MINING MANAGEMENT STRATEGY TOWARDS CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT

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Abstract: *Mining is an important economic branch in Serbia, because it is highly dependent on coal in the production of electricity. About 70% of electricity in Serbia is produced in coal-fired thermal power plants. Viewed in the long term from the perspective of the declared Green Transition until 2035, it is clear that coal exploitation will decrease in the coming years. However, it cannot happen quickly. It is estimated that coal will still remain the main source of energy until 2050, in permanent or reserve operation. In order for this transition to be realized, it is necessary to first provide appropriate renewable energy sources that enable safety and stability in the production of electricity, which is not a simple goal. Complex technological processes in mining as an economic branch facing the big tasks of transition to a green future and a sustainable economy require a responsible attitude and the application of the modern and innovative methods of environmental protection. That is why the rehabilitation of the environment during and after the exploitation of ore deposits is an important and promising research area. Modern methods of artificial intelligence help to find better solutions for recultivation, revitalization and arrangement of degraded areas and mining pits faster. This research will not only look for solutions in the field of compensation and/or environmental restoration in the mining industry, but will also make a step forward towards the use of some mining residues and their recycling. The goal is to use them as raw materials in another economic branch. The motive is environmental protection with zero waste reduction. The task is to introduce a circular economy. For a linear economy in which raw materials are only used and waste is deposited, and the environment is polluted, it has long been understood that it is an unsustainable and outdated approach. Sustainable development requires that the principles of circular economy be applied in mining, and artificial intelligence as a modern tool in the function of finding advanced solutions for environmental restoration and reuse of discarded raw materials helps in*

achieving those goals. The research presented here improves the economics of the mineral-raw material complex and upgrades it to the level of sustainable mining.

Key words: MINING, DEVELOPMENT MANAGEMENT, ENVIRONMENTAL PROTECTION, ARTIFICIAL INTELLIGENCE, CIRCULAR ECONOMY, SUSTAINABLE DEVELOPMENT

INTRODUCTION

Mining is a key industry that contributes to the economy globally. It includes the exploitation of mineral resources such as coal, metal ores, mineral oils and gases, and precious metals. This industry provides raw materials for various sectors, including construction, metal fabrication, energy and chemical industries.

The importance of mining for the economy is manifold. First, the mining sector provides jobs and encourages local economic development in the communities where mineral resources are located. Second, mining generates significant revenue from the export of mineral resources, which contributes to the country's trade balance. Also, mines provide the raw materials necessary for the production of a wide range of products, which supports the growth of other industries.

However, mining also brings challenges, such as the environmental impacts of exploitation, social tensions and potential risks to worker safety. It is therefore important that mining companies follow the best practices of sustainable development in order to minimize the negative effects and contribute to the long-term prosperity of the economy.

The key indicators of the development of mining in Serbia, are presented through the following aspects:

- Production of mineral resources: Serbia has significant reserves of mineral resources, including copper, gold, silver, lead, zinc, bauxite, lignite and other ores. The production of these raw materials plays a key role in the country's economy.
- Investments in the mining sector: Investments in research, development and exploitation of mineral resources are an important indicator of mining development. Serbia attracts foreign investors who invest in mining projects.
- Export of mineral raw materials: The export of mineral raw materials, especially copper and other metals, constitutes a significant part of the total export of Serbia. It contributes to the country's trade balance.
- Employment: Mining provides a significant number of jobs directly in mines and related industries such as metallurgy and chemical industries. Employment in mining contributes to the reduction of unemployment and the economic development of communities.
- Regulation and infrastructure: The development of mining in Serbia also depends on the regulatory framework and infrastructure capacities. Effective regulation and adequate infrastructure are key to supporting the growth of the mining sector.

Together, these indicators provide a picture of the development of mining in Serbia and its contribution to the country's economy. The share of mining in Serbia's GDP varies

from year to year in accordance with changes in the production of mineral raw materials and other factors. However, mining constitutes a relatively small part of Serbia's total GDP, usually less than 5% [1]. Compared to other sectors such as agriculture, industry or the service sector, mining often accounts for a smaller share of GDP. However, although it may not account for a significant portion of GDP, mining can have a significant impact on the economy through mineral exports and job creation.

The share of mining in the GDP of other countries of the world also varies depending on many factors, including geological resources, economic policies, and the diversity of the economy. For example, countries that are rich in mineral resources such as Australia, Canada and South Africa may have a significantly higher share of mining in their GDP compared to other countries [2].

