Preface

Recent Advances in Environmental Protection and Sustainable Engineering

Ravindra R. Navthar[1], Sandip A. Kale[2] and Amevi Acakpovi[3]

[1] Dr. Vithalrao Vikhe Patil College of Engineering, Ahilyanagar, India

[2] Technology Research and Innovation Centre, Pune, India

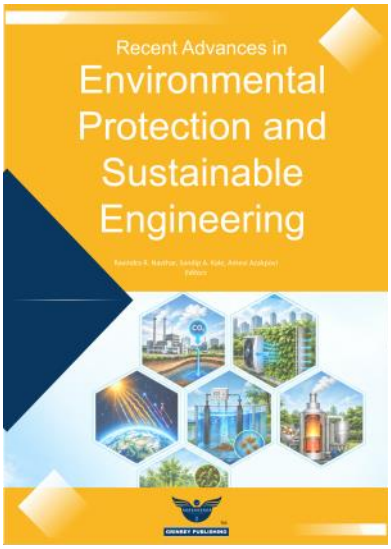
[3] Accra Technical University, Accra, Ghana

Online: 22 Oct 2026

Cite this article

Ravindra R. Navthar, Sandip A. Kale and Amevi Acakpovi (2026). Preface: Recent Advances in Environmental Protection and Sustainable Engineering. Research Transcripts in Energy, 2, *i-ii*.

DOI: https://doi.org/10.55084/grinrey/RTE/978-81-996627-6-6_0



Environmental protection and sustainable development are important challenges of the present time. Rapid industrial growth, urbanization, climate change, air pollution and wastewater generation have created serious environmental concerns. These problems require practical and scientific solutions. Engineering and technology can play an important role in reducing environmental damage and promoting the sustainable use of natural resources.

The book 'Recent Advances in Environmental Protection and Sustainable Engineering' brings together research on important environmental issues and their possible solutions. It presents studies on carbon emission reduction, air pollution control, climate change, wastewater treatment and sustainable waste management. The chapters discuss different approaches, methods and technologies that can support environmental protection.

The first chapter presents Carbon Capture, Utilization and Storage (CCUS) as a means of reducing carbon emissions from cement-based construction. Cement production is a major source of carbon dioxide emissions. The chapter reviews different carbon capture technologies, the use of captured carbon in construction materials and the economic and policy challenges involved in their implementation. It added the importance of developing low-carbon construction practices.

© 2026. This is an open access article and allows to use the as per CC BY-NC-SA 4.0 license.

The second chapter investigates the use of plants as natural air filters. Computational Fluid Dynamics (CFD) is used to study different arrangements of plant panels for removing particulate matter from air. The findings show that the zigzag arrangement provides better filtration performance than the other configurations studied. This research is useful for developing plant-based air purification systems.

The third chapter studies the relationship between solar activity, galactic cosmic rays and Earth's climate. It discusses changes in cosmic ray intensity and their possible influence on atmospheric processes and climate variability. The study also considers the limitations of the available evidence and the important role of greenhouse gases in recent climate change. It provides a useful perspective on the complex factors affecting Earth's climate.

The fourth chapter focuses on the removal of phenolic syntan from synthetic tannery wastewater using electrocoagulation. It studies the effect of operating conditions on pollutant removal and evaluates the treatment cost. The results show the potential of this method for improving wastewater treatment in the tannery industry.

The fifth chapter presents the development and experimental assessment of an induction-heated system for sanitary waste incineration. It examines the combustion behavior of different sanitary waste products and the energy required for treatment. The study explores the potential of this approach for managing sanitary waste and reducing its volume.

The sixth chapter reviews the possible use of genetically modified plants in constructed wetlands for wastewater treatment. It discusses how genetic modification may improve pollutant removal, plant tolerance and treatment performance. At the same time, it shows the need for careful biosafety assessment, environmental monitoring and suitable regulatory measures before such plants are used on a larger scale.

Hence, these chapters show that environmental protection requires a combination of scientific understanding, engineering innovation, experimental investigation and responsible decision-making. They also highlight the importance of considering cost, efficiency, safety and environmental impact while developing new technologies.

We thank all the authors for their hard work. We thank the reviewers for their time and careful comments.

We hope, this book will be useful to researchers, teachers, students, engineers and professionals working in environmental science, civil engineering, mechanical engineering and related fields. It may also encourage further research into practical solutions for environmental problems.