Research Paper Engineering

FUTURISTIC CAR

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ABSTRACT

The renewable energy is vital for today's world as in near future the non renewable sources that we are using are going to get exhausted. The solar vehicle is a step in saving these non renewable sources of energy. The basic principle of solar car is to use energy that is stored in a battery during and after charging it from a solar panel. The charged batteries are used to drive the motor which serves here as an engine and moves the vehicle in reverse or forward direction. The electrical tapping rheostat is provided so as to control the motor speed. This avoids excess flow of current when the vehicle is supposed to be stopped suddenly as it is in normal cars with regards to fuel. This idea, in future, may help protect our fuels from getting extinguished. All recent electric vehicles present drive on AC power supplied motor. The setup requires an inverter set connected to battery through which DC power is converted to AC power. During this conversion many losses take place and hence the net output is very less and lasts for shorter duration of time. Although this is cheaper the setup and maintenance required is much more in AC drive than DC drive. The vehicle designed is controlled by electrical means and not by electronic means.

KEYWORDS : Solar car, solar panel, electric vehicles

1. INTRODUCTION

There are three ways to increase the efficiency of a photovoltaic (PV) system. The first is to increase the efficiency of the solar cell. The second is to maximize the energy conversion from the solar panel. A solar panel under an open circuit is able to supply a maximum voltage with no current, while under a short circuit is able to supply a maximum current with no voltage. In either case, the amount of power supplied by the solar panel is zero. The key is to develop a method whereby maximum power can be obtained from the voltage and current multiplied together. This "maximum power point" is illustrated by looking at a voltage-current (VI) curve, and finding the "knee" of the curve. A number of maximum power point tracking (MPPT) algorithms have been developed and employed.

Thus we are utilizing the solar energy in running our car which is totally 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.

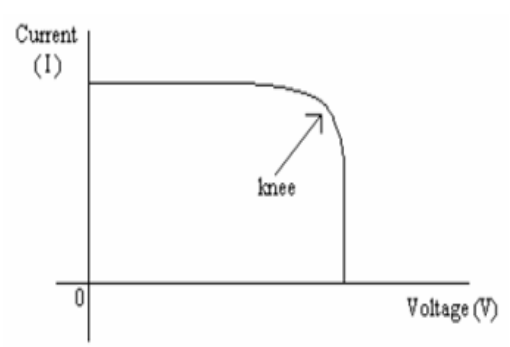


Figure 1. Illustration of a V-I Curve for a Solar Panel

The third method to increase the efficiency of a PV system is to employ a solar panel tracking system. Development of solar panel tracking systems has been ongoing for several years now. As the sun moves across the sky during the day, it is advantageous 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, representing the vertical direction from the observer to the sun. More effective solar panel trackers are two-axis in nature5, 6, 7 and have been demonstrated, for example, in the use of a solar oven concentrator.

2. SYSTEM DESIGN

At the beginning of the project, the student and faculty advisor agreed to the following design requirements:

Must track the sun during daylight hours

During the time that the sun is up, the system must follow the sun's position in the sky.

This must be done with an active control, timed movements are wasteful.

Self powered, must be fully autonomous

The system must operate on, and charge its own battery supply

Semi-permanent installation on the flat roof of a building

A base must be designed to allow installation without fasteners onto a flat section of roof

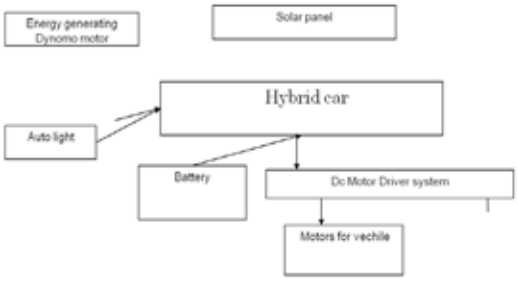
Weather resistant

This system will be designed to be fully functional outdoors and resist any wind and weather complications.

Remote instrumentation to monitor status

A method will be implemented to allow the system to be monitored remotely.

