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SOLAR WIRELESS ELECTRIC VEHICLE CHARGING SYSTEM

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Abstract: The design of a solar charging station for electric cars is thoroughly explained, along with how it solves the two main problems of fuel and pollution. There are more and more electric carson the roads today. Electric cars have proven to be effective in lessen the travel cost by switching from fuel to EV's, which is much less expensive, with the environmental benefits. However, in this case, we are developing a charging system for electric cars that provides a unique, solution. There are no cables involved, solar energy is used to maintain the charging system, and no external power source is required. The vehicles can be charged while they are moving. The development of the system involved the use of LCD Displays, batteries, solar grid, control circuits, primary and secondary copper coils, AC to DC converters, At mega processors and inverters. The system uses solar panel for power the battery through the charge controller, then the battery will store DC power. That DC power is converted into AC for transmission. The technique demonstrates how electric automobiles can be recharged while being driven, eliminating the need to stop for recharging. The technology demonstrates how an integrated wireless solar charging system for EV is used.

Keywords- Electric vehicle, EV charging, solar power, copper coils, At mega controller

I. INTRODUCTION

Numerous problems would exist on the earth without energy. Numerous everyday items, including cellphones, computers, cameras, sensors, bionic implants, satellites, and oil platforms, depend on electricity to function. When there are too many cables connected, using small power outlets can be hazardous and difficult, as Nikola Tesla initially indicated in 1891 while representing the first wireless power transfer system for charging. In 1884, Thomas Parker essentially unveiled the first electric automobile. Before 1859, there were no rechargeable batteries available for storing power. French physicist Gaston Plant solved this problem by creating the lead-acid battery, which had a few advantages. Electric vehicles are getting more and more prevalent throughout many countries. These automobiles can range in size from little to large, like electric bicycles or buses. An electric vehicle operates similarly to a conventional one, with the exception that it propels itself using an electric motor that receives electricity from a battery. [1 The new type of rechargeable battery is used because of its smaller size, greater energy storage capacity and lighter weight than standard lead-acid batteries. For users of plug-in electric vehicles, the charging process is cumbersome. Either the charger is plugged directly into the vehicle or the battery was removed for charging at some point. This demand charging process is generally simplified using inductive power transfer technology [1]. A non-moveable transmitter and one/ more moveable secondary receivers are linked through wireless path via Inductive Power Transfer (IPT) technology [1][7].

There are large air gaps between the primary source and the secondary load. Depending on the required performance, the power supply is decided as single-phase or three-phase. Power supply, transmitter (primary coil), receiver (secondary coil), microcontroller, battery, sensors and matching circuit are the basic components of Wireless power transfer system [10]. The IPT system has either a distributed or

centralized topology depending on the magnetic structure of the coil. The source produces alternating current in low frequency at transmitter coil. Magnetic fields provide connection between one primary coil and several secondary coils. IPT systems are not affected by dirt, ice, water or chemicals, making them environmentally friendly in any situation and it is available abundantly [1] [4]. The advancement in power electronics has led to the discovery of many new applications on the IPT system, including wireless power for professional devices, wireless charging of batteries for electric cars through distance between air gaps, and handling of materials [1]– [7]. Other applications of the low power IPT system include lights, mobile phones, and medical implants [1] to [7]. The interconnection of the IPT system is typically weak. The transmitting coil and the receiving coil are separated electrically from each other. Below is a list of the benefits of the IPT system. This system demonstrates solar powered wireless charging system for EV.

II. RESEARCH METHODOLOGY

The solar panel gets charged from sunlight. Then this power is supplied to battery through boost converter. Then the DC supply is given as input to inverter from battery(12v). After this the inverter convert this 12v(DC) to 220v(AC). Now this AC supply is fed to transmitting coil. By induction power is transfer from transmitting coil to receiving coil. As we know that our load is DC so rectifier is used to convert ac supply to DC and then this power is used by our load.

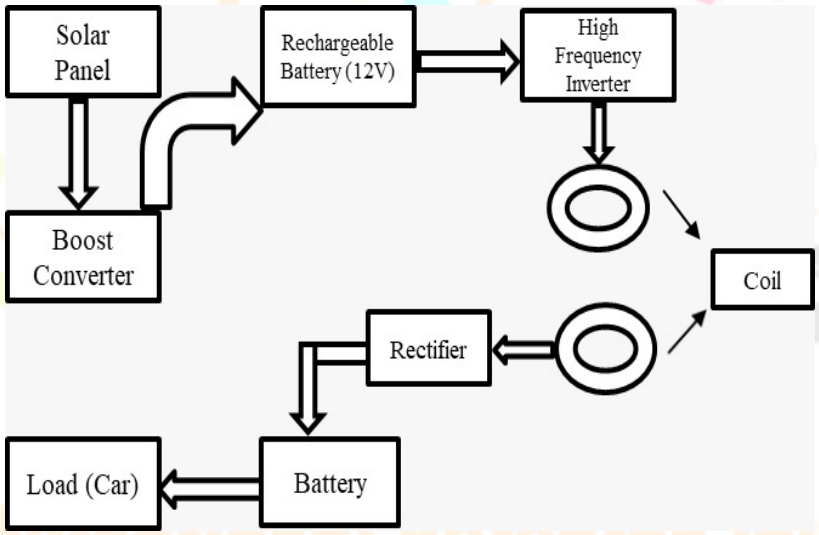

Figure 1: General operating block diagram of solar wireless Electric Vehicle Charging system.

