
EDITORIAL

# *Editorial—Shaping Our Sustainable Future with Innovative and Green Technologies*

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Climate change, disruption of ecosystems, pollution, and other negative environmental aspects represent a pervasive and severe threat to biodiversity, public health, and well-being. Long-term exposure to environmental contaminants may increase susceptibility to certain diseases, enhancing also the (bio)accumulation of harmful chemicals in the ecosystems. Therefore, a common urge of the scientific community is directed to embark on ambitious and novel solutions to fight pollution and climate change. The emergence of novel, innovative and green solutions gives rise to the development and implementation of planning models and technologies aiming to reduce the environmental impact and substance emission.

The *Green Energy and Environmental Technology* (*GEET*) journal highlights the recent advances and emerging trends in research and development of technological innovations that could define, shape, and shift toward a sustainable future. Within the four sections, featuring *Renewable Energies*, *Environmental Engineering & Clean Technologies*, *Green and Sustainable Chemistry*, *Sustainable Energy Generation, Storage and Distribution*, the GEET journal provides insights into the emerging, in-depth, and forefront topics concerning environment and ecosystems, green growth and energy efficiency, waste management, and preservation of natural resources. The multidisciplinary concept of the journal encourages researchers to gather at the intersection of environmental engineering, ecology, geology, physics, chemistry, (micro)biology, mathematics, and economics. Moreover, the cross-disciplinary character of these sections merges fundamental, theoretical, computational, and experimental studies, emphasizing the possibility of practical applications.

Building sustainable cities and communities has emerged as a promising solution for reducing the strains on the environment and natural resources. An extensive study was conducted by Banda [1] on Kitwe's (Zambia) urban forest change monitoring during one sesquidecade by using a change vector analysis. The remote sensing and geographic information system analysis represented an assistive tool in providing insights into tracking parameters and degree of change progression or regression. Also, the optimal strategies for sustainable tree planting have been

forecasted. The results demonstrated that mining activities and urban expansion contributed to the change in land cover, while the change progression has shown geographical dependence. Several tree species have been suggested to be included in the greening program, aiming to improve air quality and reduce environmental pollution. Upon the publication of this paper, the supplementary materials were deposited in Figshare, making the data available and discoverable to the readers.

Furthermore, a study by Knoflacher [2] provides an overview of the key factors that crowned Vienna as the "greenest city" in 2020. The primary focus is on the impact of the transportation system and its evolution through time, as well as its role in recent Vienna urban development. These research topics are presented within the special issue "Sustainable Cities in Practice" led by Prof. Almusaed (Jönköping University, Sweden). The GEET journal has compiled four special issues in 2023, including discussed *Sustainable Cities in Practice*, *Urban Wastewater Treatment* (led by Prof. Derco and Prof. Zakhar—Slovak University of Technology in Bratislava, Slovakia), *Twin Transition: Digital Transformation for Sustainable Green Transition* (led by Prof. Petrillo and Prof. De Felice—Parthenope University of Naples, Italy), and *Hybrid Renewable-Hydrogen Green Energy Systems* (led by Prof. Ali and Prof. Atteya—Robert Gordon University, Aberdeen, Scotland, United Kingdom).

The transition to renewable energy has become an emerging topic for the scientific community, aiming to find economical, efficient and secure solutions for power generation. The authors Al-Ali *et al.* [3] investigated the potential of two renewable-hydrogen (solar-$H_2$ and wind $H_2$) configurations in a demonstrative renewable-powered farming community at Glensaugh (HydroGlen, Scotland). The scaling and capability assessment (compared to RINA's hybrid solar-wind $H_2$ proposal) for the commercial demands and the farm's residential power supply and transportation was also carried out. The preliminary results have shown that the systems met only 11% of the farm's commercial and residential demands and none of the transport fuel demands. The performance was enhanced with additional photovoltaic (PV) capacity, creating a hybrid $H_2$ configuration (PV-$H_2$). The hybrid PV-$H_2$ configuration was evaluated and demonstrated superior performance in supplying 35% of the residential and commercial demands from solar energy and 100% of the transport demands by grid-connected PV-$H_2$. The wind-$H_2$ configuration was capable of supplying most of the residential and commercial demands and about 44% of the transport demand by hybrid PV-$H_2$ configuration. The economic evaluation and analysis were also performed in order to determine the cost-effectiveness of developed techniques and strategies.

