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Solar based EV Charging Unit

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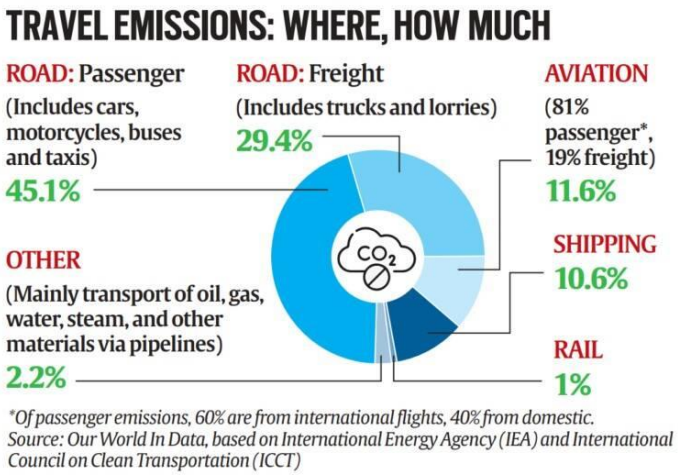
ABSTRACT

Carbon Emission is the main Constraint in India today. The power generation plant is currently the biggest carbon emitter, and the transport area is the fastest- growing carbon emitter. This paper introduces a model of solar-power-driven charging unit for electric vehicles to diminish issues encountered in India's solar energy usage processes and to deal with the growing power demand for electrical automobiles in the forthcoming future. This study applies the proposed model to verify its specialized and budgetary feasibleness. Use of renewable energy is projected for one combined use of solar radiation and Electrical Automobile charging. In this paper, a solar charging unit for an electrical vehicle is created and refined. A dc- dc boost converter is engaged to boost the solar panel power to station battery-generated power to enhance the output from the photovoltaic cell. A buck converter is used to step down the station battery voltage to electric automobile battery potential. The constant power and fixed current forms of loadingare used to charge the vehicle battery.

Keywords: Charger, Converter, Electrical vehicles, Renewable energy, Solar.

I. INTRODUCTION

The status of carbon emission till recent times was showing Transportation as the most carbon emitted area. Cars and Buses emit around 45.1 %. Truck and lorries about 29.4 %.

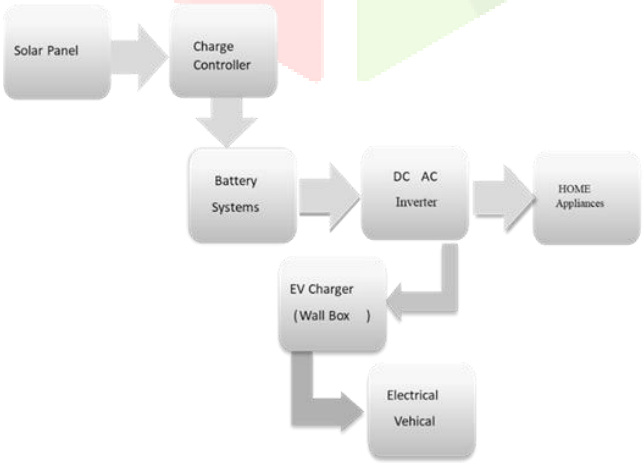


The Indian Express 13th May 2022

Very currently, Electrical vehicles have happened expeditiously gaining recognition as they are an environmental alternative to fuel-driven automobiles. In accordance with a report by International Power Organization, global Electrical Automobile takeover has shown a speedy expansion of 75% from 2019 to 2020. Studies also indicate that Electrical Automobiles (EV), as compared to nonrenewable energy autos, have considerably lower hothouse smoke transmissions that can even be brought down to nil, supported green electricity is used for chargingEVs'. Off late, tapping the amply vacant solar power and its use as a power station for Electric Cars has enhance a essentiality rather than many alternatives for fighting the hazards of environmental pollution.To hear about real devouring in different periods, to check that production and automobile charging are accomplished at the right periods, and to optimize the establishment and its administration. To enable faster acceptance of electrical vehicles in India by assuring secure, dependable, accessible, and economical Charging Infrastructure eco-plan and encouraging renewable energy habit in charging framework. This project proposes EV charger design and advancement.

