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Wireless Power Transmission-A State of Art Review

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Abstract: *In the modern era, electricity has become an indispensable component of daily life, with most technologies relying heavily on continuous power supply. Traditionally, electrical energy has been transmitted through wired connections, but recent advancements in science and engineering have introduced a revolutionary concept—WiTricity, or wireless electricity transmission. This innovation enables the transfer of electrical energy without physical conductors, offering transformative potential for consumer electronics and industrial applications alike.*

The foundation of wireless power transmission lies in the principles of electromagnetic induction and resonant magnetic coupling. Unlike wireless telecommunications—where signal integrity is paramount—wireless power emphasizes transmission efficiency, ensuring that a substantial portion of generated energy is received at the target location. Early scientific contributions, such as Maxwell's formulation of electromagnetic wave theory and Marconi's breakthroughs in wireless communication, laid the groundwork for this technology. While methods such as radio waves and lasers have been explored, they suffer from limitations including energy dispersion, line-of-sight constraints, and safety concerns. In contrast, resonant inductive coupling has emerged as a more practical and efficient alternative.

WiTricity offers significant benefits, including reduced reliance on batteries and the elimination of physical charging infrastructure. Its applications span across wireless charging of mobile devices to powering embedded systems in inaccessible locations. As research progresses, WiTricity holds the promise to redefine how energy is delivered and consumed, paving the way toward a truly wireless future.

Keywords: WiTricity

I. INTRODUCTION

WiTricity, or wireless electricity, refers to the transmission of electrical energy without the use of wires. It relies on the flow of electrons—either through conductors or even through the atmosphere, as seen in phenomena like lightning—to transfer energy conveniently from one place to another. A key principle behind WiTricity is magnetism, a fundamental force of nature responsible for the attraction and repulsion of certain materials. While permanent magnets generate constant magnetic fields, oscillating magnetic fields—produced by alternating current (AC) in a wire—are central to wireless energy transfer. These dynamic fields can induce current in nearby conductors, enabling efficient wireless power transmission.

1.1. WiTricity

The flow of electrons (current) through a conductor(like a wire), or charges through the atmosphere (like lightning).A convenient way for energy to get from one place to another.

1.2. Magnetic

A fundamental force of nature, which causes certain types of materials to attract or repel each other . Permanent magnets, like the ones on your refrigerator and the earth's magnetic field, are examples of objects having constant

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magnetic fields. Oscillating magnetic fields vary with time, and can be generated by alternating current (AC) flowing on a wire. The strength, direction, and extent of magnetic fields are often represented and visualized by drawings of the magnetic field lines.

1.3. Magnetic Induction

A loop or coil of conductive material like copper, carrying an alternating current (AC), is a very efficient structure for generating or capturing a magnetic field. If a conductive loop is connected to an AC power source, it will generate an oscillating magnetic field in the vicinity of the loop. A second conducting loop, brought close enough to the first , may "capture" some portion of that oscillating magnetic field, which in turn, generates or induces an electric current in the second coil. The current generated in the second coil may be used to power devices. This type of electrical power transfer from one loop or coil to another is well known and referred to as magnetic induction. Some common examples of devices based on magnetic induction are electric transformers and electric generators.

1.4. Energy/Power Coupling

Energy coupling occurs when an energy source has a means of transferring energy to another object. One simple example is a locomotive pulling a train car— the mechanical coupling between the two enables the locomotive to pull the train, and overcome the forces of friction and inertia that keep the train still —and, the train moves. Magnetic coupling occurs when the magnetic field of one object interacts with a second object and induces an electric current in or on that object. In this way, electric energy can be transferred from a power source to a powered device. In contrast to the example of mechanical coupling given for the train, magnetic coupling does not require any physical contact between the object generating the energy and the object receiving or capturing that energy.

1.5. Resonance

Resonance is a property that exists in many different physical systems. It can be thought of as the natural frequency at which energy can most efficiently be added to an oscillating system. A playground swing is an example of an oscillating system involving potential energy and kinetic energy. The child swings back and forth at a rate that is determined by the length of the swing. The child can make the swing go higher if she properly coordinates her arm and leg action with the motion of the swing. The swing is oscillating at its resonant frequency and the simple movements of the child efficiently transfer energy to the system. Another example of resonance is the way in which a singer can shatter a wine glass by singing a single loud, clear note.

