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A Survey On Wireless Power Transfer Based Street Light Feeding System

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Abstract— This paper Represents Importance of Witricity in this Electricity Demanding era.In this paper an autonomous system based on Wireless power Transfer using Resonant Inductive Coupling is Discussed.WPT is based on Electromagnetic Effect produced in the Conductor when it is Carrying a Current Through it. Witricity Is Cost Effective and Very Efficient Power transmission Technology For Power transmission. It can be Used to Curb the losses and reduce Power theft which are Crucial Factors in Power Transmission.

Keywords— Witricity (Wireless Electricity) , Resonant Inductive Coupling , Electromagnetic Induction , WPT (Wireless Power Transfer) , Magnetic Brush Lines , Inductive Coupling Factor, EV (Electric Vehicle), DC (Direct Current) , AC (Alternating Current) .

INTRODUCTION

Wireless power Transfer can be effective option to curb these losses as Wireless Power Transfer uses Wireless mode of transmission. Wireless Power Transfer and its application can be extremely useful in Electricity Generation and transmission. Wireless Power transfer is basically works on the principle of Transformers. We can say that transformer is a motive of Wireless Power Transfer. it is analogues to Wireless Data Transmission only power is transmitted instead of data. the concept can be used efficiently in Electricity to minimize Cost, losses and maximize the Efficiency. Concluding to this we can Develop a a system that could provide much higher Efficiency, low Transmission Cost and Secured to power theft. In proposed system we are Developing a Wireless Power transmission system in which Vehicles Battery power is used to feed a street light system. Generally any road have more than thousand vehicles running on it per day. If we collect energy from each vehicle without hampering its operation this energy can be used for feeding street lights on that road. Can be effective option to curb these losses.

METHODOLOGY

The Power From Electric Vehicle is a input to the System. this Power is DC in Nature So it is First Given to the DC to AC Converter as Wireless Power Transfer can only done with Alternating Current.

At Input Side A Controller is Used to Activate the Wireless Power transfer between Transmitting Coil and receiving Coil. To start the Power transfer a Switch is Provided at the Transmitter Side and when it is pressed the Controller will activate the Power Transfer and when it is agaain pressed the power Transfer will be Stopped.

A 16*2 LCD is Also Provided at the Transmitter section to Display the Wireless Power transfer activity i.e. Whether WPT is Ongoing or not. The Controller Will provide the Control Signal to Display the activity on LCD.

A DC to AC Converter is used to Convert the DC Current to AC Current and this AC Current is then Travels through transmitting Coil. The transmitting Coil is Copper Coil with 1000 turns. For greater Efficiency We Can Use Tesla Coil also. the Charge is Stored in the Coil based on the Principle Of Electromagnetic Induction. and this Charge is then transferred in wireless mode using Resonant Inductive Coupling.

At Receiver End The receiving Coil with 1000 turns and Made up of Copper will receive the Charge and Current Will Start Flowing through Coil. This Current Is Ac in Nature.

A Current Booster Circuit Using MOSFET and Capacitors is used to boost the Current as Efficiency is 70 %. it will boost the Current at Adequate Level.

To feed the Street Light (Specially Traffic lights) we need to Convert the AC power into DC power for that purpose DC to AC Converter is used. at Receiver Charge Storage Batteries are Used to Store the Charge. After Charging the Battery to its full level a circuit is broken using Circuit breaker Circuits.

HARDWARE UNITS REQUIRED :-

1.Power Supply Unit :

It Requires two Voltage 12 volt and 5 volt.

2. LCD Display :

it Required to Display the Power Transfer Activity. in this System we are using 16*2 LCD Display Unit.

3. Transmitting and Receiving Coils :

In this System we are Using Copper Coils with 1000 Turns For Higher Coupling Factor to increase Efficiency.Copper Coils have relatively high Coupling Factor and when the distance between the turns is reduced Coupling Factor increased and which inturns increases the Efficiency.

4. Microcontroller :

The Atmel AT89C51 microcontroller is used to control the overall operation of the LCD and Power Transfer using Switch. It is a 8-bit microcontroller. ATMEL 89C51 has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. In 40 pin AT89C51, there are four ports designated as P1, P2, P3 and P0. All these ports are 8-bit bi-directional ports.

5. Current Booster Circuit :

This Circuit is used for boosting the Received Current. in this Circuit we are Using current booster Circuit implemented using N Channel MOSFET.

6. DC to AC and AC to DC Converter :

as Wireless Power Transfer Can Occur only in AC current Carrying Conductor the DC power is Converted in AC and Vice versa is done at the Receiver Side.

7. Relay :

It is a electromagnetic device. It will used to turn ON or OFF the device which is connected to relay. Here 12v relay is required

SOFTWARE REQUIREMENTS :

It requires Keil compiler µVision 3 Which is used For Converting the the Source Code into Hex code.

It Requires Proteus version 8 for Designing Power Supply and pcb. it is also used for Primary testing and Simulation of Circuits.

ADVANTAGES :

1. Wireless Power Transfer is Very Efficient Power Transfer Mode.

2. It reduces the Losses Occurred during Power Transmission.

3. As Medium Is Wireless It Does not Involve Cost of Wiring.

4. Extending the System can make Wirless Power transfer Secure.

5. As It uses Resonant Inductive Coupling technique it is not Harmful to Living Beings.

APPLICATIONS :

1. the System Can be Used as a Solution to the Solar powered Street lights in Extreme Weather Conditions.

2.Exteneded Applications of this System Can be Used in Trains and Aeroplanes.

3. Concept is also applicable in Consumer Electronics Solar Energy Harvesting.

FUTURE SCOPE :

1. This System Can be Used In Electric Vehicle Technology.

2.it Can also used in Sattelite Communication and other Transportation Facilities.

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CONCLUSION :

Wireless Power Transfer and Witricity can be used in Every Domain Which is Directly or Indirectly Related to Electricity. it can Curb the Losses arises due to Wired Power transmission. Transmission of power through Wireless Medium will Dominate this High Demand Electricity era. Systems like Proposed System are Solution to the Conventional Electricity Transmission Techniques.

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