

ABSTRACT

SHS (Solar Home System) by using battery as its energy storage requires a backup energy storage system that can be used to save electricity that generated by PV optimally without using batteries with large capacity.

In this reasearh is designed and implemented solar home system by using two methods of energy storage that is using batteries and storage of potential energy of water. Microcontroller is used to optimizing the performance of solar panel (PV) by finding the point of MPP (Maximum Power Point) and implement it into output voltage of the synchronous buck converter controlled by PWM (Pulse Width Modulation), so as to produce output power to the battery as well as to water pump with better efficiency.

The results obtained from this research is the use of two batteries as a single energy storage on the PV can save power of 14.00 Wh. If using a battery and water pumped storage that can save power of 7.42 Wh. And the efficiency of the battery charging system when using the MPPT algorithm reaches 83.78 % while, if not using the MPPT algorithm the efficiency becomes 75.87 %.

Keywords : PV, Solar Home System, *MPP* (Maximum Power Point), ADC Conversion, MPPT, synchronous buck converter, PWM (Pulse Width Modulation)