RANCANG BANGUN *SOLAR TRACKING SYSTEM* MENGGUNAKAN SENSOR LDR DAN BH 1750 BERBASIS ARDUINO UNO R3

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ABSTRAK

Penelitian ini berfokus pada perancangan sistem pelacak matahari *(solar tracker)* menggunakan sensor LDR dan BH1750 berbasis Arduino UNO R3 untuk memaksimalkan efisiensi panel surya. Latar belakang penelitian menyoroti kebutuhan akan energi terbarukan karena dominasi bahan bakar fosil. Studi ini bertujuan mengatasi keterbatasan sensor LDR dalam memberikan data intensitas cahaya (lux) dengan mengintegrasikan sensor BH1750 untuk pengukuran intensitas cahaya yang presisi, serta wattmeter digital untuk pembacaan arus, tegangan, dan daya. Metodologi penelitian mencakup perancangan perangkat keras dan perangkat lunak, pengujian komponen (sensor LDR, BH1750, motor servo, LCD), dan pengumpulan data selama 5 hari dari pukul 09.00-15.55 WIB. Perbandingan dilakukan antara kinerja panel surya polikristalin 50WP dengan dan tanpa solar tracker, dengan parameter yang diukur meliputi arus, tegangan, daya, dan intensitas cahaya. Hasil awal menunjukkan bahwa sistem pelacak matahari secara konsisten mencapai efisiensi yang lebih tinggi daripada panel surya statis, dengan efisiensi rata-rata 11,45% dibandingkan 10,94% untuk panel statis, membuktikan keefektifannya dari selisih sebanyak 0,51%.

Kata Kunci: *Solar tracker,* sensor LDR, Sensor BH1750, Efisiensi Panel Surya, Wattmeter, Intensitas cahaya

DESIGN AND IMPLEMENTATION OF SOLAR TRACKING SYSTEM USING LDR AND BH1750 SENSORS BASED ON ARDUINO UNO R3

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ABSTRACT

This research focuses on the design of a solar tracking system using LDR and BH1750 sensors based on the Arduino UNO R3 to maximize the efficiency of solar panels. The background of the study highlights the need for renewable energy due to the dominance of fossil fuels. This study aims to address the limitations of LDR sensors in providing light intensity (lux) units by integrating the BH1750 sensor for precise light intensity measurement, along with a digital wattmeter for reading current, voltage, and power. The research methodology includes hardware and software design, component testing (LDR sensor, BH1750, servo motor, LCD), and data collection over 5 days from 09:00 AM to 3:55 PM WIB. A comparison was made between the performance of a 50WP polycrystalline solar panel with and without a solar tracker, with parameters measured including current, voltage, power, and light intensity. The initial results show that the solar tracking system consistently achieves higher efficiency than the static solar panel, with an average efficiency of 11.45% compared to 10.94% for the static panel, proving its effectiveness with a difference of 0.51%.

Keywords: *Solar tracker, LDR sensor, BH 1750 sensor, solar panel efficiency, wattmeter, light intensity*