The GEET journal also published papers highlighting the latest developments in renewable energy technologies, including the study of the correlation between a concentric rotary piston compressor isolator size and performance efficiency [4]. The summary of the advantages and disadvantages of green and blue roofs

implementation in modern architecture and their impact on climate change mitigation has been investigated in the study by Valter Mai [5]. Although the green roof represents a vegetation layer and blue roofs are designed for stormwater management, the synergistic effect of green and blue roofs demonstrated superior performance.

Water is essential for life and future sustainability. Therefore, novel and mindful solutions are necessary to conserve and maintain water quality. In the study by El Aimani [6], a seawater desalination system using reverse osmosis was developed, and the process was simulated and optimized using Matlab Simulink software. The results have demonstrated a promising potential of water desalination in producing fresh water by employing the Matlab simulation and photovoltaic solar desalination system. Sustainable energy generation, storage, and distribution can be considered fundamental technologies for providing stability, continuity, and reliability for energy systems. The theoretical and practical research studying the conversion efficiencies of two types of Si photodiodes was reported by Saito and Takesawa [7]. The current–voltage characteristics were determined and measured at several wavelengths and irradiance levels to obtain factors and conversion efficiencies as a function of the wavelength and short circuit currents. Given the results, the prediction methods were experimentally verified with good agreement. An interesting study dealing with the main challenges in implementing green energy in distribution systems was provided by Desai [8]. The solutions for protection coordination are provided and solved using a genetic algorithm between auto recloser and fuse (test system).

One of the most significant concerns in the world today is proper waste storage and management. Rapid industrial growth is causing adverse impacts on the environment and leading to an increasing demand for novel waste management solutions. Biomass valorization is becoming an emerging trend aiming to develop more efficient and sustainable technologies and economy. The summary provided by the authors Boakye *et al.* [9] extensively discussed using biomass-derived materials as adsorbents in wastewater treatment. The common techniques for material characterization were also discussed, as well as the potential mechanisms of chemical species adsorption and future perspectives of using biomaterials in the sustainable removal of specific chemical species in wastewater.

Furthermore, agricultural waste and microorganisms represent a promising resource for electric energy generation, as discussed by Rojas-Flores [10]. Microorganisms possess the ability to divert electrons produced from microbial oxidation of reduced compounds. This system could be considered bioelectrochemical fuel cells that can generate electrical current. The impact of bacteria and alkaline augmentation on lignocellulose-rich biomass/substrate for biofuel production has been reported by Ugwu *et al.* [11]. The authors reported that

untreated lignocellulose as a substrate exhibits low biofuel yields, and employing the process of alkaline augmentation was demonstrated to be an efficient method of degrading the lignin content to enhance biofuel energy production. The impact of individual operating parameters and/or the interaction of various parameters (retention time and temperature) were investigated, while the process optimization on biofuel production was performed to maximize the biofuel yield using response surface methodology.

The GEET journal highlights cutting-edge technologies and advances in environmental studies and sustainable energy technologies. Although the journal covers a broad spectrum of topics (already mentioned in this Editorial paper), we especially welcome topics related to all aspects of renewable energy generation, storage and distribution, waste and biomass management and valorization, green technologies contributing to pollution prevention and reduction, monitoring, control, and prevention of environmental pollution.

In conclusion, maintaining and preserving our ecosystems and nature in our surroundings ought to be our common priority. The best way to wrap up the end of the year is by inviting all the researchers from respective fields to contribute to the journal with their valuable research.

As we step into 2024, we look forward to sharing and uniting the knowledge for a better tomorrow and a more sustainable future. Happy New Year!

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