

DESIGNING AND TESTING SOLAR HYDROPONICS ELECTRICITY SYSTEM WITH LITHIUM ION BATTERY BACKUP

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ABSTRACT

The growing needs of society make the consumption pattern of energy to be fulfilled. It aims to prevent the energy crisis that will adversely affect many sectors. One of the step that can be done is to utilize renewable energy such as solar power whose potential is abundant in Indonesia. In addition solar power can also be integrated with modern hydroponic agricultural technology. But there is a shortage of battery component that need to be optimised for performance to be more efficient. The use of lithium ion battery in this case could be one of the solution as a storage media of energy deposit on solar power system combined with the hydroponic of the DFT system. The main component in this tool are solar panel, lithium ion battery, solar charge controller, timer, and water pump. Tool testing is conducted to determine the voltage, current, power parameters and capability of solar panel and battery that are affected by the weather condition in the charging and discharging of the battery in running the load. The result of hydroponic solar power test with lithium ion battery as energy storage media can run well. Known weather conditions such as sunlight intensity and temperature affect the output value of solar panel. The estimated real capacity battery charging time of 4.320 mAh with the average current of 30 Wp monocrystalline type solar panel during 5 days testing is 6,58 hours or 394,8 minutes with a charging speed of 656,6 mAh/h. During the test, the ability of solar panel to deliver avarage power to load is 16,35 W. The estimated discharging time with the average battery current during 5 days of testing is 2,96 hours or 177,6 minutes with a discharging speed of 1.459,5 mAh/h. The ability of an 8W DC pump to circulate 12 liters of water is 4,615 liters/minute, meaning in 2,96 hours the pump can circulate 816 liters of water.

Keywords: *Solar Energy, Hydroponic, Lithium Ion Battery, Charging, Discharging.*