ABSTRACT

Renewable energy sources are increasingly in demand by the community on the grounds that they are environmentally friendly and low in emissions. One of the uses of renewable energy sources is by utilizing sunlight using photovoltaic or solar cells. This research will utilize sunlight which will be converted into electricity using photovoltaic (PV). The use of PV has several disadvantages, namely that it will produce a small voltage and current if the sunlight received by PV is low. To overcome this, a trough concentrator will be used, where this trough concentrator will reflect or concentrate sunlight towards PV, so that the light received by PV will be greater and will have an impact on increasing the current and voltage generated. This concentrator will be placed right in front of the PV with a tilt angle of 70 ° facing east while the PV faces west with a tilt angle of 70 °. Another disadvantage of PV is that it will decrease the work efficiency of PV due to exposure to sunlight that occurs during use which will cause the PV to experience an increase in temperature on its surface, so that the resulting current and voltage will decrease. To overcome this reduction in efficiency, a thermoelectric generator (TEG) module will be utilized which is useful for converting the waste heat energy contained in PV into electrical energy. The eight TEGs will be attached to the back of the PV by utilizing an aluminum heatsink as a cooling system. This research will be monitored with a microcontroller that has been equipped with an INA219 voltage sensor and a MAX6675 temperature sensor which will then be stored in the data logger. The research on this hybrid system was carried out for three days with the results of the average voltage, current and power of 7.34V, 271.74mA and 2.36W, while without the hybrid system, it was 6.19V, 181.21mA and 1.44W. The use of this hybrid system is proven to increase the power generated by 63.8%.

Keywords: Photovoltaic, Thermoelectric Generator, Parabolic Trough Concentrator, Hybrid System.