Design of a Thermoelectric Generator-Based Thermal Energy Conversion System as a *Fan* Power Source for a Biomass Stove

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ABSTRACT

The increasing energy consumption in the household sector during the implementation of PSBB policies to avoid the COVID-19 pandemic, especially in Liquefied Petroleum Gas (LPG) has caused LPG to experience a shortage. On the other hand, the potential of Indonesia's biomass energy sources is very large, one of the potential sources of energy originating from biomass processing is charcoal and biobriquettes. However, this potential must be supported by conversion technology that makes it easier for users to operate. This study aims to design a flue heat conversion system on a biomass stove into electricity using a thermoelectric generator as a supply of electricity needs for a fan producing combustion air so that the fuel combustion process can be more optimal and the power source can come from the stove itself. The parts of this tool consist of a Prime biomass stove, a cooler, an air duct plus a fan, an electronic box, and 9 SP 1848-27145 thermoelectric generator modules in series. The tools tested include the power generated by the thermoelectric generator configuration, the power consumed by the fan, the combustion temperature by using a fan and by not using a fan. Based on the results of the tool testing, the average power data produced by the thermoelectric generator configuration is 0,041 W, while the power consumed by the fan is 0,869 W, the combustion temperature when using the fan is 132,3˚C and when not using the fan is 112,56˚C. The data shows that the heat energy conversion system into electricity on the stove is not able to meet the fan's electrical power needs. On the other hand, the addition of air supply through the fan on the biomass stove can increase the combustion temperature.

Key words: *Fan, biomass, thermoelectric generator, combustion*