



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 11, November 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

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Piezoelectric Wireless Power Transmission- A Mobile Charging Technique

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ABSTRACT:The increase in energy consumption of portable electronic devices and the concept of harvesting renewable energy in human surrounding arouses a renewed interest. This technical paper focuses on one such advanced method of energy harvesting using piezoelectric material. Piezoelectric materials can be used as mechanisms to transfer mechanical energy, usually ambient vibration, into electrical energy that can be stored and used to power other devices. A piezoelectric substance is one that produces an electric charge when a mechanical stress is applied. Conversely, a mechanical deformation is produced when an electric field is applied. Piezo-film can generate enough electrical density that can be stored in a rechargeable battery for later use.

KEYWORDS:PRESSURE, PIEZO ELECTRIC, EFFECT, WPT , RESONANT COUPLING.

I. INTRODUCTION

In the current era, which is witnessing a skyrocketing of energy costs and an exponential decrease in the supplies of fossil fuels, there arises a need to develop methods for judicious use of energy which lay emphasis on protecting the environment as well. One of the novel ways to accomplish this is through energy harvesting. Energy harvesting, or energy scavenging, is a process that captures small amounts of energy that would otherwise be lost as heat, light, sound, vibration or movement. It uses this captured energy to improve efficiency and to enable new technology, like wireless sensor networks. Energy harvesting also has the potential to replace batteries for small, low power electronic devices. Piezoelectric materials can be used as a means of transforming ambient vibrations into electrical energy that can then be stored and used to power other devices. With the recent surge of micro scale devices, piezoelectric power generation can provide a convenient alternative to traditional power sources used to operate certain types of sensors/actuators, telemetry, and MEMS devices. The advances have allowed numerous doors to

open for power harvesting systems in practical real-world applications. Much of the research into power harvesting has focused on methods of accumulating the energy until a sufficient amount is present, allowing the intended electronics to be powered. We have cited implementation of piezoelectric materials in harvesting energy from tapping of keys of keyboard and use it for various application like charging the mobile phones.

II. RELATED WORK

The existing systems are wired piezo electric charger and wireless piezo electric charger that works on the principle of electromagnetic induction for transferring power through wireless. Electromagnetic induction means when a primary coil generating a predominant magnetic field and a secondary coil being within that field so a current is induced within its coils. Step up transformer is used here.

III. METHODOLOGY

The proposed system works based on the principle of Resonant coupling that extends the Electromagnetic Induction principle for transferring power through wireless. Resonant Coupling states that coupling between primary and secondary coils becomes stronger when the secondary part resonates. Resonant Transformer is used here and wireless energy transfer is based on the strong coupling between the coils.



- As here the coupling between primary and secondary part is so strong electromagnetic waves would tunnel they would not get absorbed by air molecules during propagation and they would not get dissipated.
- The proposed system is relatively a power efficient system and power loss is relatively very low here.

IV. EXPERIMENTAL RESULTS

In this paper has both hardware and software part, hardware part consists of Piezodevice, Power Supply, Battery, Capacitor, regulator etc... Here Piezo Electric Sensor is used to generate the power and it transmit and receive through the wireless coil using resonant coupling technique. Thus, the system successfully implemented which is represented as follows.

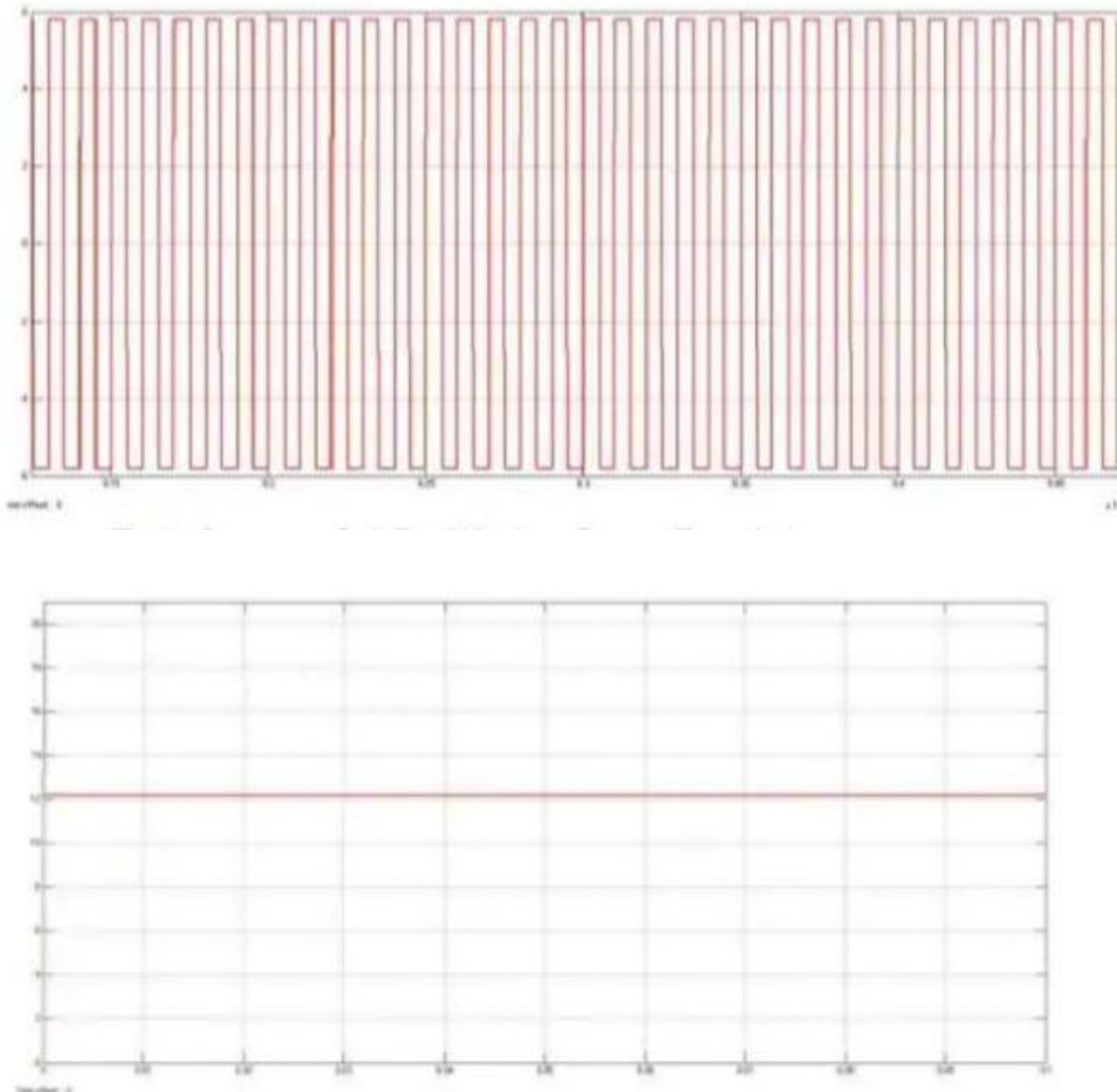


FIGURE: Final Output

V. CONCLUSION

The design of the proposed energy conservation system for mobile phones and laptop keyboards has been presented in this paper. The design presented here will be quite effective in providing an alternate means of power



supply for the mentioned devices during emergency. Further, the approach presented in this paper can be extended to many other applications where there is scope for similar kind of energy conservation.

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