



University of Belgrade, Technical Faculty in Bor



# ECOTER

**30<sup>th</sup> International Conference Ecological Truth  
& Environmental Research  
2023**

# Proceedings

**Editor**  
**Prof. Dr Snežana Šerbula**







University of Belgrade, Technical Faculty in Bor



# ECOSOP

30<sup>th</sup> International Conference Ecological Truth  
& Environmental Research  
2023

# Proceedings

Editor  
Prof. Dr Snežana Šerbula





**30<sup>th</sup> International Conference  
Ecological Truth and Environmental Research – EcoTER'23**

*is organized by:*

**UNIVERSITY OF BELGRADE  
TECHNICAL FACULTY IN BOR (SERBIA)**

*Co-organizers of the Conference:*

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## TECHNOLOGICAL PROCESSES AS SOURCES OF POLLUTION IN THE ENVIRONMENT

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### Abstract

*This paper explores the impact of technological processes on environmental pollution. Technological processes are crucial elements of industrial activities, but at the same time, they can be a source of various types of pollution, including air, water, and soil pollution. The aim of this research is to analyze different technological processes and their impact on the environment, as well as to propose possible strategies for reducing negative effects.*

**Keywords:** technological processes, environment, pollution.

### INTRODUCTION

Technological processes are an integral part of modern industrial development and play a crucial role in the production of various goods and services. However, while these processes are vital for societal progress, they also have a significant impact on the environment. Environmental pollution has become one of the greatest challenges facing humanity today, and technological processes have been recognized as one of the main sources of this pollution. The aim of this research is to analyze in detail the impact of technological processes on environmental pollution. By studying different industrial sectors and their technological processes, we will investigate how these processes contribute to the emissions of harmful gases, wastewater, toxic substances, and other forms of pollution. This analysis will enable us to gain a better understanding of the scope of the problem and identify key areas where efforts need to be focused to reduce negative impacts. Through a comprehensive overview of the topic, this paper aims to raise awareness about the importance of recognizing technological processes as sources of environmental pollution. We also want to highlight the need for the development and implementation of strategies and practices that will mitigate the negative impacts of technological processes on the environment. Only through such a holistic approach we can build a more sustainable future where technological advancements go hand in hand with environmental protection.

### THE IMPACT OF TECHNOLOGICAL PROCESSES ON THE ENVIRONMENT

The development of industrialization worldwide and in our country is achieving increasing results, but at the same time, it is causing harmful consequences to the environment. Technological processes have undeniably transformed the way we live and have brought

significant advancements in various industries [1]. However, these processes also come with a profound impact on the environment. The extensive use of energy and resources, coupled with the release of pollutants and waste, has resulted in various forms of environmental degradation. It is crucial to examine and understand the consequences of these technological processes on the environment to develop sustainable strategies for mitigating their negative effects. One of the primary impacts of technological processes is the emission of greenhouse gases, contributing to climate change. Industries heavily rely on fossil fuels for energy generation, leading to the release of carbon dioxide, methane, and other harmful gases into the atmosphere [2].

These emissions trap heat and disrupt the Earth's climate system, causing rising global temperatures, altered weather patterns, and more frequent extreme weather events. Air pollution is a primary problem in areas where industrialization is developed. It particularly occurs in cities with heavy traffic, where combustion products from motor vehicles contribute to nearly 50% of pollution. Worldwide, there are millions of passenger cars on the roads, each emitting around 600 kg of harmful substances into the atmosphere annually [1].

This pollution poses serious risks to ecosystems, biodiversity, and human health. It can lead to the depletion of natural resources, contamination of drinking water sources, and the disruption of delicate ecological balances. In addition to direct pollution, technological processes also contribute to resource depletion. The extraction and consumption of raw materials, such as minerals, metals, and fossil fuels, for manufacturing and energy production, lead to habitat destruction and loss of biodiversity. Deforestation, mining activities, and unsustainable extraction practices further exacerbate the negative impacts on ecosystems and wildlife. To address these issues, it is crucial to implement sustainable practices and technologies that minimize the environmental footprint of technological processes. This includes transitioning to cleaner and renewable sources of energy, adopting circular economy principles to reduce waste generation and promote recycling, and implementing stricter regulations and standards for emissions and waste management. Additionally, promoting awareness and education about the environmental impact of technological processes can encourage responsible decision-making and drive innovation towards more sustainable practices. In the end, the impact of technological processes on the environment is undeniable. It is imperative to recognize and address these impacts to ensure a sustainable future. By adopting environmentally conscious practices, embracing clean technologies, and promoting responsible consumption and production, we can strive towards a harmonious balance between technological progress and the preservation of our environment.

