

ABSTRACT

The development of technology has led to a high dependency on electricity in Indonesia. However, the supply of electricity from fossil fuels is decreasing, causing negative environmental impacts. Therefore, the government is focusing on the development of Renewable Energy (EBT) such as solar, water, wind, and biomass energy. One of the EBT technologies that utilizes water is the Micro-Hydro Power Plant (PLTPh), which is suitable for areas not covered by the National Electricity Company (PLN) network. However, PLTPh faces several challenges, including difficult-to-reach locations, high construction costs, and a lack of skilled workforce in the field.

To address the shortage of skilled workers in the PLTPh field, a solution that can be implemented is the development of a "PLTPh Emulator." The PLTPh Emulator is an interactive simulation that allows the general public, including students, to learn about the system, operation, and functions of the Micro-Hydro Power Plant. The PLTPh Emulator will provide information about the basic principles of PLTPh operation, the required components, and how to regulate electricity production according to demand.

Integration system testing shows that the Micro-Hydro Power Plant Emulator can control the maximum and minimum rotation of the induction motor, able to control voltage to the maximum, and the Electronic Load Controller (ELC) can divert energy if the main load usage is less than the supply generated by the excess generator to complementary loads to maintain a frequency of 50 Hz.

Keywords: Micro-Hydro Power Plant Emulator, Motor Rotation Control, Voltage Control, Electronic Load Controller.