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# Section

## G: Energy and Buildings



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#### Section Information

The aim of Energies' Energy and Buildings Section is to present new research results, and new proven practice aimed at reducing the energy needs of a building, improving building energy efficiency, and improving how energy is managed in buildings. Example topic areas within the scope of our journal's Energy and Buildings Section are listed below. This list is neither exhaustive nor exclusive:

- Sustainable buildings
- Energy consumption in buildings
- Building environmental control
- Intelligent buildings

## Featured Papers

DOI:10.3390/en14040878



### The Economic Effects of Electromobility in Sustainable Urban Public Transport

Authors: Oliwia Pietrzak and Krystian Pietrzak

Abstract: This paper focuses on effects of implementing zero-emission buses in public transport fleets in urban areas in the context of electromobility assumptions. It fills the literature gap in the area of research on the impact of the energy mix of a given country on the issues raised in this article. The main purpose of this paper is to identify and analyse economic effects of implementing zero-emission buses in public transport in cities.



The research area was the city of Szczecin, Poland. The research study was completed using the following research methods: literature review, document analysis (legal acts and internal documents), case study, ratio analysis, and comparative analysis of selected variants (investment variant and base variant). The conducted research study has shown that economic benefits resulting from implementing zero-emission buses in an urban transport fleet are limited by the current energy mix structure of the given country. An unfavourable energy mix may lead to increased emissions of SO<sub>2</sub> and CO<sub>2</sub> resulting from operation of this kind of vehicle. Therefore, achieving full effects in the field of electromobility in the given country depends on taking concurrent actions in order to diversify the power generation sources, and in particular on increasing the share of Renewable Energy Sources (RES).

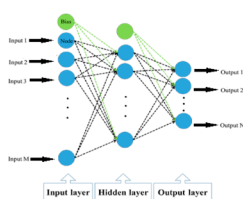
DOI:10.3390/en14061649



### Suggesting a Stochastic Fractal Search Paradigm in Combination with Artificial Neural Network for Early Prediction of Cooling Load in Residential Buildings

Authors: Hossein Moayedi and Amir Mosavi

Abstract: Early prediction of thermal loads plays an essential role in analyzing energy-efficient buildings' energy performance. On the other hand, stochastic algorithms have recently shown high proficiency in dealing with this issue. These are the reasons that this study is dedicated to evaluating an innovative hybrid method for predicting the cooling load (CL) in buildings with residential usage. The proposed model is a combination of artificial neural networks and stochastic fractal search (SFS-ANNs). Two benchmark algorithms, namely the grasshopper optimization algorithm (GOA) and firefly algorithm (FA) are also considered to be compared with the SFS. The non-linear effect of eight independent factors on the CL is analyzed using each model's optimal structure. Evaluation of the results outlined that all three metaheuristic algorithms (with more than 90% correlation) can adequately optimize the ANN. In this regard, this tool's prediction error declined by nearly 23%, 18%, and 36% by applying the GOA, FA, and SFS techniques. Moreover, all used accuracy criteria indicated the superiority of the SFS over the benchmark schemes. Therefore, it is inferred that utilizing the SFS along with ANN provides a reliable hybrid model for the early prediction of CL.



DOI:10.3390/en14010203



## The Analysis of the Factors Determining the Choice of Park and Ride Facility Using a Multinomial Logit Model

Authors: *Elżbieta Macioszek and Agata Kurek*

Abstract: The basic function of the Park and Ride (P&R) facility is to allow users to leave their vehicle on the outskirts of the city and to continue their journey to the city center using means of public transport, e.g., bus, tram, trolleybus, subway, train, or bike. In the first part of the paper, an analysis of the selected factors related to the functioning of P&R facilities in Warsaw (Poland) was performed. The main purpose of this paper was to identify and quantify the influence factors determining the choice of P&R facility during a journey. This analysis was performed for three hypothetical journey scenarios. A list of potential factors determining the choice of P&R facility during travel was compiled after conducting previous research in this area and studying the worldwide scientific literature on the subject. The structural parameters of the multinomial logit model were estimated based on the data from the survey conducted in Warsaw. The results of the analyses indicate that the decision to choose a hypothetical journey scenario depends on many factors, but primarily on the level of education, the number of years of having a driving license, age, the number of kilometers traveled during the year, and the performed activity.



