

ABSTRACT

This study examines the efficiency of monitoring the performance of a pico-hydro power plant simulator (PLTPH) located at Telkom University, specifically in relation to the collection of revolutions per minute (RPM) and output frequency data. The main problem underlying this study is the lack of efficiency in the monitoring process.

To address this issue, this study implements an Internet of Things (IoT) system on the PLTPH simulator. The approach involves installing RPM sensors on the turbine and generator to automatically measure RPM data. The sensor measurement results are then compared with manually obtained data to evaluate their accuracy. Additionally, frequency sensors are installed on the generator to measure output frequency and analyze its correlation with the collected RPM data.

The research results showed that the accuracy of turbine RPM data collection was 98.33% and generator RPM was 99.67%, resulting in an average accuracy of over 98%, indicating that the data generated by the IoT system is highly consistent with manual data. The connectivity on the interface itself has a good connection speed of 942.5 ms. Testing of the correlation between load and frequency showed that when there was an increase in load, the output frequency also increased by at least 0.3%. Analysis of the correlation between RPM values and generator output frequency was linear. An increase in RPM directly correlated with an increase in output frequency.

Keywords: pico-scale hydroelectric power plant, Internet of Things, revolutions per minute, output frequency, electric generator, system responsiveness.