Perancangan dan Analisis Tekno Ekonomi PLTS *On-Grid System* sebagai *Supply* Energi Listrik Masjid Al-Istiqamah Politeknik Negeri Jember
(*Design and Techno-Economic Analysis of On-Grid System Solar Power Plant as a Provider of Electrical Energy for Al-Istiqamah Mosque, Politeknik Negeri Jember). Supervisor:* Risse Entikaria Rachmanita, S.Pd., M.Si.

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ABSTRACT

The increase in energy demand is directly proportional to the increase in population growth and technological developments. Energy needs in Indonesia mostly come from fossil energy which has limitations and is not environmentally friendly with emission requirements. The potential for solar thermal energy as renewable and environmentally friendly energy in Indonesia is around 4.8 kWh/m2 which can be utilized as a Solar Power Plant (PLTS). This research aims to design an on-grid PV mini-grid system and techno-economic analysis using PVSyst software. This design requires 14 Longi Solar LR5-72HPH-550M solar panels and 1 Huawei SUN2000-6KTL-M1 inverter. The estimated production of electrical energy produced is 10,852 kWh/year in the first year. The initial investment cost for this PLTS system is IDR 120.343.517. The estimated savings obtained for 25 years amounted to IDR 270.115.412. Economically, based on the feasibility analysis using a method based on calculation from the LWBP rate, the NPV value is IDR 2.174.707, BCR 1.68, and PBP 11.8 years. Meanwhile, based on the feasibility analysis using a method based on LCoE calculations, the NPV value is IDR 74.877.690, BCR 2.61, and PBP 7.5 years. So that the construction of PLTS is feasible to be realized based on the research that has been done.

Keywords: *On-Gridd, Savings, PLTS, PVsyst, Techno-Economic.*