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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 as it is .....

Accept after minor revision✓

Accept after major revision.....

Do not accept (*Reasons below*) .....

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

Reviewer Name: Dr. Umeshkumar Hiralal Chavan

Detailed Reviewer's Report:

1. Overall Evaluation

The manuscript presents a comprehensive and systematic state-of-the-art review of energy consumption forecasting models used in smart grid environments. It covers statistical models (ARIMA, SARIMA), neural network-based models (ANN, MLP, LSTM), and supervised machine learning algorithms (SVM, Random Forest, KNN). The review includes mathematical foundations, comparative performance analyses, applications, and a synthesis of strengths and limitations. The paper also includes future perspectives and highlights the need for hybrid and data-driven approaches, especially in regions with data scarcity and climatic variability.

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2. Strengths of the Manuscript

a. Comprehensive Literature Coverage

The manuscript thoroughly reviews models spanning classical time-series methods, deep learning architectures, and machine learning approaches. The synthesis includes detailed explanations, equations, and model architectures, enhancing technical rigor.

b. Clear Comparative Analysis

The tabulated comparisons among ARIMA/SARIMA, ANN/LSTM/MLP, and SVM/RF/KNN models help readers understand contextual suitability, strengths, and constraints. The discussion is supported by numerous recent studies (2020–2024), ensuring relevance.

c. Strong Methodological Framework

The review follows a structured methodology inspired by PRISMA, detailing search strategies, inclusion/exclusion criteria, data extraction, and model grouping, improving credibility and transparency.

d. High Significance to Smart Grid Research

The paper addresses an important topic critical for smart grid optimization, renewable integration, and demand management. The discussions on developing countries and hybrid approaches add significant value.

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3. Minor Revisions Required

a. Some Sections Contain Dense Technical Detail

While mathematically rigorous, certain derivations and architecture descriptions (e.g., ARIMA formulation, LSTM gates) may overwhelm general readers. Simplified summaries or visual aids may improve accessibility.

b. Writing Style and Grammar

Minor issues in sentence flow, punctuation, and word choice occur in several sections. A thorough language polishing is recommended.

c. Reference Formatting Issues

Some citation formats appear inconsistent, and certain references need alignment with the journal's required style. Cross-checking numbering and formatting is advised.

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d. Missing Practical Case Integration
Though the review cites several studies, the manuscript could benefit from a concluding comparative table summarizing *actual performance metrics* (RMSE, MAE, MAPE) from studies across all models.
e. Minor Redundancy
Some descriptions of advantages/limitations of similar models overlap and may be condensed for improved conciseness.

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4. Contribution to the Field
The paper offers a valuable and updated consolidation of forecasting methods for energy consumption in smart grids. Its inclusion of comparative analyses, mathematical formulas, and model architectures provides significant technical depth. The consideration of challenges—data scarcity, model complexity, and computational load—improves the real-world applicability of the review.

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5. Final Recommendation

The manuscript is technically strong, well-structured, and scientifically significant. With minor revisions to improve clarity, coherence, and presentation quality, it will be suitable for publication.

Recommendation: Accept with minor revisions