PLANNING OF ON-GRID SOLAR POWER PLANNING WITH 30KW CAPACITY AND TECHNO-ECONOMIC FEASIBILITY ANALYSIS IN TANJUNG PERAK PORT OFFICE BUILDING, SURABAYA

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ABSTRACT

The need for electricity is projected to increase every year along with economic recovery and acceleration in development in the industrial and transportation sectors. Thus, sufficient energy supply is needed to realize these projects, one of which is using solar energy as an additional energy source. The use of solar energy is also an initial step in overcoming the energy crisis and climate crisis. In this study, the installation of solar energy aims to save monthly bills by 20% of the installed power of 690 kVa, so the savings target is 138 kVa. To achieve the generation target, an area of 142.23 m^2 is required from the area, a generation of 30,240 WP is obtained using PV with a capacity of 540 WP as many as 56 Units converted into 1 inverter with a capacity of 30 KTL. From the simulation results using PVSyst, the annual energy production is 46,173 kWh with a solar radiation coverage of 1902.6 kWh/m^2/mth. To build this project requires an initial construction cost and LCC (Life Cycle Cost) of Rp 339,514,621 resulting in a COE (Cost of Energy) value of Rp. 764.23 per kWh. Technical economic analysis shows an NPV (Net Present Value) value of Rp 247,173,645, PI (Profitability Index) of 2.1, IRR (Internal Rate of Return) of 18.64%, and DPP (Discounted Payback Period) in the 8th year. The results of real-time monitoring show that the generation target from the PVSyst estimate has been achieved so that savings of 20% of the power installed in the building are met.

Keywords*: On-Grid, Savings, PVSyst, Techno-Economy*