

## INTISARI

### RANCANG BANGUN SISTEM MONITORING PJU BERBASIS LORAWAN

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Penerangan jalan umum (PJU) merupakan infrastruktur yang mendukung kenyamanan dan keselamatan pengguna lalu lintas di malam hari. Saat ini, penerapan sistem monitoring lampu PJU pada berbagai daerah masih sangat terbatas sehingga berbagai kerugian tidak dapat ditangani dengan efektif dan efisien, seperti keterbatasan sistem pemeriksaan dan pelaporan kerusakan pada lampu PJU. Oleh karena itu, pada penelitian ini penulis membahas "Rancang Bangun Sistem Monitoring PJU Berbasis LoRaWAN" sebagai solusi dari permasalahan tersebut.

Hasil perancangan sistem monitoring PJU berbasis LoRaWAN berupa *Smart PJU* yang terdiri dari mikrokontroler ESP32, sensor HLW8012, relay, LED *driver*, modul RTC, dan lampu LED kemudian diintegrasikan dengan jaringan LoRaWAN. LoRaWAN adalah konektivitas IoT jenis *Low Power Wide Area Network* (LPWAN) dengan manfaat daya rendah, jangkauan jauh, dan biaya rendah. Alat yang telah dirancang berhasil mengirimkan data ke web *Smart Lighting* sehingga pengguna dapat melakukan pemantauan data PJU secara *real-time*, pengendalian nyala atau mati lampu, pengaturan tingkat kecerahan lampu, dan menampilkan waktu operasional yang akurat. *Smart PJU* diuji dengan metode *Non-Line of Sight* (NLOS). Kualitas sinyal yang dihasilkan diketahui dari rata-rata SNR sebesar -14.7dB dan RSSI sebesar -118.8dBm. *Smart PJU* memiliki tingkat keandalan tinggi dengan rata-rata akurasi tegangan 98.2% dan akurasi arus sebesar 98.3%. Sistem ini mampu mengurangi biaya listrik dibandingkan sistem pemantauan secara manual.

Kata Kunci: *Smart PJU*, Komunikasi LoRaWAN, *Internet of Things*

## ABSTRACT

### THE DEVELOPMENT OF PJU MONITORING BASED ON LORAWAN

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*Public street lighting (PJU) is an infrastructures that supports the comfort and safety of traffic users at night. At present, the implementation of the PJU lamp monitoring system in various regions is still very limited so that various losses that cannot be handled effectively and efficiently, such as the limited system for checking and reporting PJU lamp damage. Therefore, in this research, the authors discuss “The Development of Public Street Lighting (PJU) Monitoring Based on LoRaWAN” as a solution to this problem.*

*The result of the development of PJU monitoring based on LoRaWAN is a Smart PJU consisting of an ESP32 microcontroller, HLW8012 sensor, relay, LED driver, RTC module, and LED lights then integrated with the LoRaWAN network. LoRaWAN is a Low Power Wide Area Network (LPWAN) IoT with the benefits of low power, long range, and low cost. The tool that has been designed successfully sends data to the Smart Lighting web so that users can monitor PJU data in real-time, control lights on or off, adjust lamp brightness levels, and display accurate operational time. Smart PJU was tested using the Non-Line of Sight (NLOS) method. The result signal quality is known from the average SNR of -14.7dB and RSSI of -118.8dBm. Smart PJU has a high level of reliability with an average voltage accuracy of 98.2% and current accuracy of 98.3%. This system is able to reduce electricity costs compared to manual monitoring systems.*

**Keywords:** *Smart PJU, LoRaWAN Communication, Internet of Things*