DOI:10.3390/en14082072



## COVID-19 and Green Housing: A Review of Relevant Literature

Authors: *Arturas Kaklauskas, Natalija Lepkova, Saulius Raslanas, Ingrida Vetloviene, Virgis Milevicius and Jevgenij Sepliakov*

Abstract: This review presents an analysis of three hypotheses. The articles provide a specific perspective on green housing before, during, and post COVID-19. The validations of these hypotheses were performed by analyzing the scientific literature worldwide and by adding a statistical analysis of appropriate articles from the Scopus database. The purpose of this review is to overview the research written on housing developments during the upsurge of COVID-19 along with the responses from the green building sector, because this field appears to be rapidly emerging by the sheer volume of research studies currently undertaken. Foremost peer-reviewed journals covering construction, urban studies, real estate, energy, civil engineering, buildings, indoor air, management, economics, business, environmental studies, and environmental sciences that were published last year were selected for review. The review was conducted by applying a combination of various keywords and the criteria for paper selection, including sustainable building, green construction, green building, resource-efficient, a building's lifecycle, COVID-19, energy, water, consumption, health effects, comfort, occupant behaviors, policy, economy, Industry 5.0, energy-efficient retrofitting, and profit. Two, innovative elements in this study stand out when comparing it with the most advanced research on green housing before, during, and after COVID-19. The first innovation relates to the integrated analyses of COVID-19 pandemic, housing policies of countries and cities pertinent to COVID-19 that impact green housing and the wellbeing of their residents as well as the impact made by residents and a housing policy on the dispersion of COVID-19. This research additionally establishes that a green building analysis is markedly more effective when the analysis comprehensively covers the life process of a green building, the participating interest groups that have their own goals they wish to implement, the COVID-19 situation, and the external micro- and macro-level environments as a singular entity.



## Special Issue List in Section

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### **Application of Renewable Energy Sources (Solar, Geothermal, Wind, Biomass and Hydro Energies) in Buildings**

Guest Editor: Prof. Dr. Dorota Chwieduk

Deadline: **20 July 2022**

### **Algorithm and Intelligence for Optimizing Urban/Building Morphology**

Guest Editors: Dr. Alberto Barbaresi and Prof. Pascal YIM

Deadline: **20 July 2022**

### **Fault Identification and Fault Impact Analysis of Ventilation System in Buildings**

Guest Editors: Prof. Alireza Afshari, Dr. Jan Bendtsen and Dr. Samira Rahnama

Deadline: **20 July 2022**

### **Building Energy Management: Materials, Modeling, and Components**

Guest Editors: Dr. Ravi Anant Kishore and Dr. Marcus Bianchi

Deadline: **25 July 2022**

### **Energy Efficiency Solutions and Indoor Environmental Quality in Zero-Energy Buildings**

Guest Editors: Dr. Ludovico Danza and Dr. Lorenzo Belussi

Deadline: **20 August 2022**

### **Improving the Energy Efficiency of Buildings**

Guest Editors: Prof. Dr. Joao Miguel C. Sousa, Prof. Dr. Paulo Tavares and Prof. Hermano Bernardo

Deadline: **31 August 2022**

### **Advanced Energy Storage for Green Buildings**

Guest Editors: Dr. Xi Chen, Dr. Qinghua Yu and Dr. Xiaohui She

Deadline: **10 October 2022**

### **Low Energy and Carbon Footprint Building Materials - Waste Management and Recycling**

Guest Editors: Prof. Dr. Izabela Hager and Dr. Krzysztof Adam Ostrowski

Deadline: **1 December 2022**

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