ABSTRACT

Solar panels are one of the widely used sources of renewable energy for electricity generation. However, the power output capacity of solar panels remains limited and is influenced by several factors, such as sunlight intensity and direction. To enhance the power output of solar panels, a method is required to maximize the reception of sunlight by the panels. One such method to maximize the power output of solar panels is by employing a dual-axis solar tracker.

This research aims to promote the broader utilization of renewable energy sources by utilizing a dual-axis solar tracker, electrolysis, and aluminum batteries as an efficient and environmentally friendly energy storage solution. Controlling the dual-axis solar tracker requires a Light Dependent Resistor (LDR) sensor, which detects sunlight intensity. The LDR sensor sends signals to a microcontroller, which in turn controls a DC motor to adjust the position of the solar panel to constantly face the sun. The primary objective of this research is to enhance the efficiency and power output of solar panels.

In this study, we have integrated the processes of electrolysis and energy storage in aluminum batteries as a key innovation. Electrolysis is used to produce an alternative energy source by separating water into hydrogen and oxygen. The hydrogen produced is stored in aluminum batteries. Test results demonstrate that the power output of the photovoltaic (PV) panel is 7944mW with a voltage of 11.19 Volts and a current of 559.85mA. Furthermore, energy is generated through the electrolysis process and stored in aluminum batteries, totaling 8.5 Volts. This research has the potential to improve the performance of solar panels, enhance solar energy efficiency, and contribute to the sustainable development of renewable energy sources.

Keywords: Solar tracker, DC motor, LDR sensor, electrolysis, aluminum battery.