

ABSTRAK

Penelitian ini bertujuan untuk menganalisis kinerja sistem penerangan jalan umum berbasis panel surya di Desa Asuli, Kabupaten Luwu Timur. Sistem ini dirancang untuk mengatasi keterbatasan akses listrik konvensional dengan memanfaatkan energi matahari sebagai sumber daya utama. Metode penelitian meliputi pengumpulan data teknis di lapangan, analisis spesifikasi panel surya, baterai, dan lampu LED, serta simulasi dua alternatif perbaikan sistem: penambahan kapasitas panel dan baterai, serta pengurangan beban lampu. Hasil analisis menunjukkan bahwa efisiensi sistem sangat dipengaruhi oleh intensitas cahaya matahari, kapasitas penyimpanan baterai, dan jenis lampu yang digunakan. Alternatif pengurangan beban terbukti lebih efektif dalam meningkatkan durasi pencahayaan malam hari. Penelitian ini memberikan rekomendasi teknis untuk optimalisasi sistem PJUTS di daerah tropis, serta mendorong pemanfaatan energi terbarukan yang berkelanjutan bagi masyarakat pedesaan.

Kata Kunci: Penerangan Jalan Umum, Panel Surya, Lampu LED, Baterai, Efisiensi Energi, Desa Asuli.

ABSTRACT

This research aims to analyze the performance of solar-powered street lighting systems in Asuli Village, East Luwu Regency. The system is designed to address limited access to conventional electricity by utilizing solar energy as the primary power source. The research method includes field data collection, technical analysis of solar panels, batteries, and LED lamps, as well as simulations of two improvement alternatives: increasing panel and battery capacity, and reducing lamp power consumption. The results indicate that system efficiency is significantly influenced by sunlight intensity, battery storage capacity, and the type of lighting used. The alternative of reducing lamp load proved more effective in extending nighttime illumination duration. This study provides technical recommendations for optimizing solar-powered street lighting systems in tropical environments and encourages the sustainable use of renewable energy in rural communities.

Keywords: *Solar Street Lighting, Solar Panel, LED Lamp, Battery, Energy Efficiency, Asuli Village.*