

**DESIGN OF A SOLAR HYBRID BASED PUBLIC STREET LIGHTING  
SYSTEM at MIFTAHUL HASAN PAKUSARI ISLAMIC BOARDING  
SCHOOL JEMBER**

Dedy Eko Rahmanto, S.TP., M.Si. (*Undergraduated Thesis*)

Achmad Fathan Abdillah  
*Renewable Energy Engineering Study Program*  
*Department Of Engineering*

**ABSTRACT**

*Reliance on conventional street lighting faces obstacles due to PLN electricity supply, which causes high costs and limits the number of street lights, leaving the Pondok Pesantren Miftahul Hasan area poorly lit. The need for reliable and energy-efficient public street lighting is becoming more urgent, especially in areas with minimal lighting. This situation affects nighttime activities, increases safety risks, and results in high electricity costs. To address these problems, a centralized hybrid Solar Power Plant system was designed at Pondok Pesantren Miftahul Hasan, Pakusari, Jember. This system design uses solar panels as the main source, batteries for energy storage, and the PLN grid as a backup through an Automatic Transfer Switch (ATS) to maintain supply continuity. The design stages include literature study, energy needs survey, component capacity calculation, control panel fabrication, and system testing. The main components used in this design include 550 Wp solar panels, 12 V 120 Ah batteries, a 1000 W inverter, a 60 A solar charge controller (SCC), and 15 W LED lights placed according to lighting needs. Testing shows that the system can harness solar energy during the day, use the batteries at night, and automatically switch to the PLN grid when battery capacity drops. This system design keeps the lighting running, improves comfort and safety at the pesantren, and cuts electricity costs. Hybrid solar power plant is a practical and sustainable solution for rural and semi-urban areas, with potential for further development through smart control and long-term monitoring to boost system reliability.*

**Keywords:** *design, energy storage, hybrid solar power plant, public street lighting.*