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PROCEEDING FOR INTERNATIONAL COLLOQUIUM ON NEXTGEN CONSTRUCTION

2025

*Future-Ready Construction and Facility Management:
Driving Research and Innovation for a Smart Built Environment*

**PROCEEDING FOR
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NEXTGEN CONSTRUCTION
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IMPLEMENTATION OF A 100 kWp SOLAR POWER PLANT (PLTS) AT UNIVERSITAS PAMULANG VIKTOR CAMPUS

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Abstract

This project focuses on the implementation of a 100 kWp Solar Power Plant (PLTS) at Universitas Pamulang Viktor Campus as part of a national initiative to promote renewable energy and reduce dependency on fossil fuels. The PLTS system supplies electricity for both lighting and power installations in the campus basement area, specifically the canteen and surrounding facilities. Beyond energy generation, the project serves as an educational and research platform for Electrical Engineering students to gain practical experience in solar energy systems. The system's design integrates photovoltaic panels, inverters, and control units optimized for tropical conditions. The initiative demonstrates the university's commitment to sustainability, energy efficiency, and academic innovation through its adoption of renewable energy.

Keywords: Solar Power Plant, PLTS, renewable energy, education, sustainability.

1. INTRODUCTION

The implementation of solar energy technologies has become increasingly significant in addressing Indonesia's growing energy demands and carbon emission challenges. Universitas Pamulang, through its Department of Electrical Engineering, has initiated a 100 kWp Solar Power Plant (PLTS) project at the Viktor Campus to contribute to the national renewable energy mix. This initiative aligns with the government's target of achieving 23% renewable energy share by 2025. The PLTS installation aims to reduce campus electricity consumption from conventional sources while providing a real-world laboratory for teaching and research on sustainable energy technologies.

2. LITERATURE REVIEW

Solar photovoltaic (PV) systems have become one of the most practical renewable energy solutions due to their scalability, reliability, and environmental benefits. According to Wibowo and Rahmawati (2022), grid-connected PV systems significantly reduce institutional electricity costs and contribute to national carbon reduction goals. Furthermore, education-based installations like those in universities serve dual functions — they generate clean energy while acting as learning tools for students. Several Indonesian universities have begun adopting campus-based solar energy systems; however, most remain limited in scale. This project expands on prior studies by implementing a medium-scale 100 kWp system suitable for both operational and educational purposes.

3. METHODOLOGY

The 100 kWp PLTS system was installed on the rooftop and adjacent areas of the Universitas Pamulang Viktor Campus. The system configuration includes:

- a) Photovoltaic Modules: 250 high-efficiency panels (each rated at 400 Wp).
- b) Inverters: Three 33 kW grid-tied inverters for stable AC conversion.
- c) Monitoring System: IoT-based performance tracking integrated with a local control center.
- d) Distribution: Electrical output is connected to the basement lighting and power installations, including the campus canteen.

Data on power generation, irradiance, and temperature were collected using sensors to evaluate performance under tropical climatic conditions.

4. FINDING AND DISCUSSION

Initial monitoring results indicate that the PLTS system generates an average of 380–420 kWh per day, depending on solar intensity. This energy output meets approximately 60% of the total electrical demand in the designated campus area. The system demonstrates high reliability with minimal maintenance, and the performance ratio averages 82%, which is within the optimal range for tropical installations. The integration of the monitoring system enables real-time analysis of energy production and system efficiency. Beyond technical performance, the project enhances students' competencies in photovoltaic system design, installation, and maintenance, reinforcing the link between theory and practice in renewable energy education.

5. CONCLUSION

The implementation of a 100 kWp PLTS at Universitas Pamulang Viktor marks a significant step in promoting renewable energy in higher education institutions. The system not only contributes to energy savings and emission reduction but also supports practical learning in solar technology. The project exemplifies the synergy between sustainability goals and academic innovation. Future development will focus on expanding the system's capacity, integrating energy storage, and conducting long-term performance evaluations for broader institutional application.

6. REFERENCES

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