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Development of Solar Energy Power Service Delivery Vehicle

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ABSTRACT: A solar vehicle is an electric vehicle powered completely or significantly by direct solar energy. Solar Vehicle depends on PV cells to convert sunlight into electricity to drive electric motors. 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 moves the vehicle in reverse or forward direction. The design of a solar vehicle is severely limited by the amount of energy input into the car.

I. INTRODUCTION

Solar-powered vehicles (SPVs) use photovoltaic (PV) cells to convert sunlight into electricity. The electricity goes either directly to an electric motor powering the vehicle, or to a special storage battery. PV cells produce electricity only when the sun is shining. Without sunlight, a solar powered car depends on electricity stored in its batteries. The vehicle harness energy from the sun through a solar panel made from solar cells and also called photovoltaic cells. Photovoltaic systems make use of the photovoltaic effect (photo - light and voltaic - electricity), the basic process discovered the PV effects while experimenting with an electrolytic cell made up of the two metal electrodes, finding that certain materials would produce small amounts of electric current when exposed to light Energy is something which is inevitable for human survival on earth. We are either directly or indirectly dependent upon different forms of energy to meet our needs Oneform of such energy is the energy from the fossil fuels. The energy obtained from these sources can be used for generating electricity, running automobiles, etc. but, the fossil fuels are exhaustible as they are present in limited numbers and their regeneration takes millions of years. These are also contributors to pollution of environment. So, we need to focuses on the non-conventional sources of energy, to deal with these problems of fossil fuels. To implement this idea, we have designed an Electrical vehicle that runs on solar energy. The vehicle designed is a four wheel drive and can be used for short distances. We need to focuses on their design considerations and efforts in making them cost efficient, as these vehicles form the future of automotive industry. This vehicle is a step ahead in this direction. The above block diagram gives an overview about how the solar powered Vehicle works. Sun is the prime source of energy for the vehicle. Solar panels absorb the energy from sun and then, the solar energy is converted into electrical energy. The electrical energy thus obtained, is then fed as an input to the batteries to charge them. These charged batteries are used to run 48 V DC high torques series motor. The shaft of the motor is connected to the rear wheels of the vehicle through belt and pulley system. This belt and pulley system will help drive the wheels. The batteries which are being used are firstly fully charged and thereafter, they are charged by panels. This helps in completion of charging – discharging cycle of the batteries, which is very essential for proper working of batteries

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II. OBJECTIVES

The main objective of our project is to increase the vehicle speed, stability and continuously run the vehicle. To overcome the problem and the weakness, this project need to do some research and studying to develop better technology. To make it success there are several thing that we need to know such as what will be the prime mover, how to stored it and the advantages of this new vehicle. To develop a vehicle that use renewable energy, environmentally friendly and cheap. To develop an electric vehicle that can charge the battery when it is not in used. To develop low speed vehicle, but for a longer distance.

III. WORKING PRINCIPLE

A solar powered vehicle uses energy from the sun with the help of solar panels to recharge their batteries. These vehicle depend on photovoltaic cells that help them in converting sunlight into electricity. Technically speaking, the photons of sunlight strike the photovoltaic cells and excite the electrons. PV cells are placed together to form an array. The larger arrays in use can produce over 2 kilowatts (2.6 hp). The brushless DC motors 48v 800 rpm used in this vehicle because carrying the high power load. The battery pack in a typical solar vehicle is sufficient to allow the vehicle to go (80 km) without sun, and allow the vehicle to continuously travel at speeds of 30mph. A solar controller is an electronic device that controls the circulating pump in a solar hot possible from the solar panels and protect the systems from overheating. To show the charge percentage, voltage, power inputs and output, indicate. There are the fitting and welding work on this vehicle

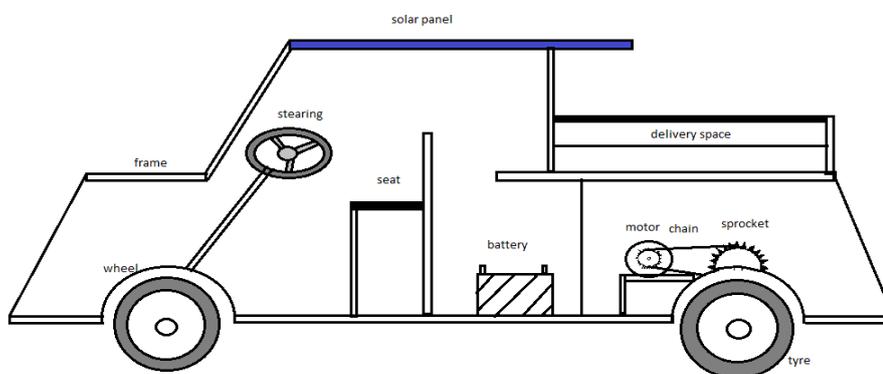


Figure 1. Development of Solar Power Service Delivery Vehicle

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IV. MATERIALS USED

S.NO	MATERIALS	SPECIFICATION / QUALITY
1	Motor	48v, 800rpm
2	Battery	12v, 60amp
3	Solar panel	100w
4	Solar Controller	12v
5	Brake	Disc
6	Frame	Mild Steel
7	Wheel	4

V. ADVANTAGES

- Solar vehicle turn out less noise
- Solar vehicle easy to maintenance
- Solar vehicle turn out no harmful emissions
- Solar energy is renewable
- Solar energy is environment friendly

VI. APPLICATION

- Use batteries to store extra power for use at night
- Solar power is pollution free and cause no greenhouse gases to be emitted after installation
- Reduce dependence on foreign oil and fossil fuel
- Solar panels are long lasting

VII. CONCLUSION

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. 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. As

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this field of automobiles will be explored the problems will get solved. The solar automobiles have a huge prospective market and we should start using them in our day to day life.

REFERENCES

- 1.R. Marudhi Prasad, A Krishnamoorthy (2019), Design validation and analysis of drive range enhancement and battery bank deration in electric vehicle integrated with split power solar source
- 2.Abhinya Chaturvedi, Kirti Kushwaha, Parul Kashyap, Dr. J. P. Navani (2015), Solar Powered cycle Vehicle
3. Ambilwade Visha B, Ambilwade Kavita B, Pathak Vaibhav J , Shilwant Supriya A (2018), Dual Purpose Portable Solar Bike with Optimized Design
- 4.Alisaa Kumari, Ankita Ranjan, Shivangi Srivastava (2014), Solar Powered Vehicle
5. M. A. Spina, R. J. de la Vega, S. R. Rossi*, G. Santillán, R. C. Leegstra, C. Verucchi, F.A. Gachen, R. E. Romero, G. G. Acosta (2012), Design of a Solar Vehicle Based on Hybrid Energy System
6. G.Rizzo (2017) Automotive Applications of Solar Energy
7. Yogesh Sunil Wamborikar, Abhay Sinha (2010), Solar Powered Service Vehicle