

# Real-Time Wireless Energy Management System of Miniature Standalone Photovoltaic Application

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## **Abstract:**

Standalone photovoltaic (PV) system is practical and beneficial for the place where the physical power transmission line is not feasible. Nevertheless, for miniature scale standalone PV system, efficient and interactive energy management is extremely necessary to ensure that the battery is capable of supplying energy to the load uninterruptedly without any failure as its condition is being monitored, time by time. In this paper, a real-time energy management system equipped with wireless monitoring features has been developed and tested. All energy information such as battery voltage, generating current, discharging current, etc. are well displayed and extracted directly from the developed system. The high-power switching system is able to be controlled remotely as several MOSFETs attached to the main circuit are feasible to be flagged on or off via Blynk application instantaneously without any time lag. Therefore, the proposed system may become a good model for better small-storage-capacity based real-time energy management system in the future.

**Keywords :** Energy Management System; Real-Time Monitoring System; Solar Energy; Standalone Photovoltaic System

## REFERENCES

- [1] T. V. Thang, A. Ahmed, C. I Kim, and J. H. Park, "Flexible System Architecture of Stand-Alone PV Power Generation With Energy Storage Device," *IEEE Trans. Energy Convers.*, vol. 30, no. 4, pp. 1386–1396, Dec. 2015.
- [2] M. A. A. M. Zainuri, M. A. M. Radzi, A. C. Soh, and N. A. Rahim, "Development of adaptive perturb and observe-fuzzy control maximum power point tracking for photovoltaic boost dc-dc converter," *IET Renew. Power Gen.*, vol. 8, no. 2, pp. 183–194, Mar. 2014.
- [3] A. Belhamadia, M. Mansor, and M. Younis, "Hybrid diesel/PV system sizing and cost estimation," in *3rd IET International Conference on Clean Energy and Technology (CEAT) 2014*, 2014, pp. 1–5.
- [4] M. M. Nezami and M. Sarwar, "Characteristic modeling analysis and simulation of solar PV module," in *2015 Annual IEEE India Conference (INDICON)*, 2015, pp. 1–6.
- [5] X. Xiaoli and Q. Daoc, "Remote monitoring and control of photovoltaic system using wireless sensor network," in *2011 International Conference on Electric Information and Control Engineering*, 2011, pp. 633–638.