International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 04 | April - 2023 Impact Factor: 8.176 ISSN: 2582-3930

# SOLAR POWER ENABLED SMART CAR

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**ABSTRACT -**

The project "Solar Power Enabled Smart Car" is based on the renewable energy i.e. solar energy. As conventional energy sources are limited in stock, in future they may vanish principally run out i.e. by using photovoltaic solar cells. The basic idea of the project is to making the car smart by using solar energy i.e. solar panel.

Our project includes the PV panel to generate electricity by solar energy and utilization of this electricity to run the devices which requires continuous power supply and which help us in moving car. For this, various equipment's such as solar hybrid inverter, battery etc. has been employed along with solar PV panel.

This system is designed to generate the energy in an eco-friendly manner with the source from solar radiation which is available in abundance and has features as:

- A clean and eco-friendly source of power.
- Solar modules convert sunlight into electricity without pollution
- Negligible maintenance as there is no moving parts and maximum reliability.
- Modular design and easily expandable. Long life span of solar modules.
- Simple installation i.e. can be mounted on roof top or ground.
- Can be installed at point of use to avoid transmission losses.
- Energy independence.
- Protection against future escalation of energy costs.
- Available throughout the year.

**INTRODUCTION -**

The world's energy requirement is increasing rapidly due to factors such as population growth, industrialization, and higher standards of living. The majority of electrical energy is currently generated from fossil fuels, which are conventional and nonrenewable energy sources. If the rate of consumption of these nonrenewable energy sources continues to increase, there will be no source left for electricity generation in the future.

Renewable energy sources, on the other hand, are those that can be regenerated and do not deplete with use. They are also free of cost to produce, making them an attractive alternative to nonrenewable sources. There are several non-conventional energy resources available, including geothermal, tidal, wind, solar, and biogas. Solar energy is particularly abundant and can be easily harnessed through advanced solar energy systems to generate electricity.

In light of this energy scenario, we propose a project to use solar energy to generate electricity for a smart car. Our project involves using solar panels to convert solar energy into electricity, a hybrid inverter (UPS) to safely transfer the solar panel's output to a battery, and a load to be powered by the battery. We aim to provide safety features for single female drivers and offer a range of other applications.

Our project, "Solar Power Enabled Smart Car," seeks to promote the use of renewable energy sources for transportation and reduce the dependence on nonrenewable energy sources. By harnessing the power of the sun, we can create a sustainable and eco-friendly means of transportation.

**Safety concerns for women drivers:-** Women drivers often face safety concerns, especially when driving at night or in unfamiliar areas. The lack of adequate lighting, poorly lit roads, and the risk of harassment or assault can make driving a car an adventure and pose risks to women's safety.

**Time consumption due to traffic snarls:-** Traffic congestion and long waiting times are major challenges in urban areas, leading to significant time wastage and increased fuel consumption. Idling in traffic not only contributes to increased emissions but also impacts productivity and efficiency, adding to the challenges of meeting timelines.

**Unauthorized driving by underage children:-** There have been instances of underage children attempting to drive cars without the knowledge or permission of their parents or possessing a valid driver's license, which is illegal and poses safety risks. Ensuring proper control and authorization for car usage is crucial, especially in households with underage children.

**Need for constant power supply for devices:-** Many modern devices used in cars, such as navigation systems, infotainment systems, and other electronic appliances, require a constant power supply for optimal functioning. However, relying solely on the car's battery or other traditional power sources may not always be efficient or sustainable, leading to challenges in providing continuous power supply to these devices.

**Increasing demand for renewable energy solutions:-** With the growing concerns of climate change and the need to reduce dependence on fossil fuels, there is a rising demand for sustainable and renewable energy solutions. Incorporating renewable energy sources, such as solar power, into cars can offer an eco-friendly and innovative approach towards addressing energy needs in transportation.

**Lack of safety features for single women drivers:-** Single women drivers may face additional safety concerns due to their vulnerable status. The absence of specific safety features tailored to their needs, such as emergency alert systems, tracking mechanisms, or other safety measures, can pose risks to their security while driving.

