ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

Tesla's Free Energy World

Marthy Siva Sai Krishna[1], Durgam Rajesh[2]

Dept. of ECE, GITAM University, Hyderabad, India[1, 2]

ABSTRACT: Tesla-one of the greatest minds of our century who has dreamed about the distribution of free energy to the world but his dream never came true because of lack in capital investment and politics played by the business people. At present generation we can fulfil his dream by using the present technology advancements. There are many methods to generate energy freely. The existing methods include production of energy through biogas, solar (solar panels), Wind (wind mill), tidal, hydro, geothermal etc. These methods cannot meet all the needs due to some environmental challenges and due to uneven distribution of resources due to various conditions. By using tesla's wireless power transfer idea, we can provide free energy to all over the world. Ideally this wireless power transfer method solely cannot provide free energy to the world but practically collaboration between all these above mentioned methods are necessary and by using our Beam Forming Technique we can overcome most of the drawbacks faced by the Tesla's idea. This paper is about how we can meet the energy gap existing and how we can overcome the drawbacks behind these methods.

KEYWORDS: Tesla, Beam forming, Satellite, Solar, windmill, Tidal.

I.INTRODUCTION

The primary concern of any country is to meet its present energy needs and plan for the future needs. It is estimated that every year the total energy demands are increased by 150% in the developing nations of Africa and Asia. With the advancements in the technology the power requirements are increasing and there by the utilization of the natural resources for energy generation are increasing. Most of the energy is generated by burning natural resources such as coal, natural gas etc and by nuclear fission reactions. The depletion of these natural resources leads to several severe environmental pollutions. This huge usage of non-renewable resources results in decrease in amount of resources left in this nature. This modern world is facing these kinds of challenges. These are all due to increase in energy requirements. We can overcome these challenges by meeting energy requirements through various ways other than using non renewable sources such as utilizing solar power, tidal power, wind movement etc. Through tidal energy we can produce electricity by the water flow towards the turbines. The flow of charge produces current and there by this can be obtained by using solar panels. The energy generated is stored inside capacitors and can be used for later use. The generation of power using windmills is dependent on the speed of the wind moving from one side to other. These methods are used to produce energy freely. A small solar panel can produce an average of 4-5 kilowatts of power which can be used to power up tube lights for straight 4 hours, 2 fans for 24 hours, a TV for 4 hours and refrigerator for the whole day. But the disadvantages of these solar panels are these are costly to buy and maintain. Whenever there is no sunlight basically during the time of cyclones and monsoon season solar panels cannot be used to produce energy and in the same way when there is no wind we cannot use windmills as a like biogas too. The naturally prepared biogas takes time to reproduce and gives very less amount of energy. Keeping generation of energy on one side even today we face challenges in the transmission of the power from source to electric loads. One of the major issues is the losses occurring during the transmission and distribution of electrical power. Almost all 26% of the energy is getting wasted during transmission process which is highest in India. These transmission losses are due to absorption of the power over the medium, resistance of the wires, impudence mismatching between the source and load side etc. These are some of the side effects we are facing these days. So we can say from this that still we have to develop different innovative methods to generate energy and we are not able to meet the energy requirements in each and every part of the world due to various reasons such as environmental challenges etc: - The energy requirements in these places can be meet by transferring power wirelessly or through wired. As discussed above the transfer of energy through a medium is holding less efficiency so wireless power transfer is the only way that can produce high efficiency, low loss (no resistance) .

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

II.WIRELESS POWER TRANSFER (WPT)

Wireless electricity is also called as witricity. The principle behind this witricity is magnetic resonance. Objects with same frequency tend to exchange energy. Requires new approaches to supplying power to equipment.WPT from the time of 1800's has been an underdeveloped technology. Tesla had always tried to introduce worldwide free energy distribution. But due to lack of capital investment and politics from the business people it didn't go well.The wireless power transfer is one of the important research oriented area these days. Back in 1890's Tesla has tried to lighten a lamp by means of a resonant circuit grounded on one end. A coil outside laboratory with the lower end connected to the ground and the upper end free. The lamp is lighted by the current induced in the three turns of wire wound around the lower end of the coil as shown in figure1.There was a buzz those days that tesla has transferred the power wirelessly to lit up 60 bulbs that are 5 kilometers away from the source. That means he has transferred a large amount of power wirelessly to a distance of 5 kilometers. But nobody knows what technology he has used to transfer that amount of energy to that large distance. In today world recently in 2013 a Japanese university started doing research on WPT where they successfully transferred 13millivolts to a distance of 51 meters. From this we can say that how advance the Tesla is when compared to the today's generation. He is the father of the wireless technology. Wardenclyffe tower was designed by Tesla for Trans-Atlantic wireless telephony and also for demonstrating wireless electrical power transmission (figure 2). Tesla intended to transmit messages, telephony and even facsimile images.

