ABSTRACT

Fossil energy or fossil fuels are non-renewable natural resources. Fossil energy has a limit in use because the amount is limited and cannot be reproduced and is not environmentally friendly. The industrial area is one of the most widely used fossil energy in the operation of its equipment. One way to reduce the use of fossil energy is to use renewable energy. Renewable energy is an alternative energy source that can be used as the main energy for daily life. According to the law of conservation of energy, sound energy can also be converted into electrical energy. Locations with high noise levels, such as factories, have the opportunity as a source of sound energy to be converted into electrical energy. Therefore, the researchers designed a sound energy conversion system into electricity using piezoelectric components that can be used as an additional energy source in industrial areas.

To realize the tool in this study, the Helmholtz resonator component was used. The resonator cavity is in the form of a cube measuring 40 x 40 x 40 cm and the resonator neck is cylindrical with a length of 15 cm with three variations in diameter, namely 7.5 cm, 9 cm, and 11.5 cm. The main component used is a piezoelectric which is mounted on the top side of the resonator cavity as many as 32 pieces are connected in series. Experiments were carried out by providing sound from speakers with a range of 70 – 80 dB, 80 – 90 dB, 90 -100 dB, and 100-110 dB which were regulated by the power amplifier on the speaker. The larger the diameter of the neck of the resonator, the greater the resonant frequency of the resonator, and the greater the sound given, the greater the vibration of the resonator so that the voltage and current generated by the piezoelectric is also greater. after passing through the full-wave rectifier circuit, a voltage of 1.211 VDC is obtained, then when charging the 22 F capacitor, the voltage charged to the capacitor is 1.230 V for one minute with a given sound range of 100 - 110 dB.

Keywords: Piezoelectric, Helmhotz Resonator, Sound energy, Voltage, Current