WIRELESS POWER CONDUCTION

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Abstract — Wireless Power Transmission has been attracting a wide range of subjects in various fields and also become a highly active research area because of their potential in providing high technology to our daily lives. The wireless power transmission will be mandatory to use in the near future because this technology enables the transmission of electrical energy from a power source to an electrical load across an air gap without any interconnecting wire. In this presentation, we describe wireless power transmission using electrostatic excitation method.

Keywords— Twin alignment system, Solar panel

1. INTRODUCTION

Electricity energy needs to be transported to the distribution lines through cords (wires or any conductors). One of the major issues in power transmission is the losses occur during transmission and distribution process of electrical power due to the energy dissipation in the conductor and the equipment used for the transmission.

As the demand increase, day by day, the power generation and power loss are also increased. The cost-efficient of making electricity is also high so that by using wireless power transmission technology we can overcome power loss in the cords which would result better than the existing system.

Wireless power transmission is revolutionizing the mode of electricity transmission to enable the reliable and efficient wireless charging of millions of everyday electronic devices with inter grating a power source to an electrical load without the aids of wire.

Such a transmission is used in cases where interconnecting wires are hazardous or inconvenient.

2. LITERATURE REVIEW

1. Wireless Power Transmission Trends

Mohammad Shadujaman, Hooman Samani, Mohammad Arif-2014
Wireless power transfer, magnetic resonance, microwave power transmission

2. Wireless Power Transfer

Lucia Dumitriu, DragosNiculai, Mihai Lordache, Lucian Mandache, Georgiana Zainea-2012
Inductive power transfer, magnetic flux

3. Wireless Charging Technologies (fundamentals)

Xiao Lu, Ping Wang, DusitNiato, Dong In Kim, Zhu Han - 2015
An air gap, radiofrequency power transmission

4. Microscale Magnetic Power Transmission

Jaegue Shin, Seungyong Shin, Yangsu Kim, SeungyoungAhn, Seokhwan Lee, Guho Jung, Seong-Jeub Jeon, Dong-Ho Cho - 2014
Invertor, Magnetic wireless power transfer, Electromotive force shielding

3. PROBLEM STATEMENT

India world's second populous country has the second most lacking access to electricity. Nearly 18000 villages have no electricity. This is due to the lack of facility for power transmission. The Indian government has planned to invest nearly 14025 crores for electrifying rural areas from the year of 2015.

This scheme implemented under the name of "SAUBHAGYA". Currently, in Tamilnadu, the usage of electricity is so high so that Tamilnadu is getting current from the other states for crores of rupees.

A. Objective:

The main purpose of this idea is to transmit the power wirelessly through Telsa coil by exciting the electrons present in the air.

To use a solar panel for generating power to Tesla coil.

To deliver power to areas that is difficult to light up with weird power transmission.

B. Existing system

For transmitting the power wirelessly Microwave Power Transmission and Laser Power Transmission technology are used.

Microwave power transmission (MPT): This technology transfers high power from the base station to receiving station or mobile devices with two places being in the line of sight.

With the help of geosynchronous receiving and transmitting satellites, this technology enables the objects to acquire power from the base station using magnetron.

MPT provides the efficiency in energy conservation but it is slightly difficult to focus the beam in a small region. Besides, this technology could pass through the atmosphere easily. The first step of power transmission is initiated with converting electrical energy to microwaves energy and then microwaves energy will be captured with using rectenna.

C. Disadvantage

In this technology, the Alternating Current (AC) current cannot be directly converted to microwaves energy. Therefore, AC needs to be converted to Direct Current (DC) first and then DC is converted to microwaves by using magnetron. Transmitted waves are received at rectenna and then rectify microwaves into electricity with more efficiently. It will give DC as the output. In the final step, DC will be converted back to AC.

Process timing is more.

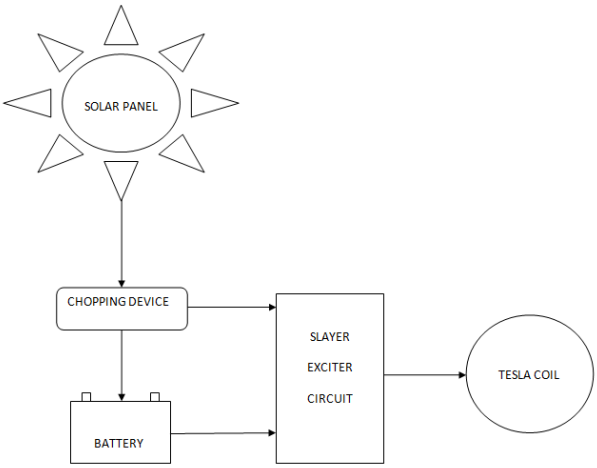
The frequency ranges may cause the long-term medical care.

