# Solar Vehicle For Physically Challenged People

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**ABSTRACT**

In present scenario, due to serious crisis in energy sector, alternative energy and energy for sustainable development is imminent. Hence, clean and efficient usage of energy sources becomes the prime importance across the global. Recently, innovation in Electric Vehicles (EVs) has attracted prominent attention since they use clean electricity. The increased demand in usage of electric vehicle started because of lower noise pollution, reduced emission, less maintenance requirement, and decreased power consumption along with eco-friendly technology. Integration of renewable energy sources such as solar and wind power would be an efficient method.

## II. INTRODUCTION

The quests for a constant, safe, clean, environmental-friendly fuel is never-ending. Vehicle bon-based fuels, such as fossil fuels are unsustainable and hazardous to our environment. Some of the alternatives are renewable energy sources which include all fuel types and energy vehicleriers, different from the fossil ones, such as the sun, wind, tides, hydropower and biomass. Amongst these elements, solar energy is preferred since it could provide the cleanest sustainable energy for the longest duration of time – the next few billion years. Photovoltaic production becomes double every two years, increasing by an average of 48 percent each year since 2002. Due to its innumerable benefits in environmental, economic and social aspects PV systems have becomes the world's fastest growing energy technology. It can arguably be said that the only limitation to solar power as an energy source is our understanding of developing efficient and cost effective technology which can implement it.

## III. MOTIVATION

The persons with physical disabilities restrict their movement within a house or building due to their dependence on other people for their outdoor work. The disabled people use their limbs to drive the wheelchairs which physically stress them. There are electrical wheelchairs which are operated by hands, by mouth or any other functioning body part. The high cost and its limitation for outdoor environment restrict its usage for rich people and hospitals. This often makes the poor disabled person to be unemployed and depend on others for their daily life. In this regard,

developing a low cost self-driven electric wheel vehicle can improve the life of the person. This paper presents a low cost vehicle for physically challenged people that can be used as a mobile shop to sell products at any place independently.

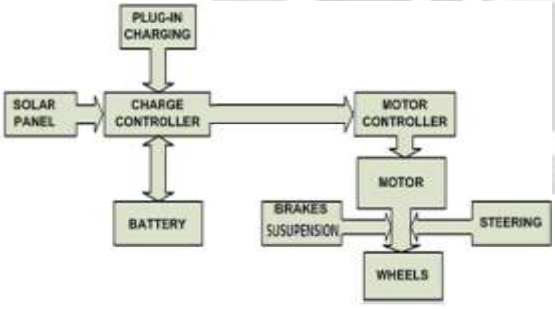
## IV. OBJECTIVE

This idea emerged by looking towards the people who are physically challenged due to accidental injuries, military warfare injuries, diseases, accidents, and birth defects. They always dream of driving vehicles, riding vehicles but unfortunately due to some reasons they are denied of these privileges. With this project we designed and modified a system to convert hand operated vehicle to a leg operated version. This project is aimed at the people injured or disabled by their legs and have to travel long distance and other day to day activities. We specifically developed an affordable and rugged vehicle appropriate for use in a developing country like India. This meant designing with the use of locally available parts and manufacturing facilities. The basis of our designing made the Solar vehicle more of an appropriate technology because it uses a familiar, locally available platform as starting point.

## V. MAIN COMPONENTS

- We have used a 10W Polycrystalline Solar Panel in our project for the vehicle. It can generate 100watt/hr up to 5-6 hours.
- The battery to be used is a 24V 7A sealed lead-acid re-chargeable battery
- We have used a solar charge controller with a rated voltage of DC 24V
- For our project we have used a Half-grip Twist Throttle with nearly 100 ohm resistance.
- 250W Geared DC Motor
- Three 14 Inches Tyre

## VI. WORKING PRINCIPLE




Basically we have create a tri-wheel solar vehicle. We have made the basic structure of our solar vehicle by welding the iron thin plates and a cardboard to hold the weight of a person or any material 100-120kg . We have tried to make the demo model as light as possible. In the housing structure we have used 25mm shaft with a pinion. We have connected another chain pulling pinion to the main shaft by using a chain through welding which is connected to the geared motor. Now the circuit part, for that the solar panel is connected to the battery which is charged directly by the sunlight and the second way to charge the battery is through direct electricity. Now when the input is provided through the throttle as in when we twist the throttle, which then sends the in put to the controller . the controller then processess the input and sends out the desirable instruction i.e. output to the motor , which then

controls the wheels and varies the the speed according to the input taken by the motor. We have added the brakes and the suspensions for the future implementation as our main motive was to provide the basic idea of what we are building.

## VII. ADVANTAGES

- 100% inexhaustible energy, which is renewable and free.
- No toxic or polluting emissions into the air.
- Reduces the need to rely on the electricity grid or natural gas.

## VIII. DISADVANTAGES

- High initial investment.
- Not continuous or steady energy.
- There is always a location problem.

## IX. RESULTS

## X. CONCLUSIONS

Solar-powered electric vehicles are safe with no volatile fuel or hot exhaust systems. They are zero emission vehicles, odourless, smokeless and noiseless. They require minimal maintenance, are more reliable with little or no moving parts and can be efficiently charged nearly anywhere. Needless to say it is very much cost efficient.

## XI. FUTURE SCOPE

Since solar cars can easily incorporate future technology, we hope that it would not be long before the majority of the worlds' people would switch to driving this modern vehicle and thereby bring about a positive change in their lives and the environment.

This is just the beginning of a new technology and it is guaranteed that future developments will make solar cars the predominant mode of transportation over vehicles with internal combustion engines.

In order to cope with the increasing demands for fuel and the disastrous environment pollution due to driving carbon-based vehicles, it is quite necessary to switch to a new source of energy, i.e. the solar power which would be a cheap, efficient, limitless and of course an eco-friendly alternative. Solar-powered electric vehicles are safe with no volatile fuel or hot exhaust systems. They are zero emission vehicles, odorless, smokeless and noiseless. They require minimal maintenance, are more reliable with little or no moving parts and can be efficiently charged nearly anywhere. Needless to say it is very much cost efficient.

Since solar cars can easily incorporate future technology, we hope that it would not be long before the majority of the worlds' people would switch to driving this modern vehicle and thereby bring about a positive change in their lives and the environment. This is just the beginning of a new technology and it is guaranteed that future developments will make solar cars the predominant mode of transportation over vehicles with internal combustion engines. This report deals with impact of bidirectional battery charger electric vehicles charging station on power grid and its consequences. The establishment of EVCS depends on the driving range and number of electric vehicles. In fast developing technological world, the need for alternative sources of energy is increasing. The EVs plays an important role in the transportation sector for reduction of greenhouse gas emissions, global warming. The penetration of EVCS in large quantities into the existing grid network severely affects the grid parameters and it cannot be neglected. The use of hybrid technology involving solar, wind and other renewable energy resources along with battery storage system in the EVCS may eventually improve the reliability and availability of the power supply to EVs and also reduces its impact on to the power grid. The influence of charging stations on the connected

power grid is the major factors that should be accounted in planning and establishment of future EVCS. The modelling and simulation for bidirectional battery charger has been made in MATLAB/SIMULINK simulation platform for the result analysis.

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