ABSTRACT

With the rapid development of technology and the increasing demand for energy, electricity consumption in buildings contributes approximately 30% of global energy and 26% of global energy-related emissions. This is due to users not knowing the extent of their electricity usage. To determine the amount of electricity consumption, monitoring is necessary to prevent excessive use of electricity. However, many monitoring systems are still manual and rely on kWh meters with limited information and no early warning integration, which hinders the efficiency of electricity management.

In this final project, an automatic monitoring and alert system for electricity usage in buildings based on the Internet of Things is developed. This system enables the monitoring and automatic alerting of electricity usage in a building. This research uses a literature study approach, system design based on the PZEM-004T sensor and ESP32 module, debugging using Arduino IDE and the Antares platform. Additionally, it involves the development of a Flutter application for online monitoring and providing alerts.

The test results show that the system is capable of monitoring and providing automatic alerts for electricity usage. Voltage and current readings on the PZEM-004T sensor have an accuracy of 99.91% and 97.36%. The buzzer, mobile app notifications, and relay are effective as offline and remote warning systems. Thus, it can provide signals to take actions for electrical management efficiency and prevent excessive electricity usage. The system also supports real-time monitoring of electricity usage through the Antares platform, and provides flexibility in setting desired electricity usage limits.

Keywords: Internet of Things, PZEM-004T, Warning System, Monitoring System.