

Design and Techno-economic Analysis of On-Grid Solar Power Plant at SD Muhammadiyah 1 Jember with PVSyst Software.
Supervisor: Ahmad Fahriannur, S.T, M.T.

Anggita Nuradani Lestari
Renewable Energy Engineering Study Program
Department of Engineering

ABSTRACT

The demand for electrical energy in Indonesia is increasing from year to year along with the increasing population growth and the national economy. Electricity demand in Indonesia is expected to increase by 4.2% by 2024. Indonesia has a solar energy potential of 4.8 kWh/m² so, it is suitable for the application of Solar Power Plant (PLTS). This research uses quantitative methods to design a grid-based PLS system and conduct economic analysis using PVSyst software. The results obtained from this design use JA Solar monocrystalline solar panels of type JAM72S30 with a capacity of 550 Wp 12 pieces and 1 Huawei SUN-2000-5KTL-M1 inverter. The total investment cost of PLTS on grid is IDR 102.527.506 with O&Mpw for 25 years amounting to IDR 30.300.789, the cost of replacing the inverter is IDR 17,500,000 and the LCC or life cycle costs incurred are IDR 132.828.304.

Based on the calculation of investment feasibility using the NPV, PI, and IRR methods, the investment is not feasible. However, based on the PBP and BCR methods, the investment is feasible. In addition, with the installation of this PLTS, it is estimated that it will save 47% of electrical energy and the electricity bill will save Rp 10,994,940 in the first year. Due to the annual degradation solar panel of 0.55%, the production of electrical energy will decrease so that in the 25th year it is estimated to save up to 9% and electricity bill savings of Rp 2,135,590.

Key words: *PLTS, on grid, PVSyst, Techno Economy, Electrical Energy Savings*