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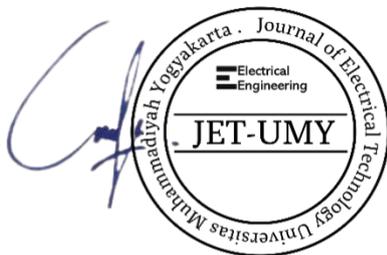
Journal of Electrical Technology UMY (JET-UMY)

We are pleased to inform you that your article, "*Implementation of a LoRa-Based Electric Vehicle Energy Monitoring System in Internet-Limited Competition Areas*" has been accepted for our publication in our journal, Volume 9 No. 2 December 2025. Below are the details of the article:

Author : Achmad Rifa'i, Indah Sulistiyowati, Akhmad Ahfas, and Shazana Dhiya Ayuni
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Best wishes,



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Implementation of a LoRa-Based Electric Vehicle Energy Monitoring System in Internet-Limited Competition Areas

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Abstract

The Kontes Mobil Hemat Energi (KMHE) and the Shell Eco-marathon (SEM) are competitions that encourage students to design and develop energy-efficient and environmentally friendly electric vehicles. However, the majority of current energy monitoring systems for electric vehicles are built on Internet of Things (IoT) designs that depend on a stable connection to the internet, which is frequently unavailable in situations such as race tracks. Obtaining real-time energy usage statistics during vehicle operation becomes challenging due to this constraint. This research aims to design and implement a LoRa (Long Range)-based electric vehicle energy monitoring system that operates independently of internet networks. The proposed system consists of transmitter and receiver units that monitor voltage, current, power, and electrical energy parameters using a Current Transformer (CT) sensor, a voltage divider circuit, an ADS1115 ADC module, and an ESP32 microcontroller as the main controller. A LoRa RA-02 module operating at 433 MHz is used to wirelessly send data, which are then shown in real time at the receiving device. Experimental results show that the system is capable of transmitting data reliably up to a distance of approximately 500 meters under field conditions without internet connectivity. The voltage measurement exhibits an average error below 0.1%, while the current measurement error ranges up to 4.65% compared

to reference instruments. During vehicle operation, the system is able to calculate electrical power and energy consistently during vehicle operation. These results demonstrate that the suggested LoRa-based monitoring system is appropriate for real-time electric car energy monitoring in competitive settings with spotty internet connectivity.

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