III. LITERATURE REVIEW

The idea of wireless power transfer using the IPT method has been known for a while and is currently garnering increasing attention. The primary component of this dissertation is the literature review, and a thorough analysis of the field has been conducted as shown below.

J. C. Ferreira, V. et.al [1] "presented a double-coupled system (DCS) for electric car battery charging. An intermediate coupler is located between the primary coil and the secondary sensor and acts as a switch. Efficiency is increased by sharing all the losses between the branches overall.

P. Venugopal, P. Bauer [2] Describe a new design approach where design factors are considered in the selection of coreless IPT parameters such as ideal number of coils, compensation capacitors and frequency. If the right design is chosen, there is a chance to deliver high power with high efficiency.

S. R Kutwad, S. Gaur et.al [3] Explain a two-way IPT system that uses weak magnetic couplings to enable easy wireless power transfer between two sides that are separated by an air gap. It is challenging to design and regulate a system without an accurate mathematical model. State variables created a dynamic model. This model is a common tool for controller design as well as steady-state and transient analysis of IPT systems.

B. Revathi A. Ramesh, et.al [4] it is possible to extend the power transmission distance between the transmitter and the receiver coil by installing intermediate repeaters in the IPT system, accordingly. It is carefully determined where the repeater should be placed between the transmitter and the receiver. For producing the same amount of electricity, the efficiency of the two alternative setups varies greatly. If the repeater is placed closer to the transmitter than the receiver, the efficiency will improve. A gap of 10-15 cm between the road surface and the bottom of the electric vehicle is significant for larger vehicles such as trucks or buses, so certain techniques are required to increase the charging distance depending on the gaps. To achieve this, repeaters are inserted

IV. CONCLUSION

The wireless charging system used to recharge the battery of an electric vehicle uses the idea of IPT. A drive circuit is used between the transmitting coil and the receiving coil, which uses a MOSFET and a microcontroller as a switch. To reduce power wastage and the magnetic field radiation problem, power transfer is enabled by turning on the transmitter circuit when the vehicle is present and turning off power transfer when the vehicle is not. The transmitted power of the system is controlled by an AC switch in the designed excitation circuit. The use of an electric car battery charger to test an inductive power transfer system is shown. A practical prototype system with 67% efficiency level is built and the results are confirmed. The system provides reliability, longevity and safety.

V. REFERENCES

[1] S. R Kutwad, S. Gaur "Wireless Charging System for Electric Vehicle" International Symposium on Power Electronics (Ee), 2017, pp. 1-7

[2] B. Revathi , A. Ramesh, S. Sivanandhan "Solar Charger for Electric Vehicles" International Conference on Emerging Trends and Innovation In Engineering And Technological Research(ICETIETR), 2018, pp.1-4.

[3] K. Anu , J. Elzalet , A. Akila "Charging Station for E-Vehicle using Solar with IOT" International Conference on Advanced Computing & Communication System(ICACCS), 2019, pp. 785-791.

[4] W. Wenbin et al., "Development of Wireless Charging System for Electric Vehicles Based on Adjustable DC Power Module" IEEE Conference on Industrial Electronics and Applications (ICIEA), 2019, pp. 1419-1424.

[5] P. Lopes, P. Costa and S. Pinto "Wireless Power Charging on Electric Vehicles" International Young Engineers Forum (YEF-ECE), 2021, pp. 132-137.

[6] X. Liang , M. S. A. Chowdhury "Emerging Wireless Charging Systems for Electric Vehicles – Achieving High Power Transfer Efficiency" IEEE Industry Applications Society Annual Meeting (IAS), 2018, pp. 1-14.

[7] M. A. Al Mamun, M. Istiak and K. A. Al Mamun "Design and Implementation of A Wireless Charging System for Electric Vehicles" IEEE Region 10 Symposium (TENSYMP), 2020, pp. 504-507.

[8] N. Ramesh, V. Vanitha "Solar Powered Battery Charging System with Maximum Power Point Tracking" International Conference on Electrical Energy Systems (ICEES),2018, pp. 364-368.

[9] J. C. Ferreira, V. Monteiro and J. L. Afonso "Smart Electric Vehicle Charging System" IEEE Intelligent Vehicles Symposium (IV), 2011, pp.758-763.

[10] P. Venugopal, P. Bauer, G. R. C. Mouli "Future of Electric Vehicle Charging" International Conference on signal processing, Communication, Power and Embedded system, 2016, pp. 441-44