## **THE IMPACT OF THE CHEMICAL INDUSTRY ON ENVIRONMENTAL POLLUTION**

The chemical industry plays a critical role in driving economic growth and providing a wide range of essential products. However, it also has a significant impact on environmental pollution. The production, use, and disposal of chemical substances can result in various forms of pollution that pose serious risks to ecosystems and human health. One of the primary concerns associated with the chemical industry is the release of toxic substances into the environment. Chemical manufacturing processes often involve the use of hazardous materials,



which, if not properly managed, can contaminate air, water, and soil. Accidental spills, leaks, and inadequate waste management practices can lead to the release of pollutants that have long-lasting effects on ecosystems and can accumulate in the food chain.

Air pollution is a major consequence of chemical industry activities. Emissions of volatile organic compounds (VOCs), nitrogen oxides ( $\text{NO}_x$ ), and sulfur dioxide ( $\text{SO}_2$ ) from manufacturing plants contribute to the formation of smog, acid rain, and the deterioration of air quality [3].

These pollutants have detrimental effects on human health, respiratory systems, and contribute to the greenhouse effect and climate change. Water pollution is another significant concern associated with the chemical industry. Effluents from chemical manufacturing facilities may contain various toxic substances, heavy metals, and other pollutants that, if discharged untreated, can contaminate water bodies. This contamination poses a threat to aquatic ecosystems, disrupts the balance of aquatic life, and affects the quality of drinking water sources. Furthermore, the improper disposal of chemical waste can have long-term consequences. Hazardous chemicals that are not adequately managed or disposed of can seep into the soil, contaminate groundwater, and persist in the environment for extended periods. This contamination not only affects the immediate vicinity of the waste site but can also spread through water systems, leading to far-reaching ecological and health implications.

To mitigate the environmental impact of the chemical industry, it is crucial to prioritize sustainable practices and technologies. This includes implementing stricter regulations and standards for waste management and emissions, promoting the use of cleaner and greener production processes, and investing in research and development of safer alternatives to hazardous chemicals [3].

Additionally, fostering transparency and accountability within the industry is essential to ensure responsible and environmentally conscious practices throughout the supply chain. In the end, chemical industry has a significant impact on environmental pollution. It is imperative to address these issues through proactive measures that prioritize sustainable practices, pollution prevention, and the development of safer alternatives. By promoting responsible chemical management and investing in greener technologies, we can strive for a more sustainable and environmentally friendly future.

## **THE IMPACT OF THERMAL POWER PLANTS ON ENVIRONMENTAL POLLUTION**

The impact of thermal power plants on environmental pollution is a significant concern. These power plants play a crucial role in electricity generation, but their operations often result in various forms of pollution that pose risks to the environment and human health. One of the primary concerns associated with thermal power plants is air pollution.

The combustion of fossil fuels, such as coal, oil, and natural gas, releases harmful emissions into the atmosphere. These emissions include sulfur dioxide ( $\text{SO}_2$ ), nitrogen oxides ( $\text{NO}_x$ ), particulate matter, and greenhouse gases like carbon dioxide ( $\text{CO}_2$ ). They contribute to the formation of smog, acid rain, and climate change, and have detrimental effects on air quality and respiratory health [2].

Thermal power plants also generate large quantities of ash and other solid waste as byproducts. These wastes often contain toxic substances, heavy metals, and other pollutants that can contaminate soil and water when not properly managed. Improper disposal and inadequate treatment of these wastes can lead to soil degradation, groundwater pollution, and the contamination of nearby ecosystems. Water pollution is another significant concern associated with thermal power plants. The cooling processes used in these facilities often involve withdrawing large amounts of water from nearby water bodies, such as rivers or lakes, for cooling purposes [2].

