

Optimization of *Reusable* Energy in *Internet of Things* Components on Early Flood Detection Devices in Tambak Kemeran Village

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ABSTRACT

Flooding is a natural disaster that frequently occurs due to high rainfall, poor drainage systems, and uncontrolled land use changes. The government and the public require an efficient and reliable early flood detection system to support disaster mitigation efforts. However, early flood detection devices still face issues related to power consumption that need to be optimized for more effective and sustainable operation. This study aims to optimize energy usage in Internet of Things components of the early flood detection device to improve power efficiency and extend operational duration. The research method used is an experimental approach, involving the design of an IoT-based system utilizing solar panels as the primary energy source. Data from various sensors are collected and analyzed to optimize the device's energy consumption. Testing is conducted to measure system endurance under various operating conditions. The test results show that the developed early flood detection device has an average energy efficiency of 5.14%, with solar panel input power ranging from 12.8 W to 60 W. The device consumes 1.8 W of power, allowing the system to operate for up to 11 hours and 40 minutes on a fully charged battery. Additionally, the system is capable of operating automatically and transmitting monitoring data in real-time. It is expected that this developed early flood detection device can provide a more effective solution for disaster monitoring and mitigation. Moreover, this research supports the implementation of more energy-efficient Internet of Things technology in energy management..

Keywords: *Flood Detection, Internet of Things, Energy Optimization, Power Efficiency, Solar Panels.*