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REVIEWER'S REPORT

Manuscript No.: IJAR-59602

Title: CALENDAR-AWARE PHOTOVOLTAICÂ–BATTERY ASSESSMENT FOR TWELVE TEACHING ROOMS AT A SAHELIAN UNIVERSITY CAMPUS

Recommendation:
Accept

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

Reviewer's ID: JPR- 015

Detailed Reviewer's Report

Reviewer's Comment for Publication.
Acceptance Comment are mentioned below suitable for the paper titled "**CALENDAR-AWARE PHOTOVOLTAICÂ–BATTERY ASSESSMENT FOR TWELVE TEACHING ROOMS AT A SAHELIAN UNIVERSITY CAMPUS**"

Reviewer Comments: Accept

Reviewer Comments –

1. Introduction

The manuscript addresses the important challenge of planning photovoltaic–battery systems for university teaching facilities in a Sahelian climate. It highlights the limitations of relying solely on equipment inventories and annual energy balances when evaluating the temporal alignment between electricity demand and solar generation. The integration of academic calendars, cooling requirements, and vacation periods provides a practically relevant perspective on campus energy management. The study also considers interannual weather variability and operational losses, strengthening its relevance to renewable energy planning. Overall, the introduction establishes a clear research objective with potential implications for sustainable and reliable electricity supply.

2. Literature Review

The study addresses relevant themes in photovoltaic–battery system planning, including demand reconstruction, solar generation variability, battery sizing, and chronological energy assessment. Its focus on academic calendars extends conventional energy planning by explicitly considering changes in teaching schedules and seasonal occupancy. The inclusion of timestamp conventions and operational losses adds methodological relevance to the assessment of renewable energy systems. The research also

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addresses the practical challenge of conducting energy assessments when metered consumption data are unavailable. Overall, the study contributes to the discussion of context-sensitive photovoltaic–battery planning for educational institutions.

3. Solution Approach / Methodology

The manuscript combines inventory-based electricity demand estimates for twelve teaching rooms in Maradi, Niger, with hourly solar-model outputs for 2022 and 2023. It evaluates three academic-calendar scenarios while incorporating finite battery energy capacity and power constraints. The methodology also examines temporal reconstruction of solar data and assesses the effects of conversion inefficiencies, auxiliary loads, reduced usable storage, and cleaning schedules. This chronological modelling approach provides a structured means of evaluating energy coverage and operational trade-offs. The consideration of multiple scenarios strengthens the practical applicability of the proposed assessment framework.

4. Results and Discussion

The reported results demonstrate the importance of academic schedules in determining electricity demand and photovoltaic–battery system performance. Refining the teaching schedule reduces the estimated annual demand envelope from 280.6 MWh to 195.7 MWh, while closing ordinary teaching during July and August reduces demand to 161.1 MWh in 2023. For a 175 kWp photovoltaic system with 400 kWh of usable storage and a 100 kW battery power limit, minimum energy coverage reaches 97.9% in 2022 and 99.1% in 2023 under the permissive calendar. Under the July–August closure scenario, coverage increases to 99.7% and 99.4%, respectively, while combined operating losses demonstrate the potential benefit of increasing capacity to 200 kWp. These findings highlight the importance of chronological modelling, calendar-aware demand estimation, and sensitivity analysis in system planning.

5. Conclusion

The manuscript presents a relevant assessment framework for photovoltaic–battery planning in educational facilities with variable occupancy and seasonal operating schedules. Its integration of academic calendars, hourly solar data, battery constraints, and operational losses provides a more informative perspective than annual energy balancing alone. The comparison of two weather years also highlights the importance of evaluating system performance under varying solar conditions. The findings offer practical guidance for improving renewable energy planning in resource-constrained and hot-climate environments. Overall, the manuscript makes a useful contribution to sustainable campus energy management and is suitable for publication.

Overall, the manuscript is relevant to sustainable construction research and is suitable for publication.