

ABSTRAK

RANCANG BANGUN PEMBANGKIT LISTRIK *HYBRID* MENGUNAKAN TURBIN ARCHIMEDES DENGAN DAYA 100 WATT

(2026 : xiv + 69 Halaman + Daftar Tabel + Daftar Gambar + Daftar Lampiran)

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Penelitian ini bertujuan merancang dan membangun sistem pembangkit listrik hybrid yang menggabungkan turbin angin Archimedes dan panel surya sebagai sumber energi terbarukan skala kecil. Turbin angin dirancang dengan diameter 100 cm dan panjang bilah 85 cm, sedangkan sistem surya menggunakan dua panel 120 Wp yang dirangkai seri. Energi listrik dari kedua sumber disalurkan melalui pengontrol pengisian dan disimpan pada baterai. Pengujian dilakukan selama tiga hari dengan mengukur parameter tegangan, arus, dan daya. Hasil penelitian menunjukkan bahwa sistem hybrid mampu beroperasi dengan baik dan menghasilkan daya rata-rata sebesar 38,19 W pada hari pertama, 49,42 W pada hari kedua, dan sekitar 69 W pada hari ketiga. Kontribusi daya terbesar berasal dari panel surya karena intensitas radiasi matahari yang cukup tinggi, sedangkan kontribusi turbin angin masih terbatas akibat kecepatan angin yang belum optimal. Dengan demikian, kinerja sistem hybrid lebih dipengaruhi oleh energi surya dibandingkan energi angin.

Kata Kunci: Archimedes, Hybrid, Turbin, Daya, Pembangkit Listrik

ABSTRACT

DESIGN OF A HYBRID POWER PLANT USING AN ARCHIMEDES TURBINE WITH 100 WATT POWER

(2026: xiv + 69 Pages + List of Tables + List of Figures + List of Appendices)

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This study aims to design and build a hybrid power generation system that combines an Archimedes wind turbine and solar panels as a small-scale renewable energy source. The wind turbine is designed with a diameter of 100 cm and a blade length of 85 cm, while the solar system uses two 120 Wp panels connected in series. Electrical energy from both sources is channeled through a charge controller and stored in a battery. Testing was carried out for three days by measuring voltage, current, and power parameters. The results showed that the hybrid system was able to operate well and produced an average power of 38.19 W on the first day, 49.42 W on the second day, and around 69 W on the third day. The largest power contribution came from the solar panels due to the relatively high intensity of solar radiation, while the contribution of the wind turbine was still limited due to suboptimal wind speed. Thus, the performance of the hybrid system is more influenced by solar energy than wind energy.

Keywords: Archimedes, Hybrid, Turbine, Power, Power Plant