D. Laser power transmission

This technology is slightly different with MPT where it enables the power concentrated in a small area by utilizing the mirror. This technology also provides high powers that are coherent and not dispersed. However, laser technology gets attenuated when it propagates through the atmosphere.

In addition, this technology has been used to apply rover to explore the presence of ice in the bottom of craters.

4. BLOCK DIAGRM



5. WORKING PROCESSES

The working system can be widely classified into the following systems

1. Solar panel
2. Chopping device
3. Battery source
4. Slayer exciter circuit

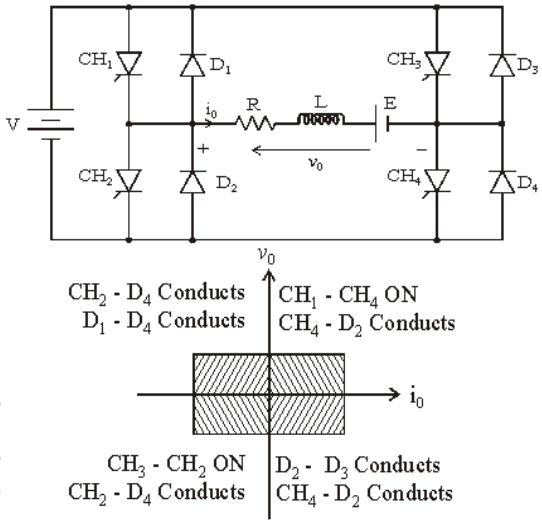
A. SOLAR PANEL

The solar panel is used as the main power source. The solar panel we are using in this project is a poly-crystalline solar panel. This has the multi-grains structure. Since it is doped with multi-crystalline silicon it has increased efficiency.

B. CHOPPING DEVICE

The chopping device has many applications such as
Switched capacitor filters
Variable-frequency drives
D.C. voltage boosting
Battery chargers

This chopping device is used in the circuit in order to maintain frequency and charge the battery in order to transmit power to the coil at night time. During daytime the chopping device is directly connected to Slayer Exciter Circuit

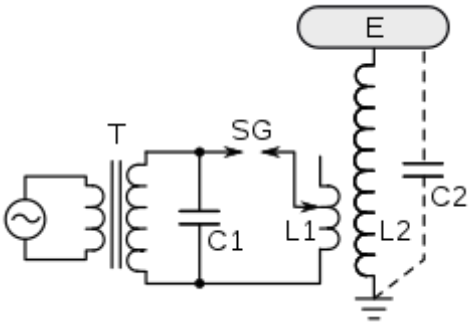


BATTERY

The battery used is 12 volt 10000mAH Li-ion battery which is much enough to transmit power to the SEC for about 12-14 hours.

SLAYER EXCITER CIRCUIT

A Slayer Exciter is an air-cored transformer that steps up a very low DC voltage to a very high AC voltage. The driver circuit takes the electricity from the power source and prepares it for the transformer. The primary coil creates a magnetic field from the electricity. The secondary coil converts the magnetic field back into electricity and steps it up to a much higher voltage. Finally, the top load acts as a capacitor, greatly increasing the strength of the electromagnetic field.



TESLA COIL

A Tesla coil is an electrical resonant transformer circuit designed by inventor Nikola Tesla in 1891. It is used to produce high-voltage, low-current, high-frequency alternating-current electricity.

Tesla experimented with a number of different configurations consisting of two, or sometimes three, coupled resonant electric circuits. This is used to ionize the air which in terms electrifies the and the charges are carried through the air to transmit power.

6. ADVANTAGES

1. This methodology can deliver power to areas where wired power transmission is difficult.
2. It can reduce the installation of posts and transformers
3. This system can reduce complex constructions when compared to other wireless transmission technologies
4. This system can light up more deserted and more remote rural areas

7. CONCLUSION

Wireless technology is a non-radiative mode of energy transfer, relying on the magnetic near field. Magnetic fields interact very weakly with biological organisms-people and animals- and are scientifically regarded to be safe. Wireless products are being designed to comply with applicable safety standards and regulations.

Hence Wireless is technology safe. Wireless can transfer power depends on the source and receivers. if it is relatively close to one another, and can exceed 95%. Efficiency is primarily determined by the distance between the power source and capture device, however, the shape may impact the efficiency. It can transfer the power through walls also.

Traditional magnetic induction requires that the power source and capture device be very close to one another usually within millimeters to transfer power efficiently. Wireless is a convenient and cost effective technology as it will help minimize the use of plastic and copper used in electric devices this new technology has tremendous merits like high transmission integrity and low loss.

As the resonant frequency gets tighter, the energy transferred to other objects drops away. With improved efficiency and range, this technology will change the way we look at energy transfer.

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