

Conversion Sound (Noise) Energy into Electrical Energy

Ajay Shyamkunwar¹, Ashis Patra², Tarun Shrivastava³

Student, Department of Electrical Engineering, Madhav Institute of Technology and Science,
Gwalior, Madhya Pradesh, India¹

Associate Professor, Department of Electrical Engineering, Madhav Institute of Technology and Science,
Gwalior, Madhya Pradesh, India²

Assistant Professor, Department of Electrical Engineering, Madhav Institute of Technology and Science,
Gwalior, Madhya Pradesh, India³

Abstract: The world is growing fast and we are consuming very heavy amount of energy, electrical energy resources major role plays in our modern and social life, So we need to find more electrical resources, and mostly Renewable energy resources pure and clean energy sources because in modern world, we have lack of non-renewable resources (Coal, petroleum, gas etc.). But we are growing fast and we are finding solution of this situation, we are going to renewable resource (Solar, Thermal, water, Air & sound etc.). We are known about Energy can be changed from one form to another, but it cannot be created or destroyed. This present day there lots of noise pollution in factories, industry, road rages and airports etc. If we can convert sound energy into electrical energy then we can get pure and renewable electrical source.

Scientific Explanation: According to the law of thermodynamics is law of conservation that's mean Mechanical form of energy could be converting into electrical energy form. The property of Piezo material converts mechanical stress into electrical energy, so we can use this property and make a device which would be able to convert sound to electric energy form in this paper tried to generating electrical charge or voltage by conversing sound into electrical using Piezoelectric Generator

Keywords: Renewable energy, Sound energy, Piezoelectric material, thermodynamics law.

I. INTRODUCTION

In modern world we are mostly depend electric power. We cannot imagine our life without them. Ours most of the appliances, computers, mobile etc. Work by electricity. Our population is increasing day by day and using electrical energy a lot, which is a matter of thinking.

This is not only our country situation, rather global situation. Our energy resources are limited and the need of electrical energy will double in upcoming decades, it necessary to finding many pure and clean energy resources we are research approximate all types of renewable energy resources like Solar, wind, thermal, nuclear but we are not proper study on sound energy at the time. if we would be able to convert sound or noise into electrical energy, we are generating pure and green energy. the simple e.g. if we convert noise surrounding of the area (traffic, road rage, heavy working factories and airports etc) into electric energy, we are decrease burden on our non-renewable source because it's have in limited. In this paper we work on a method to convert sound energy into electric energy by using of some electronic component (rectifiers, resistor) and Piezoelectric Materials and make a device for generating electric energy.

II. LITERATURE REVIEW

We, the help of piezoelectric device convert sound waves into electric charge. These devices made by mostly crystals and as soon as pressure is applied on it, the signal of energy is received. Scientist study on it, they have produced electricity by using it to make sound pressure waves and then passing it through piezoelectric devices to produce electricity.

The Advantage

- It is a clean and renewable resources of energy and a 'Green' alternative
- Sound pressure waves are omnipresent, even when not audible to our ears.
- It can used to power small gadgets.

- It may be used in street lights at very low cost
- it can be vast beneficial for the underdeveloped world

An abstract published by researchgate from a research paper published by Indiana university states possibility oh sound (noise) to energy conversion. A small excerpt from that abstract is stated below...

Just think If we can convert sound energy into electrical energy then we can get pure and renewable electrical source.

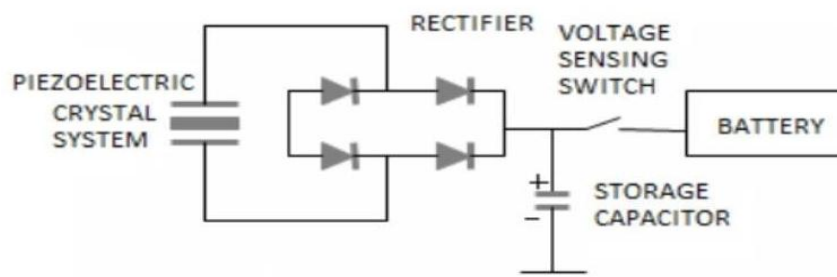
Scientific Explanation: According to the law of thermodynamics is law of conservation that's mean Mechanical form of energy could be converting into electrical energy form. The property of Piezo material converts mechanical stress into electrical energy , So we can use this property and make a device which would be able to convert sound to electric energy form .Transducer is also used for convert mechanical energy to electrical energy so it can be convert sound wave into electrical charge. Use of transducer to convert sound waves into electrical energy and vice versa is in sound box (speakers) and sound buzzer etc also i could be convert into electric energy, it could be used in traffic signal light , streets lights and heavy working factories by using of noise pollution cause by cars , vehicles, heavy machine and surrounding area of airports and traffic area etc

- Not just these but there are few articles published by IEEE that explore this topic. published by IEEE on "generation of electrical energy from sound energy", (International Conference on Signal Processing and Communication) ICSC, 16 March 2015

Harvesting only sound from noise to produce electrical energy might not just be uneconomical but inefficient as well as only approximate of 1-5% of sound might be converted. Thus we plan on harvesting vibrations along with sound for the purpose of energy generation. Vibrations are also a form of mechanical energy that are detected by piezoelectric sensors and converted to energy. We plan to use extremely sensitive piezoelectric material that will detect both sound and vibrations to convert them to electrical energy. Thereby improving our projects efficiency.