In this example, the wine glass is the resonant oscillating system. Sound waves travelling through the air are captured by the glass, and the sound energy is converted to mechanical vibrations of the glass itself. When the singer hits the note that matches the resonant frequency of the glass, the glass absorbs energy, begins vibrating, and can eventually even shatter. The resonant frequency of the glass depends on the size, shape, thickness of the glass, and how much wine is init.

1.6. WiTricity Technology

WiTricity power sources and capture devices are specially designed magnetic resonators that efficiently transfer power over large distances via the magnetic near−field. These proprietary source and device designs and the electronic systems that control them support efficient energy transfer over distances that are many times the size of the sources devices themselves

1.7. Magnetic Coupling

Magnetic coupling occurs when two objects exchange energy through their varying oscillating magnetic fields. Resonant coupling occurs when the natural frequencies of the two objects are approximately the same.

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II. THE INVENTION OF WITRICITY TECHNOLOGY

The increasing demand for mobility and convenience in modern electronics has driven the development of wireless power transfer technologies. A significant breakthrough in this field emerged from the work of MIT Professor Marin Soljačić, who envisioned a world where electronic devices could charge themselves without being physically plugged in. This idea led to the development of WiTricity—short for Wireless Electricity—a technology that enables the transfer of electrical energy without wires using the principle of magnetic resonant coupling.

WiTricity operates on the concept that two objects with the same resonant frequency can efficiently exchange energy through their oscillating magnetic fields, even at moderate distances, and with minimal interaction with surrounding objects. This is analogous to how a swing receives energy only when pushed at its natural frequency or how a wine glass absorbs sound energy when exposed to its resonant tone. Initial experiments using copper coils successfully powered a 60-watt bulb wirelessly over distances exceeding two meters, demonstrating both efficiency and practicality.

Coupled Resonators was Fit for the Situation

Technologies such as WREL (Wireless Resonant Energy Link), developed by Intel, build on these principles to create efficient wireless energy systems suitable for consumer and industrial applications. These systems promise a future where devices like laptops, smart phones, and electric vehicles can charge seamlessly—improving convenience, reducing dependency on batteries, and enabling new design possibilities. This paper explores the working principles, technological advancements, and applications of WiTricity, highlighting its transformative potential in the field of energy transmission..

2.1. Initiation

The story started late one night a few years ago, with MIT Professor Marin Soljacic standing in his pajamas, staring at his cell phone on the kitchen counter. It was probably the sixth time that month that he was awakened by his mobile phone beeping to let him know that he had forgotten to charge it. At that moment, it occurred to him: "There is electricity wired all through this house, all through my office—everywhere. This phone should take care of its own charging!" But to make this possible, one would have to find a way to transfer power from the existing wired infrastructure to the cell phone—without wires. Soljacic started thinking of physical phenomena that could make this dream a reality.

2.2. Coupled Resonators was Fit for the Situation

To achieve wireless power transfer in a way that is practical and safe, one needs to use a physical phenomenon that enables the power source and the device (in this case, the mobile phone) to exchange energy strongly, while interacting only weakly with living beings and other environmental objects, like furniture and walls. The phenomenon of coupled resonators precisely fits this description. Two resonant objects of the same resonant frequency tend to exchange energy efficiently, while interacting weakly with extraneous off−resonant objects.

A child on a swing is a good example of a resonant system. A swing exhibits a type of mechanical resonance, so only when the child pumps her legs at the natural frequency of the swing is she able to impart substantial energy into the motion of the swing. Another example involves acoustic resonances: imagine a room with 100 identical wine glasses, but each filled with wine up to a different level, so that each resonates at a different frequency (that is, they each emit a different tone or note when tapped, by a utensil, for example).

2.3. WiTricity Technology is Born

The experimental design consisted of two copper coils, each a self −resonant system. One of the coils, connected to an AC power supply, was the resonant source. The other coil, the resonant capture device, was connected to a 60 watt light bulb. The power source and capture device were suspended in mid− air with nylon thread, at distances that ranged from a few centimeters to over 2.5 meters (8.2 ft). Not only was the light bulb illuminated, but the theoretical predictions of high efficiency over distance were proven experimentally. By placing various objects between the source and capture device, the team demonstrated how the magnetic near field can transfer power through certain materials and around metallic obstacles.

