Evaluation Study on Off-grid Solar Power Plant on The Engineering Building's Politeknik Negeri Jember

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ABSTRACT

The current Indonesia's Power Generation resources majority are still dominated by coal, even though coal is a non-renewable energy resource and its price continues to rise. Environmentally friendly and renewable energy resources are being researched. Amid all renewable energies, solar PV is of particular interest, especially in Indonesia. Solar power plant converts solar irradiation into electricity with PV modules. This study carried out overall evaluation of 4 kWp off-grid solar power plant located on Politeknik Negeri Jember's Engineering Building. The evaluation conducted based on Feasibility study guide published by the Ministry of Energy and Mineral Resources, and International Standard IEC 62174. The measures of the operation were evaluated for 3 days from 09.00 am – 2.30 pm at 30 minutes intervals using 800 W halogen lamp as load. The results obtained are PV efficiency of 44%, inverter Efficiency of 92 %, SCC efficiency of 95 %, and performance Ratio of 44 %. There were no fatal problems found during testing process and overall components physical condition were good. There are several things to do to improve the performance and quality of the power plants, such as cleaning and maintenance routines, additions of monitoring components such as integrated pyranometer to facilitate monitoring. Addition of cooling system to cool down the PV module can also be done to increase PV module efficiency.

Keywords: *Solar Power Plant, PV module, performance*