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Wireless Charging Vehicles Using Renewable Resources

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ABSTRACT

In wireless charging, energy is transmitted across space by an electromagnetic field. Electric vehicles (EVs) are becoming increasingly popular due to environmental concerns and rising gasoline prices. Electric vehicle battery charging can be accomplished either by plugging into power stations or by wireless energy transfer. A dynamic charging system can be implemented to recharge the vehicle even while driving. Here, we discuss another renewable resource that allows electric vehicles to be wirelessly powered. This will help users to drive without interruption. These advances make WPT very attractive for the application of electric vehicle charging in both stationary and dynamic charging. By adopting WPT in an electric vehicle, the obstacles of charging time, range, and cost can be easily overcome.

Keywords: Electric vehicles, electromagnetic field, 555 TIMER, Transformer, ATMEGA 32, COIL

I. INTRODUCTION

Electric vehicle charging will play an imperative role in increasing the demand for e-vehicles in the market; the lack of charging infrastructure is the main reason for not buying an e-vehicle. With renewable energy, we studied portable chargers for electric vehicles. Wireless electric vehicle charging is based on inductive energy transfer between two coupled coils, one of which is "primarily" connected to a charging station with solar, wind, and grid power, and the other is "secondarily" connected to the battery of an e-vehicle. Wireless charging offers convenience and safety. This is because drivers can avoid the danger of a power cable and they can park the vehicle without the need to plug in to start recharging the battery.

II. LITERATURE SURVEY

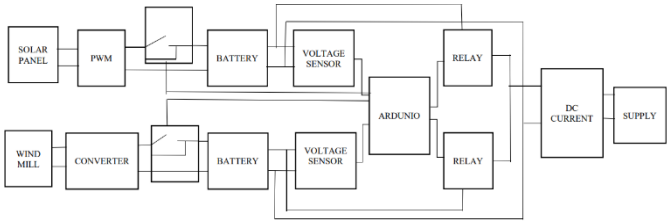
1. XIAOFENGWU GUNJIELI [1] suggests that they will use the energy harvesting method for a lightweight management scheme for a smart wireless charging system in 2020. Energy harvesting is the process of obtaining energy from external sources and storing it for wireless autonomous devices. The limitations of energy harvesting are that it has low power consumption. A dynamic charging system is implemented in this project, which is a fast charging system capable of discharging 50 kW of power.
2. According to BUGATHA RAM VARA PRASAD [2] in Solar Wireless Charging System in 2022. they used the methodology of a static charging system where the

vehicles should remain static to charge the vehicle. The limitations of a static charging system are that the vehicles must remain static to charge the vehicle, but they cannot charge the vehicle when it is in motion. In the project, we are implementing a dynamic charging system where 50 kW of power can be discharged and the vehicle can be charged while moving.

3. According to T. RAJKUMAR [3], renewable energy sources such as solar energy are used to generate electrical energy. Electric vehicle charging was based on the amount of solar energy captured by a solar panel using photovoltaic technology. However, the major drawback or limitation of this project was that the electric vehicle can be charged when the solar panel is exposed to the sun. To solve this problem, we can use wind energy to generate electrical energy from wind.

4. XIAOFENGWU GUNJIELI [4] suggests that they will use the energy harvesting method for a lightweight management scheme for a smart wireless charging system in 2020. Energy harvesting is the process of obtaining energy from external sources and storing it for wireless autonomous devices. The limitations of energy harvesting are that it has low power consumption. A dynamic charging system is implemented in this project, which is a fast charging system capable of discharging 50 kW of power.

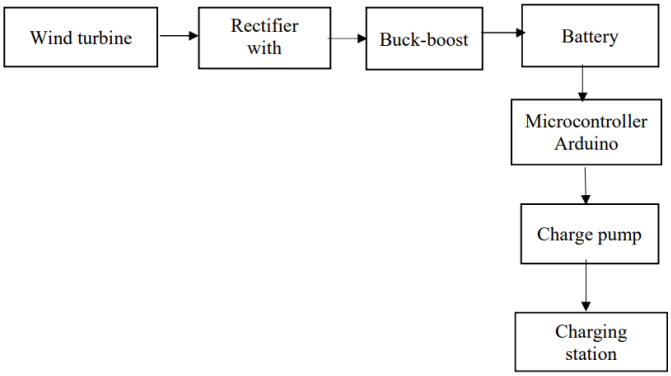
CIRCUIT DIAGRAM



OVERALL CIRCUIT DIAGRAM

The wireless charging module is analyzed. There transmitting coil will be placed on the road. The receiving coil is under the vehicle. A high Frequency alternating magnetic flux is generated. An electric vehicles battery can be charged. The electronic components are connected to the coil. The Active Front End is connected to the initial renewable energy. This part of the transmitter block is complemented by a power factor correction block (PFC) that monitors the reactive power flowing from the source to the transmitter to ensure grid stability. A high-frequency full-bridge inverter (HF) is then used to supply a high excitation current to the transmitter coil. Two factors have a significant impact on the overall economics of the system. The first factor is related to the compensation method that ensures the accuracy of the current and voltage waves. The second important factor is related to the design of the coils used, where the surface area of the transmitter is related to the shape of the coil, whether it is circular or not. The two specifications of the models are presented. The corresponding advantages and weaknesses of each model are also presented. Several WPT structures for automotive applications are evaluated in the literature to assess magnetic coupling and feasibility. Most of these studies investigated structures that incorporate circular designs. Recently, a circular planar structure was tested for 2 kW inductive power transfer. It was demonstrated that the null zone was the lowest compared to the other models.