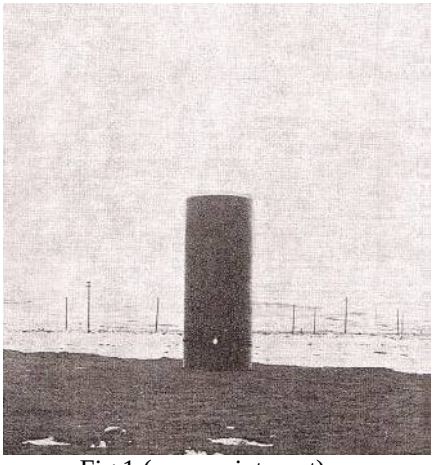

Fig 1 (source: internet)

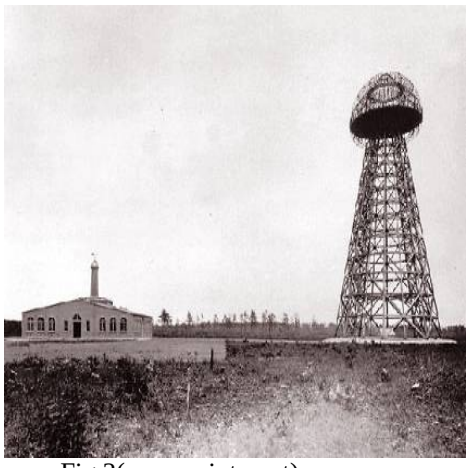

Fig 2(source: internet)

There are several methods to transfer energy wirelessly such as Induction, Evanescent Wave Coupling, Electromagnetic Transmission, Electrodynamics Induction, Radio and Microwave, Electrostatic Induction.

Induction is similar to the transformer working principle. The fact that a change in the current of one coil affects the current and voltage in the second coil is quantified in the property called mutual inductance. The moving charge produces magnetic field...When the moving current is DC the field produced is called static magnetic field. The flux developed from the static magnetic field doesn't induces current When the moving current is AC the field produces the flux that changes with time with respect to AC amplitude. When this time changing flux cuts the conductor it produces an electric force inside the conductor which results in the generation of charge flow. This charge flow produces the current. The process of induction is shown in figure 1:

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

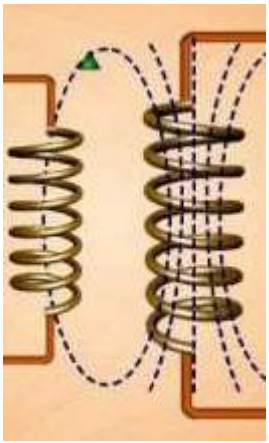

Fig 3 (source: internet)

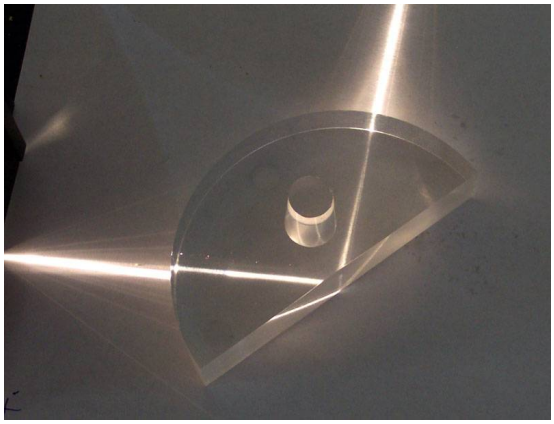

Fig 4: Evanescent field (source: internet)

Evanescent Wave Coupling (figure 2) is another kind of WPT technique, where we can send the electromagnetic signal through a non radioactive resonant tunnelling. Since those EM waves are passed through the tunnel they don't get absorbed or faded. Almost we can achieve 96% efficiency through this. But the only disadvantage of this technique is that it not handy beyond 5 meters.

Radio and Microwave's can be used to transfer power which is highly directional and making long distance power beaming possible. Rectenna acts as a transducer which converts microwave energy into electricity which is almost 92% efficient. Power transfer using microwaves is being used for the energy transfer from orbiting solar power satellites to Earth.

Electrostatic Induction(figure 3) which is also known as capacitive coupling where the differential current place a vital role in transferring the power from one plate to other. The electric field gets concentrated in between the plates which help to travel the current from one side to the other. But this is not used to transfer power to large distances. The differential capacitance between two plates over a conducting ground plane for wireless energy transmission involving high frequency AC potential differences transmitted between two plates.

