

WIRELESS TRANSMISSION OF ELECTRICITY FOR A VEHICLE USING SOLAR PANEL

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ABSTRACT: *Although individual consumers may be reluctant to trade in their gas guzzlers for electric vehicles, public transit departments have already been experimenting with these low-emission alternatives. But the challenges of electric transportation are the same for municipalities: mainly, how do you keep the vehicles fully charged without constant interruptions to the travel schedule? The concept of wireless charging of a Hybrid Bus throughout the track or road concept could be an answer to this conundrum. This project uses inductive charging technology into bus stops that would allow electric buses to work continuously on roads excited by WiTricity concept and the transmitter coils powered by Solar Panels. WiTricity uses an electromagnetic field to transfer energy between two objects. Energy is sent through inductive coupling to an electrical device, which then can use that energy to power the motors of the bus. In this prototype of project the battery is eliminated and this reduces the weight of the bus and the efficiency tends to increase. Solar panels are installed on top of the structure's roof for ex on the bus stops would collect and convert sunlight into electricity throughout the day. The roof would be curved in such a way that would both protect waiting passengers from the elements and allow the energy to be transferred to the bus wirelessly anytime the vehicle pulls up underneath the overhang. Components for inductive charging are hidden and protected against damage or dirt in the Solar Curve's tilting roof construction.*

I. INTRODUCTION

In this era of modernization, electricity has become the cup of life. A moment without electricity makes your thinking go dry. The major source of conventional form of electricity is through wires. The continuous research and development has brought forward a major breakthrough, which provides electricity without the medium of wires. This wonder baby is called WiTricity. There are certain small but very useful discoveries made in history, which changed the world forever, Newton's gravitational law, Watt's steam engine, Thomson's bulb and many more. But a renaissance occurred with the invention of Electromagnetic Waves by Maxwell. And with this there started a new era called WIRELESS TECHNOLOGY. Today, as we can see the word 'wireless' is common in day to day life. Wireless communication has made the world smaller.

II. RELATED WORK

One of the major issue in power system is the losses occurs during the transmission and distribution of electrical power. As the demand increases day by day, the power generation

increases and the power loss is also increased. The major amount of power loss occurs during transmission and distribution. The percentage of loss of power during transmission and distribution is approximated as 26%. The main reason for power loss during transmission and distribution is the resistance of wires used for grid. The efficiency of power transmission can be improved to certain level by using high strength composite overhead conductors and underground cables that use high temperature super conductor. But, the transmission is still inefficient. According to the World Resources Institute (WRI), India's electricity grid has the highest transmission and distribution losses in the world – a whopping 27%. Numbers published by various Indian government agencies put that number at 30%, 40% and greater than 40%. This is attributed to technical losses (grid's inefficiencies) and theft. Any problem can be solved by state of the art technology. The above discussed problem can be solved by choose an alternative option for power transmission which could provide much higher efficiency, low transmission cost and avoid power theft. The solution for this is wireless transmission of electricity.

III. EXISTING WORK

In our project, we are using concept of WiTricity to move the vehicle on a real time basis without any battery. Our purpose is to make the prototype of the electric vehicle. In this we are using the table size platform which acts as a road. For transmission of the electricity, we are using copper coil of particular gauges. And the same type of coil is fitted at the vehicle section. The vehicle will move when resonance frequency of both the coil will match.

IV. PROPOSED WORK

Electricity is the flow of electrons (current) through a conductor (a wire), or charges though the atmosphere (like lightning).It is the set of physical phenomena associated with the presence and flow of electric charge. Electricity gives a wide variety of well-known effects, such as lightning, static electricity, electromagnetic induction and the flow of electrical current. In addition, electricity permits the creation and reception of electromagnetic radiation such as radio waves. In electricity, charges produce electromagnetic fields which act on other charges.

Magnetism

It is a fundamental force of nature, which causes certain types of material to attract or repel each other. Permanent magnets like in our refrigerator and the earth's magnetic field are example of objects having constant magnetic fields.

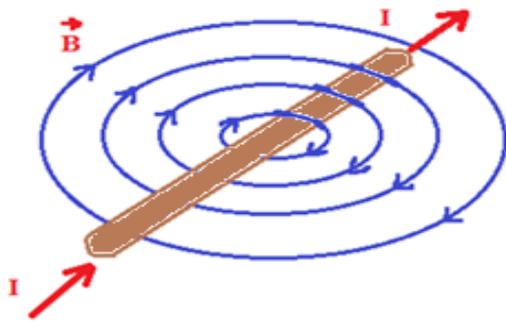


Fig1.1 Current I flowing in the circuit generates magnetic fields

Electromagnet

It is a term for the interdependence of time-varying electric and magnetic fields. The oscillating magnetic field produces a magnetic and electric field. An electromagnet is a type of magnet whose magnetism is produced by the flow of electric current. The magnetic field disappears when the current ceases.

