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FOREWORD

It is our honor to present the 25th edition of the *SGEM GeoConference Proceedings 2025*. These peer-reviewed proceedings reflect the scientific work presented at the SGEM GeoConference - an international platform where **Geosciences and STEM** unite to create knowledge that supports a more sustainable and responsible future. SGEM stands on a foundational belief: science is valuable not because it is new, but because it is **true, useful, and serving society**.

This volume 25 / issue 4.1: *Energy and Clean Technologies* — brings together research studies on nuclear and hydrogen innovations, clean mobility, advanced energy storage, catalytic processes for renewable fuels, recycling technologies, industrial waste valorization, circular economy models, air quality, and pollution mitigation strategies. These themes directly support the United Nations Sustainable Development Goals: SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals).

Energy transition is one of the defining challenges of our generation. In this issue, researchers explore hydrogen-based systems, clean and small mobility, nuclear and catalytic innovation, renewable infrastructure vulnerability mapping, and circular processing of industrial by-products. Studies on recycling, waste-to-fuel conversion, and bioeconomy demonstrate that **sustainability is achieved not only by producing clean energy but also by reducing resource losses, minimizing pollution, and extending material life cycles**. Air quality studies and climate mitigation approaches reinforce the notion that technological progress must protect, not exploit, our planet.

All manuscripts included in these proceedings underwent a rigorous **double-blind peer-review** conducted by independent experts. Only papers demonstrating scientific integrity, originality, and meaningful contribution were accepted for publication. Every accepted manuscript receives an individual **Crossref DOI** and is permanently archived in the SGEM Digital Library, ensuring academic traceability, citability, and long-term preservation.

Demonstrating geographical and disciplinary diversity, the SGEM GeoConference unites researchers, professionals, and emerging scholars from over 25 countries across multiple continents, including developed and developing nations and diverse research traditions. What makes SGEM unique is its profound commitment to its core mission - **promoting Sustainability, fostering progress in Geosciences and Education, and supporting continuous scientific development.** Here, **the Earth** is not only studied - **it is respected.**

On behalf of the Editorial Board and the SGEM Scientific Committee, we express our sincere gratitude to all authors for their trust, to the reviewers for safeguarding scientific quality, and to all institutions supporting this global scientific initiative. Together, we transform knowledge into impact and ideas into progress.

We wish you inspiring reading and meaningful scientific achievements.

Sincerely yours,

Prof. Dr. hab. oec. Baiba Rivza

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