Block Diagram



As indicated above, an Advance system is employed to control the movements of the Dc motor which control solar panel. This whole system is chosen because of the energy conservation perspective. Three power measurements are made at and around the last azimuth angle of the solar panel. The location of the largest power measurement becomes the new azimuth angle of the solar panel. One of the key elements of the design is for the system to be autonomous. An energy balance calculation was performed to determine if the overall energy consumption (to drive the motor, etc.) would be less than the amount of energy generated by the solar panel.

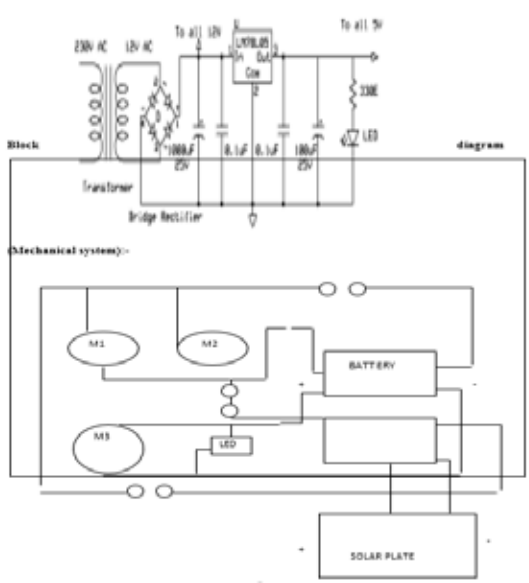
The energy consumed during the 72 hour period may exceed the energy available to charge the battery. In fact, although the system was able to operate in front of an audience during the senior design day, the system eventually drained the batteries during subsequent testing during the summer. This may have been due to the energy balance, a software glitch in the microcontroller, or a combination of the two. Clearly, the major energy drain over a long period of time is due to the system at idle.

3. WORKING OF AUTO LIGHT:

Light sensor and dimmer: The LDR light sensor is used to sense intensity of light. Two LDR based light intensity sensor is placed in front of vehicle in vertical position. If upper sensor senses more intensity of light, meaning the high light beam of opposite car is ON. So to acknowledge font car driver to dim their light the head light of our vehicle flash once and becomes in dimmer position.

The output voltage of a sensor is amplified by an operational amplifier. The output from Operational Amplifier is connected to the AD pin of microcontroller. The microcontroller converts it into digital form and with the help of embedded formula it activates or deactivates head light relay.

Circuit Diagram of engine:



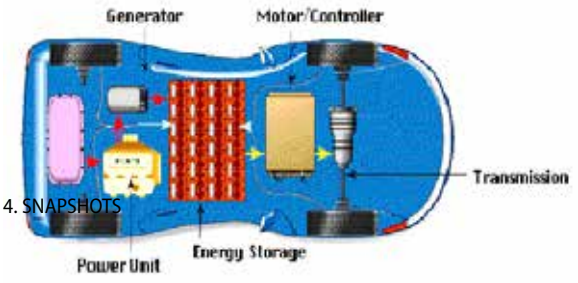
M1 & M2- Dc motors

DM3- Dynamo motor

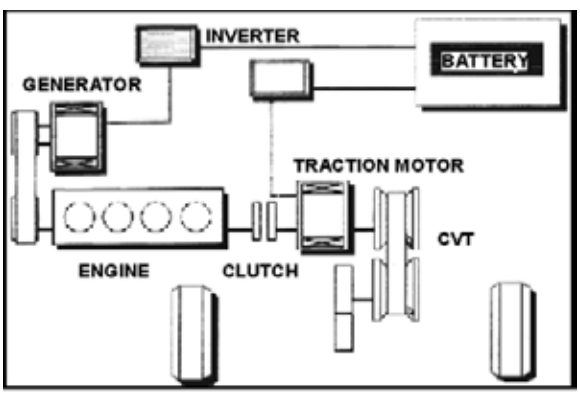
LED- light emitting diode to indicate power

Battery- 12v DC

1Solar plate



4. SNAPSHOTS



5. RESULT AND FUTURE SCOPE:

At present the major challenge with utilizing the solar energy is the high cost of the PV cells. However, in future as the use of the PV cells for various applications increase, cost of manufacturing technology for PV cells is sure to come down. This will promote greater use of the PV cells and continuous sliding down of the prices. The solar car will become affordable cost wise in the next five years or so.

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