

ABSTRAK
EVALUASI KINERJA PEMBANGKIT LISTRIK TENAGA BAYU
MENGGUNAKAN TURBIN ARCHIMEDES DENGAN
TRANSMISI MEKANIK PULLEY V-BELT

(2026 : xvi +49 Halaman + Daftar Tabel + Daftar Gambar + Daftar Lampiran)

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Penelitian ini bertujuan untuk mengevaluasi kinerja Pembangkit Listrik Tenaga Bayu (PLTB) berbasis turbin Archimedes poros horizontal dengan dan tanpa transmisi mekanik pulley V-belt. Parameter yang dianalisis meliputi tegangan, arus, daya listrik, dan efisiensi sistem. Hasil pengujian menunjukkan bahwa PLTB dengan transmisi mekanik pulley V-belt memiliki kinerja yang lebih baik dibandingkan sistem tanpa transmisi. Pada kondisi kecepatan angin buatan, sistem dengan transmisi menghasilkan tegangan rata-rata 5,53 V, arus rata-rata 0,05 A, dan daya rata-rata 0,385 W, sedangkan sistem tanpa transmisi menghasilkan tegangan rata-rata 1,6 V, arus rata-rata 0,014 A, dan daya rata-rata 0,024 W. Efisiensi rata-rata sistem dengan transmisi mencapai 4%, lebih tinggi dibandingkan sistem tanpa transmisi sebesar 3%. Hasil penelitian menunjukkan bahwa penggunaan transmisi mekanik pulley V-belt mampu meningkatkan daya keluaran dan efisiensi sehingga menghasilkan performa PLTB yang lebih optimal.

Kata kunci : Turbin, Archimedes, Puli, Daya, Kecepatan

ABSTRACT
PERFORMANCE EVALUATION OF WIND POWER PLANT USING
ARCHIMEDES TURBINES WITH V-BELT
MECHANICAL TRANSMISSION

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This study aims to evaluate the performance of a horizontal-axis Archimedes wind turbine power generation system with and without a V-belt pulley mechanical transmission. The analyzed parameters included voltage, current, electrical power, and system efficiency. The test results showed that the system equipped with a V-belt pulley transmission performed better than the system without transmission. Under artificial wind speed conditions, the transmission system produced an average voltage of 5,53 V, an average current of 0.05 A, and an average power output of 0,385 W, while the system without transmission generated an average voltage of 1,6 V, an average current of 0,014 A, and an average power output of 0,024 W. The average efficiency of the transmission system reached 4%, higher than the 3% efficiency achieved by the non-transmission system. These results indicate that the V-belt pulley mechanical transmission effectively improves power output and efficiency, resulting in better overall performance of the Archimedes-based wind power generation system.

Keywords: *Turbine, Archimedes, Pulley, Power, Speed*