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## REVIEWER'S REPORT

Manuscript No.: IJAR- 55171

**Title:** ENERGY CONSUMPTION FORECASTING MODELS FOR SMART GRIDS: A STATE-OF-THE-ART REVIEW AND APPLICATION PERSPECTIVES

**Recommendation:**
Accept

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

Reviewer Name: Dr. Ashish Yadav

## *Detailed Reviewer's Report*

**Reviewer's Comment for Publication.**

Acceptance Comment are mentioned below suitable for the paper titled "ENERGY CONSUMPTION FORECASTING MODELS FOR SMART GRIDS: A STATE-OF-THE-ART REVIEW AND APPLICATION PERSPECTIVES"

**Reviewer Comments: Accept**

**Reviewer Comments –**

### Introduction

The paper presents a timely and well-motivated study on energy consumption forecasting within smart grids, an area of growing importance due to increasing renewable energy penetration and the need for efficient power system management. The introduction clearly establishes the relevance of accurate forecasting for operational planning, demand balancing, and policy formulation. The problem statement is well-articulated, and the objectives of the study are aligned with current challenges faced by modern power systems, particularly in the context of data-driven decision-making and sustainability.

### Literature Review

The literature review is comprehensive and systematically structured, covering a wide range of forecasting techniques from classical statistical models to advanced deep learning approaches. The inclusion of recent studies (2020–2024) demonstrates the paper's relevance and awareness of the current state of the art. The comparative discussion of models such as ARIMA, SVM, Random Forest, and LSTM effectively highlights their respective strengths and limitations, providing a solid theoretical foundation for the study. The review also identifies clear research gaps, especially regarding model adaptability and data constraints in developing regions.

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**Methodology and Solution Approach**
The methodology is logically presented, with clear justification for the selection of forecasting models and evaluation metrics. The classification of approaches based on forecasting horizon, data characteristics, and computational requirements enhances the clarity and applicability of the study. The proposed solution approach, which emphasizes comparative analysis and the potential of hybrid and data-driven models, is both methodologically sound and practically relevant. The consideration of real-world constraints such as data scarcity and climatic variability further strengthens the methodological rigor.

**Results and Discussion**
The results are discussed in a coherent and insightful manner, with appropriate use of performance metrics including RMSE, MAE, MAPE, and $R^2$. The comparative synthesis effectively demonstrates how different models perform under varying conditions, offering valuable insights into their practical deployment. The discussion successfully links the findings back to the objectives of the study, highlighting scenarios where advanced machine learning and deep learning models outperform traditional approaches, while also acknowledging trade-offs related to complexity and interpretability.

**Conclusion**
The conclusion effectively summarizes the key contributions of the paper and reinforces its significance for both academic research and practical applications in smart grids. The proposed future perspectives on hybrid modeling and data-driven approaches provide a clear direction for further research, particularly in addressing challenges faced by developing countries. Overall, the paper is well-structured, technically sound, and makes a meaningful contribution to the field of energy consumption forecasting, warranting acceptance for publication.