ABSTRACT

"Gaharu Nature School is a food-based school. One of its initiatives is the cultivation of tilapia fish. This system is established to ensure that the tilapia fish receive a steady oxygen supply in areas with limited access to electricity. Besides meeting the aeration needs for tilapia fish cultivation, this system will also be used as a learning tool for Gaharu Nature School students. Therefore, the design of a solar-powered aerator is being developed for use at Gaharu Nature School. In the construction of this system, a pond with dimensions of 5 x 4 meters and a depth of 100 cm will be used. The aerator will operate with energy from a Solar Power Generator. With the implementation of this system, it is expected to provide optimal aeration without being hindered by the limited access to electricity at the research location of this final project.

In this research, a solar-powered aerator has been constructed using a SKU SEN:0237 sensor to measure the dissolved oxygen levels in the pond and solar panels as its power source. Additionally, a solar charge controller of the MPPT type was used to channel power to a LiFePO4 battery for energy storage. An Arduino was also employed to control the power supplied to the aerator using a 5V DC relay.

The use of a 100A LiFePO4 battery requires 6 hours for charging, starting from a battery capacity of 7.8% to reach 86.8%, with an initial battery voltage of 11.1 V and a final voltage of 14.1 V, using a 220Wp solar panel. Testing was conducted on the aerator system, and it took 25 minutes to increase the dissolved oxygen level from an initial 2 ppm to 4 ppm by the 25th minute."

Keywords : *Pool, Solar Power Plant, Photovoltaic, Aerator, Tilapia, Aeration.*