

ABSTRACT

Perusahaan Umum Daerah Tirta Manuntung Balikpapan (PTMB) is a regional company that provides clean water services in city of Balikpapan, East Borneo. Currently PTMB implements a postpaid system for payments. In this system customer can use water prior to making payment, which often results in payments delays and has the potential to cause financial losses for PTMB. To address this issue, a web-based water meter monitoring system with a prepaid balance payment method has been deployed.

PTMB SmartMeter is a water meter product that integrates water usage monitoring, device geolocation, and prepaid systems with the water meter installed in customers homes. This system consists of two types of users: admin and customer. Admin has access to geolocation features and customer data management, while customer can monitor their water usage and purchase credit. The system was built using Laravel framework for the back-end, Bootstrap for the front-end, and MySQL as the database. From the hardware system powered by an ESP32 microcontroller equipped with various sensors, including water flow sensor, voltage sensor, pressure sensor, and other supporting components.

System testing results indicate that the system operates effectively. Black-box testing and User Acceptance Testing (UAT) showed near 100% functionality success with higher level of user satisfaction. Website security is considered reliable, despite 17 low-level warnings being identified. Overall sensor accuracy exceeded 90%. In the internet data usage test, 0.57 KB per communication is required to cover the transmission and retrieval of data from the sensor and the server. An average power recorded at 7.45 Watts. Solenoid valve exhibited an average response time of 8 seconds. The battery operates for up to 10 hours and 33 minutes, and over 24 hours with solar panel support. A 7-day stress test demonstrated good system stability, though temperature increases were observed in some components.

Keywords: Geolocation, Monitoring System, Prepaid, PTMB, Water Meter