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# POWER GENERATION BY UTILIZING WASTE ENERGY

**Bhavesh Khandelwal[1] , Shubham Konda[2] , Devrat Upadhyay[3] , V.S Kulkarni[4]**

*[1,2,3,4]E&TC, JSPM's Rajarshi Shahu College of Engineering, Savitribai Phule Pune University, (India)*

**ABSTRACT**

*We all know everywhere there is huge scarcity of energy and for running most of our appliances and to carry out daily work we need electricity. It's really very difficult to imagine our life without electricity, our life would really stop so there is high need to produce electricity at faster rate and find other feasible method to produce electricity .Energy is the basic need for the development of the modern world. For meeting up the regular demand of energy we need to design a system that will produce electricity without destroying nature. Random sound energy around us can be treated as a source of electric power after their efficient conversion using suitable transducer. In this project, piezoelectric transducers are used for conversion of sound to electric energy. The produced electric energy from multiple piezoelectric transducers are stored in multiple super capacitors which are then summed up and amplified through adder and voltage multiplier circuits. Also when a person walks, pressure is exerted on the ground and this pressure can be converted into electrical energy and it can be used to power electronic devices. In this project, a cascade mat of piezoelectric sensors is placed on the path. When a person walks on the mat, power is generated by the piezoelectric sensor mat which is then processed and can be used to power up electronic devices.*

***Keywords:*** *energy consumption, sound, pressure ,piezoelectric generator , electrical power.*

## I. INTRODUCTION

Fuel is serving as the main source of electric power which is non renewable. Minerals like coal, gas, diesel, etc are used for generating electricity. The minerals sources are limited on earth and hence these sources decreasing day by day because of using it extensively. So, research is going on for renewable sources of electric power that can meet the demand of future.

A relatively less discussed source is available sound energy around us in the form of noises which can be considered as a source for electricity if it can be effectively converted into electric power. In simple words , sound is the vibration of any substance. The substance can be air, water, wood, or any other material, and the only place in which sound cannot travel is in vacuum. When these substances vibrate , or rapidly move back and forth, they produce sound. Sound can be sensed through various types of sound sensors. In many systems and processes, dissipation of energy is inevitable whatever renewable or conventional energy was used. For instance, as a car passes over a speed-breaker, most of car kinetic energy will be wasted as heat in it. On the other hand,

to ensure the security of the populated areas of streets, the speed-breakers are required , whatever we use electrical cars or the cars consuming gasoil.

Also another kind of energy i.e pressure which is available everywhere can be converted into electrical energy by effectively utilising. Pressure depends on how much force or weight is exerted, and over the area on which that force is applied: greater force, more pressure. Pressure is defined as force per unit area. In this project, we use piezoelectric sensors for conversion of sound and pressure to electrical energy.

## II. RELATED WORK

2.1 *Mehul Garg, Devyani Gera, at.el. "Generation of electrical energy from sound energy"* This paper explores a relatively less popular source of clean energy. Noise (sound) energy can be converted into viable source of electric power by using a suitable transducer. This can be done by using a transducer by converting vibrations caused by noise into electrical energy. An application is proposed for the same, in which a speaker and a transformer are used to convert noise produced by car horn into electrical energy. The vibrations created by noise can be converted into electrical energy through the principle of electromagnetic induction. The received signal was stepped up using a transformer. A similar setup was placed at distance 1 meter from the exhaust pipe of a 350 cubic centimetre engine of motorbike. The demonstrated ideas probe into a clean readily available source of energy[1].

2.2 *G. R. Ahmed Jamal*, Hamidul Hassan, at.el."Generation of usable electric power available random sound energy"* From In this work, a relatively less explored source of green energy is proposed. Random sound energy around us can be treated as a source of electric power after their efficient conversion using suitable transducer. An effective way of producing usable electric power from available random sound energy is presented here. Piezoelectric transducers are used for conversion of sound into electric energy. The produced electric energy from piezoelectric transducers are stored in multiple super capacitors which are then summed up and amplified through adder and voltage amplifier circuits. The resultant electric power was used to charge a rechargeable DC battery so as to store this energy. The proposed idea can give a new source of green energy and can contribute in global search for renewable energy[2].

2.3 *Shalabh Rakesh Bhatnagar "Converting sound energy to electric energy"* This paper is conveying the information about converting sound energy to electric energy. This paper uses three different methods to generate electricity from sound and conveys which method is most suitable.[3].

2.4 *Md. Saiful Islam, at.el "Generation of Electricity Using Road Transport Pressure".* This paper focuses on speed breakers on the streets since a high amount of kinetic energy is wasting there. This paper presents a novel speed-breaker generator (SBG) for extraction of kinetic energy of vehicle flow in street. This device converts the kinetic energy of the vehicles into electrical energy. This is done by moving plate installed on the road, this plate takes the stroke motion of the vehicles and convert it to the rotary motion by crank mechanism and it generates electricity[4].

