

## **Investigation on the performance of a prototype of thermo-electric generation with heat pipe-heat sink**

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A significant problem in thermo-electric generators is the thermal design of the heat sink because it affects the performance of thermo-electric modules. As compared to conventional cooling systems, heat pipe heat sink have numerous advantages. Some of these advantages are: high heat-transfer rates; absence of moving parts and lack of auxiliary consumption (passive system). This paper presents the analysis of power generation using the combination of heat pipes and thermo-electric generators. The aim is to improve power output by an appropriate design of the heat sink. The average geometrical parameters of heat sink (fin height, fin space and fin thickness) were obtained from data collected from previous studies closely similar to this prototype. The prototype was tested and the temperature, voltage and current data were collected. All data were recorded by using a temperature data recorder, power meter and multimeter. It was found that the highest maximum power output was 1.925 watts at a temperature difference of 85°C. However, the prototype did not achieve the maximum output expected. This was a result of limitation of TEG model (where only one TEG was used) and the limitation of the performance of the prototype. The prototype successfully generated enough power to charge a cell phone and laptop when connected to two or three TEGs. Moreover the heat pipe heat sink needs optimization to meet the design output from the manufacturer of the TEG at hot side temperature and cold side temperature