EUROPEAN SCIENTIFIC JOURNAL
by European Scientific Institute
16 YEARS

Paper: **"Techno-Economic Optimization of a Grid-Tied Hybrid Photovoltaic–Battery System Under Vietnam Climatic Conditions"**

Submitted: 16 March 2026
Accepted: 06 April 2026
Published: 30 April 2026

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Doi: 10.19044/esj.2026.v22n12p1

Peer review:

Reviewer 1: Tímea Bernadett Mátyás
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Reviewer 2: Carlos Ibanez
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Reviewer 3: Salloom A. Al-Juboori
Applied Science Private University, Jordan

Reviewer 4: Fateh Mebarek-Oudina
Skikda University, Algeria

Reviewer A:
Recommendation: Resubmit for Review

The TITLE is clear and it is adequate to the content of the article.
Yes, the topic is clear in reference to the subject and subject to study.
The ABSTRACT clearly presents objectives, methods, results, and conclusions.
The summary includes all the necessary elements and presents the results of the work carried out. It clearly states the objectives to be achieved.
There are a few grammatical errors and spelling mistakes in this article.
In terms of structure and grammar, the article contains no errors, review the following sentences in order to apply maximum grid import power compared
The study METHODS are explained clearly.
The methods or methodology used are not clearly explained, nor are the theories that support the analysis carried out; it is recommended to describe and cite them to better support the information and results obtained.
The results are clear and do not contain errors.
yes, i suggest included the payback for pv-only , its the references . The expression "lowest capital " is subjective
The CONCLUSION or summary is accurate and supported by the content.
The conclusions fulfill the study's objectives. The data is very clear in the description; however, further substantiation of the points mentioned in the results and methods sections is needed.
The list of REFERENCES is comprehensive and appropriate.
All references are cited in the text.
Please rate the TITLE of this paper.
[Poor] **1-5** [Excellent]
5

Please rate the ABSTRACT of this paper.
[Poor] **1-5** [Excellent]
5

Please rate the LANGUAGE of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the METHODS of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the RESULTS of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the CONCLUSION of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the REFERENCES of this paper.
[Poor] **1-5** [Excellent]
5

Overall Recommendation!!!
Accepted, minor revision needed

Comments and Suggestions to the Author(s):
Overall, the article is very interesting; it presents a climate problem and offers an alternative solution, an important issue in current times; the necessary adjustments are minor.

Reviewer B:
Recommendation: Resubmit for Review

The TITLE is clear and it is adequate to the content of the article.
Yes, the title is both clear and highly adequate for the content of the article. It accurately reflects the study's scope, methodology, and geographic focus.
The ABSTRACT clearly presents objectives, methods, results, and conclusions.
Yes, the abstract clearly and systematically presents the four essential elements of the research paper.
There are a few grammatical errors and spelling mistakes in this article.
While the article is technically sound and follows a professional structure, there are several grammatical and spelling inconsistencies, primarily in the data presentation and section transitions. The most significant errors occur in the internal referencing system where the text mentions table numbers or labels that do not match the provided content. Some punctuations are missing, there are some table number duplications, as well as missing units and formatting. In some cases the mathematical notations are inconsistent, are there are some spelling errors and typos.
The study METHODS are explained clearly.
Yes, the study methods are explained clearly and follow a logical progression from system architecture to mathematical modeling and operational strategies.
The results are clear and do not contain errors.
While the results are presented clearly and support the study's narrative, a close technical review reveals several internal inconsistencies, labeling errors, and mathematical contradictions. There are direct contradictions between the text, the summary tables, and the technical logic of the scenarios. The text states that the PV+BESS+TOU configuration substantially reduced grid

import and effectively reduces grid import. However, Table 2 (the second one) shows that grid import actually increases. In Table 2 (the first one), the peak reduction for the PV+BESS+TOU case is listed as a negative value which implies that the peak shaving strategy actually increased the peak compared to the baseline, which contradicts the claim that it achieves peak shaving and strategic energy shifting. Table 2 (the first one) shows a higher value for the TOU case than the standard BESS case. Usually, higher export results in a lower self-consumption ratio (SCR), yet the table claims the SCR increased. Furthermore, why are there 2 Table 2? What about Table Y? There are other labeling discrepancies like equation 11 abbreaviated as PR, pct. The text refers to equation 1 for power balance , equation 2 for PV power , and others, but the actual mathematical LaTeX/text for these equations is missing from the provided content. Furthermore, in the final table, CAPEX is listed in VND, but the LCOE is switched to USD/kWh (0.05) without providing the exchange rate used for the conversion.