BLOCK DIAGRAM FOR WIND ENERGY

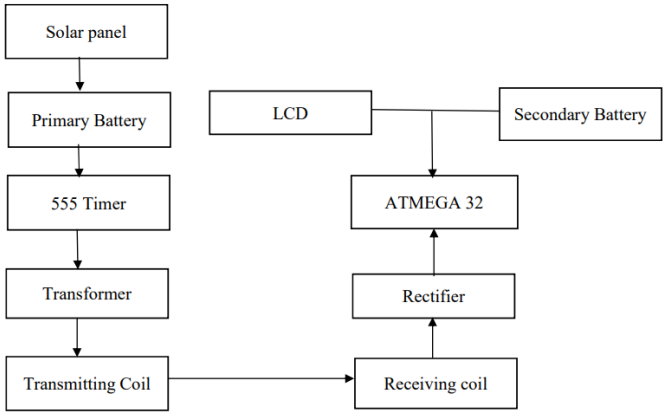


GENERATION OF WIND ENERGY

Arduino is responsible for controlling the battery charging system in this scenario. The battery of the windmill is continuously checked with Arduino through voltage sensors and its signal is fed into

Arduino pins. With the help of a voltage sensor, Arduino continuously receives voltage values. Thus, the Arduino pins are used to control the relays on the windmill. It controls the charging of the batteries by charging them until the voltage reaches 16 volts or more. the relay. When a car comes into contact with the transmission area, the Arduino senses it and switches off the relay. Then the Arduino checks the battery level of the windmill and switches the relay based on which battery has the highest voltage level.

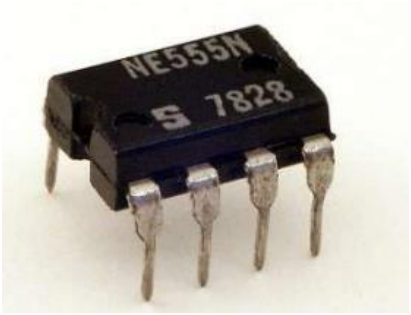
BLOCK DIAGRAM FOR SOLAR ENERGY



GENERATION OF SOLAR ENERGY

HARDWARE COMPONENTS USED

555 TIMER



The IC is used to convert a noise input to a clean digital output using a Schmitt trigger inverter gate. The input signal can be connected to a series of capacitors that can be connected to the trigger and threshold pins. It's also a voltmeter of sorts, and the output pulse width is proportional to the difference between the input voltage across the 4.7uf capacitor

Transformer

A transformer is a device used in the transmission of electrical power. The transmission current is AC. It is usually used to increase or decrease the supply voltage without changing the frequency of AC between circuits. The transformer works on the basic principles of EMI and mutual induction.

ATMEGA 32

Atmega32 has 40 pins. There are three pins for providing the necessary power and reference voltages for the internal ADC and 32 (48) I/O pins. The ATmega32 has the ability to handle analog inputs. Either Port A can be used as a DIGITAL I/O line or each pin can be used as a single input channel. A pair of pins can be used together. ATmega32 has four portsx8 pins which can be configured as digital I/O pins.

COIL

A coil, in an electric circuit, one or more turns, usually circular or cylindrical, of currentcarrying wire for

producing a magnetic field or for providing electrical resistance or inductance: in the latter case, a coil is also called a reactor. An electromagnetic is produced by a soft iron core. A cylindrical coil that moves a plunger inside is called a solenoid.

LCD

Liquid crystals are used to produce images. The liquid crystal display panel is designed to project on-screen information of a microcomputer onto a larger screen with the aid of a standard overhead projector, so that large audiences may view on-screen information without having to crowd around the TV monitor. Pin 1 is the ground and source pin. The terminal has a display pin. The source pin is used to connect the power source to the display.

The display has connections and pins. Some displays only have a few pins.

III. CONCLUSION

Wireless charging systems for electric vehicles are classified according to the length of the air gap between the transmitting and receiving sides. Various wireless charging techniques for electric vehicles described in the literature are examined. The principle of each technique is presented, and various topologies associated with each technique are summarized and compared, with a particular focus on power transfer efficiency. For a sustainable electrified transportation system, a dynamic energy charging system should be developed that provides higher output power efficiency in the presence of misalignment and lower installation costs. It efficiently charges the batteries of solar-powered vehicles with minimal energy consumption. The PMPC motor can be used to generate wind energy at maximum speeds. Solar energy and wind power are the way to a greener future.

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