Design And Build A Internet Of Things-Based Solar Panel 50 WP Performance Monitoring System

Risse Entikaria Rachmanita S.Pd., M.Si. *(Minithesis Counselor)*

Mohammad Nova Ali Assyatiri
Study Program Of Renewable Energy Engineering
Departement of Engineering

ABSTRACT

This study aims to design and test a 50 WP solar panel performance monitoring system based on the internet of things (IoT) to improve the efficiency and reliability of Solar Power Plants (PLTS). This system uses INA219, DS18B20, and BH1750 sensors to monitor voltage, current, temperature, and light intensity in real-time, with data sent via the MQTT protocol to the Visual Studio interface. Testing shows a high level of accuracy with an average error of 0.57% for the panel voltage sensor, 0.37% for the battery voltage sensor, 2.81% for the panel current sensor, 2.16% for the battery current sensor, 3.07% for the light intensity sensor, and 0.83% for the temperature sensor. The efficiency of the solar panels ranges from 6%-14%, with panel power between 5-30 W which is influenced by light intensity and surface temperature. This system has proven successful in delivering real-time data and providing easy-to-understand visualizations. This study concludes that IoT can improve the efficiency of PV power plant monitoring and recommends further development in thermal management and device protection from extreme weather conditions.

Keywords*: Energy Efficiency, Internet of Things, Monitoring System, MQTT Protocol, Solar Panels.*