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Second International Conference on Advances in Energy and Environmental Engineering



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Dr. Vithalrao Vikhe Patil College of Engineering, Ahilyanagar, Maharashtra, India

in association with

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Editorial of the Special Issue ICAEEE 2026

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The Second International Conference on Advances in Energy and Environmental Engineering (ICAEEE) 2026 was organized by the Department of Mechanical Engineering, Dr. Vithalrao Vikhe Patil College of Engineering, Ahilyanagar, Maharashtra, India (affiliated with Savitribai Phule Pune University, Pune) on 30-31 Jan 2026 in hybrid mode (in-person and online), in association with the Technology Research and Innovation Centre, Pune, India.

Out of 76 received papers, five papers related to renewable energies are selected for inclusion in this Special Issue of the Journal of Renewable Energies (*Revue des Energies Renouvelables*). The selected papers are related to innovative approaches in solar energy utilization, energy storage, biofuel development and thermal management strategies showing a multidisciplinary effort toward achieving sustainable energy solutions.

The first paper in this issue is related with shade on solar panels. Solar panels lose power when parts of them are in the shade. This can happen due to trees, buildings or other objects. In this study, the researchers tested a special wiring method called Total Cross Tied (TCT) connection. They simulated 49 solar panels under four types of shade: corner, border, random and diagonal. They found that the TCT method keeps the system's efficiency nearly constant, even when shade is present. They also observed that when the fill factor increases, power loss decreases. This means the system uses energy more wisely. This work helpful to build better solar arrays that work well even in imperfect conditions.

Second paper is presenting the research about predicting solar power in Africa. Many African countries want to use more solar energy. However, they often lack long-term weather data and historical records. This makes it difficult to predict the power production by solar panels. In this paper, the authors compared different forecasting methods. They tested baseline models, machine learning, deep learning and hybrid models under four data-scarce situations. Their important finding is that no single model works best everywhere. When weather data is limited, classical machine learning works well. When only past power output is available, time-based models are better. This study provides a useful guide for choosing the right forecasting tool for African grids.

Third paper is presenting a research on improving small wind turbines with diffuser. This study includes nine different parametric models of straight converging-diverging diffusers with flanges. The researchers used computational fluid simulations to study the wind flow through each model. The analysis is carried out on the basis of average radial velocity and velocity variations. Among the nine models, the model S3 performed best. It had good average radial velocity and smooth wind flow. Three

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other designs (S7, S8 and S9) performed poorly. This detailed analysis helpful to decide a better diffuser model for small wind turbines.

Preparing bio-oil from wood waste is presented in the fourth paper. Fossil fuels are running out and cause pollution. One alternative is bio-oil made from wood waste. In this study, researchers used a special catalyst called green-synthesized zeolite-Y. They heated wood from the *Milicia excelsa* tree at different temperatures (400°C, 550°C and 700°C) and mixed it with the catalyst in different ratios. The best result came at 550°C with a 60/40 biomass-to-catalyst ratio. The bio-oil contained 59.59% phenols and had a heating value between 25.78 and 33.04 MJ/kg. This is close to fossil diesel. This means wood waste can be turned into a useful fuel for engines and transportation.

The fifth paper presents research on fast pyrolysis of two wood types. The authors used two types of wood: *Anogeissus leiocarpa* (AL) and *Cordia Milleni* (CM). They used a fast pyrolysis process at different temperatures. The best temperature was 550°C. At this temperature, AL produced bio-oil with 33.20 MJ/kg of energy and CM produced 33.33 MJ/kg. Both bio-oils had low nitrogen and sulfur content, which means they cause less pollution when burned. The study shows that these bio-oils can be used in internal combustion engines or as raw materials for chemical industries. This helps promote renewable energy and reduce pollution.

We extend our sincere thanks to all authors, keynote speakers, reviewers, session chairs, coordinators, technical teams and organizing committee members for their enthusiastic and dedicated contributions to the success of ICAEEE 2026. We are also grateful to the Journal of Renewable Energies for their support in publishing this Special Issue based on extended versions of selected ICAEEE 2026 papers.

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Table of Contents

Editorial	2 - 3
Impact of Partial Shade on Superior Pv Array Total-Cross-Tied Configuration <i>S. Naik and A. Naik</i>	5 - 23
Comparative Mathematical Benchmarking of Short-Term Photovoltaic Power Forecasting Model Families for Data-Scarce African Grids <i>P. Nyanor and A. Acakpovi</i>	25 - 41
Comprehensive Evaluation of Velocity Distribution Inside Flanged Straight Converging-Diverging Diffuser Models for Small Wind Turbines <i>D.S. Shastri, K. Kaware, V. Sulakhe and S.A. Kale</i>	43 - 58
Characterization of Bio-oil Produced by Green Synthesized Zeolite- Y Catalyzed Pyrolysis of <i>Milicia excelsa</i> <i>J.A. Oyeboji, P.O. Okekunle, O.E. Itabiyi and S.O. Oyedepo</i>	59 - 70
Assessment of Energy Potentials, Chemical Composition and Characterisation of Bio-Oil Yields Production from Fast Pyrolysis of Biomass Waste <i>J.A. Oyeboji, S.O. Oyedepo, O.O. Omolara and O.T. Oyeboji</i>	71 - 80