



SOLAR WIRELESS ELECTRIC VEHICLE CHARGING SYSTEM

¹prof.Archana K , ²Raghu P V, ³M C Sindhu priyanka , ⁴Anusha C

Department of EEE ,Cambridge Institute Of Technology

Abstract: Wireless Power Transfer [WPT] using the magnetic induction technology Developed a novel solar wireless electrical vehicle charging system integrating renewable energy and wireless technology. The system efficiently harnesses solar power to wirelessly charge electric vehicles, ensuring sustainability and convenience. Employing advanced electromagnetic resonance, it enables seamless transfer of energy between the charging pad and the vehicle. Through optimization algorithms, it maximizes energy capture and minimizes environmental impact. The system boasts robustness, reliability, and scalability, offering a promising solution for the future of electric vehicle charging infrastructure. Extensive simulations and real-world testing validate its performance and feasibility. This innovative system represents a significant step towards greener transportation and a sustainable energy ecosystem. Because of this more frequent rate, the battery's charging is rapid and great efficient. It will improve the experience of driving an EV. Through the introduction of WPT in an electric-powered vehicle, the obstacles of charging duration, distance, and cost can be conveniently managed. The WPT age is growing swiftly in the last few years.

Keywords: Solar Electric Vehicle, Renewable energy resources, Photovoltaic cell.

I. INTRODUCTION

We also be using a mix of solar energy and main supply and it be very helpful to the user. The battery be very hard to design in an EVs because of the high power and energy density. There have be many types of batteries used in instruments be lithium-ion batteries be the best solution for electric-powered vehicles. In the transportation systems, lately there is other of the most effective topic be the WP. and it be consists of High-frequency power output, Magnetic induction principles the Solar panel and a little other issue be the protection consideration.

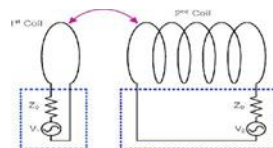


Figure.1 Magnetic Induction

Due to limited sources being available, it's important for us to come up with alternative methods for creating energy. WPT is a way to charge that is convenient and saves money. It has been estimated that 20-30% of the losses occur because of wires. As a result, Wireless Power Transmission is trying to decrease these losses and lower the pollution levels that come from the resources we currently use. WPT comes in handy when charging small electronic devices[2]. The sun strength Satellites are built with the concept of catching sunlight in areas for use in the world are expected to be in operation by 2025-2030. The SPS designs are mainly founded on WPT.

Now the modern paramount utility is the charging of gas now not rockets, electric cars, and many others. The fundamental operating principle of Inductive WPT Charging is that the inductor has components. One component acts as a number one winding and the alternative acts as a secondary winding [4]. The frequency changer is to alternate the low-frequency AC electricity to high-frequency AC electricity. Then the immoderate-frequency Alternate Current is transmitted from number one to the secondary component. Then it's far transformed to DC energy and is supplying the to the battery %.

II. LITERATURE REVIEW

Many companies and groups which manufactures electric autos with wireless charging systems are:

- ♣ Tier 1 automotive suppliers including Delphi, Magna, Maxwell and Panasonic;
- ♣ Auto OEMs, including, GM, Audi, BMW, Chrysler, Daimler, Ford, Mitsubishi, Honda and Toyota.
- ♣ Present-day active WPT suppliers include WiTricity, Evatran, Conductix Wampfler, LG and many more.

The most famous wireless innovation is the Edison building by Nikola Edison where he attempted remote power transmission. He fizzled because of the event of spreading in each directions. A comparative scene will be performed by Indian scientists at the Mumbai Tower. The initial tests in Wireless Power Transmission are ceiling of the globule in time at a detachment of 2m from a broadcasting spiral. With development with in the field of wireless technology.

