

**PETRASTH  
(PELTIER ELECTRIC WITH ORGANIC TRASH)  
UTILIZATION OF ORGANIC WASTE WITH PELTIER EFFECT  
AS ELECTRICAL ENERGY PRODUCER IN HOUSEHOLD WITH AIR FILTER**

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**Abstract**

The garbage problem is closely related to the behavior of the community management system. Based on the calculation of BAPPENAS (National Development Planning Agency), 2.25 million tons of garbage in 1995 and estimated that there are 53.7 million tons of garbage pile in Indonesia in 2020. Each meter<sup>2</sup> of municipal waste 120-170 kg, that contain 70% are organic waste, some of it are not processed optimally. Based on this problem, we aim to optimize the utilization of organic waste as the supply of electrical energy in households with Thermotrash System.

This system uses Thermoelectric which utilizes Peltier effect to remove the heat. Thermoelectric is a device that able to convert heat energy into electrical energy. Directly, where the heat energy obtained from the temperature difference. When Peltier is electrified, it will move the heat from the hot side to the cold side, generally it will be generating the difference of hot temperature about 39°C to 68°C. In the process, the garbage are burned in addition to remove the moisture in organic waste into compost through composter and also to produce heat. High temperatures in the heating process are used to run the work systems of Peltier, where they are built by two different semiconductor pieces, N type and P type to generate electricity. Whereas for the process of making compost on this system by heating the garbage to reduce water content, then the result of the heated garbage will be composted on composter.

The smoke from the combustion is reprocessed so that is not causing environmental pollution and make this device based on green energy. Distillation is a technique that used to process smoke that are produced by the device so that becomes a safe air to breathe, where the resulted smoke is directed towards the U-shaped chimney that contains water. Water is used in the distillation and it will be done repeatedly to make the smoke into clean air and not pollute the

environment. On the surface of the device, it can be used as a stove, because the heat from combustion can be heating the surface of sufficient equipment to heating water. So This system will get 2 advantages, Besides being able to utilize organic waste to be made fertilizer it also able to generate electricity and save The use of fuel energy in households without polluting the environment.

Besides the potential of Thermoelectric utilization is to convert low heat into electricity. For example, the difference between air temperature that are flowing daily with a relatively constant soil temperature. The temperature difference obtained usually from 1 to 10K. Because in such cases, low thermodynamics efficiency, then what needs to be done in generating electricity is to move the large amount of heat to produce the larger electrical power (Nurulianthy, 2012). In addition to generating simple electricity, Petrash also able to produce Organic fertilizer, it is expected to improve the innovation of the farm technology.