

# INTEGRATION OF TELEGRAM BOT AND SPREADSHEET IN AN IOT-BASED ELECTRIC POWER MONITORING SYSTEM FOR BOARDING HOUSES

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## Abstract

Efficient and transparent electricity usage is a crucial requirement in residential management, particularly in boarding house environments. Traditional systems that rely on manual metering often lead to inaccuracies and conflicts between owners and tenants. This study aims to design and implement an Internet of Things (IoT)-based electricity power monitoring system using the PZEM-004T sensor and ESP32 microcontroller. The system enables real-time electricity consumption measurement, records data to Google Spreadsheets, and sends notifications to owners and tenants via Telegram. Test results indicate that the system operates accurately and responsively. The sensor achieved 99.56% accuracy in voltage measurement and 99.04% in current measurement, with precision reaching 99.43% and 91.25%, respectively. All designed features functioned properly, including access control differentiation between owners and tenants, ON/OFF control, automatic load disconnection in case of overload, data transmission, and load status monitoring for five rooms, both manually and automatically. The system demonstrated real-time responsiveness to Telegram commands, achieving a 100% success rate in testing.

**Keywords:** Power Monitoring, Boarding House, IoT, ESP32, Telegram