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Thus Prof. Soljacic's dream of finding a method to wirelessly connect mobile electric devices to the existing electric grid was realized. WiTricity Corp. was soon launched to carry this technology forward from the MIT laboratories to commercial production.

2.4. WiTricity Transfer Electric Energy or Power Over Distance Without Wires

"Resonance" is a property that exists in many different physical systems. It can be thought of as the natural frequency at which energy can most efficiently be added to an oscillating system.

A playground swing is an example of an oscillating system involving potential energy and kinetic energy. The child swings back and forth at a rate that is determined by the length of the swing. The child can make the swing go higher if she properly coordinates her arm and leg action with the motion of the swing. The swing is oscillating at its resonant frequency and the simple movements of the child efficiently transfer energy to the system..

Another example of resonance is the way in which a singer can shatter a wine glass by singing a single loud, clear note. In this example, the wine glass is the resonant oscillating system. The sound wave energy is converted to mechanical vibrations of the glass itself. When the singer hits the note that matches the resonant frequency of the glass, the glass absorbs energy, begins vibrating, and can eventually even shatter. The resonant frequency of the glass depends on the size, shape, thickness of the glass, and how much wine is in it.

2.5. WREL(Technology)

WREL (Wireless Resonant Energy Link) is a form of wireless resonant energy transfer technology developed by Intel.

The technology relies on strongly coupled based on resonant inductive coupling caused by electromagnetic resonators, a principle similar to the way a trained singer can shatter a glass using his/her voice. At the receiving resonator's natural frequency, energy is absorbed efficiently, just as a glass absorbs acoustic energy at its natural frequency. At the wall socket, power is put into magnetic fields at a transmitting resonator - basically an antenna. The receiving resonator is tuned to efficiently absorb energy from the magnetic field, whereas nearby objects do not.

2.6. Benefits

With this technology enabled in a laptop, for example, batteries could be recharged when the laptop gets within several feet of the transmit resonator

However, it may be seen that if some energy is placed in a 'sender' coil when it is in resonance then the coil will ring for a number of cycles before losing the energy to its resistance. Provided the Q of the transmitting circuit is high enough to overcome the coupling coefficient, then most of the power can eventually be absorbed by the receiving coil over several cycles and can be tapped off. The remaining power will be lost in the resistance of the sender, and some in the receiver coil also.

III. WITRICITY AND DISTINCTIONS FROM TRADITIONAL WIRELESS POWER CONCEPT

3.1. Traditional Magnetic Induction

At first glance, WiTricity technology for power transfer appears to be traditional magnetic induction, such as issued in power transformers, where conductive coils transmit power to each other wirelessly, over very short distances. Inductive charging uses the electromagnetic field to transfer energy between two objects. A charging stations ends energy through inductive coupling to an electrical device, which stores the energy in the batteries. Because there is a small gap between the two coils, inductive charging is one kind of short −distance wireless energy transfer. The two coils must be very close together, and may even overlap, but the coils do not make direct electrical contact with each other. Induction chargers typically use an induction coil to create an alternating electromagnetic field from within a charging base station, and a second induction coil in the portable device takes power from the electromagnetic field and converts it back into electrical current to charge the battery. The two induction coils in proximity combine to form an electrical transformer However, the efficiency of the power exchange in traditional magnetic induction systems drops by orders of magnitude when the distance between the coils becomes larger than their sizes. In addition to electric transformers, other devices based on traditional magnetic induction include recharge able electric toothbrushes, and

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inductive ”charging pads’’ which require that the object being charged be placed directly on top of, or very close to, the base or pad supplying the power

3.2. Radiative Power Transfer

WiTricity technology for power transfer is non−radiative and] relies on near−field magnetic coupling. Many other techniques for wireless power transfer rely on radiative techniques, either broadcasted or narrow beam (directed radiation) transmission of radio, or light waves. Broadcasted radiation of radio frequency energy is commonly used for wireless information transfer because information can be transmitted over a wide are to multiple users. The power received by each radio or wireless receiver is miniscule, and must be amplified in a receiving unit using an external power supply. Because the vast majority of radiated power is wasted into free space, radio transmission is considered to be an inefficient means of power transfer. Note that while more energy can be supplied to the receiver by "cranking up the power" of the transmitters in these systems, such high power levels may pose a safety hazard and may interfere with other radio frequency devices In addition to radio waves, visible and invisible light waves can also be used to transfer energy. The sun is an excellent radiative source of light energy, and industry and academia are working hard to develop photovoltaic technologies to convert sunlight to electrical energy. A laser beam is a form of directed light radiation, in which visible or invisible light waves may be formed into a collimated beam, delivering energy in a targeted way. However, as in the case of directed radio waves, safe and efficient transmission of laser power requires a clear line of sight between the transmitter and receiver.