This withdrawal can disrupt aquatic ecosystems and harm fish and other aquatic organisms. Additionally, the discharge of heated water back into the source can lead to thermal pollution, affecting the temperature balance and ecological health of the water bodies. The extraction, transportation, and storage of fossil fuels for thermal power plants also have environmental consequences. These activities can result in habitat destruction, deforestation, and biodiversity loss. The exploration and extraction of fossil fuels can disrupt ecosystems, impact wildlife habitats, and contribute to the depletion of natural resources. To mitigate the environmental impact of thermal power plants, various measures can be implemented. These include adopting cleaner and more efficient technologies, such as advanced pollution control systems, to reduce emissions and improve air quality. Increasing the use of renewable energy sources, such as solar and wind power, can help reduce reliance on fossil fuels. Additionally, implementing proper waste management practices, including the safe disposal or recycling of ash and other solid waste, is crucial to minimize soil and water contamination. Furthermore, strict regulations, monitoring, and enforcement mechanisms are necessary to ensure compliance with environmental standards and promote responsible practices within the industry. Investing in research and development of innovative technologies and promoting energy conservation and efficiency can also contribute to reducing the environmental impact of thermal power plants. In conclusion, thermal power plants have a significant impact on environmental pollution. It is essential to address these concerns through the adoption of cleaner technologies, proper waste management practices, and the promotion of renewable energy sources. By prioritizing environmental sustainability and minimizing the negative impacts of thermal power generation, we can strive for a cleaner and healthier environment.

## **MEASURES TO REDUCE POLLUTION CAUSED BY TECHNOLOGICAL PROCESSES**

Measures to reduce pollution caused by technological processes are essential in promoting sustainable development and preserving the environment. Several strategies can be implemented to minimize the negative impact of these processes on air, water, and soil quality [3]. One effective measure is the adoption of cleaner production technologies. This involves implementing innovative techniques and equipment that minimize the generation of pollutants and waste during the manufacturing and production processes. By optimizing resource utilization and reducing emissions, cleaner production technologies can significantly reduce environmental pollution. Another crucial measure is the implementation of stringent environmental regulations and standards. Governments and regulatory bodies can establish and enforce strict guidelines to limit the release of pollutants into the environment. These

regulations can cover emissions control, waste management, and the use of hazardous substances. Compliance with these standards can help mitigate pollution and ensure that technological processes are conducted in an environmentally responsible manner. Promoting the use of renewable energy sources is another effective measure. By transitioning from fossil fuels to clean and renewable energy sources like solar, wind, and hydroelectric power, the reliance on environmentally harmful energy generation methods can be reduced. This shift not only helps in combating air pollution but also contributes to mitigating climate change. Additionally, waste management plays a crucial role in reducing pollution from technological processes. Implementing proper waste disposal and recycling practices ensures that hazardous materials and byproducts are handled safely and do not contaminate the environment.

Recycling and reusing materials can also reduce the extraction of raw resources and minimize waste generation. Furthermore, fostering awareness and education about the environmental impact of technological processes is essential. By promoting sustainable practices and providing information on the consequences of pollution, individuals and organizations can make informed decisions and take steps to reduce their ecological footprint. In conclusion, implementing measures to reduce pollution caused by technological processes is crucial for preserving the environment. By embracing cleaner production technologies, enforcing stringent regulations, promoting renewable energy, implementing proper waste management, and raising awareness, we can strive for a cleaner and more sustainable future [2].

## CONCLUSION

Technological processes are significant sources of pollution in the environment. The extensive use of energy, the release of harmful emissions, and improper waste management contribute to air, water, and soil pollution. To mitigate these negative impacts, it is crucial to adopt cleaner technologies, enforce stricter regulations, promote renewable energy sources, and prioritize responsible waste management. By doing so, we can strive towards a more sustainable future where technological progress and environmental preservation go hand in hand.

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