

***Analysis of Electric Energy Consumption Savings on Plastic Bottle Waste
Transformer Machine into 3D Printing Filament with Solar Power***

Yuli Hananto, S.T.P., M.Si. as Supervisor

Umi Kulsum

Renewable Energy Engineering Study Program

Department of Engineering

ABSTRACT

Plastic waste management is a big challenge in Indonesia, especially the type of PET plastic that is difficult to decompose. This research develops a plastic bottle waste transformer machine into solar-based 3D printing filament as an innovative solution to reduce plastic waste while supporting the utilization of renewable energy. The machine is designed using a 200 Wp off-grid Solar Power Plant (PLTS) system with Automatic Transfer Switch (ATS) as the main energy source. The research aims to analyze the savings in electrical energy consumption and the effectiveness of the PLTS system in machine operations. The test results show that the use of a hybrid system (PLTS and PLN) is able to save energy by 1,928 kWh (39.45%) and operational costs by Rp 2,785.38 (39.43%) per production cycle compared to the full use of PLN electricity.

Keywords: 3D Printing Filament, Energy Efficiency, Plastic Waste, PLTS, Solar Energy.