III. METHODOLOGIES

Generating electric energy from sound energy by using of Piezoelectric Materials .Sound along with vibrations when received by piezoelectric sensor will convert the mechanical energy to electrical signals. These signals will be then processed by the rectify circuit and storage capacitor to produce proper rectified energy which then further undergoes transformation through multiplier circuit to be processed to load

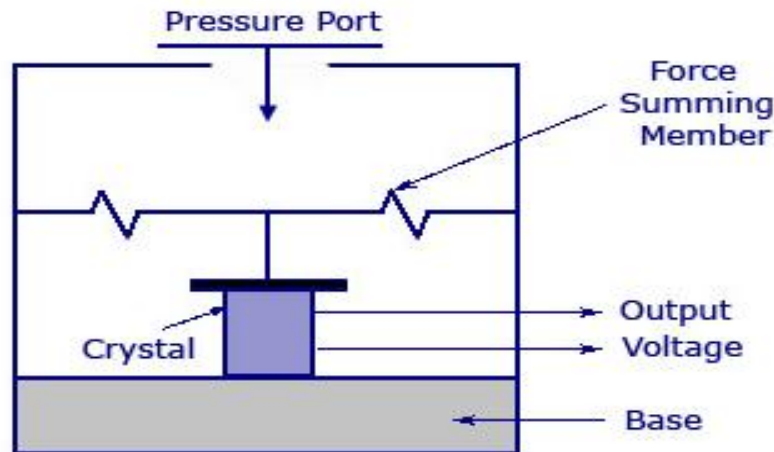


IV. PIEZOELECTRIC SENSOR /TRANSDUCER

Piezoelectric transducer is a device that works on the piezoelectric effect. When we apply temperature, pressure or force on it, it generates electrical energy. It is a piezoelectric transducer made of quartz crystal; the crystal is mostly composed of silicon and oxygen and arranged in its crystalline structure. All crystals are symmetrical, but piezoelectric quartz crystals do not, piezoelectric crystals are only electrically neutral. As you apply pressure to it, the symmetry breaks down and the positive and negative terminals are formed at the piezoelectric transducer end side, respectively, and a small amount of electric charge and voltage is released. If we increase the force on the piezoelectric transducer then the value of charge starts increasing

V. PIEZOELECTRIC EFFECTS

Piezoelectric effect is the ability of certain material to generate electric charge in response to applied Mechanical force /stress on it The word **Piezoelectric** is derived from the Greek piezein, which means to squeeze or press, and piezo, which is Greek for "push".



Piezo-Electric Transducer

VI. SCOPE OF THE PROJECT

Our project has various utilizations. Some key future applications are listed below:

- In traffic light system at busy squares and traffic routes
- Busy streets, footpaths, pavements
- Busy and crowded places

VII. MERITS

- Vast frequency response
- Not required for external source, it is self generating energy
- Easy to use because small dimension and large measuring range

VIII. DEMERITS

- Required for improvement because efficiency is low
- It is bit extravagant
- Sensor is affected by temperatures, that on impact high on circuit

CONCLUSIONS

Noise (sound) is an important part of generating pure and clean resources of electrical power, using of suitable (piezoelectric) transducer convert useless sound (road traffic noise, heavy load machine noise etc.) into visible electrical energy. this can be work, using a Piezoelectric transducer, allows the vibrations caused by noise to be converted into electrical energy

we see many source of sound but ignore them, one of them is the loud sound (noise) generated by many factories and industries. The use of transducer to convert sound vibrations (noise pollution) into energy demonstrates that noise can act as alternative source of energy . as the sound (noise) level increases ,so will the energy

Scope of sound to electricity

Sound as an alternative source of energy has a huge potential that has been left largely untapped as we progress further towards using Renewable and sustainable sources of energy. The creation of energy through sound can thus translate into creation of electrical energy by one of the most readily available form of pollution. Sound waves are a form of mechanical energy. As per the law of thermodynamics, oscillations of mechanical waves can be converted into electrical energy. We utilize the principle of electromagnetic induction, using transducers to convert mechanical into electrical energy. The proposed technique generates electrical energy through readily available sound energy. This technique not only helps in generating electrical energy from noise but also helps in reducing pollution. Production of electricity from available noise pollution as a source is a relatively new concept. The generation of noise pollution,



objectionable though it may be, is mostly unavoidable in most circumstances. Therefore, the production of energy from this available sound source can prove to be useful.

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