

ABSTRAK

RANCANG BANGUN *PIEZOELEKTRIC ENERGY HARVESTING* SEBAGAI SUMBER ENERGI ALTERNATIF BERBASIS VARIASI BERAT BADAN DENGAN *OUTPUT* LED STRIP

(2025 : xiii + 52 halaman + 44 gambar + 10 tabel + 16 lampiran)

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Penelitian ini membahas rancang bangun piezoelektrik energy harvesting sebagai sumber energi alternatif berbasis variasi berat badan dengan output LED strip. Pengujian dilakukan pada berat badan 75 kg, 80 kg, dan 85 kg dengan tiga konfigurasi rangkaian: seri, paralel, dan kombinasi. Hasil pengujian menunjukkan bahwa pada rangkaian seri dengan Vout sekitar 2,14–2,40 V LED tidak menyala (intensitas 0 lux) karena meskipun tegangannya tinggi, arus tetap rendah. Pada rangkaian paralel dengan Vout sekitar 2,14–2,40 V LED dapat menyala (intensitas $\pm 0,5$ lux) karena arus meningkat walaupun tegangan tetap. Rangkaian kombinasi dengan Vout sekitar 2,16–2,40 V juga mampu menyalakan LED karena baik tegangan maupun arus meningkat. Secara umum, peningkatan berat badan menghasilkan kenaikan Vout dari piezoelektrik, yang menunjukkan potensi sistem ini sebagai sumber energi alternatif skala kecil.

Kata Kunci : Piezoelektrik, Energi Alternatif, Dioda Bridge, Kapasitor Elektrolit, LED Strip 3528

ABSTRACT

**DESIGN AND DEVELOPMENT OF PIEZOELECTRIC ENERGY
HARVESTING AS AN ALTERNATIVE ENERGY SOURCE BASED ON
BODY WEIGHT VARIATION WITH LED STRIP OUTPUT
(2025: xiii + 52 pages + 44 figures + 10 tables + 16 appendices)**

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This study discusses the design of a piezoelectric energy harvesting system as an alternative energy source based on body weight variation with an LED strip output. Tests were conducted using body weights of 75 kg, 80 kg, and 85 kg with three circuit configurations: series, parallel, and combination. The results show that in a series configuration with V_{out} around 2.14–2.40 V, the LED remained off (0 lux) due to low current despite the high voltage. In the parallel configuration with V_{out} around 2.14–2.40 V, the LED turned on (≈ 0.5 lux) as the current increased while the voltage remained constant. The combination configuration with V_{out} around 2.16–2.40 V also lit the LED because both voltage and current increased. Overall, higher body weight produced higher V_{out} from the piezoelectric system, indicating its potential as a small-scale alternative energy source.

Keywords: Piezoelectric, Alternative Energy, Bridge Diode, Electrolytic Capacitor, LED Strip 3528