Rancang Bangun Sistem Smart Metering Berbasis Teknologi LoRa pada Fakultas Teknik di Universitas Indonesia = "Building System for Smart Metering Based on LoRa Technology at Faculty Engineering in University of Indonesia"

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Abstrak

Saat ini, semua yang kita gunakan dalam aktivitas sehari-hari didasarkan pada teknologi berbasis listrik. Perkembangan teknologi saat ini dapat mendukung upaya peningkatan aksebilitas pasokan listrik untuk menjangkau seluruh daerah berkaitan erat dengan konsumsi energi listrik dan efisiensi tenaga listrik di Indonesia. Sistem metering listrik dengan kWh konvensional yang telah diterapkan sebelumnya belum cukup untuk mendukung pertumbuhaan demand energi listrik di Indonesia karena sistem pembacaan memiliki karakteristik pembacaan secara manual, kurang efisien (menghabiskan banyak waktu), akurasi data dan pengembangan aplikasi yang kurang, serta membutuhkan biaya tenaga kerja tinggi. Smart meter dengan penerapan Advanced Metering Infrastructure (AMI) dengan teknologi komunikasi LoRa memberikan solusi mengukur konsumsi energi yang digunakan, tegangan, dan parameter lainnya secara real-time. Beberapa keunggulan kWh-meter yang mendukung sistem AMI, dalam upaya manajemen energi adalah mampu mencatat dan mengolah informasi konsumsi listrik dengan otomatis, mendekati waktu sebenarnya, dan mampu berkomunikasi 2 arah. Pada pengujian dengan jarak 33.77 m menghasilkan rata-rata RSSI sebesar -101.853 dBm dan SNR sebesar 7.39 dB. Pengujian dengan jarak 102.72m menghasilkan rata-rata RSSI sebesar -106.54 dBm dan SNR sebesar 6.46 dB. Pengujian dengan jarak 41m menghasilkan nilai rata-rata RSSI sebesar -105.205 dBm dan SNR sebesar 6.651dB. Pengujian dengan jarak 115.21m menghasilkan nilai rata-rata RSSI sebesar -108.415 dBm dan SNR sebesar 5.476 dB. Pengujian dengan jarak 174.24m menghasilkan nilai rata-rata RSSI sebesar -114.719 dBm dan SNR sebesar -0.145dB

.....Nowadays, everything we uses in our everyday activity is based on electricity from our regular phone to our vehicle. Current technological developments can support efforts to increase the accessibility of electricity supply to reach all regions, which are closely related to electricity consumption and electricity efficiency in Indonesia. The electric metering sistem with conventional kWh that has been applied previously is not sufficient to support the growing demand for electrical energy in Indonesia because the reading sistem has the characteristics of manual reading, is less efficient (takes a lot of time), data accuracy and application development is less, and requires labor costs. high. Smart meters with the application of Advanced Metering Infrastructure (AMI) with LoRa communication technology provide a solution to measure the energy consumption used, voltage, and other parameters in real-time. Some of the advantages of the kWh-meter that supports the AMI sistem in energy management efforts are being able to record and process electricity consumption information automatically, close to real time, and be able to communicate in two directions. To determine the performance of the measurement sistem using a LoRa based three-phase multifunctional kWh meter, the measurement is implemented at Faculty of Engineering at the UI. In testing with a distance of 33.77 m, the average RSSI is -101.853 dBm and an SNR of 7.39 dB. Testing with a distance of 102.7 m resulted in an average RSSI of -106.54 dBm and an SNR of 6.46 dBm. Testing with a distance of 41 m resulted in an average RSSI value of -105.205 dBm and an SNR of 6.651 dB. Testing with

a distance of 115.21m produces an average RSSI value of -108.415 dBm and an SNR of 5.476 dB. Testing with a distance of 174.24 m produces an average RSSI value of -114.719dBm and an SNR of -0.145dB.