In some countries, mining can account for a significant portion of GDP, especially if they are based on the extraction of oil, gas or other precious minerals. However, in many developed economies, mining's share of GDP is relatively small due to a greater focus on service industries, technology and manufacturing.

According to statistical data from the report, e.g. According to the Australian National Statistics Agency, as well as international organizations such as the World Bank or the International Monetary Fund, in Australia, in 2020, mining accounted for about 7% to 8% of Australia's GDP [3]. Mining averaged about 5% to 6% of Canada's GDP from 2015 to 2020, according to Canada's Department of Natural Resources [4]. According to data from the Statistics Department of South Africa, the share of mining in the country's GDP in 2020 was about 7% of South Africa's GDP [5].

The research in this paper focuses on the most common ore in exploitation in Serbia, which is coal. Serbia has balance reserves of 3.5 x 109 t of coal, of which 87% is lignite, 10% is coal of the brown-lignite type, and only 2% is pure brown coal and 1% is hard coal [6]. The green transition by 2035 will cost Serbia 8.5×10^{12} euros, according to the management projects of the mining development strategy, carried out by EPS and the Ministry of Energy and Mining. Of that, 2.2×10^{12} would be spent on the reconstruction of existing systems, 5.8×10^{12} on the creation of new replacement capacities, and 0.5×10^{12} on environmental protection [7].

METHODOLOGY

This manuscript summarizes the results of the latest research in the fields of mining, energy, environmental protection, circular economy and sustainable development. The research in this paper is based on desk research and literature review, with case study methodology of the positive world practice.

The goal is to answer the following questions from the perspective of the circular economy and sustainable mining perpectives:

- How do changes in energy policies affect the exploitation of coal?
- What are the latest strategical innovations in mining and how are they applied?
- What are the main environmental challenges associated with coal mining?
- What are the best practice case sudies in the world?

The methodological holistic approach to research in this manuscript includes a complex and organized procedure, starting from logical principles and principles according to established phases. For the purpose of creating this work, the following general and special scientific methods are used:

- Systematized data collection and analysis of the latest existing, world-recognized scientific results in the field of assessment and management of mineral raw materials, strategic management, environmental protection, circular economy and sustainable development;
- Methods of induction and deduction, analysis and synthesis, as well as the method of analogy.
- The collected data are processed using statistical methods using Microsoft Excel and IBM SPSS Statistics 24 software packages.

RESULTS AND DISCUSSION

CIRCULAR ECONOMY IN MINING

The circular economy is a model of economic development that emphasizes maximizing the use of resources, minimizing waste, and creating sustainable material flows throughout the product life cycle [8]. In the mining sector, the application of the circular economy can significantly reduce the ecological footprint, improve resource efficiency and contribute to more sustainable development. This chapter explores ways in which circular economy principles can be implemented in mining, including resource optimisation, material reuse and recycling, as well as innovation in technologies and business models. Resource optimization is key to a circular economy in mining. This implies more efficient use of raw materials, reduction of waste and minimization of negative impacts on the environment. The main stand points are:

- Efficiency in exploitation: Advanced technologies, such as automation and artificial intelligence (AI), can improve the accuracy and efficiency in exploitation of ore deposits. For example, using AI to analyze geological data allows mining companies to more accurately identify rich zones and reduce the amount of tailings mined.
- Waste management: Waste generation during mining activities can be reduced through better management of processes and materials [9]. Using techniques such as dry separation can reduce the need for water and the production of mining mud.
- Restoration of resources: After the end of exploitation, mining areas can be restored through the processes of reclamation, returning the land to its natural state and restoring the ecosystem. This approach not only reduces negative impacts on the environment, but can also create new economic opportunities, such as tourism and agriculture.

The reuse and recycling of materials are key principles of the circular economy [10] that can be applied in mining to reduce the need for new exploitations and preserve natural resources. The most important are:

- Recycling of mining waste: Mining waste, such as tailings and waste rock, often contains useful materials that can be recycled. For example, hydrometallurgical techniques can be used to extract metals from mining waste, reducing the need to exploit new ore deposits.
- Metal recycling: Metallurgy can play a key role in the circular economy. Recycling metals from waste products and industrial waste can significantly reduce energy consumption and greenhouse gas emissions compared to primary metal production. For example, aluminum recycling consumes only 5% of the energy needed to produce new aluminum from ore.
- Reuse of mining facilities: Mining facilities and infrastructure can be reused for other purposes after the end of exploitation. For example, abandoned mines can be turned into warehouses, tourist attractions or even fish farms. This approach not only reduces the ecological footprint, but can also create new sources of income for local communities.

