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Electric Vehicles that have a Solar Energy Charging Station for the Wireless Charging Station

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Abstract
Due to the effects of non-renewable fossil fuels and the pollution they cause, the combination of green energy sources, including solar energy, with electric vehicles has become more and more popular over the past ten years. Solar panels can be utilized with electric vehicle (EV) charging stations to lessen the controller's workload. This work demonstrates cutting-edge analysis of Utilizing solar panels to provide electricity, remote control transmission is used to charge the batteries of electric vehicles. The goal of this study is to increase understanding of the solar electric vehicle charging station and the wireless power transfer (WPT) framework. Many kinds of solar EV charging stations have been thoroughly studied in order to accomplish this goal. Following the acquisition of a few concepts, the various WPT components

Keywords: electric vehicle, wireless charging, wireless power transfer, inductive power transfer, capacitive power transfer. dynamic wireless charging

I. INTRODUCTION
Since the days of Tesla, the idea of using wireless communication to power and charge engines and other devices has been studied. However, approach was unsuccessful because there was no technical assistance throughout that period. A significant advancement in this regard was made by researchers in 2007 when they managed to regulate light coming from a wireless source two meters away. Significant advancements in the profession have been made since this noteworthy accomplishment. Charging electric vehicles (EVs) is one of the several additional uses for wireless power transfer (WPT), which is being investigated and has many benefits. Conventional wired or plug-in charging techniques are also included under the umbrella term "conductive charging system". The solutions that are attached have a few problems. As an illustration, they require robust connectors and charging cables. Furthermore, the product that has to be charged and the power supply need to be physically attached to the charger. Furthermore unfriendly to both people and the environment is the connected charging system. Electric shock could occur from a shorted charging line or deteriorating insulation due to several variables like temperature, ground contact, or self-charging equipment. They can be used with numerous batteries, or, in order to reduce risk and decrease charging times, a non-capacity battery can be replaced on a single charge as needed. For instance, if an automobile can go a specific distance batteries. An alternative is to swap out the car battery and charge it while you're on the road at a charging station. However, there are also issues with batteries. Batteries have a long lifespan, are heavy, and cost a lot at first. It can only hold so many batteries before the weight starts to get in the way. Future updates for electronic storage devices will fix these problems. Another technique for resolving battery issues is WPT. One way to lower the initial cost is to use a wireless charging system instead of big, heavy batteries. After a thorough examination of the pertinent research literature, we talk about and evaluate the numerous EV wireless working concepts, tactics, materials, and techniques. mechanisms for charge in this investigation. The study's primary findings are enumerated in the list below: Offer insights and feedback on pertinent inquiries. This section provides a brief overview of the WPT method before delving into more detail into EV wireless charging devices and the numerous techniques employed for this purpose. finished reviewing the DWCS and SWCS and gave a summary of the design process. referred to as a gap, ionizes the air between the electrodes and generates electrical current. The design and prototype of the IPT-based DWCS have been examined. Wireless charging system compatibility, power management, and communication.

II. BLOCK DIAGRAM

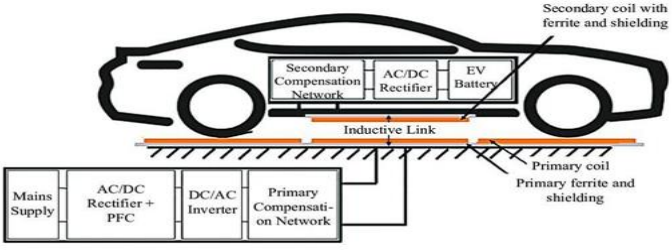

Fig. No. 1 – Block Diagram

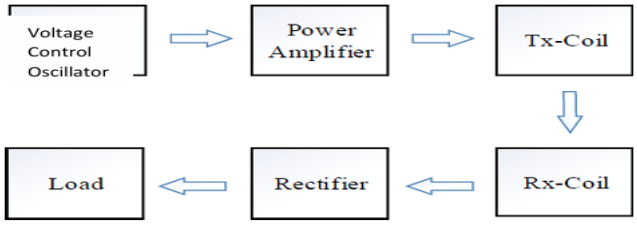

Fig. No. 2 - Wireless power transfer over a short distance is accomplished using inductive coupling. Power is transferred by use of mutual induction between two coils. The receiving antenna is made up of the secondary coil, whereas the transmitting antenna is the primary coil.

