

Solar Powered Vehicle

¹Harshita Badlani, ²Hitesh Mainani, ³Kamal Kishore Bhakar

¹Student, ²Student, ³Student

¹Department of Electrical Engineering, SKIT M & G, Jaipur, 302017 ¹Harshita Badlani, Jaipur, Rajasthan, India

Abstract— one of the front runners in the area of renewable energy resources today is solar power. Photovoltaic cells are used to convert solar energy in to useful electrical energy. The objective of this project is to construct an efficient solar car, for the daily office commuters of the country so that they can travel a fixed distance that they need to commute everyday on a reliable and economical car that essentially runs on free renewable solar energy.

Index Terns – All Terrain Vehicle, Solar Panels, etc.

1. INTRODUCTION

Our objective is to build a cost efficient solar powered Electric All-Terrain Vehicle consisting 150 kg of weight. Here all terrain means that any vehicle, which is able to run on, all sort of roads i.e. off road, for e.g. muddy areas, hilly regions, steep bumps etc. An EV is a vehicle propelled by an electric motor, rather than a traditional petrol or diesel engine. The electric motor is powered by rechargeable batteries that can be charged using solar energy In the solar ATV, the power will be transmitted through the 10 HP 1440 rpm rated BLDC or induction motor. Further, power delivers through chain sprocket drive and the half shafts via continuous variable transmission to the wheels. BLDC motor will be gaining input through Lithium ion batteries (chargeable) placed on the vehicle. These batteries charge through Smart Flowered Shape Solar Panels, mounted on the top members and controlled by rotating structure moving about an axis through sensors and servo-motors system. These sensors senses the solar energy or sun rays coming from the sun and rotate the panel structure to the side of maximum solar intensity. Thus, these smart flower solar panels will move according to the motion of sun with respect to earth for providing the more efficiency in power generation even at the morning & evening hours.

II. DESIGN & WORKING PROCEDURE

A. Block diagram

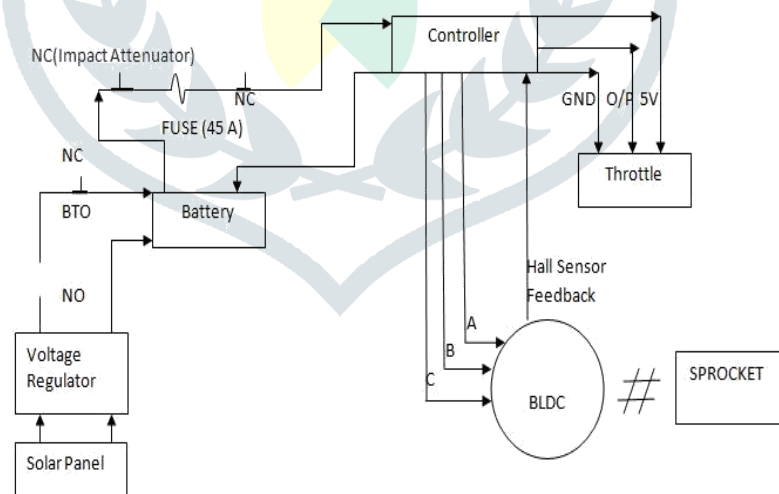


Fig. 1 Block Diagram of Proposed System

B. Apparatus required

Following are the various components used in this project:-

1. Batteries
2. Chasis

3. Solar panels
4. Electric Motor
5. Rotating Assemblies
6. Controller

1) Batteries

A battery is an electrochemical energy storage device, that uses chemistry to store potential energy (voltage) in the form of electrons. When a resistive load is applied across the positive and negative terminals of a battery, the circuit is completed, and you can extract energy from the battery to perform work (like starting the engine in your car). But, here the power from battery is the only fuel to this vehicle. Here lead acid battery is used.

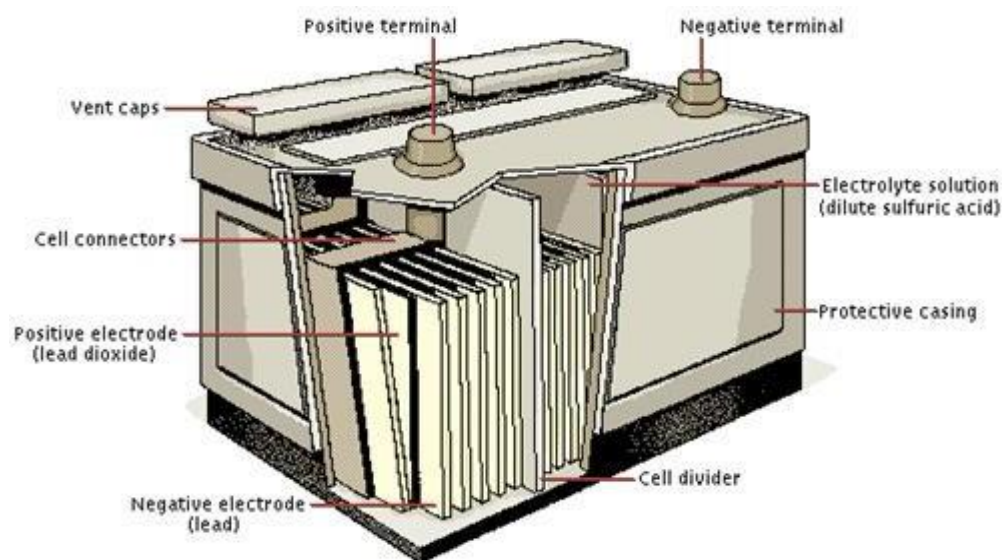


Fig.2 lead acid cell

2) Chassis

A chassis is the internal framework of an artificial object, which supports the object in its construction and use. An example of a chassis is a vehicle frame, the underpart of a motor vehicle, on which the body is mounted; if the running gear such as wheels and transmission, and sometimes even the driver's seat, are included, then the assembly is described as a rolling chassis.