A tram in Seoul city tour by using transmitting coils and tipsy charging. Resonant coupling can be utilized to draw a clever picture of electrical juice for motorcars. The amount of resonance is finally being exposed when likened to an opera singer. If the sounder's recurrent tone fits the opera singer's usual tone, their goblets break into bits while their voice is forcefully aggravated; when their frequency ranges align, the goblets break into bits because of the bolstered wobbling [3]. This same scenario is utilized for Wireless Power Transmission WPT known as magnetic resonance coupling

III. BASIC PRINCIPLES

Within the earlier ten years, there has been some massive studies done on the transmission of wireless electricity. This can actually be split into two kinds: radiative and non-radiative, depending on the way the power is transferred. Radiative power gets sent through an antenna that takes the form of an electromagnetic wave. Even though electromagnetic waves go in all directions, which makes the power efficiency quite low.[1] Non-radiative power relies on the magnetic connection of conducting loops. Non-radiative energy transmission can also be split again into two different types: the short-range and the mid-range, with the mid-range WPT method having a transmission distance that's larger than the dimensions of the resonating coil.

The three basic aspects of WPT are:

1. Inductive coupling among operating and using circuits.
2. Tuning in of circuits, this is "oscillation transformer".
3. Capacitance loaded open circuit.

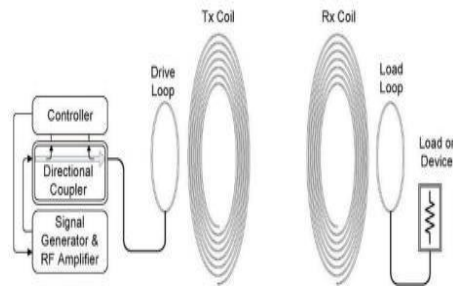


Figure.2 Magnetically coupled WPT

The magnetic oscillation region produced through the RF amplifier causes the Tx coil, which gives electricity toward the drive loop to be carried out mildly. This is the many turns whirl coil after the Tutu-flip power loop. Thus this system is used as a step-up transformer. This same configuration now operates as a step-down transformer on the receiving edge because of the sectional framework unit connected to the device here. The Tx coil and Rx coil's connection appears due to mutual inductance, a property regarding the space within these coils and geometry. If transmitting and receiving coil are in resonance and have a similar resonant frequency, power can be transmitted from far across the air.

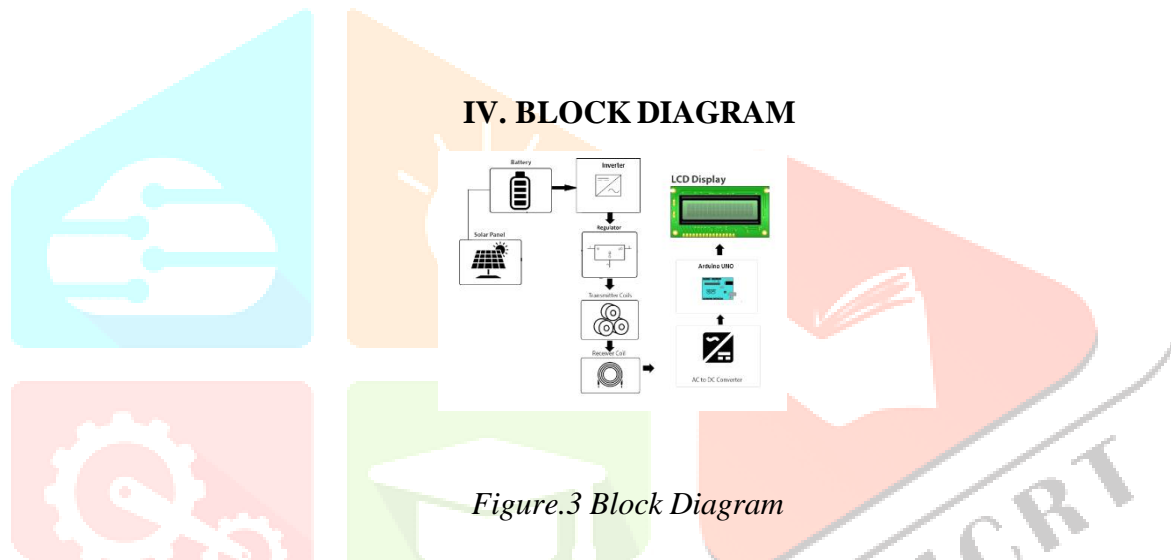


Figure.3 Block Diagram

The panel solar providing energy electric stored in a battery rechargeable of 12v through controller charge and Regulator Voltage maintains constant power. Displays LCD 16*2 are utilized for indicating solar panel & status battery. For 12v supply is splitting into 3 to 5 volts for the controller Arduino by utilizing the network divider. The sensor voltage is utilized for sensing the electric vehicle's voltage which is necessary to be charged. The logic communication serial is utilized for inputting to Arduino.