2. 1 WORKING PRINCIPLE OF TESLA COIL

High-voltage transformers called Tesla coils are frequently employed as transmitters for wireless power transfer. A resonant transformer, the Tesla coil is made up of the primary and the secondary LC circuits have very weak connections. It is a transformer, which is why we use it as a transmitter, but it functions differently from a typical transformer in that it provides us with a high-frequency output that increases induction on the load side and a lot of power. With a high-voltage generator, a capacitor known as a primary capacitor is charged and momentarily stored in a Tesla coil. When a particular switch is connected to a fully charged capacitor Primary capacitors can be linked in both series and parallel configurations; the distinction is in the relationship between the primary coil and the primary capacitor, and the opposite end of the high-voltage generator is connected to the capacitor. The first coil's other end is home to the RF ground.

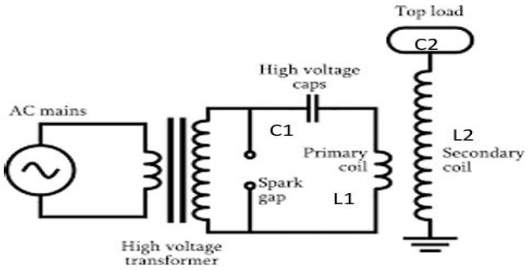

Fig. No. 3 – Tesla Coil Operation

High-voltage transformers called Tesla coils are frequently employed as transmitters for wireless power transfer. A resonant transformer, the Tesla coil is made up of the primary and the secondary LC circuits have very weak connections. Because it functions differently from a typical transformer and can produce more power and frequency output, which has a stronger effect on the cargo, we employ it as a transmitter. With a high-voltage generator, a capacitor known as a primary capacitor is charged and momentarily stored in a Tesla coil. Electricity is generated when the capacitor is fully charged and linked to a unique switch known as a gap, which ionizes the air between the electrodes. The difference between and is between the primary capacitor and the primary coil, and the opposite end of the primary capacitor can be connected in either series or parallel configuration. The high-voltage generator is connected to the capacitor. The first coil's other end is home to the RF ground.

2. 2 CIRCUIT FOR AC TO DC CONVERSION

Every electrical or technological device needs to be powered legitimately. Although Tesla coils function at various The majority of the gadgets we use on a daily basis run at 50 or 60 Hertz. The Tesla coil produces and operates at higher frequencies in order to maintain a consistent LC resonant frequency. The power from a Tesla coil must be transformed into a form that other devices may use because it cannot be used directly by any device. As stated by According to the law of conservation of energy, energy can change forms but remains constant throughout time. This idea also holds true in this situation. Using the load coils, take note of the high frequency voltage and transfer it to the complete power plant, which transforms AC into DC.

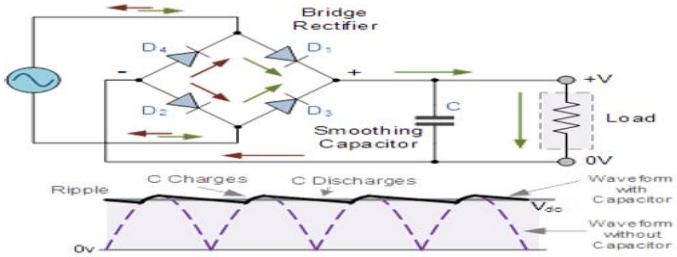

Fig. No. 4 – Full Bridge Rectifier and its O/P Waveform

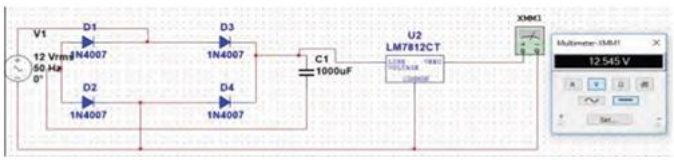

Fig. No. 5 – Schematic Arrangement of Full Bridge Rectifier

Every bridge rectifier's detail is completed crisply and clearly. A schematic diagram of a whole rectifier bridge that transforms AC voltage to DC voltage is shown in Figure 5; The whole bridge rectifier's circuit layout is displayed in Figure 4. This AC-DC converter was used twice in our project: once in the oscillator circuit and once to deliver DC voltage to the load LED at the receiving end.