The CONCLUSION or summary is accurate and supported by the content.

The conclusion section is generally accurate in its qualitative summary of the study's intent, but it faces significant challenges regarding data support due to contradictions found in the results section. The conclusion accurately reflects the broad goals and architectural findings described in the methodology. It correctly states that a comprehensive model was developed incorporating PV, battery, inverter efficiency, and grid interaction. It accurately summarizes that the EMS coordinates power flows and stores surplus energy to supply loads during low solar periods. The claim that these systems are technically viable is supported by the simulation's ability to maintain the battery within safe SOC limits while meeting load demands. However, while the conclusion makes strong claims about the PV+BESS+TOU configuration, the data provided in the results tables actually contradicts some of these summary statements. The conclusion states the TOU configuration achieves the most favorable operational performance. However, the data in Table 2 shows this case has the highest LCOE and the longest payback period compared to the standard PV+BESS case. The conclusion credits the TOU strategy with enabling peak shaving. Yet, the results table lists a peak reduction of -28.28% for this scenario, which mathematically suggests an increase in peak grid import rather than a reduction. The summary suggests TOU improves performance, but the data shows grid import increases from 2854.1 kWh in the standard battery case to 4406.9 kWh in the TOU case. On the other hand the conclusion's claim that battery integration significantly improves performance is backed by the increase in SCR and SSR.

The list of REFERENCES is comprehensive and appropriate.

The list of references is appropriate in terms of topical relevance, but it may not be considered comprehensive for a doctoral-level study due to several structural and depth-related limitations. While the references cover the necessary pillars of the research, there are gaps that a doctoral-level reviewer might identify. The references lean heavily toward case study literature rather than the optimization theory literature. A comprehensive doctoral list would typically include more citations on specific optimization algorithms like linear programming, particle swarm optimization used in EMS. The references should reflect the how as much as the what. Include foundational papers on the specific algorithms, and include uncertainty modelling. There is a significant risk that some references are being cited to support claims that the study's own data contradicts. Ensure the references cited for peak shaving and cost reduction actually align with your results, which currently show a negative peak reduction and higher LCOE for the TOU case. Ensure that the 2025 references regarding Vietnam are used to clearly define what they missed and what this study adds.

Please rate the TITLE of this paper.

[Poor] **1-5** [Excellent]
5

Please rate the ABSTRACT of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the LANGUAGE of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the METHODS of this paper.
[Poor] **1-5** [Excellent]
3

Please rate the RESULTS of this paper.
[Poor] **1-5** [Excellent]
2

Please rate the CONCLUSION of this paper.
[Poor] **1-5** [Excellent]
4

Please rate the REFERENCES of this paper.
[Poor] **1-5** [Excellent]
2

Overall Recommendation!!!
Return for major revision and resubmission

Comments and Suggestions to the Author(s):
The manuscript addresses a relevant topic for Vietnam's energy transition but requires a major revision to resolve critical data contradictions where the optimized time-of-use strategy currently shows higher costs and lower peak reduction than the baseline. You must also insert the missing mathematical notation for all referenced equations and consolidate the duplicate Table 2 and non-existent Table Y to ensure technical clarity. Additionally, please correct the fragmented reference list where several citations are split across multiple entries and standardize the bibliographic metadata to meet professional academic standards. Finally, the conclusions must be rewritten to objectively reflect the numerical findings, as the current text claims economic and grid benefits that are not supported by your simulation results.

Reviewer C:

Recommendation: Revisions Required

The TITLE is clear and it is adequate to the content of the article.
can be improved
The ABSTRACT clearly presents objectives, methods, results, and conclusions.
shoud be improved
There are a few grammatical errors and spelling mistakes in this article.
yes
The study METHODS are explained clearly.
more details should be added
The results are clear and do not contain errors.
can be improved more
The CONCLUSION or summary is accurate and supported by the content.
should be improved , Write this part in the form of important points
The list of REFERENCES is comprehensive and appropriate.
More recent artiles must be added
Please rate the TITLE of this paper.
[Poor] **1-5** [Excellent]
2

Please rate the ABSTRACT of this paper.
[Poor] **1-5** [Excellent]
3

Please rate the LANGUAGE of this paper.
[Poor] **1-5** [Excellent]
3

Please rate the METHODS of this paper.
[Poor] **1-5** [Excellent]
2

Please rate the RESULTS of this paper.
[Poor] **1-5** [Excellent]
3

Please rate the CONCLUSION of this paper.
[Poor] **1-5** [Excellent]
3

Please rate the REFERENCES of this paper.
[Poor] **1-5** [Excellent]
2

Overall Recommendation!!!

