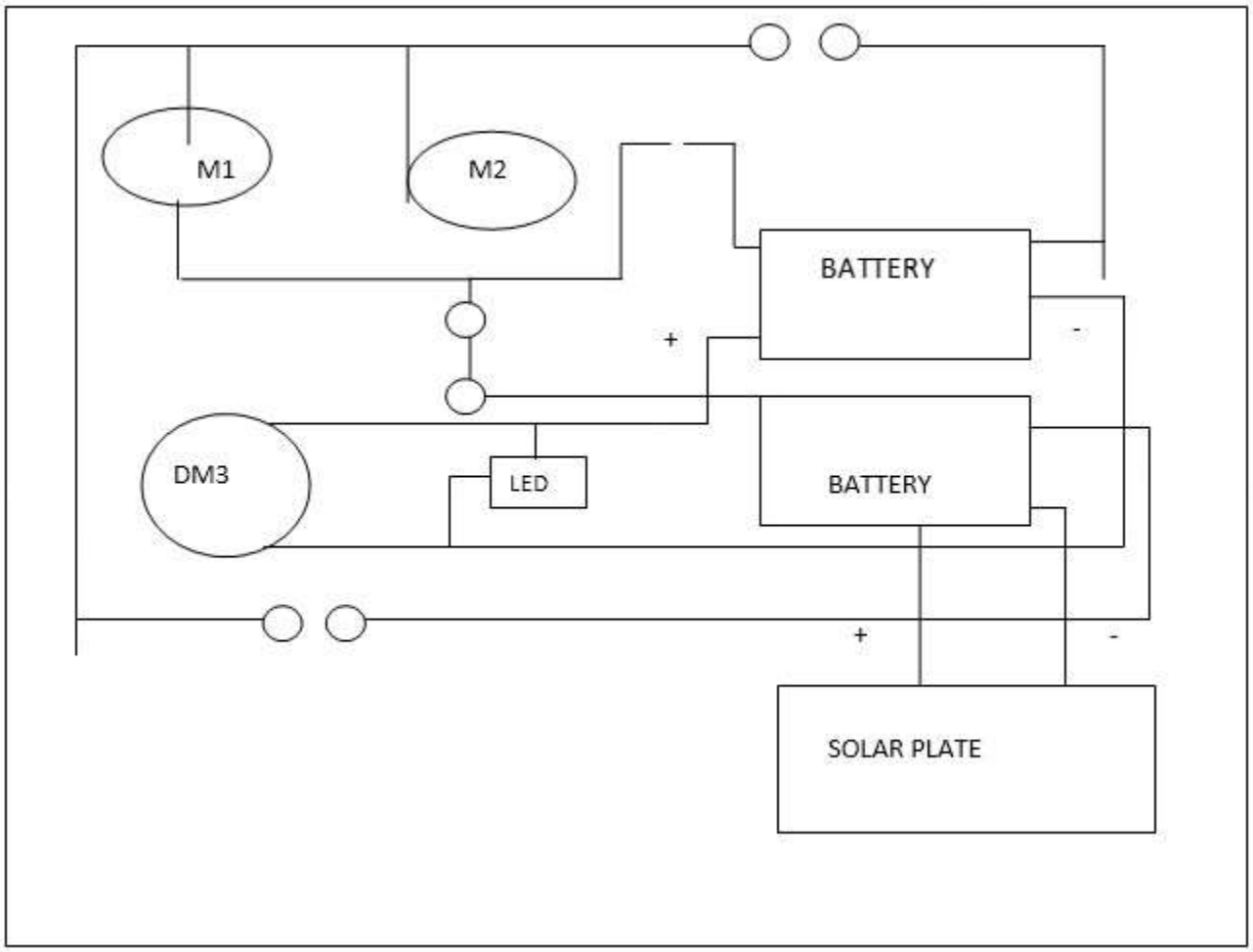
Block diagram of Mechanical System



M1 & M2- Dc motors
DM3- Dynamo motor
LED- light emitting diode to indicate power
Battery- 12v DC
1Solar plate

