



EDITOR-IN-CHIEF'S WORD

Dear Readers,

We are pleased to present this issue of *Engineering Power*, which brings together research and reflections at the intersection of engineering innovation, sustainability, and societal need. As the world faces growing challenges—from demographic shifts and energy demands to environmental constraints—engineering continues to play a pivotal role in shaping solutions that are both technically sound and socially relevant.

This edition highlights how interdisciplinary approaches, combining advanced technologies with practical applications, can drive progress in areas critical to our future. Whether in transportation, energy systems, or the built environment, the engineering community is responding with creativity, scientific rigor, and a clear sense of responsibility.

As always, the Croatian Academy of Engineering remains committed to fostering dialogue and collaboration across disciplines, institutions, and borders. We hope that the insights shared in these pages will inform, inspire, and contribute to the ongoing pursuit of knowledge and innovation.

Editor-in-Chief

Vedran Mornar, President of the Croatian Academy of Engineering



EDITOR'S WORD

Dear Readers,

In this issue of *Engineering Power* journal we continue the presentation of selected papers presented at the SDEWES conference series. The editor of the issue is Prof. Neven Duić, who has once again brought together contributions from various fields of environmental engineering. In this issue, we can read about the impact of partially automated trucking on the demand for human drivers, the use of shading systems to enhance energy efficiency, visual and thermal comfort and the synthesis, characterisation and electrochemical testing of hybrid electrocatalysts for fuel cell applications. I hope you enjoy reading this issue.

Editor

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



FOREWORD

With a broad vision of integrating diverse systems for long-term sustainability, the international conference series on the sustainable development of energy, water, and environmental frameworks began in the early 21st century. Now in its third decade since its founding in Dubrovnik, Croatia (2002), the call for such an integrated perspective is more urgent than ever. One of the key challenges lies in using surplus from one system as a timely input for another—essential for preserving Earth's life-support systems. Improving efficiency across interconnected domains like electricity, heating, cooling, transport, water, waste, industry, construction, forestry, and agriculture is central to reducing environmental impact while enabling development.

Engineering is well-placed to respond, but it must transcend disciplinary silos. The technical solutions needed to protect the environment without sacrificing modern comforts are inherently interdisciplinary—drawing on engineering fields alongside architecture, economics, agriculture, and forestry. This collection of studies spans transport automation, building energy efficiency, and fuel cell technology.

In the first case, partial truck automation could reduce driver demand by up to 60% on freeways and 25–41% overall, offsetting shortages in Germany's haulage industry—especially on long-distance routes [1].

The second study evaluates shading systems in Southern Italy, finding that dynamic shading can cut visual discomfort to negligible levels and lower cooling demand by 30%, though it increases lighting needs [2].

The third explores low-cost $\text{MnO}_2\text{-Fe}_2\text{O}_3$ hybrid catalysts as alternatives to platinum for fuel cells. Synthesized using coprecipitation and tested in alkaline solution, the hybrid showed the most efficient oxygen reduction performance [3].

References:

- [1] E. Jungblut, T. Grube, J. Linssen and D. Stolten, "The Impact of Partially Automated Trucking on the Demand for Human Drivers," *Engineering Power*, vol. 19, no. 4, pp. 2-8, 2024.
- [2] T. Testasecca, M. Bonomalo and M. Beccali, "Using shading systems to enhance energy efficiency, visual and thermal comfort in two case studies in Southern Italy," *Engineering Power*, vol. 19, no. 4, pp. 8-23, 2024.
- [3] Irfan, D. Astiaso Garcia, M. Della Pietra, S. Frangini and K. Imran Khan, "Synthesis, Characterization and Electrochemical Testing of MnO_2 , Fe_3O_4 and $\text{Fe}_3\text{O}_4\text{-MnO}_2$ Hybrid Electrocatalysts in Alkaline water for fuel Cell applications," *Engineering Power*, vol. 19, no. 4, pp. 24-31, 2024.

Guest Editor

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