



# Sound Energy Virtual Source of Electricity

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## ABSTRACT:-

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 of 1 meter from the exhaust pipe of a 350 cubic centimeter engine of a motorbike. The demonstrated ideas probe into a clean and readily available source of energy.

**Keywords:-**Electromagnetic induction, Electromotive Force, Renewable Energy, Piezoelectric, Sound Energy, Transducers.

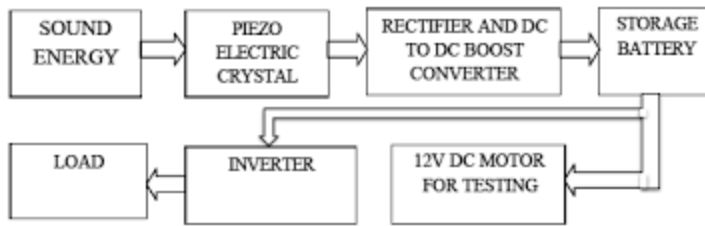
## INTRODUCTION:-

The need for an alternative source of energy is rising fast. Until now, majority of power needs of the world relies upon the exploitation of the non-renewable fossil fuels. However recent estimates put the use of oil and coal up to 2030, after which the world will need to foster the need for a more efficient and widespread use of technology. The search for a renewable source of energy that can satisfy our ever growing needs is the need of the hour. Solar & wind energy have already been tapped as a source of renewable source of energy, and are now being widely accepted as one of the replacements for fossil fuels. However their availability and adherence to natural factors such as weather conditions. However a largely ignored and more readily available source of energy is available in the form of sound energy.

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. This paper takes a step forward in this direction, using sound as a source of energy to provide a viable electronic source in a vehicle, converting the sound waves into electrical 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 have used 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.

## BLOCK DIAGRAM AND DISCRIPTION:-



**Fig.1 Conversion of sound energy into electrical using piezoelectric crystal**

When sound energy is applied to the piezoelectric material creates strain in crystal then it reverses. The strain is converted into electric energy by piezoelectric material.

As non-renewable sources, accumulation of noise required to generate electricity that led the way to invent another unseen source of energy. When sound wave travel through a medium periodically replaced and with sound waves it oscillates. Because of kinetic energy of the oscillation and potential energy compression sound wave displaces back and forth. Before sound energy converted into electricity it can be transformed into heat energy, but not extremely systematic. By piezoelectric material, the loss conversion is added additionally whereas dissimilar method is converted to electricity. From mechanical strain. Piezoelectric materials are the crystal which transform to electric energy. Third law (3rd law) of thermodynamics states that mechanical energy might be converted into electric energy.

The Piezoelectric material used for transformation of noise pollution to green energy and then to electric energy In response to pertain mechanical stress the word piezoelectricity explains electric charges will accumulate in some specific materials (solid materials). In some materials (crystalline materials) the effect of Piezoelectric is defined as the electro-mechanical relation between electrical state and mechanical state with no inversion symmetry. Figure 1 shows the Conversion of sound energy into electrical using piezoelectric crystal.

When charges are applied in an electric field by extrinsic means when a piezoelectric crystal is placed, the crystal indicate strain and the dimensions of the crystal changes. The inverse piezoelectric effect defined as the direction of the pertain electric field is reversed then the direction of the resulting strain is also reversed. When sound energy is applied to the piezoelectric material creates strain in crystal then it reverses. The strain is converted into electric energy by piezoelectric material. The effective property of piezoelectric material can be used for the device to transform to electric energy from sound energy.

Single crystal materials indicate the following event when the crystal is deformed by implementation of an external stress. When the crystal is mechanically strained either electric charges or sound energy emerge on the crystal surfaces. When control of the strain reverses, the polarity of the electric charge is also reversed direct piezoelectric effect. Sound energy could be used to perform different functions by converting into useful electric energy.

#### **ADVANTAGES:-**

The operation and maintenance are very low.

It does not require any kind of fuel.

It is renewable source of energy.

It is pollution free.

Sound energy can be easily converted into electrical energy and vice versa.

It cannot be used in places where decibel of sound is very low.

#### **FUTURE SCOPE:-**

If sound energy is able to be converted into electric energy efficiently it could help us to reduce the scarcity of electrical energy across the globe. This helps in the reduction of CO<sub>2</sub> since Electrical energy is clean energy.

The noise pollution in the road would be able to get converted into electric energy and lights the street lightning, signals and various other electrical appliances altogether.

The sound energy is the unexplored source which has enormous potential to meet the future growing requirements of the electricity and serve as the eco-friendly and renewable source of energy.

This technology is not practically usable up till now due to efficiency concerns but the present work on this field makes its future quiet promising. The noise pollution in runway could be used to produce electricity.

### **CONCLUSION:-**

Sound is present enormous quantity in nature it can be utilized into suitable electrical energy. The efficiently converted energy helps us to reduce the scarcity of electric energy across the globe. The purpose of converting sound to electricity is to reduce power usage from alternative sources like solar and inverter. Sound is not continuous form of energy and it is difficult to harvest but it can be overcome with the help of piezoelectric material. This system is more efficient and less expensive compared to the existing solar systems; the power rating can be increased or decreased according to the applications.

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