Implementing a circular economy in mining requires innovation in technologies and business models [11] that support sustainability and resource efficiency within:

- Green technologies: The use of green technologies, such as renewable energy sources, can reduce the environmental footprint of mining activities. For example, solar panels and wind turbines can provide energy for mining operations, reducing dependence on fossil fuels and CO_2 emissions.
- Digitization and AI: Digitization of mining operations can improve efficiency and reduce waste through better planning and resource management [12]. AI can help analyze geological data, optimize mining processes and predict risks, enabling more efficient use of resources.
- New business models: Business models that support the circular economy, such as product-as-a-service and closed-loop systems, can enable more sustainable development in mining. For example, instead of selling metal, companies can offer rental services or recycling products, thereby extending the life of the material and reducing the need to exploit new resources.

The implementation of the circular economy in mining has significant social and economic aspects [13] at the same time, including the creation of new jobs, the improvement of the quality of life of local communities and the reduction of social tensions through:

- Employment and education: Through circular business models, new jobs can be created in the fields of recycling, reuse and sustainable technologies. Educating and training the workforce for these new sectors can improve economic opportunities and reduce unemployment in mining communities.
- Quality of life: Sustainable mining practices and land reclamation can improve the quality of life of local communities. For example, the transformation of mining areas into green areas and recreational zones can improve living conditions and create new economic opportunities through tourism and recreation.

- Reducing conflicts: Implementing a circular economy can reduce conflicts between mining companies and local communities through transparent resource management, community involvement in decision-making and compliance with environmental standards. This approach can increase trust and cooperation between different actors.

An extraordinary reuse function could be faund within the former, abanded salt mine in Transylvania in Romania. The mining pits that are no longer used for salt exploitation are now reorganised in to health center for the rehabilitation of lung diseases, amphitheatres, salt museum and amusement park with playground for children and sport fields, Figure 1. The tourists can play billiards, mini-golf, bowling, handball, football tennis, badminton, mini-basketball and boat ride on underground lake, or enjoy in artist sculptures made in rock salt.

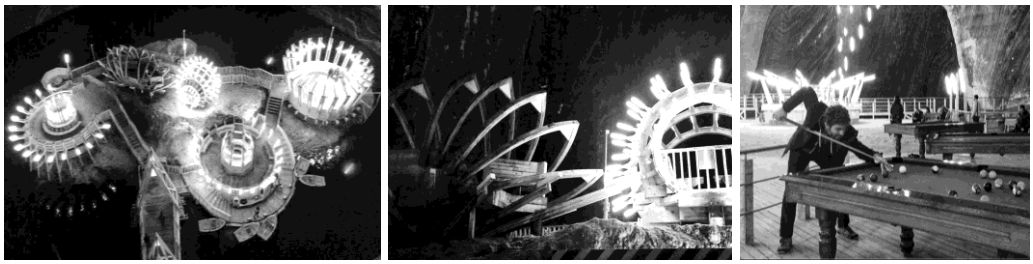

Figure 1, A tourist attraction in former Theresa Mine pesent the symbol and a source of benefit, prosperity and pride for Turda local comunity (figure taken by the author)

Positive examples from practice illustrate how the circular economy can be successfully implemented in mining. The Belgian company Umicore is a leader in metal and battery recycling [14]. Their recycling processes enable the extraction of valuable metals from electronic waste, reducing the need for primary ore mining. The Indian company Tata Steel [15] has implemented circular principles in its production, including the recycling of steel and the use of waste as a raw material for the production of cement. This approach reduces waste and improves resource efficiency. Some mining companies use recycling and material reuse technologies to reduce waste and improve resource efficiency. Their projects include the recycling of copper and aluminum, as well as the reuse of mining waste to build roads and infrastructure.

The circular economy in mining represents a sustainable and innovative approach that can significantly reduce the ecological footprint, improve resource efficiency and contribute to sustainable development. Through optimization of resources, reuse and recycling of materials, as well as innovations in technologies and business models, the mining sector can become an example of sustainability and responsible management of resources. The implementation of the circular economy requires cooperation between mining companies, government, local communities and other actors, but it brings significant economic and environmental benefits that are crucial for the future of the mining sector and the conservation of natural resources.