3.3. Magnetic Resonance Imaging(MRI)

MRI machines use "magnetic resonance imaging" to produce Diagnostic images of soft tissue. Many people assume that WiTricity "Resonant Magnetic Coupling" must be similar to magnetic resonance imaging (MRI) technology however; the technologies are similar in name only. MRI is, as its name suggests, a technology for using magnetism as a basis for diagnostic imaging of soft tissue in the human body. It utilizes a strong DC magnet to orient the magnetic fields of atoms within tissues, and radio frequency fields to manipulate those atoms in a selective way, so that tissues and structures can be imaged clearly. The "resonance" referred to in "MRI" refers to the resonance of Atomic structures. MRI is not considered to be a method for wireless power transfer.

3.4. Tesla’s Vision of Wireless World

In the late 1800's and early 1900's, at the dawn of the electrification of the modern world, some scientists and engineers believed that using wires to transfer electricity from every place it was generated to every place that it could be used would be too expensive to be practical. Nikola Tesla, one of the most well known of these scientists, Had a vision for a wireless world in which wireless electric power and communications would reach around the world, delivering information and power to ships at sea, factories, and every home on the planet. Tesla contributed significantly to our understanding of electricity and electrical systems and is credited with inventing three− phase AC power systems, induction motors, fluorescent lamps, radio transmission, and various modes of wireless electric power transfer. WiTricity technology for power transfer is different than the technologies proposed by Tesla, but his work is referenced and acknowledged in the scientific articles published by WiTricit y founding technical team.

IV. DESIGN AND PERFORMANCE CAPABILITIES OF RESONANT WIRELESS ENERGY SYSTEMS

4.1. Highly Resonant Strong Coupling Pro Ideas High Efficiency Over Distance

WiTricity mode of wireless power transfer is highly efficient over distances ranging from centimeters to several meters. Efficiency may be defined as the amount of usable electrical energy that is available to the device being powered, divided by the amount of energy that is drawn by the WiTricity source. In many applications, efficiency can exceed 90%. And WiTricity sources only transfer energy when it is needed. When a WiTricity powered device no longer needs to capture additional energy, the WiTricity power source will automatically reduce its power consumption to a power saving "idle" state.

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4.2. Energy Transfer via Magnetic Near Field Can Penetrate and Wrap Around Obstacles

The magnetic near field has several properties that make it an excellent means of transferring energy in a typical consumer, commercial, or industrial environment. Most common building and furnishing materials, such as wood, gypsum wallboard, plastics, textiles, glass, brick, and concrete are essentially "transparent" to magnetic fields—enabling WiTricity technology to efficiently transfer power through them. In addition, the magnetic near field has the ability to "wrap around" many metallic obstacles that might otherwise block the magnetic fields. WiTricity applications engineering team will work with you to address the materials and environmental factors that may influence wireless energy transfer in your application.

4.3. Non-Radiative Energy Transfer is Safe for People and Animals

WiTricity technology is a non−radioactive mode of energy transfer, relying instead on the magnetic near field. Magnetic fields interact very weakly with biological organisms—people and animals—and are scientifically regarded to be safe. Professor Sir John Pendry of Imperial College London, a world renowned physicist, explains: "The body really responds strongly to electric fields, which is why you can cook a chicken in a microwave. But it doesn't respond to magnetic fields. As far as we know the body has almost zero response to magnetic fields in terms of the amount of power it absorbs." Evidence of the safety of magnetic fields is illustrated by the wide spread acceptance and safety of house hold magnetic induction cook tops. Through proprietary design of the WiTricity source, electric fields are almost completely contained within the source. This design results in levels of electric and magnetic fields which fall well within regulatory guidelines. Thus WiTricity technology doesn't give rise to radio frequency emissions that interfere with other electronic devices, and is not a source of electric and magnetic field levels that pose a risk to people or animals. Limits for human exposure to magnetic fields are set by regulatory bodies such as the FCC, ICNIRP, and are based on broad scientific and medical consensus. WiTricity technology is being developed to be fully compliant with applicable regulations regarding magnetic fields and electromagnetic radiation.

