



MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
UGC Autonomous

Department of ECE

Seminar Presentation

Name of the Faculty : **Dr. Roshan Kumar**
Assistant Professor, Dept. of ECE

Category of registration : **Full-time faculty**

Seminar Title : **Wireless Power Transmission Technology**

Date and Time : **Saturday, 17th October, 2015, 2.30pm.**

Venue : **Seminar Hall, Dept. of ECE,**
Madanapalle Institute of Technology and Science.
Madanapalle 517325.

Listener : **All UG & PG students**

All are cordially invited

HOD/ECE



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Seminar Report on Wireless Power Transmission Technology

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Submitted by : **Dr. Roshan Kumar, Assistant Professor, Dept. of ECE**



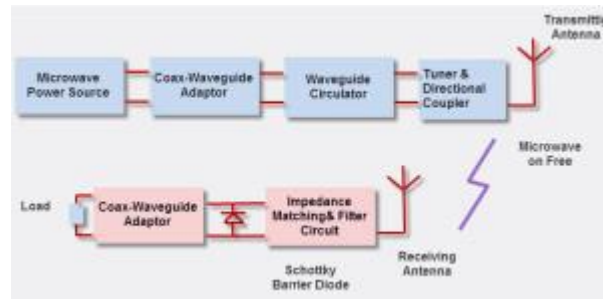
Wireless power transmission technology is not a new technology. In 1888, it was demonstrated by Nikola Tesla. There are three main systems used for wireless electricity transmission: solar cells, microwaves and resonance. In an electrical device, microwaves are used to transmit electromagnetic radiation from a source to a receiver. The name wireless power transmission states the transfer of electrical power from a source to an electrical device without the help of wires. Basically, it involves two coils: a transmitter and a receiver coil. The transmitter coil is powered by an AC current to produce a magnetic field, which in turn induces a voltage in the receiver coil. The basics of WPT involve the inductive energy transmission from a transmitter to a receiver through an oscillating magnetic field. To get this DC current, that is supplied by a power source, it is converted into high-frequency AC current by the specially designed electronics built into the transmitter.

Types of Wireless Power Transmission Methods:

There are different types of wireless power transmission methods: microwave power transmission, inductive-coupling-power transmission and laser-power transmission methods.

1. Microwave Power Transmission

William C Brown, the pioneer in the WPT technology, has designed and exhibited to show how power can be transmitted through free space by microwaves. The concept of the WPT is explained with a functional block diagram which is shown below.



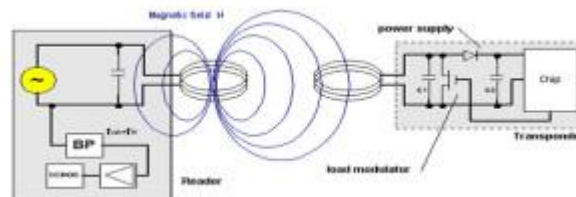
Microwave Power Transmission

The functional block diagram of WPT consists of two sections: transmitting section and receiving section. In the transmission section, the microwave power source generates microwave power which is controlled by the electronic control circuits. The waveguide circulator protects the microwave source from the reflected power, which is connected through the co-ax waveguide adaptor. The tuner contests the impedance between the microwave source and transmitting antenna. Then, based on the signal propagation direction, the attenuated signals are separated by the directional coupler. The transmitting antenna emits the power regularly through free space to the receiving antenna.

In the receiving section, the receiving antenna receives the transmitted power and converts the microwave power into DC power. The filter and impedance matching circuit is provided for setting the output impedance of a signal source which is equal to rectifying circuit. This circuit consists of Schottky barrier diodes which converts the received microwave power into DC power.

2. Inductive Coupling Power Transmission:

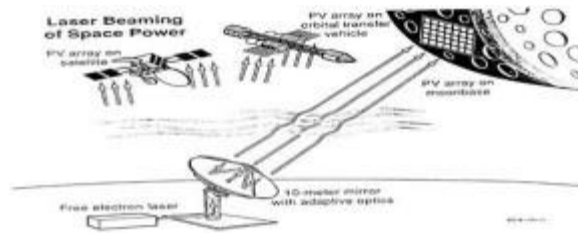
Inductive coupling method is the most important methods transferring energy wirelessly through inductive coupling. Basically, it is used for near -field power transmission. The power transmission takes place between the two conductive materials through mutual inductance. The general example of inductive coupling power transmission is a transformer.



Inductive Coupling Power Transmission

3. Laser Power Transmission:

In this type of power transmission method, a LASER is used to transfer power in the form of light energy, and the power is converted to electric energy at the receiver end. The LASER gets powered using different sources like sun, electricity generator or high-intensity-focused light. The size and shape of the beam are decided by a set of optics. The transmitted LASER light is received by the photo-voltaic cells, that converts the light into electrical signals. Usually, it uses optical-fiber cables for transmission.



A LASER power Transmission System
Laser Power Transmission System

Working Example of Wireless Power Transfer

Thank you