



Methodological Evaluation of Off-Grid Community Systems in Ghana: Time-Series Forecasting Models for System Reliability Measurement

Kwasi Afrimaa¹, Yaw Gyamfi²

¹ University of Cape Coast

² Department of Data Science, University for Development Studies (UDS)

Published: 19 November 2001 | **Received:** 14 June 2001 | **Accepted:** 26 September 2001

Correspondence: kafrimaa@hotmail.com

DOI: [10.5281/zenodo.18733471](https://doi.org/10.5281/zenodo.18733471)

Author notes

Kwasi Afrimaa is affiliated with University of Cape Coast and focuses on Computer Science research in Africa. Yaw Gyamfi is affiliated with Department of Data Science, University for Development Studies (UDS) and focuses on Computer Science research in Africa.

Abstract

The development of off-grid community systems in Ghana has been a subject of interest due to their potential to enhance energy access and sustainability. A comprehensive search strategy was employed using databases such as Web of Science and Google Scholar. Studies were selected based on inclusion criteria related to off-grid community energy systems in Ghana. Time-series analysis revealed that the average accuracy of forecasts improved by 15% when incorporating seasonal adjustment methods, indicating significant improvement in system reliability measurement. The review highlights the importance of using robust forecasting models for reliable system performance assessment and underscores the need for further research to validate these findings across different contexts. Researchers should consider validating their findings through additional empirical studies and explore integrating machine learning techniques for enhanced predictive accuracy. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{Vert}^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, Ghanaian, off-grid, sustainability, forecasting, reliability, econometrics, GIS*

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

✉ **REQUEST FULL PAPER**

Email: info@parj.africa

Request your copy of the full paper today!

SUBMIT YOUR RESEARCH

Are you a researcher in Africa? We welcome your submissions!

Join our community of African scholars and share your groundbreaking work.

Submit at: app.parj.africa



Scan to visit app.parj.africa

Open Access Scholarship from PARJ

Empowering African Research | Advancing Global Knowledge