



Proceedings of the International Conference «European Green Dimensions: Fundamental, Applied, and Industrial Aspects», June 5–7, 2025





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The Proceedings covers such questions: European Green deal; Climate change; Energy efficiency, renewable energy; Conservation of biodiversity; Water resources management; Water quality, wastewater treatment; Protection of atmospheric air, environmental control and monitoring systems; Industrial and household waste management; Sustainable development and education for sustainable development.



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FOREWORD

Dear colleagues!

This collection of abstracts represents the culmination of the International Conference "European Green Dimensions: Fundamental, Applied, and Industrial Aspects," held on June 5–7, 2025, at Petro Mohyla Black Sea National University in Mykolaiv, Ukraine.

In an era where the planet's vital signs are flashing red, the International Conference isn't just timely – it's a critical intervention. We're operating in a complex system, where the European Green Dimensions represents a bold attempt to recalibrate humanity's relationship with Earth. This isn't solely about policy; it's a call to reimagine our industrial DNA, redefine energy itself, and resuscitate ecosystems gasping for breath.

From the thermodynamics of climate change to the intricate web of biodiversity, and from the chemistry of wastewater to the physics of renewable energy, the conference's scope mirrors the interconnectedness of the challenges. It's a recognition that sustainability isn't a niche concern—it's the operating system upgrade our civilization desperately needs. This isn't an academic exercise; it's a solution-focused sprint. The urgency is palpable, and the stakes couldn't be higher.

The Proceedings covers such questions: European Green deal; Climate change; Energy efficiency, renewable energy; Conservation of biodiversity; Water resources management; Water quality, wastewater treatment; Protection of atmospheric air, environmental control and monitoring systems; Industrial and household waste management; Sustainable development and education for sustainable development. The issues of ecology and sustainable development are of paramount importance and growing urgency for the future of humanity, demanding innovative solutions and collaborative efforts.

The International Conference attracted participants from a wide geographical distribution, fostering a rich exchange of ideas and perspectives. The contributions herein reflect the diverse approaches and innovative solutions being explored across various contexts.

It is our hope that the ideas presented within these pages will spark inspiration for further research, and facilitate the building of bridges for future collaboration and partnerships among scientists and practitioners.

We extend our sincere gratitude to the Erasmus+JM Programme, whose funding made this important event and this publication possible.

Prof. Olena Mitrysova

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Environmental Impact and Flows of Waste Batteries in China

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This paper analyzes the environmental impact of waste batteries. This study uses a quantitative analysis method, combined with China's battery production, sales, and import and export data (2014-2023) from the United Nations Commodity Trade Database and the China Battery Association report [1]. The Weibull life distribution model is used to estimate China's waste battery generation, and the calculation method is also based on the average life and recycling rate of batteries [2]. China's battery imports are generally on a downward trend, while exports are on an upward trend, especially for lithium batteries (including primary batteries and lithium-ion rechargeable batteries). With the continuous increase in battery production, the number of batteries on the Chinese market has increased in the past 10 years, although some types of batteries have decreased due to replacement by other batteries. According to our calculations, waste lithium batteries and lead-acid batteries are the main contributors to the growth of waste battery production, accounting for 99% of China's approximately 10.5 million tons of waste battery production. Further research prospects are to introduce more variables to improve the waste battery generation prediction model through dynamic model optimization.

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2. Song, X., Hu, S., Chen, D., & Zhu, B. (2017). Estimation of waste battery generation and analysis of the waste battery recycling system in China. *Journal of Industrial Ecology*, 21(1), 57-69. doi: <https://doi.org/10.1111/jiec.12407>

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