ISSN: 2320-5407

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

ISSN NO. 2320-5407

REVIEWER'S REPORT

Manuscript No.: **IJAR-53727** Date: **09.09.2025**

Title: PERFORMANCE EVALUATION OF A 500 kWp SOLAR PHOTOVOLTAIC POWER PLANT CONNECTED TO GRID USING PVSYST SOFTWARE, IN LAMBAYE AREA, SENEGAL

Recommendation:
Accept after major revision .....

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality			✓	
Clarity			✓	
Significance			✓	

Reviewer Name: Dr.K.Arumuganainar **Date: 09.09.2025**

Reviewer's Comment for Publication.

The paper is relevant and technically strong but requires substantial improvement in clarity, justification of methods, and depth of discussion. Economic feasibility, socio-economic benefits, and stronger novelty claims should be added.

Detailed Reviewer's Report

Manuscript Title: *Performance Evaluation of a 500 kWp Solar Photovoltaic Power Plant Connected to Grid Using PVSyst Software, in Lambaye Area, Senegal*

Recommendation: Major Revision

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1. Originality & Novelty

- **Strengths:**
  - The study focuses on Senegal's Lambaye area, which is underrepresented in solar PV performance literature.
  - The tilt and azimuth optimization provides site-specific insights.
- **Weaknesses:**
  - Similar PVsyst-based simulation studies have been conducted worldwide; the novelty lies mostly in the location.
  - The manuscript does not explicitly highlight how this work advances beyond prior Senegalese or West African PV research.

Comment: The authors should emphasize the novelty more clearly — e.g., rural electrification challenges in Lamb aye, contribution to Senegal's Horizon 2050 program, or unique site conditions.

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2. Technical Quality

- **Strengths:**
  - Methodology is well structured and uses standard PVsyst 7.2 with Meteonorm 8.1 data.
  - Results include performance ratio (82.24%), specific yield, monthly variation, and detailed loss diagram.
- **Weaknesses:**
  - Assumptions (inverter model, soiling rate, temperature coefficient) are not fully justified.
  - No sensitivity or uncertainty analysis.

- No cost-benefit or financial feasibility assessment.

Comment: Technical quality would be significantly improved if the authors:

- Justify simulation parameters.
- Add an uncertainty/sensitivity analysis.
- Include at least preliminary economic feasibility indicators (e.g., LCOE, payback period).

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3. Clarity & Presentation

- **Strengths:**
  - Structure follows standard format (Abstract → Introduction → Methodology → Results → Conclusion).
  - Tables and figures support the text.
- **Weaknesses:**
  - Language requires editing for grammar and clarity (e.g., "a500 kWp" → "a 500 kWp").
  - Figures (especially loss diagram, monthly PR) are not high-quality and lack clear labels.
  - Abstract is wordy and lacks structured highlights (Objectives, Methods, Results, Implications).

Comment: Manuscript requires English language polishing and better formatting of figures/tables. Authors should also rewrite the abstract in a more structured style.

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4. Literature Review & References

- **Strengths:**
  - Covers studies from Africa, Asia, and Europe.
  - Includes recent works (2024–2025).
- **Weaknesses:**

- Limited discussion on *gaps* in prior work.
- Reference style inconsistent (missing DOIs, incomplete author details).
- Some references out dated and not directly relevant.

Comment: Improve literature review by:

- Highlighting *what previous studies did not address* (research gap).
- Including more recent African case studies (2022–2025).
- Correcting reference formatting per journal guidelines.

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5. Results & Discussion

- **Strengths:**
  - Comprehensive performance data presented.
  - Good analysis of tilt and azimuth variations.
  - Comparison with international studies adds value.
- **Weaknesses:**
  - Mostly descriptive; lacks critical interpretation.
  - No validation against measured data from similar plants in Senegal.
  - No discussion of socio-economic impact (jobs, rural electrification benefits).

Comment: Authors should deepen the discussion by:

- Comparing with actual operational PV plants in Senegal.
- Explaining reasons for observed PR differences with other countries.
- Adding socio-economic implications (energy access, affordability).

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6. Conclusion

- **Strengths:**
  - Restates key findings (annual yield, PR, loss breakdown).
- **Weaknesses:**
  - Too brief; lacks future perspectives.

- No policy or practical recommendations.

Comment: Expand conclusion to discuss:

- Scalability of this model to larger PV plants.
- Integration with storage or hybrid systems.
- Relevance to Senegal's Horizon 2050 targets.

Final Recommendation: Major Revision

The paper is relevant and technically strong but requires substantial improvement in clarity, justification of methods, and depth of discussion. Economic feasibility, socio-economic benefits, and stronger novelty claims should be added.