Return for major revision and resubmission

Comments and Suggestions to the Author(s):

The manuscript entitled “Techno-Economic Optimization of a Grid-Tied Hybrid PV–Battery System under Vietnam Climatic Conditions” addresses a relevant and timely topic in the field of renewable energy integration and energy management. The study explores the techno-economic performance of PV–battery systems under different operational strategies, including time-of-use (TOU) tariffs. While the topic is of practical importance, the manuscript in its current form requires substantial revisions to meet the scientific and presentation standards of an international journal.

Comments

1. The manuscript contains numerous grammatical, typographical, and stylistic errors that significantly reduce readability and clarity. Several sentences are awkwardly constructed, and technical terminology is sometimes misused.

A comprehensive language revision by a native English speaker or professional editing service is strongly recommended.

2. The manuscript does not explicitly define its novel contribution. The integration of PV systems with battery storage and EMS strategies under TOU tariffs has already been widely investigated.

The authors must clearly state:

• What is new in the proposed framework
• How it differs from existing techno-economic studies
• What additional scientific or practical value is provided

Without a clearly defined novelty, the contribution remains incremental.

3. The introduction is relatively limited and does not sufficiently reflect the current state-of-the-art. It should be expanded with recent and relevant studies to properly position the manuscript. In particular, the authors are encouraged to integrate recent contributions related to energy optimization and hybrid energy systems, such as:

• “Energy Optimization of a Dish/Stirling Solar System for Electricity Generation”
• “Thermal Analysis of the Solar Collector Cum Storage System Using a Hybrid-Nanofluids”

Incorporating such studies will help to:

• establish a stronger scientific context
• highlight the importance of optimization strategies
• better justify the present work

4. The modeling framework lacks sufficient detail for reproducibility.

The authors should:

• Add a complete nomenclature section (all symbols, parameters, and units)
• Clearly present governing equations and assumptions
• Provide detailed descriptions of PV, battery, inverter, and EMS models
• Explain the TOU-based control logic in a structured manner

This is essential for scientific transparency and reproducibility.

5. One of the major weaknesses of the manuscript is the lack of model validation.

The authors must:

• Validate the model against experimental data or
• Compare results with published studies

Without validation, the credibility of the results remains limited.

6. The figures require significant improvement:
• Low resolution
• Missing or unclear axis labels and units
• Inconsistent legends
All figures must be enhanced to meet publication standards:
• High resolution
• Clear labeling
• Physically meaningful presentation
7. The discussion is currently too descriptive and mainly reports numerical trends.
The authors should:
• Provide deeper physical and engineering interpretation
• Explain mechanisms behind observed behaviors (e.g., SCR/SSR improvement, battery response under TOU tariffs)
• Relate findings to real-world applications
8. The techno-economic aspect is not sufficiently developed.
The authors are encouraged to:
• Clearly define economic indicators (e.g., LCOE, payback period, net present value)
• Perform sensitivity analysis (tariffs, battery cost, system size)
• Provide a comparative assessment of different configurations
9. The manuscript does not adequately discuss its limitations.
The authors should explicitly address:
• Modeling assumptions
• Simplifications in battery dynamics
• Dependence on climatic and tariff data
• Applicability to other regions
10. All tables must be properly cited and explained in the text
• Benchmark comparisons with previous studies should be included
This would significantly enhance the credibility of the results.
11. The conclusion should be rewritten in a more structured and impactful way.
It is recommended to:
• Present key findings as clear bullet points
• Highlight major quantitative improvements
• Emphasize practical implications
• Suggest future research directions
12. The reference list should be expanded to include recent and high-impact studies.
In addition to the above-mentioned works:
• “Energy Optimization of a Dish/Stirling Solar System for Electricity Generation”
• “Thermal Analysis of the Solar Collector Cum Storage System Using a Hybrid-Nanofluids”
the authors are encouraged to incorporate further relevant literature on:
• hybrid renewable systems
• energy management strategies
• techno-economic optimization
This will significantly strengthen the academic positioning of the manuscript.

The manuscript addresses an important topic and has potential; however, it currently suffers from

insufficient novelty, lack of validation, limited discussion depth, and presentation issues. Therefore, major revisions are required before the manuscript can be considered for publication.