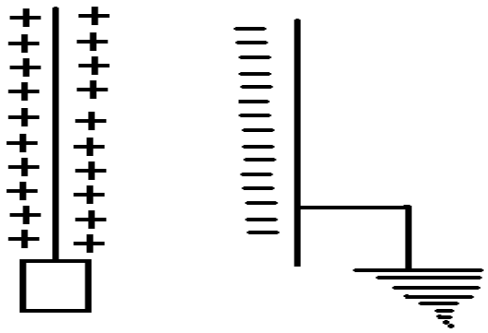

Figure 3**(Source: internet)**

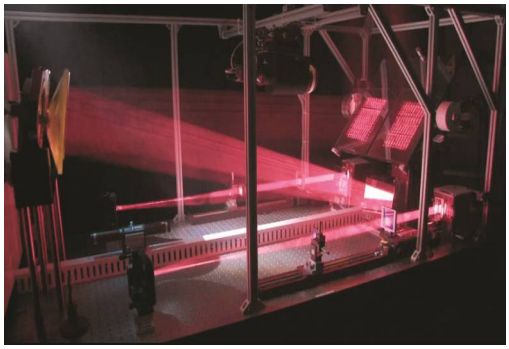

Figure 4**(Source: internet)**

Optical Method (power beaming) (figure 4) Basic theory behind optical mode of wireless power transmission is to convert electricity in laser beam which point to receiver made up of photovoltaic cell. Example: Laser power

In order to transfer the power the waves must be targeted so that total energy transmitted is made to reach the load. Travelling wave tube (TWT), klystron and magnetron oscillators are the most commonly used microwave transmitters where researches more tends to use magnetron oscillators as it is very cheap and highly efficient.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

III.WIRELESS POWER TRANSMISSION BLOCK DIAGRAM

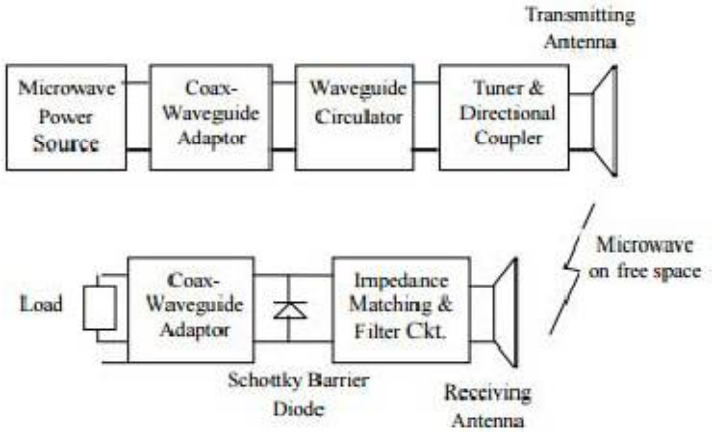

Figure 5 **(Source: internet)**

This block diagram consists of 2 sections: one is transmitter and other is receiver sections. At transmitter side the microwave power source generates microwave power which is controlled by various electronic circuits. In order to provide the protection to the source the waveguide circulator is used. This is connected through the Coax-Waveguide adaptor. The tuner is used for impedance matching between the microwave source and transmitting antenna. Directional coupler is used to separate the attenuated signal during signal processing and its propagation. The transmitting antenna is finally used to emit the power into the space. At the receiving section the receiving antenna checks for the transmitted power and convert that microwave energy into electricity through rectenna. As the name suggests this filter and impedance matching circuit is provided to match the output impedance of signal source with the rectifying circuit. Schottky barrier diodes are used in rectanne.

WPT system completely reduces existing high-tension power transmission cables, substations and towers between the consumers and generating station. . The power could be transmitted to places to which the wired transmission is not possible. The largest application of the WPT is the production of power by placing satellites with giant solar arrays in Geosynchronous Earth Orbit and transmitting the power as microwaves to the earth known as Solar Power Satellites.

IV.TESLA EXPERIMENT

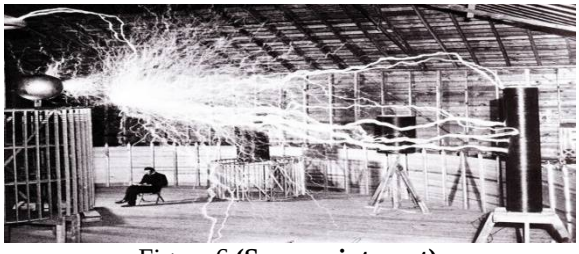

Figure 6 **(Source: internet)**

Tesla in 1891 demonstrated the wireless power transmission in lecture at New York City. In this demonstration he used two metallic sheets connected to the tesla's oscillator to which a high frequency oscillating voltage has been applied. This produces the oscillating electric fields between the metallic sheets which can ionize the gases at low pressure present in tubes which are placed in between these metal plates. These tubes glow due to the phenomena of fluorescence. Later in 1899 at Colorado he did this experiment using the resonant inductive transfer phenomena. The coil is in resonance with tesla's magnifying transmitter there by powering the light bulb at bottom. Tesla in the span of 13 years has many experiments based on inductive and capacitive coupling using spark-excited radio frequency resonant transformer to popularize the idea of wireless power transmission. With the above experiments he was able to transmit the power wirelessly for short distances. He had lit lights across a stage in front of American institute of

