

ABSTRACT

The usage of solar energy as one of the alternative energy sources has tremendously increased these days. The sunlight could be transformed into electrical energy using a technology called a solar cell (photovoltaic). However, the power that a solar cell could generate is not as maximum as it gets. This is impacted by the efficiency of the width, temperature, and material of the solar panel as well as the intensity of the sunlight.

In this final project, a Battery Control Unit MPPT (Maximum Power Point Tracking) is made using perturb and observe (P&O) algorithm. This algorithm could maximize the power outage from the solar panel and also adjusting with the load voltage. The parameters that will be measured is the voltage, current, and power that comes from the solar panel and synchronous buck converter.

The result from this final project a Battery Control Unit design that could control the process of charging and distributing the electrical energy to the load. The efficiency of this system with the MPPT P&O algorithm is 82.09% and without the MPPT P&O algorithm is 80.77%.

Keywords: *Photovoltaic, MPPT, Synchronous Buck Converter, P&O Algorithm, Automatic Switch*