Magnetic Induction

If a conductive loop is connected to an AC power source, it will generate an oscillating magnetic field in and around the loop. If a second conducting loop is brought near enough, it will capture portion of that oscillating magnetic field, which in turn generates or induces an electric current in the second coil. Thus the electrical power transfer from one loop or coil to another is known as magnetic induction. Examples of such phenomenon are used in electric transformer and electric generators. This concept is covered by the laws of electromagnetic induction by Faraday. Where he states that whenever there is change in magnetic flux linking with the coil an emf is induced in the coil. And the magnitude of the same is equal to the product of number of turns of the coil and the rate of change of flux

$$E = N(\Phi_1 + \Phi_2) / t \text{ volts}$$

Where e= induced emf

N=Number of turns

Φ_2 = final value of flux 2

Φ_1 = initial value of flux 1

t= time duration during which the change in flux takes place.

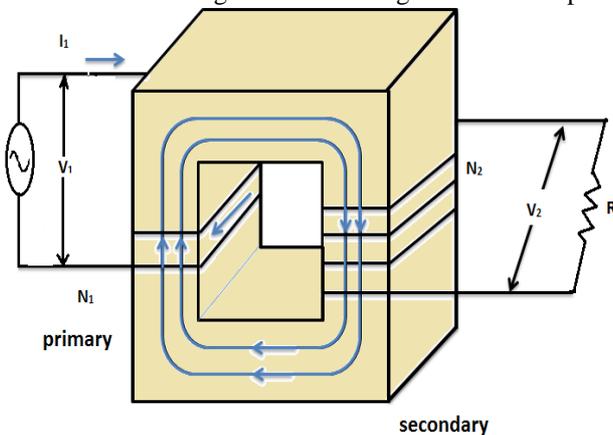


Fig 1.2 Electric transformer

Energy/Power Coupling

This phenomenon occurs when one device is able to transfer energy to another device. Magnetic coupling occurs when one object's magnetic field is able to induce an electric current to the other devices on its vicinity WITRICITY BASED VEHICLE

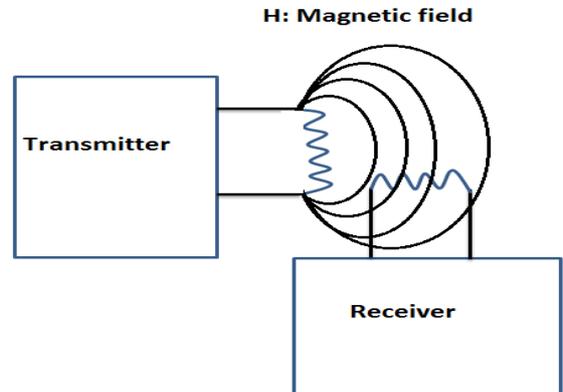


Fig1.3 Energy/Power Coupling

Resonance

Resonance is the phenomenon in which magnetic systems that possesses both magnetic moments and angular momentum. It is the natural frequency at which energy can most efficiently be added to an oscillating system. It exists in most of the physical systems. When the resonant frequency is found it vibrates with higher energy.

Resonant Magnetic Coupling

As stated above magnetic coupling occurs when there is energy exchange between two objects through their varying magnetic fields. But the resonant coupling occurs when the natural frequencies of the two becomes approximately equal

V. CONCLUSION

After spending a considerable amount of time reviewing the project in hand, the concept of WITRICITY sheds light on considerable arrays of conclusions. Firstly, the property of Magnetic Induction which is under scrutiny in this project possesses absolutely NO harm to living beings and thus is regarded safe .The basic reason behind this statement is realized from the fact is no radioactive mode of energy transfer. Range being the only major constraint that raise some eyebrows, it is matter of time that this aspect is overcome as well. Efficiency is the constantly improving parameter and cost being a major viewpoint related to this project, it can be concluded that there will be no gain without a certain amount of pain. The transfer of power can efficiently take place through the walls as well as water makes this application even more noteworthy and finally the basic knowledge that in future there would be NO requirement of tedious chargers and cables makes us more apprehensive of the future of this project!!! Thus , we have completed almost 50% work as designed a power supply and block diagram required for our project.

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