ABSTRACT

Greenhouse Gas (GHG) emission reporting in Indonesia is still largely conducted manually, leading to inefficiencies and reduced accuracy—particularly in industrial sectors such as mining. This study aims to develop an integrated information system based on Internet of Things (IoT) technology to automate the acquisition, calculation, and data integration of Scope 1 GHG emissions to the reporting system. The system collects real-time CO_2 and CH_4 data through sensors connected via the MQTT protocol to the ThingSpeak platform and stores it in a Laravel-based database for further processing. Using an iterative incremental development approach, the system automatically generates daily, monthly, and annual reports. The system was evaluated through functional testing and expert validation by a GHG consultant. Results demonstrate that the system can operate independently in 24-hour cycles and produce accurate reports aligned with emission reporting standards. This solution is considered effective in supporting industrial compliance with emission regulations and enhancing operational efficiency and environmental accountability.

Keywords— information system, Internet of Things, GHG emissions, Scope 1, automated reporting