

ABSTRACT

The provision of electricity in agricultural land, especially in mountainous regions with limited land, poses a real challenge in Indonesia. Many small-scale farmers face difficulties in obtaining a stable electricity supply from PLN (state electricity company). The demand for electrical energy in the agricultural sector is continuously increasing with the adoption of modern technologies such as water pumps for irrigation, automatic watering systems, and processing tools during harvest. This research develops a Solar Power Plant System (PLTS) designed to provide a solution to the challenges faced by small-scale farmers in limited agricultural land. The solar panel design used by the researchers is a wave-shaped design, which demonstrated the best power and land efficiency compared to the tree, curved roof, and semi-circular designs tested. This system is divided into two parts: Hardware and Software. The hardware system utilizes ESP32, INA219, and 18650 lithium batteries to transmit battery power data, current, and voltage of the solar panels, with the batteries also serving as power storage for farmers' use at night. The software system employs Tailwind CSS, JavaScript, and PHP MySQL technologies to create a solar panel monitoring website. This website facilitates farmers in remotely monitoring the condition of their solar panels without having to visit their farms in person.

Keywords: Agricultural Electricity Supply, Solar Power Plant System (SPPS), Wave Design, Monitoring System