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REVIEWER'S REPORT

Manuscript No.:IJAR-51113 Date: 04/18/2025

Title:
Smart Solar-Powered Water Pumping System with Energy Storage and Bidirectional Power Flow Mechanism

Recommendation:
Accept as it is .....
Accept after minor revision.....Yes.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

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

Reviewer Name: Saikat Banerjee, PhD **Date:** 04/18/2025

Reviewer's Comment for Publication.

(*To be published with the manuscript in the journal*)

The reviewer is requested to provide a brief comment (3-4 lines) highlighting the significance, strengths, or key insights of the manuscript. This comment will be Displayed in the journal publication alongside with the reviewers name.

.....

This paper successfully integrates components for a smart solar water pumping systems. The motivation is relevant and practical especially where energy availability is often unreliable.

.....

Novelty for application that intelligently switches between PV and grid power are demonstrated in this paper with descriptive modeling and results.

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Detailed Reviewer's Report

Overall the paper has a novel approach for solar powered water pumping system incorporating energy storage and a bidirectional power flow mechanism. The structure behind this framework can be truly be useful as it is practical and revelation particularly as mentioned in agricultural areas. The motivation are well defined with intelligently switching PV and grid power. Comprehensive simulation and experimental results were described on this paper. Technical depth is also a strong point for this paper especially when MATLAB modeling for theoretical foundation and covering multiple modes of operation. Minor Revision are needed overall to make it a comprehensible read.

Remarks for the author:

- ***Would suggest to add more power metrics(harmonic analysis for VSC) that would help make your case stronger to the reader.***
- ***For practical implementation, any consideration or future plans for component specs.***
- ***I would recommend to add flow chart to describe the flow of the control logic that you are implementing.***

- ***Formatting needs to be looked at overall on the paper:***

Example: Conclusion —- S seems larger in font

Figures:

- ***Figure 2: Caption should be more descriptive as the image is too detailed.***
- ***Highlight the function blocks that represents the system architecture so that the user can follows its path.***
- ***Figure 3 can use more highlighted edited image showing the characteristics (pros & cons) of the system***

References:

- ***Entries for 19 & 20 are duplicated.***
- ***Update the references— many of them are 20 years old. This is not good to make your case for the novelty of the project.***

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- ***Recent work from 2019 should be considered. (for IOT based PV monitoring, MPPT control with AI/ML)***

Lastly, the paper is well detailed with analysis and practical results. Would recommend formatting, language and grammar check to better have clarity on the general format for the paper.