Types of Chassis · Composite Structure · Unibody Structure · Tubular Space Frame · Glass Fiber Body · Carbon-Fiber Monocoque Chassis · Aluminium Monocoque



Fig.3 Structure of chassis

3) Solar Panels

Initially, we focused on two design of implementation of solar panels. First, it was flowered shape design in which we have used 6 panels in lowering patels sequence whose orientation changes accordingly to sun rays and mounted on the top side of vehicle. Second, it was the normal structure which is to be laid on the top side of the vehicle. The solar cell is the semiconductor device that converts the light into electrical energy. The voltage induces by the PV cell depends on the intensity of light incident on it. The name Photovoltaic is because of their voltage producing capability.



Fig. 4 Smart Flower Solar Panel

4) Electric Motor

An electric motor is an electric machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor’s magnetic field and winding currents to generate force in the form of rotation.

Components of electric motor :-

- Rotor
- Stator
- Bearings
- Air Gap
- Windings

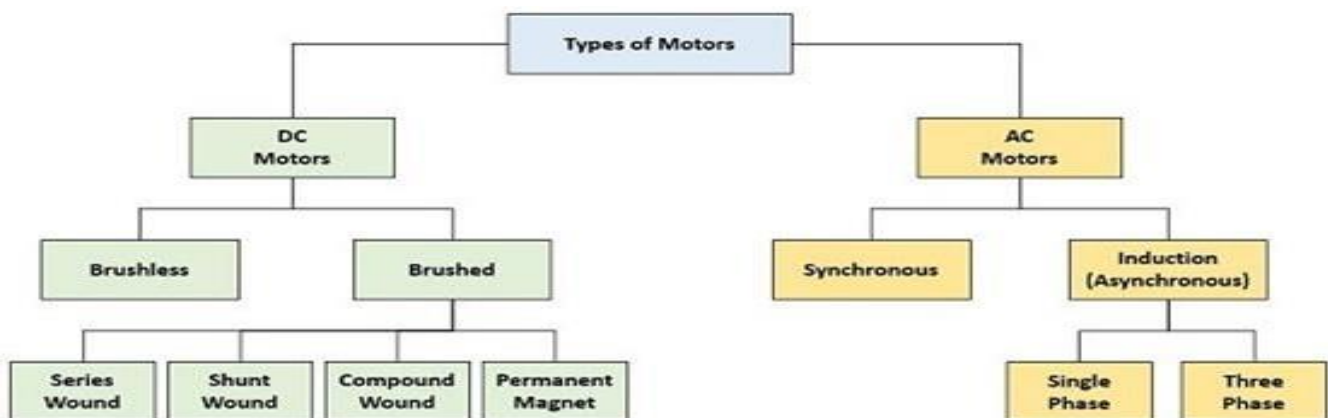


Fig. 5 Block Diagram For Types Of Motor

5) Rotating Assemblies

a.) **Hub Structure** - A hub is the central part of a wheel that connects the axle to the wheel itself. Many expressions use the term for a literal or figurative central structure connecting to a periphery. Below is the image of the Hub.



Fig.6 Structure Of Hub

6) Controller

Motor movement is controlled by means of carefully designed drive signals. Compared to brushed motors, brushless motors offer improved reliability, longer life, smaller size, and lower weight. BLDC motors have become more popular in applications where efficiency is a critical concern and, generally speaking, a BLDC motor is considered to be a high-performance motor capable of providing large amounts of torque over a wide speed range.

III. ADVANTAGE

- 1 High efficiency
- 2 Smart system
- 3 Reduce pollution
- 4 Smart cooling
- 5 Fuel efficient
- 6 Emergence use



Fig- 6- Snapshot Of Our Vehicle

IV. CONCLUSION

• Engineering students will have to serve in the public and private sector industries. Theoretical approach is not sufficient. The lack of exposure in practical training, and functioning of industrial organization is the measure hindrance in the student employment. In the open economy era of fast modernization and tough competition, a holistic knowledge is mandatory. Project making is one of the major steps in this direction.

V. FUTURE SCOPE

Future scope of the electric vehicles depend upon whether the advantages of using them outweighs their disadvantages. Following are the chief advantages of using electric vehicles-

1. Eco-friendly: They are cleaner as no fumes are released as in case of gasoline-run conventional vehicles.
2. Renewable energy: Using solar energy as the powering source then the greenhouse gas production reduces and the environment is well taken care of.
3. Cheaper to run: Using EVs reduces the running costs as there are fewer moving elements used. Hence it is an economical alternative.
4. Cheaper to maintain: Due to less moving parts relatively little servicing is required and no expensive exhaust systems necessary, thus making the maintenance cheaper.

VI. REFERENCES

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