**Limited availability of charging infrastructure:-** While electric cars are gaining popularity, the availability of charging infrastructure can still be limited, especially in certain areas. This can pose challenges for electric car owners to find reliable and convenient charging options, impacting their overall driving experience

**LITERATURE SURVEY:**

Ref [1]:- The purpose of this study is to present a solar-powered battery charger that utilises a photovoltaic (PV) panel to convert solar power into electricity, while a DC/DC converter controls the output power of the PV panel and the charging current for the battery. The study employs an optimal control algorithm in the software to obtain the maximum available power from the sun. The proposed technique can be applied to various light electrical vehicles, such as golf carts, scooters, and airport utility vehicles, as well as other renewable power stations that use batteries for energy storage. To evaluate the performance of the system, the study presents simulation and experimental results, which are then compared. This research fills a gap in the literature by proposing a novel solution for charging batteries using solar power, which has various practical applications in the field of renewable energy. The study provides valuable insights into the design and implementation of solar-powered battery chargers, which can contribute to the development of more sustainable and efficient energy systems.

Ref [2]:-Hybrid electric vehicles are becoming increasingly popular due to the growing interest in green transportation and the use of renewable energy sources, such as solar power. Solar panels are a free and widely available source of energy that can be used to power hybrid vehicles. Previous studies have shown that solar tracking systems can significantly increase the amount of solar energy collected compared to fixed horizontal photovoltaic panels. However, there is a difference between solar tracking systems designed for fixed plants and those designed for mobile applications. This paper presents a prototype of a solar tracking system for vehicles and an energetic analysis of the system. The paper describes the geometric optimization of the system and presents an energy evaluation that includes the computation of solar gain, mechanical energy required to move the roof, and energy losses. The analysis is performed using MATLAB® software and the SimMechanics tool. This research contributes to the development of more efficient and sustainable hybrid electric vehicles, which can have significant implications for the future of transportation.

Ref [3]:-Professor Bilal Ahmad of Kashmir has developed a unique solar car that has caught the attention of major Indian car manufacturers. The car has been designed to be eco-friendly with zero pollution and is affordable, making it a car of the future. Bilal's solar car is equipped with monocrystalline solar panels, which generate maximum energy for the vehicle to work smoothly. Additionally, it has 'Gullwings,' which open upward and have solar panels fitted to them. Bilal has spent thousands of hours working on the car and is now further working on improving its speed and mileage. The Chairman of Mahindra Car Company, Anand Mahindra, has shown his support for Bilal and offered to explore and develop the car further. The car has garnered significant attention for its innovative design and eco-friendly features.

## CONCLUSION

Project aims to address the challenges of limited power supply in cars and the need for continuous energy supply for various devices such as gas pressure gauges, speed breaker sensors, anti-rodent devices, car vacuum cleaners, and broadband networks. The proposed solution is to utilize solar energy panels along with a hybrid inverter and battery system to generate electricity without cost or pollution.

The use of solar panels provides a clean and sustainable source of power by harnessing renewable energy from the sun. The hybrid inverter and battery system will allow excess solar energy to be stored during the day and used during periods of low solar radiation, providing a reliable source of energy for powering various devices in the car and maintaining the vehicle's performance.

Implementation of this project not only addresses power supply challenges in cars but also promotes the use of non-conventional energy sources for generating electrical energy. This creates awareness among individuals and students about the importance of renewable energy and contributes to achieving the targets set by the Ministry of New and Renewable Energy (MNRE).

Furthermore, the continuous energy supply provided by this project enhances the reliability of power for broadband networks, Wi-Fi routers, CCTV night vision, and laptop charging points, ensuring uninterrupted connectivity and functionality of these devices.

Overall, your project offers a smart and sustainable solution to the challenges of power supply in cars and the need for continuous energy for various devices. It promotes the use of renewable energy, creates awareness, and contributes towards achieving renewable energy targets, benefiting both the institute and individual users.

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**[3]https://www.wionews.com/india-news/kashmiri-teacher-makes-a-solar-car-indian-%20car-manufacturers-offer-to-develop-further-499512**