2.5 *Mrinmoy Dey, at.el "Power Generation for Auto Street Lght Using PZT"***.** This paper is focused on applications of auto street light for transportation facilities using that energy. When roads or tyres of the vehicles

are engineered with piezoelectric technology, the energy produced by the pressure of moving vehicles is captured by piezo sensors and converted into electrical charge by Lead Zirconium Titanate as a piezoelectric transducer(PZT), then stored the energy is used as an energy generation source. This energy source can be used for auto-street lighting as a source of roadside power generation unit. [5].

2.6 *Joses Paul P, at.el "Project Power Shoe: Piezoelectric Wireless Power Transfer-A Mobile Charging Technique "* In this paper a Mobile Charging system is designed . A piezoelectric generator is placed in the shoe . The Power that is generated by piezoelectric generator when a person walks and is transferred to the device by using a mid-range wireless power transfer(WPT) which is a Resonance Coupling Technique. When a person walks, pressure is exerted on the ground and this pressure and be converted into electrical energy and it can be used to power electric devices. Harvesting mechanical energy from human motion is an attractive approach for obtaining clean and sustainable electric energy[6].

2.7 *A Dinesh Kumar, DR S.Sumanthi " Renewable Energy Source Piezo Electric Harvesters in Car Tyres "* The main aim of this paper is to harvest energy that coould power a car without causing any kind of pollution in an economical way. We are embedding the piezoelectric crystals in the tyres of cars and heavy vehicles which on application of force(i.e due to the pressure applied) produces electricity. When the wheel of the vehicle rotates, the mechanical tress exerted by the vehicle on the crystal is converted into electrical energy using the piezoelectric crystals can be coupled with circuits that could enable storage of electricity in batteries. Piezoelectric crystals are enabled to produce electricity due to the piezoelectric effect in the vehicles during the course of journey . Using this method electricity for different hybrid cars and energy efficient means of transport can be created. [7].

2.8 *Mohd H.S Alrashdan Burhanuddin Yeop Majlis, at.el "Design and Simulation of Piezoelectric Mirco Power Harvester for Capturing Acoustic Vibrations"* In this paper, Piezoelectric Micro Power Harvester (PMPH) is designed that is able to harvest environmental vibration sounds and convert it to usable electrical power. The design and simulation of PMPH is based on composite micro-cantilever beam with top roof mass able to harvest environmental vibration sounds and convert it to usable electrical power[8].

## III. PROBLEM STATEMENT

To develop a system for generating electric power through waste energy that is created due sound pollution and pressure exerted by humans, vehicles and different things on various surfaces in day to day activities. To develop the system that converts sound and pressure energy into electric energy or other form of energy. Interface the piezoelectric sensor, relay, all this devices with Microcontroller.

## IV. METHODOLOGY

In this project PIC16F877A microcontroller is used. The Crystal Circuit is externally connected to the controller for providing the initial reference clock to the microcontroller. The External Reset Circuit is used to reset the microcontroller. Two sensors ,one for sensing the sound and another for sensing the pressure, are used in the circuit. Sound sensor is a bank of (30-40)piezoelectric sensors which are cascaded together. For sensing the pressure multiple piezoelectric sensors are used. When the sound and pressure energy is sensed by the sensors then this energy is converted into the electrical energy. Output of the sensors is given to the voltage regulator

block and rechargeable battery.The voltage regulator is used to provide constant voltage to the controller. In the absence sufficient electrical energy from the sensors the controller is operated through the battery. When the battery is discharged completely and the is no any source of input for the sensors for generating the electric energy then in this case the battery is switched to mains supply for driving the load. The LCD is interfaced with the microcontroller to display which of the sensors i.e sound or pressure is active or if both are active then it will display both sensors are activated. The load is connected to the Relay and the relay driver circuit is used drive the relay circuit.The input to the circuit is random sound or pressure. When the sound waves and pressure is sensed by the piezoelectric sensor then the diaphragm present in the sensor is vibrated and this mechanical form of energy is converted into the electrical energy.

## V. CONCLUSION AND FUTURE SCOPE

In the near future, it will prove to be a great boon to the world, since it will be able to extract electrical energy from many sources such as waste sound and pressure and many types of different energies of renewable type. There are multiple sources of sound and pressure that go unnoticed . The use of transducers to convert sound and pressure into energy demonstrates that noise can act as an alternative source of energy. This design can be implemented in areas where large amount of noise or sound energy or pressure is generated like in nuclear power plants, heavy machinery as this design will not only generate green energy but also help in reducing noise pollution levels. Also in various gym equipments and machinery the this proves to be a great source to generate electricity. Hence there are many applications areas in which this technique can be utilised and electricity can be generated easily and scarcity of electricity can be reduced.

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