



## EDITOR-IN-CHIEF'S WORD

It is my great pleasure to present another issue of Engineering Power to our readers. This issue brings together innovative research in energy engineering, with a focus on the urgent need for a transition toward sustainable, renewable energy sources, as the detrimental effects of fossil fuel reliance continue to challenge both our environment and global economies.

It highlights the pivotal role that energy engineering plays in facilitating this shift, alongside the increasing impact of digitalization in shaping smarter, more efficient technological solutions. The contributions in this issue not only reflect cutting-edge advances but also emphasize the importance of integrating environmental considerations into every stage of technological development.

Together, these papers aim to bridge gaps in addressing key global challenges related to energy and the environment. I hope that you find the insights and findings presented here to be both thought-provoking and impactful as we work together toward a more sustainable future.

Editor-in-Chief

Vedran Mornar, President of the Croatian Academy of Engineering



## EDITOR'S WORD

Dear readers,

I am pleased to introduce you to the Engineering Power issue, edited by Prof. Sandro Nižetić, PhD and Assoc. Prof. Goran Krajačić, PhD. Four publications cover the following topics: the novel battery charging control system, strategies to secure the green transition in China, a systematic review of thermal management of electric vehicle batteries and remote sensing methods to assess the Surface Urban Heat Island (SUHI) effect. This issue concludes with a report on the CAETS 2023 conference e2-mobility - Solutions and Opportunities, which took place in Zagreb from October 9-11, 2023. I hope you enjoy reading it!

Editor

Bruno Zelić, Vice-President of the Croatian Academy of Engineering



## FOREWORD

In modern and developed society the energy aspect plays a key role, and it can be considered as a major driver of global economies. Excessive utilization of fossil fuels for power generation in the past decades has caused sensible environmental issues that are becoming more severe, more frequent and unpredictable. Therefore, there is a clear necessity for a determined shift towards cleaner energy generation technologies that should be based on renewables. Advances and developments in energy engineering are playing pivotal role to meet desired shift from fossil-based technologies to renewables. Moreover, intense digitalization in various fields of engineering has become rapid and allowed different smart solutions in engineering. Digitalization can help to accelerate desired energy transition and in general can bring beneficial opportunities for humanity. However, novel developed technological solutions should consider also environmental implications, besides the performance and economic aspect. Environmental related problems are finally ending as economic problems; thus, all novel developed engineering solutions should be carefully evaluated from an environmental point of view. The environmental aspect is a key one to confirm and to secure long-term suitability of novel technological solutions in the field of engineering. The integration and targeted implementation of smart solutions can bring beneficial opportunities for humanity. This special issue brings new knowledge that contributes to bridge above mentioned key population challenges. This special issue consists of the overall four published papers. In the work Comparison of Conventional and Fuzzy Logic-based Charging Control Systems without and with State-of-Charge Estimator, the

novel battery charging control system was proposed, and that uses fuzz logic controller. The obtained simulations on lithium-titanate battery cell model proved that examined approach has potential to reduce charging time to about 17.7% when compared to the conventional constant-current constant-voltage charging control strategy. The work Energy development status and emerging technologies in China discussed strategies that will secure green transformation in China, with special emphasis on hydrogen-based technologies. The work delivered analysis of current state regarding energy supply system and provided in-depth discussion of future possible development strategies for China. The systematic review of battery thermal management systems for electric vehicles was provided in work A systematic review on battery thermal management systems for electric vehicles. Within the work effective thermal management strategies were discussed such as air-based cooling, cooling with phase change materials, heat pipe cooling, liquid cooling as well as hybrid cooling methods, to secure desired temperature rise in the battery. The work contributed to the present knowledge and deeper understanding of various cooling approaches for batteries in electric vehicles. The work Utilizing Satellite Remote Sensing and Geographic Information Systems for Assessing Urban Heat Island Effects as Urban Planning Tools for Emerging Economies considered remote sensing methods to assess the Surface Urban Heat Island (SUHI) effect. Landsat satellite spectral images were used to evaluate variations of land surface temperature and finally to estimate urban heat island intensity. The research outcomes indicated the importance of green infrastructure such as parks or green roofs for instance as they can significantly reduce urban heat island effect. The previously discussed contributions within this special issue contributed to the further development of smart technologies in energy engineering applications. The Guest Editors would like to thank the authors for their contribution as well as to the anonymous reviewers who have helped to improve the quality of published papers. Finally, we would like to thank Prof. Dr. Bruno Zelić for providing us with technical support for managing of this special issue.

Guest-Editors

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