

ABSTRACT

SHS (Solar Home System) is an independent electrical power system which generally requires a power storage such as a battery or energy storage. In this final project the author will design and implement a solar home system using two energy storage methods, namely using batteries and water potential energy storage.

To optimize the performance of solar panels, a method is used to find the highest point of MPPT (Maximum Power Point Tracking). By receiving analog input generated from various sensors and converting it first to digital (ADC Conversion), then it is processed into the MPPT control algorithm and the output voltage is obtained from the synchronous buck converter which will be controlled with PWM (Pulse Width Modulation), so that it can produce power output to the battery as well as to the water pump with more optimal and better efficiency.

From the results of the analysis obtained, the use of two energy storage methods, namely batteries and pumped storage potential energy storage using a single solar panel can produce a power of 10.99 Wh. In contrast, only using the battery storage method can produce a power of 7.84 Wh and the pumped storage potential energy storage method can produce a power of 1.35 Wh. The efficiency of MPPT P&O using the battery storage method and pumped storage potential energy is 85.96%, using the pumped storage potential energy storage method is 79.85%, and using the battery storage method is 72.36%.

Keywords:*Solar Panel Solar Home System, pumped storage, solar charger controller, Maximum power point tracking.*