By this, an Arduino controller is utilized to provide switching pulses to the MOSFET inverter. The output from the holding is addressed to transmitter coil. Energy is transferred through electromagnetic induction to receivers through productive coupling. Inductive coupling is used since antenna to wireless power is brought from transmitting to input of receiver. The receiving widget, a bridge rectifier is placed to convert alternating current voltage to direct current voltage and convey DC output. A capacitor is covered in the circuit to act as a filter that will reduce ripple voltage wireless power transmission is the transmission of electrical power from power sourcing into electric charge in lack of human-made conductors[5]. Wi-Fi power transfer the use of solar power is Wi-Fi power transfer is inconvenient, not hazardous, and inexperienced technology.[3]. wireless power transfer the use of solar power is Wireless power transfer is inconvenient, not hazardous, and inexperienced technology.[3] A Wireless power transfer electricity emitter emits a magnetic area with the help of the coil with the same frequency emitted by the wireless power receiver. For best impedance, cable reels are used on both sides.

V. WORKING

Solar panels power batteries through a charging controller. Battery charging and storage of DC power occurs. The DC power must then convert to AC for transmission. We utilize a transferrin for this task. Power conversion to AC transpires by using transferrin and regulation via circuitry. It's then employed to energize copper rolls for transmitting wireless energy. An enclosed electric vehicle also possesses a copper coil.

When the car is driving over the spirals, power is sent from the giving-away spiral to any coil. Remember, the power is still AC electricity that is pushed into this loop. Next, we transform this into DC once more, so it's ready to load the EC battery. We apply AC to DC conversion mechanisms to flip it back to DC electricity. Additionally, we monitor the incoming voltage using

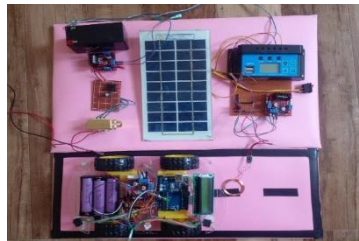


Figure.4 model.

an arduino one and showcase this on an LCD screen. As a result, the setup showcases a solar-powered wireless loading setup for electronic cars that can be fused in the path.

V. CONCLUSION

In this project, a wireless power transfer system receives input from solar energy that is renewable. In order to prevent flux leakage and short circuits caused by cables, we can generate power during the day and utilize it to charge electric vehicles (EVs) at night using a solar-powered charging station. Those who conduct study in the area of wireless power transmission will find it useful. To operate the vehicles with great efficiency and improve the quality standards, wireless power transmission is used. We are employing solar energy to supply power. A charging price for an electric car is proposed in this project, and it includes the identification equipment. When an authorized tag is read by the RFID reader, the EV begins to charge, and the user account is also credited with a portion of the charging fee. Based on precise power metering and an appropriate billing strategy, this system provides quick invoicing and charging.

The system was validating through the experiment results. Revolutionizing road transportation with high-performants, safe, and cost-effectively dynamic electric vehicle charging can be a game-changes. Future researches could focus on the health effects of long-term exposure on weak electric and magnetic fields, as well as mechanisms for detecting live and foreign objects in the proximity of WPT systems, Techniques to embed WPT technology in roadways, and Approaches to analyze impacts of large- scale WPT system deployment on the electric grid.

In addition to enabling wirelessly powered biomedical implants, humanoid robotics, and supersonic hyper loop transportation, technologies being developed for dynamic electric vehicle charging are fundamental. There are countless exciting technological challenges to be faced. This study proposed the design of wireless solar electric vehicle charging for electric cars. Automobile electrification is inevitable due to environmental factors and electricity related issues. There are numerous advantages to wireless charging using solar energy over wired charging.

VI. REFERENCE

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