4.4. Scalable Design Enables Solutions from mill watts to Kilowatts

WiTricity systems can be designed to handle a broad range of power levels. The benefits of highly efficient energy transfer over distance can be achieved at power levels ranging from mill watts to several kilowatts. This enables WiTricity technology to be used in applications as diverse as powering a wireless mouse or keyboard (mill watts) to recharging an electric passenger vehicle (kilowatts). WiTricity technology operates in a "load following" mode, transferring only as much energy as the powered device requires.

4.5. Flexible Geometry Allows WiTricity Devices to be Embedded Into OEM Products

WiTricity technology is being designed so that it can be easily embedded into a wide variety of products and systems. The physics of resonant magnetic coupling enables WiTricity engineers to design power sources and devices of varying shapes and sizes, to match both the packaging requirements and the power transfer requirements in a given OEM application. WiTricity has designed power capture devices compact enough to fit into a cell phone. Give a PROPER TITLE for research paper.

V. WITRICITY APPLICATION

WiTricity wireless power transfer technology can be applied in a wide variety of applications and environments. The ability of our technology to transfer power safely, efficiently, and over distance can improve products by making them more convenient, reliable, and environmentally friendly. WiTricity can be used to provide

5.1. Direct Wireless Power

When all the power advice needs is provided wirelessly and no batteries are required. This mode is for advice that is always used within range of its WiTricity power source.

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5.2. Automatic Wireless Charging

When a device with rechargeable batteries charges itself while still in use or a test , without requiring a power cord or battery replacement. This mode is for a mobile device that may be used both in and out of range of its WiTricity power source.

WiTricity technology is designed for Original Equipment Manufacturers(OEM's) to embed directly in their products and system.

5.3. WiTricity Technology will make your Products:

5.3.1 More Convenient

- No manual recharging or changing batteries.
- Eliminate unsightly, unwieldy and costly power cords.

5.3.2 More Reliable

- Never run out of battery power.
- Reduce product failure rates by fixing the ‘weakest link’: flexing wiring and mechanical Interconnects.

5.3.3 More Environmentally Friendly

- Reduce use of disposable batteries.
- Use efficient electric 'grid power' directly instead of inefficient battery charging.

5.3.4 Consumer Electronics

- Automatic wireless charging of mobile electronics (phones, laptops, game controllers, etc.) in home, car, office, Wi−Fi hotspots while devices are in use and mobile.
- Direct wireless powering of stationary devices (flat screen TV's, digital picture frames, home theatre accessories, wireless loud speakers, etc. eliminating expensive custom wiring, unsightly cables and"wall−wart" power supplies.
- Direct wireless powering of desktop PC peripherals: wireless mouse, keyboard, printer, speakers, display, etc. eliminating disposable batteries and awkward cabling.

5.3.5 Industrial

- Direct wireless power and communication interconnections across rotating and moving "joints" (robots, packaging machinery, assembly machinery, machine tools) eliminating costly and failure−prone wiring.
- Direct wireless power and communication interconnections at points of use in harsh environments (drilling, mining, underwater, etc.) where it is impractical or impossible to run wires.
- Direct wireless power for wireless sensors and actuators, eliminating the need for expensive power wiring or battery replacement and disposal.

5.3.6 Transportation

- Automatic wireless charging for existing electric vehicle classes: golf carts, industrial vehicles.
- Automatic wireless charging for future hybrid and all−electric passenger and commercial vehicles, at home, in parking garages, at fleet depots, and at remote kiosks.
- Direct wireless power interconnections to replace costly vehicle wiring harnesses and slipping.

5.3.7 Other Applications

- Direct wireless power interconnections and automatic wireless charging for implantable medical devices (ventricular assist devices, pacemaker, defibrillator, etc.).

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- Automatic wireless charging and for high tech military systems (battery powered mobile devices, covert sensors, unmanned mobile robots and aircraft, etc.).
- Direct wireless powering and automatic wireless charging of smartcards.
- Direct wireless powering and automatic wireless charging of consumer appliances, mobile robots, etc.

