

**Techno-Economic Analysis of Hybrid Rooftop Solar Power Plants (PLTS)
with Thermoelectric for Residential Scale**

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ABSTRACT

The demand for electricity is increasing along with the population growth and technological advancements. Energy needs in Indonesia mostly come from fossil energy which is limited and not environmentally friendly. Indonesia has solar energy potential with solar irradiation approximately 4.8 kWh/m²/day. Therefore, a power generator from renewable and environmentally friendly sources is needed, one of which is Rooftop Solar Power Plants (PLTS). The Techno-Economic Analysis of Hybrid Rooftop Solar Power Plants (PLTS) with Thermoelectric for Residential Scale is expected to be an innovative solution that can help the government increase the utilization of renewable energy. The data collection method that used in this study is literature review and PVSyst simulation. The Hybrid Rooftop Solar Power Plants with Thermoelectric for Residential Scale is designed for a 42 m² house, generating a power output of 3.6 kWp. Based on the economic analysis, The Rooftop Solar Power Plants with Thermoelectric for Residential Scale is considered feasible because it has a lower energy cost of Rp 38/kWh compared to PLN's basic electricity tariff of IDR 567/kWh. The investment feasibility calculation shows an NPV of Rp 3,340,330, the BCR value is 1.64, and the PBP will be achieved in 10 years, 2 months, and 26 days.

Key words: Renewable Energy, Solar Panels, Techno-Economics, Thermoelectric.