

The Sustainable City: Advances in Renewable Energy and Energy Saving Systems

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Abstract: According to United Nations data, half of the world's population lives in cities and forecasts indicate that by the middle of the 21st century, this percentage will have increased to 65%. The increase in the urban population favors the creation of a network of interactions that entails a series of material and energy flows. These cause environmental impacts that affect the quality of life of citizens and the environment as a whole. According to data from the International Energy Agency, cities occupy 3% of the planet's surface and are responsible for 67% of global energy consumption. The effects caused by this consumption, as well as its impact on the depletion of resources, make it necessary to carry out an exhaustive study of renewable energies and new energy saving systems. This Special Issue aims to present new advances and developments in renewable energy and energy saving systems that allow cities to evolve in a sustainable way.

Keywords: zero-energy buildings; energy saving; renewable energy; sustainability and sustainable energy; smart grids; energy efficiency; bioclimatic architecture; sustainable transport; biomass; solar energy; wind energy; geothermal energy



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1. Introduction

The world is becoming increasingly urbanized. Since 2007, more than half of the world's population has been living in cities, and according to the UN, that number is expected to rise to 60% by 2030 [1]. Faced with this critical situation, the UN landed the 17 objectives that make up the so-called Sustainable Development Goals. These are 17 ambitious proposals to combat the world's major problems, such as poverty, climate change, inequality and the environment, among others.

Making cities and human settlements inclusive, safe, resilient and sustainable is Sustainable Development Goal 11 in the UN 2030 Agenda on Sustainable Development [1]. However, to achieve this goal, the following four fundamental aspects need to be taken into account [2]:

- Social development;
- Economic growth;
- Environmental protection;
- Institutional dimension.

According to Kennedy, Cuddihy and Engel-Yan (2007), a sustainable city would be one in which the input of material and energy resources and the disposal of waste do not exceed the capacity of the surrounding environment [3]. In order to achieve sustainability, cities face the following challenges:

- Reduce CO₂ emissions;
- Use energy efficiency and renewable energy sources;
- Generate and maintain green spaces in cities;

- Encourage urban mobility and public transport among citizens.

This Special Issue aims to present new advances and developments in renewable energy and energy saving systems that allow cities to evolve in a sustainable way.

Abdallah et al. conducted a review of the state of the art on Recycling Composite Waste Using Pyrolysis for Sustainable Development [4].

Ramez Abdallah et al. developed a simple neural network model to predict the annual radiation and estimate the optimum tilt angles for (PV) panels for all countries worldwide [5].

Aiman Albatayneh et al. compared different buildings that had undergone facade retrofitting to increase thermal comfort, such as increasing the external insulation layer and replacing window glazing or shading. The results show significant energy savings in the different buildings [6].

Aiman Albatayneh et al. studied the impact of more efficient lighting systems on the optimal windows-to-wall ratio of typical residential buildings in Jordan [7].

Enríquez Santiago et al. developed a methodology where three optimum permanent magnet synchronous generators (PMSGs) dimensions and several options that can be defined by the user from the maximum efficiency optimized PMSG to the minimum weight optimized PMSG were obtained [8].

2. Publication Statistics

Table 1 shows a summary of the number of authors who participated in this Special Issue and their country of origin according to their affiliation. A total of 22 authors from seven countries have contributed scientific studies related to the sustainability of cities.

Table 1. Authors' countries.

Number of Authors	Country
10	Mexico
4	Palestine
3	Jordan
2	Spain
2	Turkey
1	United Arab Emirates

3. Authors' Affiliations

Table 2 shows the affiliation of the 22 authors who participated in this Special Issue. For statistical purposes, only the first affiliation of each author has been considered.

Table 2. Authors' affiliations.

Author	First Affiliation	Country
Adel Juaidi	An-Najah National University	Palestine
Aiman Albatayneh	German Jordanian University	Jordan
Alberto-Jesus Perea-Moreno	Universidad de Córdoba	Spain
Antonio Verde Añorve	Universidad de Ciencias y Artes de Chiapas	Mexico
Emad Natsheh	An-Najah National University	Palestine
Francisco Manzano-Agugliaro	University of Almeria	Spain
Guillermo Ibáñez Duharte	Universidad de Ciencias y Artes de Chiapas	Mexico
Hüseyin Çamur	Near East University	Turkey
Jesús Antonio Enríquez Santiago	Universidad de Ciencias y Artes de Chiapas	Mexico
Joel Pantoja Enríquez	Universidad de Ciencias y Artes de Chiapas	Mexico
Jorge Evaristo Conde Díaz	Universidad de Ciencias y Artes de Chiapas	Mexico
Laura Vereá	Universidad de Ciencias y Artes de Chiapas	Mexico
Mahmut A. Savaş	Near East University	Turkey
Mhd Bashar AlKhatib	German Jordanian University	Jordan
Mustafa Jaradat	German Jordanian University	Jordan
Orlando Lastres Danguillecourt	Universidad de Ciencias y Artes de Chiapas	Mexico

Table 2. Cont.

Author	First Affiliation	Country
Quetzalcoatl Hernandez-Escobedo	Universidad Nacional Autónoma de México	Mexico
Ramez Abdallah	An-Najah National University	Palestine
Samer Abdala	Oilserv Company	United Arab Emirates
Sufyan Samara	An-Najah National University	Palestine
Geovanni Hernández Gálvez	Universidad Popular de la Chontalpa	Mexico
Rafael Dorrego Portela	Universidad del Istmo	Mexico

4. Topics

Table 3 shows the topics of the different scientific studies carried out on the sustainability of cities.

Table 3. Topics of the Sustainable city.

Topic	Number of Manuscripts	Reference
Recycling Composite Waste	1	[4]
Solar Photovoltaic Systems	1	[5]
Thermal Comfort	1	[6]
LED Lighting Technologies	1	[7]
Optimization of Wind Turbines	1	[8]

Author Contributions: Conceptualization, A.-J.P.-M. and Q.H.-E.; methodology, A.-J.P.-M. and Q.H.-E.; validation, A.-J.P.-M. and Q.H.-E.; formal analysis, A.-J.P.-M. and Q.H.-E.; writing—review and editing, A.-J.P.-M. and Q.H.-E. All authors have read and agreed to the published version of the manuscript.

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