VI. QUESTIONNAIRE

The concept being so new and innovative brings in so many questions. Hereafter, some questions are being answered on the basis of study done on the topic and relevant topics.

Is WiTricity technology safe?

Human beings or other objects placed between the transmitter and receiver do not hinder the transmission of power. WiTricity technology is a non−radioactive mode of energy transfer, relying instead on the magnetic near field. Magnetic fields interact very weakly with biological organisms—people and Animals—and are scientifically regarded to be safe. WiTricity products are being designed to comply with applicable safety standards and regulations.

How much power can be transferred?

Till now, Scientists has been able to transfer more than 60W power. The technology by its self is capable of scaling from applications requiring mill watts to those requiring several kilo watts of power. Over what distance can WiTricity technology transfer power? WiTricity technology is designed for"mid−range" distances, which we consider to be anywhere from a centimetre to several meters. The actual operating range for a given application is determined by many factors, including power source and capture device sizes, desired efficiency, and the amount of power to be transferred.

How efficient is WiTricity technology?

The power transfer efficiency of a WiTricity solution depends on the relative sizes of the power source and capture devices, and on the distance between the devices. Maximum efficiency is achieved when the devices are relatively close to one another, and can exceed 95%.

What s the Future of WiTricity?

MIT's WiTricity is only 40 to 45% efficient and according to Soljacic, they have to be twice as efficient to compete with the traditional chemical batteries. The team's next aim is to get a robotic vacuum or a laptop working, charging devices placed anywhere in the room and even robots on factory floors. The researchers are also currently working on the health issues related to this concept and have said that in another three to five years time, they will come up with a WiTricity system for commercial use.

VII. CONCLUSION AND FUTURE SCOPE

The transmission of power without wire is not a theory or a mere possibility, it is now a reality. The electrical energy can be economically transmitted without wires to any terrestrial distance. Many researchers have established innumerous observations, experiments and measurements, qualitative and quantitative. Dr. N. Tesla is the pioneer of this invention.

Wireless transmission of electricity has tremendous merits like high transmission integrity and low loss (90−97% efficient) and can be transmitted to anywhere in the globe and eliminate the need for an inefficient, costly, and capital-intensive grid of cables, towers, and substations. The system would reduce the cost of electrical energy used by the consumer and get rid of the landscape of wires, cables, and transmission towers. It has negligible demerits like reactive power which was found insignificant and biologically compatible. It has a tremendous economic impact to human society.

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Wireless power transmission is completely harmless to human health and so it is very safe to stay in such an environment. Wireless power transmission is designed in such a way that it can pass through even insulators such as wood, plastics, etc., except through metals. If an arrangement is made in such a way that in a certain region electricity is flowing wirelessly, like television, laptop, mobile, etc., once turned on, will start charging like we use repeaters in digital data transmission. We can even use resonant repeaters in order to increase the range of wireless electricity. Even wireless transmission, if being extended by resonant repeaters, suffers very less loss in maximum capacity. Though this concept is developing very fast and is very soon going to be implemented in cheaper prices too, but it still won't be able to extend to a wide range. But it can be developed to be used in domestic purposes.

Electricity is considered as one of the basic needs of human beings. The conventional power transmission uses transmission lines to carry the power from one place to another, but it is costlier in terms of cable costs and there also exists a certain transmission loss. Wireless power transmission, on the other hand, is very efficient and easy to maintainable technology. Hence, wireless power transmission can be designed which will involve and will be helpful in even the most basic things in a better, efficient and easier way.

REFERENCES

[1] http:ffwww.WiTricity.com
[2] http:ffwww.WiTricitypower.com
[3] http:ffwww.sciencemag.orgfcgifdataf1143254fDC1f1
[4] http:ffwww.sciencemag.orgfcgifcontentfabstractf1143254
[5] http:ffwww.witric.comf2007f06f10fWiTricity−impactf
[6]AnarticlepublishedintheScienceMagazineas"WirelessPowerTransferviastronglyCoupledMagneticResonances"byAndrekurs,Science317,83(2007);Dol:10.1126f science.1143254.
[7] "Efficient Non−Radiative Midrange Energy Transfer" by Aristeidieskaralis, Marlin Soljacic.