

## **ABSTRACT**

*Water is a crucial necessity for humans. UNESCO has established that every individual has the right to 60 liters of water per day. However, many regions in Indonesia currently face difficulties in accessing clean water. This issue is partly caused by extreme climate change. Climate change results from carbon emissions, which are partly due to fossil fuel power plants.*

*Therefore, an integrated off-grid solar photovoltaic with a cartridge filter system was designed in this study. The system was expected to improve water quality with the minimum clean water production at 240 liters per day. It is equipped with a 19W DC pump, allowing it to be placed directly at the water source to be filtered. The system includes a 20 WP solar panel, a 19W DC pump, a 12V 7Ah battery, a 24V Solar Charge Controller, and cartridge filters of types FB-10-PP5, FB-10-PP10, and FC-10-CTO.*

*The results showed that the efficiency of the 20Wp solar panel used is between 5-6% daily. If the battery is empty, the 20Wp solar panel cannot operate using the method of running the pump while charging the battery. However, the 20Wp solar panel can operate using the method of running the pump after charging the battery. Meanwhile, a 50Wp solar panel can operate using the method of running the pump while charging the battery. Using the method of running the pump after charging the battery produces an average of 966.87 liters of water per day. In contrast, using the method of running the pump while charging the battery produces an average of 1176.37 liters of water per day.*

*Key word : Cartridge filter, Solar Panel, Off-Grid Solar Pv System, DC Pump, Solar Charge Controller*