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B: Sustainable Energy

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About the section *B: Sustainable Energy*

Sustainable energy is a form of energy that is able to meet the energy demands of today without any detriment to the world and its inhabitants nor be in danger of expiring or becoming depleted, such that it can be reliably used over and over again. Sustainable energy should be widely promoted as it does not cause any harm to the environment and is widely available and free of cost.

Topics of interest for publication include but are not limited to:

1. Renewable Energy Sources
   - 1.1 Solar Power
   - 1.2 Solar Heating
   - 1.3 Wind Power
   - 1.4ManagingIntermittencyofSolarPowerandWindPower
   - 1.5 Hydropower
   - 1.6 Wave, Tide and Ocean Thermal Energies
   - 1.7 Bioenergy
   - 1.8 Geothermal Energy
   - 1.9 Other
2. Sustainable Energy Market and Industry Trends
   - 2.1 Trends for individual technologies
3. Sustainable Energy Policy
   - 3.1 Environmental
   - 3.2 Economic
   - 3.3 Sociocultural
   - 3.4 Socioeconomic and Policy

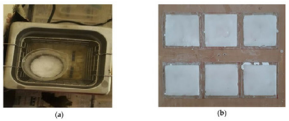
Content Highlights

DOI:10.3390/en13143582

Investigation of Inorganic Phase Change Material for a Semi-Transparent Photovoltaic (STPV) Module

Authors: Alagar Karthick, Muthu Manokar Athikesavan, Manoj Kumar Pasupathi, Nallapaneni Manoj Kumar, Shauhrat S. Chopra and Aritra Ghosh

Abstract: The semi-transparent photovoltaic (STPV) module is an emerging technology to harness the solar energy in the building. Nowadays, buildings are turning from energy consumers to energy producers due to the integration of the STPV module on the building envelopes and facades. In this research, the STPV module was integrated on the rooftop window of the experimental room at Kovilpatti (9°10′0″ N, 77°52′0″ E), Tamil Nadu, India. The performance of the STPV modules varies with respect to the geographical location, incident solar radiation, and surface temperature of the module. The surface temperature of the STPV module was regulated by the introduction of the mixture of graphene oxide and sodium sulphate decahydrate ($Na_2SO_4 \cdot 10H_2O$). The various concentration of the graphene oxide was mixed together with the $Na_2SO_4 \cdot 10H_2O$ to enhance the thermal conductivity. The thermal conductivity of the mixture 0.3 concentration was found to be optimum from the analysis. The instantaneous peak temperature of the semi-transparent photovoltaic phase change material (STPV-PCM) module was reduced to 9 °C during summer compared to the reference STPV. At the same time, the energy conversion efficiency was increased by up to 9.4% compared to the conventional STPV module. Due to the incorporation of the graphene oxide and $Na_2SO_4 \cdot 10H_2O$, the daily output power production of the STPV module was improved by 12.16%.



DOI:10.3390/en13051164

Multi-Criteria Decision-Making (MCDM) for the Assessment of Renewable Energy Technologies in a Household: A Review

Authors: Indre Siksnelyte-Butkiene, Edmundas Kazimieras Zavadskas and Dalia Streimikiene

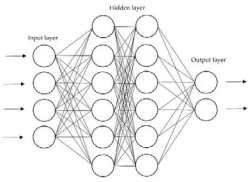
Abstract: Different power generation technologies have different advantages and disadvantages. However, if compared to traditional energy sources, renewable energy sources provide a possibility to solve the climate change and economic decarbonization issues that are so relevant today. Therefore, the analysis and evaluation of renewable energy technologies has been receiving increasing attention in the politics of different countries and the scientific literature. The household sector consumes almost one third of all energy produced, thus studies on the evaluation of renewable energy production technologies in households are very important. This article reviews the scientific literature that have used multiple-criteria decision-making (MCDM) methods as a key tool to evaluate renewable energy technologies in households. The findings of the conducted research are categorized according to the objectives pursued and the criteria on which the evaluation was based are discussed. The article also provides an overview and in-depth analysis of MCDM methods and distinguishes the main advantages and disadvantages of using them to evaluate technologies in households.

DOI:10.3390/en13153764

A Critical Review of Wind Power Forecasting Methods—Past, Present and Future

Authors: Shahram Hanifi, Xiaolei Liu, Zi Lin and Saeid Lotfian

Abstract: The largest obstacle that suppresses the increase of wind power penetration within the power grid is uncertainties and fluctuations in wind speeds. Therefore, accurate wind power forecasting is a challenging task, which can significantly impact the effective operation of power systems. Wind power forecasting is also vital for planning unit commitment, maintenance scheduling and profit maximisation of power traders. The current development of cost-effective operation and maintenance methods for modern wind turbines benefits from the advancement of effective and accurate wind power forecasting approaches. This paper systematically reviewed the state-of-the-art approaches of wind power forecasting with regard to physical, statistical (time series and artificial neural networks) and hybrid methods, including factors that affect accuracy and computational time in the predictive modelling efforts. Besides, this study provided a guideline for wind power forecasting process screening, allowing the wind turbine/farm operators to identify the most appropriate predictive methods based on time horizons, input features, computational time, error measurements, etc. More specifically, further recommendations for the research community of wind power forecasting were proposed based on reviewed literature.

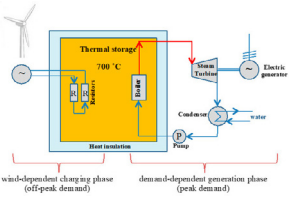


DOI:10.3390/en13020340

Thermal Energy Storage for Grid Applications: Current Status and Emerging Trends

Authors: Diana Enescu, Gianfranco Chicco, Radu Porumb and George Seritan

Abstract: Thermal energy systems (TES) contribute to the on-going process that leads to higher integration among different energy systems, with the aim of reaching a cleaner, more flexible and sustainable use of the energy resources. This paper reviews the current literature that refers to the development and exploitation of TES-based solutions in systems connected to the electrical grid. These solutions facilitate the energy system integration to get additional flexibility for energy management, enable better use of variable renewable energy sources (RES), and contribute to the modernisation of the energy system infrastructures, the enhancement of the grid operation practices that include energy shifting, and the provision of cost-effective grid services. This paper offers a complementary view with respect to other reviews that deal with energy storage technologies, materials for TES applications, TES for buildings, and contributions of electrical energy storage for grid applications. The main aspects addressed are the characteristics, parameters and models of the TES systems, the deployment of TES in systems with variable RES, microgrids, and multi-energy networks, and the emerging trends for TES applications.



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Deadline: **20 May 2022**

Modeling and Analysis of Biomass-to-Energy Supply Chains
Guest Editor: Dr. Fereshteh Mafakheri
Deadline: **30 April 2022**

Design and Optimization of Sustainable Energy Systems
Guest Editor: Prof. Dr. Sara Lumbreras
Deadline: **25 April 2022**

Advances in Energy Storage Systems for Renewable Energy
Guest Editors: Dr. Marcin Wołowicz, Prof. Dr. Krzysztof Badyda and Prof. Dr. Piotr Krawczyk
Deadline: **15 September 2022**

Renewable Energy Resource Assessment
Guest Editors: Dr. Hyun-Goo Kim, Prof. Dr. Iniyan Selvarasan and Prof. Dr. Charlotte Bay Hasager
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