2. 3 BASIC WORKING PRINCIPLE:-

Wireless charging and transformer functioning are same. Wireless charging makes use of both wire coils and receiver coils. By means of DC/AC and AC/DC converters, the electrical grid's 220V 50HZ alternating current is changed into high-frequency alternating current and delivered to the transmitting coil. Disconnect the receiving coil, provide alternating magnetic flux, and allow the receive coil to combine the AC output. Good wireless charging depends on the transmit and receive coils' resonant frequencies being maintained, hence both sides have balancing to regulate the resonant regularity. The battery is powered by a battery management system (BMS) or battery pack, and AC power is converted to DC power at the receiver side.

2.4 WIRELESS CHARGING DEVELOPMENT:

Incredibly well-liked. By substituting wireless charging for the required cord, the Cable losses can be completely removed. It can be risky for someone to plug and unplug devices for charging while holding the incorrect cords. Wireless payments have certain disadvantages despite being effective and time-saving. The stationary electric vehicle is made to be a system that can charge electric vehicles (EVs) in the parking lot or when the vehicle is not traveling a great distance after plug-in parking. Driving an electric automobile while charging it at the same time is When an electric car is charged while it is being driven, this is known as dynamic wireless charging. WEVCS is separated into two categories: 1) Wireless charging that is static. 2) Wireless charging system that is dynamic

2. 4. 1. STATICAL WIRELESS CHARGING SYSTEM FOR ELECTRIC VEHICLES:

It charges while the car is, as the name implies. fixed, making it possible to quickly and simply change the plugs without needing to use the driver. Put another way, we can halt it and recharge the battery because the car has a wireless charging mechanism. The receiver is positioned beneath the vehicle, and the transmitter is in place. The transmitter and receiver need to be plugged in before we can begin charging the vehicle. The size of the pad, the separation between the transmitter and the receiver, and the The power supply's level has an impact on the charging time. Where cars are typically parked for extended periods of time, SWCS is advised. There should be 150–300 mm of space between traffic lights. Parking lots, office buildings, homes, retail centers, and other locations can all have SWCS installed.

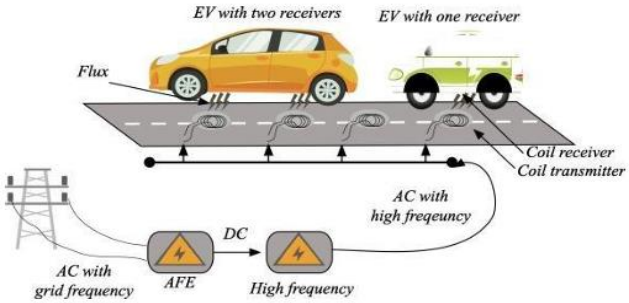

Fig. No. 6 - static wireless electric vehicle charging system

2. 4. 2. DWCS, or dynamic wireless charging system:

Regarding electric vehicles, wireless charging. The ultimate in technology is the ability to charge an automobile while on the go. When it comes to wireless charging technology, it has proved effective. The emphasis is on the power and range of electric vehicles. When driving on and off the highway, dynamic wireless charging will help maintain and increase the vehicle's battery charge. Furthermore, it lessens the requirement for a sizable power reserve and further lessens the vehicle's weight. Energy is delivered over the air from a transmitting station to a receiving coil.

Conclusion

This study looked into the wireless charging of electric cars. The best technology for electric car charging is wireless charging. Comparing wireless charging to non-wireless charging yields numerous benefits. because of his vast travels. It shortens the time needed to charge the vehicle and even enables EV charging while driving. The cost of treatment will go down with time, despite the hefty initial outlay. Because of its advantages over conventional cable systems, it is utilized more frequently. By utilizing WCEV, power loss can be decreased. Future predictions state that everything will be entirely wireless. Comparing wireless charging to other methods, there are numerous benefits. Future technological developments may make wireless charging of electric cars a reality. Control over inverter design, topology, and individual safety still require immediate additional study.

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