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

electrical engineers and he found that he could increase the distance by placing a LC circuit receiver tuned or in resonance to the transmitter's LC circuit by resonant inductive coupling. In Colorado he was able to light three incandescent lamps placed at a distance of hundred feet with 10 megavolts generated by the coil. This method is popular and currently being used for short range wireless power transfers.

V. MICROWAVE POWER TRANSMISSION IN SOLAR POWER SATELLITES

Figure 7 (Source: internet)

Magnetic resonance is the main basic principle behind the wireless power transfer. The satellites are allowed to put into the geostationary orbit in order to provide various services to the earth. These services include information collection regarding climate, deposition of minerals, maps etc:-the satellite should have efficient more power to operate...they have high storage batteries that can operate mostly during night times. During day time the satellite depends upon the solar energy. The satellite consists of array of antenna system that exposes to sunlight during day time and generates required energy that are necessary to meet the requirements. By making certain kind of modulations with the advancement in the latest technologies we can design the antenna system such that it can not only serve the satellite but also used to supply the power to various remote areas on the earth.i.e there are many places on the earth mainly in African and Antarctica where the generation of energy is quite challenging. Due to various environmental and geographical conditions it is not possible to have wind mills and solar panels at all the places. So, in such kind of places we can provide energy through the satellites wirelessly. This would allow them to receive energy 99% of the year. A large rectenna array facility will be built on the Earth to collect the incoming microwaves. To maintain a good lock on the rectenna the satellite will need to be built with a retro directive transmitter which locks on to a pilot beam emanated from the ground station.

We can use digital beam forming techniques to overcome the interference issues. We can save power through digital beam forming techniques. The power will get concentrated on the required area only without getting wasted. At present this research is taking place under 2.4 GHz-6 GHz spectrums. There are some spectrum issues because we operate WI-FI in this band only. As the next generation technology LI-FI is coming soon through which we can put an end to WIFI, so that we can use that 2-4 GHz – 6 GHz band for the WITRICITY purposes. The initial establishment of this process takes huge cost but the long term benefits are very fruitful. In this way we can meet the energy requirements all over the earth.

VI. FUTURE SCOPE

The wireless power transfer method in realising the TESLA'S free energy idea. As an estimation by 2030 we can transfer energy to the whole world using the geostationary solar power satellites. This energy can be used to run electric vehicles, ships, electric appliances and aircrafts. We need not worry of filling up energy from stations. By using this idea we can fulfil 95% of world's future energy requirements and even reduce the emissions of pollutants. The world would free of laying & maintenance of cables and wires. Power would be available 24*7 to everyone even at the time of natural calamities. Important aspect of this idea is no one would be paying for energy usage which is nothing but fulfilling TESLA'S idea of free energy to the world.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 10, October 2016

VII.CONCLUSION

Wireless power transfer method is the advanced method to transfer power to remote locations where energy production is impossible or time consuming process. Using this method we can easily transfer energy with just some initial installation. Using this method we can have instantaneous high energy for applications and with the use of Digital beam forming technique which is the advanced method which helps in transferring power from a satellite to 3 to 4 places adaptively so the signals are directive to the location with the maximum power for each of the location. This method is adaptive so that much of the energy is not wasted for the transmission in unnecessary direction.

REFERENCES

[1] Sagolsem Kripachariya Singh, "Wireless Transmission of Electrical Power Overview of Recent Research & Development" International Journal of Computer and Electrical Engineering, Vol.4, No.2, April 2012.
[2] Vikash Mishra, Lavya Nigam, Anand Mohan, "Wireless Power Transmission," International Journal of Emerging Technology and Advanced Engineering, Volume 4, Issue 2, February 2014
[3] S. D. Rankhamb, A. P. Mane, "Review Paper on Wireless Power Transmission" Paper ID: (IJSR)
[4] Er. Lince Mathew,Prof. Yash Pal Singh, "An Extensive study of "Wireless Power Transmission"- A Next Generation Power Transmission System, (IJIEASR) Volume 2, No. 12, December 2013.
[5] https://www.efxkits.us/wireless-power-transmission-technology.