PLANNING OF SOLAR POWER PLANT AT Al – FALAH KARANGMOJO MOSQUE, GUNUNGKIDUL

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ABSTRACT

The need for electrical energy in Indonesia is increasing every year. The uneven distribution of electricity grid infrastructure can lead to a shortage of electricity supply. PLTS off grid system can be the best choice because PLTS off grid will not be affected by disturbances or power outages by PT. PLN (Persero). This study aims to determine the potential of electrical energy at the Al-Falah Mosque by using Helioscope software. Al-Falah Mosque of 6,802 kWh with a demand for electrical energy of that size requires 12 solar panels with a capacity of 200 Wp, 12 batteries with a capacity of 150 Ah, 1 unit of SCC, 1 unit of SCC with a capacity of 2400 W and 1 unit of inverter with a capacity of 3000 W. From the simulation results, 3 PLTS designs are produced. Of the 3 designs, design 2 was found to be the most effective by producing an annual production of 3,247 MWh with a performance ratio of 79.6%. In terms of economic investment, the initial investment is Rp. 167,101,750 with a system age of 20 years from the PLTS component. The design of this PLTS is profitable. We can see this in several aspects such as the Net Present Value (NPV) aspect, which is Rp. 2,469,085 (NPV). >0), then in the Profitability Index (PI) aspect, which is equal to (PI>1), then the calculation of the pay back period is known that the initial investment cost will return in the 10th year with a cumulative net value of Rp. 175,448,720.

Keywords*: PLTS, off grid, Helioscope*