Components of the System

- DC MOTORS: A DC motor is an electric motor that runs on direct current (DC) electricity. DC motors were used to run machinery, often eliminating the need for a local steam engine or internal combustion engine. DC motors can operate directly from rechargeable batteries, providing the motive power for the first electric vehicles.
- Dynamo Motor: A dynamo is an electrical generator that produces direct current with the use of a commutator. Dynamo motors are used to charge the battery, when dynamo motors will move they will generate power through which battery will be charged which is used to drive motors.
- Solar Cell: A solar cell is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect. It is a form of photoelectric cell which, when exposed to light, can generate and support an electric current without being attached to any external voltage source.
- Battery: A batter acts as a storage device for the electricity. In the solar vehicles, the electrical energy from the solar cell get store in the battery which is further used by the solar vehicles through the motors as a fuel.
- Diode: A diode is a semiconductor device which allows current to flow through it in only one direction. Although a transistor is also a semiconductor device, it does not operate the way a diode does. A diode is specifically made to allow current to flow through it in only one direction.

- Capacitor: Capacitors are common components of electronic circuits, used almost as frequently as resistors. The basic difference between the two is the fact that capacitor resistance (called reactance) depends on the frequency of the signal passing through the item. Capacitors are used in circuits for many different purposes. They are common components of filters, oscillators, power supplies, amplifiers, etc. The basic characteristic of a capacitor is its capacity - the higher the capacity, the higher is the amount of electricity it can hold.
- Resistor: Resistors are the most commonly used component in electronics and their purpose is to create specified values of current and voltage in a circuit.

WORKING PROCESSES

As much like other solar-powered equipments like homes and solar panel, the solar cars get energy from the sun, converting it into electricity. That electricity then transfer to the battery to get store in it which further utilizes as a fuel to runs the car's motor. Instead of using a battery, some solar cars direct the power straight to an electric motor. Solar vehicles can fulfil this through photovoltaic cells (PVC) sandwich in between the solar panels. PVCs are the main components of solar cell that convert the sun's energy to electricity. PVCs are made up of silicon's semiconductors that absorb the light. The sunlight's energy then frees electrons in the semiconductors, creating a flow of electrons. That flow generates the electricity that powers the battery or the specialized car motor in solar cars.

ADVANTAGE AND DISADVANTAGE

Advantages

- Unlike regular cars, solar energy powered cars are able to utilize their full power at any speed.
- Solar powered cars do not require any expense for running.
- Solar cars produce less noise.
- Solar cars essay to maintenance.
- Solar cars produce no harmful emissions.

Disadvantages

- Solar cars don't have speed or power that regular cars have. • Solar powered cars can operate only for limited distance. • If there is no sunlight.
- If it is dark out for many days, the car battery will not charge and this can be a problem. This is the main reason why people don't rely on solar cars.
- Good solar powered car is expensive. It cost around $200,000 or more.
- Parts used in solar cars are not produced in large quantity so they are expensive.

CONCLUSIONS AND FUTURE ASSETS

Conclusion

Futuristic cars are perfect solution to control the increasing levels of pollution. It is a very good substitute and replacement for a conventional vehicle.

The solar vehicle solves many problems related to the environment and is the best pollution free method. We need to make use of them so that we can reduce our dependence on fossil fuels. Solar vehicles do have some disadvantages like small speed range, initial cost is high. Also, the rate of conversion of energy is not satisfactory (only 17%). But these disadvantages can be easily overcome by conducting further research in this area; like the problem of solar cells can be solved by using the ultra efficient solar cells that give about 30-35% efficiency.

Future scope

Reference to an ultimate eco-car call to mind electric vehicles (EV) and fuel cells (FC). However, hybrid vehicles are not for mass production of Eves or FCs. Hybrid systems improve the overall efficiency of any power train and can be used with petrol diesel or fuel cell system.

Unlike petrol and diesel engines the hybrid system is a technology and still has a lot of room for improvement. In any case this technology further the use of environmental technologies while delivering comforts and driving pleasure.

No matter which theory regarding the size of fossil fuels reserves one subscribes to it is certain that someday the reserves will run out. At that point cars will be certain to adopt systems such as hydrogen fuel cells. The hybrid technologies will be indispensable in making that system efficient.

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