II. RESEARCH DESIGN AND METHODOLOGY:

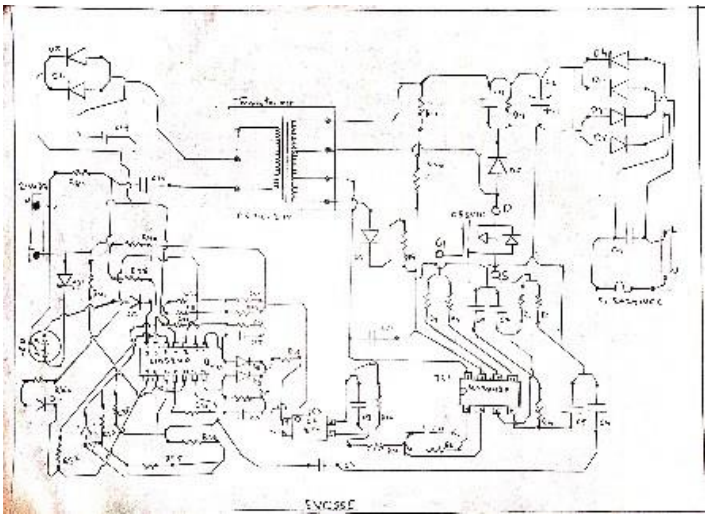
As our title implies Electric vehicle charging station identification of problem and requirements of the research in our society throughout survey on the types of electric vehicle has done. Solar energy is directly related to the location's hence, comprehension and analyses of weather patterns become imperative. A daily load for the charging station is defined, after which suitable system components are chosen and manual calculations are done to size the battery bank and the solar array capacity. Then, manual testing of the system is done for verification purpose. This is an iterative process, and amendments are made to attain the most optimized version of the EV charging station using solarenergy. The performance data, thus calculated, are recorded, and compared.



Block Diagram

Block Diagram consist of solar which is connected to battery through charge controller, battery is connected to the inverter which convert the DC-AC, then this energy is fed to the EV charger for Charging the percent of EV battery.

III. CIRCUIT DIAGRAM



As shown in (Figure), during EV charging because of continuous pulsation in the voltage generated by the solar panels, it is not used for any kind of application. It may damage the system and will be cause a hazard. That's why, as solar panels generated the pulsating DC voltage, that DC voltage is to be converted into stable 230V AC with the help of an inverter circuit. After that with the help of a charging wall box, that is 230V AC is converted into 24/36 V DC, 1.5Amp. This 24/36V DC, 1.5Amp is used to charge the electronic vehicle.

As shown in the figure, the above circuit is having a transformer that is converting 230v ac to DC voltage. With the help of ic LM324, we can vary the put dc voltage from 3v to 36v, and with the help ofic 817, we can have the control dc voltage variation with the help of the diode bridge circle we can regulate the put DC voltage. By the ic A3842A, the circuit can count the pulse width modulation and convert the pulsating DC to stable DC voltage.

This project is helpful for a fast charging of the electric vehicle. It can charge a typical electric scooter having a 3000watt battery capacity hardly in 2hrs.

IV. HARDWARE LIST

- IC's LM324A, EL817, A3842A
- LED
- transformer
- Rechargeable battery
- Solar panel
- Inverter
- Register
- Diode
- Zener diodes
- Capacitor
- Wire
- PCB board

- EV charging provide solution of ourrequirement of fast charging of EV.
- Time saving.
- Eco-friendly.
- Use of renewable energy source reduced impact of Carbon footprint

V. ADVANTAGES

VI. RESULT

- Converting 250 ac to 24/36 dc.
- Pulsating power supply has been controlled.
- Safety indicator function switches LED from green to red light as an when risk arises.

VII. CONCLUSION

Solar based electric automobile charging unit, give hassle free economical charging solution to electric car and cost effective and affordable for humanbeing.

The combination of Solar power and EV is a together beneficial to individual in which each one can reveal a new street of progress for the other, while still plateful in reducing the CO2 imprint. Furthermore, the PV-EV synergism is expected to reveal new fenestrae of multiple space shortly throughout the worth chain while maintain the clean power commitment.

Whereas uses of PV-EV greenhouse gas transmissions, air dirtiness and health issues created by contamination, reliance on petroleum, environmental pollution all this will be deprived of in the near future.

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