

ABSTRACT

Photovoltaic can convert sunlight energy into electrical energy. But in addition to producing electrical energy, photovoltaic can also produce wasted heat. Waste heat can be reused as electrical energy by using a thermoelectric generator (TEG). Power output of the photovoltaic-TEG combination can be increased by adding a concentrator.

In this research, an integration of PV and TEG systems with a Fresnel lens concentrator is designed which is expected to increase the power generated and increase the exhaust heat generated by PV. The type of PV used is polycrystalline type with a capacity of 20 W. While the TEG used is the type of TEC-12706.

This test lasted for two days by comparing the PV-TEG system with a concentrator with PV without a concentrator. From the results of the tests carried out, the average value of voltage, current and power produced by PV with a concentrator is 6.32 V, 309.14 mA, 2.17 W. When compared to PV without a concentrator, there is an increase in voltage, current, and the average power is 136%, 145%, and 404%, respectively. Meanwhile, from TEG, the average voltage, current, and power are 0.52V, 0.54 mA, and 0.9 W, respectively. The most optimal PV output is obtained by using the distance between the PV and the Fresnel concentrator as far as 39 cm.

Keywords : Concentrator Fresnel, photovoltaic, thermoelectric generator wasted heat, power