

ABSTRACT

Fossil energy is a non-renewable energy source, but fossil energy is needed to meet energy needs in all sectors of activity. In the gas factory industrial area, there are potential sources of renewable energy such as noise caused by gas compressors. Utilizing the potential of renewable energy sources in industrial areas can reduce the use of electricity from PLN. So the solution to reduce the use of fossil fuels is to develop renewable energy. One alternative source of renewable energy is harvesting mechanical energy using piezoelectric materials.

In this research, we will design a prototype of a hybrid conversion of sound energy, pressure energy, and wind energy into electrical energy using piezoelectric materials. In testing the tool for the current and voltage of each energy, the results of the sound energy source using loudspeakers with a noise level of 100 – 110 Db, the average voltage and current produced are 1.145V and 460mA. The results of the highest human footing are produced from a mass of 100 kg, the average voltage and average current produced are 27.07V and 13.66 mA. The test results from the wind energy source, with a speed of 5 m/s and the distance from the fan to the windmill that produces the largest output is 70 cm, the average voltage and average current are 0.53V and 0.004mA. In testing the tool for charging capacitors using 10 μ F, 100 μ F, and 100 μ F capacitors. The average voltage that the capacitor stores for 60 seconds from each capacitor are 11.89V, 4.22V, and 0.71V. Meanwhile, the average current stored by the capacitor for 60 seconds from each capacitor is 6.82 mA, 2.28 mA, and 0.018 mA. The results of the hybrid system test are the average voltage of 28.01 V and the average current of 14.08 mA. This test produces an average of 23.68 joules of electrical energy. The electricity sales rate from the electrical energy that can be obtained is Rp. 1,296 / kWh.

Keywords : Piezoelectric, Sound energy, Pressure Energy, Wind Energy, Electrical Energy