

ABSTRAK

PERBANDINGAN MODE OPERASI SISTEM PEMBANGKIT LISTRIK TENAGA SURYA *OFF-GRID* DAN *HYBRID*

(2026: xv + 57 Halaman + Daftar Gambar + Daftar Tabel + Daftar Lampiran)

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Pembangkit Listrik Tenaga Surya (PLTS) merupakan salah satu sumber energi terbarukan yang ramah lingkungan dan berkelanjutan. Penelitian ini bertujuan membandingkan mode operasi PLTS Off-Grid dan Hybrid berdasarkan tegangan, arus, dan daya pengisian baterai. Metode yang digunakan meliputi studi literatur, observasi, dan pengujian langsung pada kedua sistem. Hasil pengujian menunjukkan bahwa sistem PLTS Hybrid menghasilkan daya charging yang sedikit lebih tinggi dibandingkan sistem Off-Grid. Rata-rata daya charging sistem Off-Grid sebesar 9,602 Watt dan 11,272 Watt, sedangkan sistem Hybrid sebesar 10,682 Watt dan 12,29 Watt. Selisih rata-rata daya charging masing-masing sebesar 1,232 Watt dan 1,018 Watt. Berdasarkan hasil tersebut, sistem Hybrid menunjukkan kinerja pengisian baterai yang lebih baik, sedangkan sistem Off-Grid memiliki konfigurasi yang lebih sederhana. Hasil penelitian ini diharapkan menjadi referensi dalam pemilihan mode operasi PLTS sesuai kebutuhan pengguna.

Kata Kunci: PLTS, Off-Grid, Hybrid, Baterai, Daya Pengisian.

ABSTRAK

COMPARISON OF OPERATING MODES OF OFF-GRID AND HYBRID SOLAR POWER GENERATING SYSTEMS

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Solar Power Plants (PLTS) represent an environmentally friendly and sustainable source of renewable energy. This study aims to compare the operating modes of off-grid and hybrid solar power systems based on voltage, current, and battery charging power. The methodology employed includes a literature review, observation, and direct testing of both systems. Test results indicate that the hybrid solar power system generates slightly higher charging power compared to the off-grid system. The average charging power for the off-grid system was 9.602 Watts and 11.272 Watts, whereas for the hybrid system, it was 10.682 Watts and 12.29 Watts. The differences in average charging power were 1.232 Watts and 1.018 Watts, respectively. Based on these results, the hybrid system demonstrates superior battery charging performance, while the off-grid system features a simpler configuration. These findings are expected to serve as a reference for selecting a solar power system operating mode that meets user needs.

Keywords: Solar Power Plant (PLTS), Off-Grid, Hybrid, Battery, Charging Power.