TRENDS IN COAL EXPLOITATION IN SERBIA UNTIL 2050

Analysis of trends in coal exploitation in Serbia until 2050 requires consideration of several key factors, including changes in energy policies, environmental regulations, economic conditions, as well as technological innovations in the field of mining and energy. Coal exploitation in Serbia represents a key energy sector [16], but also a challenge due to environmental and economic aspects. Coal mines such as Kolubara and Kostolac play a significant role in the production of electricity, providing about 2/3 of the country's total electricity. However, trends point to changes that will shape the future of the mining industry by 2050. Although coal production in the largest countries of the world and in Serbia is increasing [17], see Table 1, one of the main goal is the gradual reduction of coal production.

Table 1, Coal production in millions of tons in the largest countries of the world and in Serbia (https://www.iea.org/)

Year	China	USA	India	Indonesia	Australia	Russia	Serbia
1980	620	830	119	10	96	200	19
1990	1070	997	200	13	120	225	22
2000	1380	1023	320	70	298	250	29
2010	3240	985	570	270	449	334	38
2020	3680	486	760	500	493	398	40
2023	4100	520	850	550	508	405	42

The European Union and international pressures to reduce carbon dioxide emissions influence Serbia to adapt its energy policies. In accordance with the Paris Agreement and the EU Green Deal [18], Serbia is expected to significantly reduce the use of fossil fuels, including coal, and increase the share of renewable energy sources. It is projected that by 2030 coal production will decrease significantly, and by 2050 it should be reduced to a minimum.

Since coal exploitation has to decline, in the transition period it will be necessary to modernize existing technologies in order to reduce greenhouse gas emissions. Implementing carbon capture and storage (CCS) technologies can help reduce the environmental footprint of coal-fired power plants. Also, improving the energy efficiency of existing plants will reduce the total consumption of coal.

At the same time, Serbia will have to diversify its energy sources in order to reduce its dependence on coal. This includes increasing investment in renewable energy sources such as wind, solar, hydropower and biomass. Numerous projects aimed at increasing the capacity of renewable sources have already been started, and new ones are planned. This diversification will help to mitigate the economic and social effects of the transition from coal to sustainable energy sources.

Socio-economic impacts and the transition of the workforce from the coal mining sector to other energy sources will have a significant impact on local communities that depend on the mining sector. A key aspect of this process will be a socially responsible transition

that will provide retraining and new jobs for workers from the coal sector. The development of new industries and technologies can create employment opportunities in the sectors of renewable energy sources, energy efficiency and sustainable development.

The success of the transition will depend on the political framework and investments. Serbia must adopt clear strategies and plans that will encourage investments in the modernization of the energy sector and the development of renewable energy sources. Cooperation with international institutions and funds can provide financial and technical support. Policies that encourage research and innovation, as well as favorable regulatory frameworks, will be key to attracting domestic and foreign investment.

Achieving climate goals and all sustainable development goals will be a central aspect of future coal mining policies. Serbia is obliged by international agreements to reduce greenhouse gas emissions and increase the share of renewable sources in the energy mix. Implementation of these goals will require strict emission control measures, improvement of energy efficiency and gradual elimination of subsidies for fossil fuels.

Coal mining in Serbia faces significant changes in the coming decades. Reduction of production, modernization of technologies, diversification of energy sources and socio-economic impacts of the transition will be key factors. Investments, political will and international cooperation will be essential for a successful transition to a more sustainable and environmentally friendly energy system. These changes will not only contribute to the reduction of greenhouse gas emissions, but will also open up new opportunities for economic development and employment, creating the basis for Serbia's long-term energy security.

COAL AS THE MAIN SOURCE OF ENERGY UNTIL 2050?

Coal has long been a key energy source for many countries around the world, thanks to its availability and relatively low cost [19]. However, due to the negative impacts on the environment and human health, as well as the growing awareness of climate change, the role of coal in the global energy mix is increasingly being questioned. This chapter explores the future of coal as a primary energy source until 2050, including economic, environmental and technological aspects.

The economic attractiveness of coal lies in its relatively low price and large reserves available worldwide. Many countries with significant coal reserves, such as China, India, Russia and the United States, rely on coal as a major component of their energy mix:

- Cost and Availability: Coal is often cheaper than other fossil fuels, such as oil and natural gas, making it an attractive choice for power generation and industrial use. Its wide availability and relatively stable prices enable energy security for countries that possess it in large quantities.
- Employment and economic growth: The mining industry is a significant source of employment in many countries. The shift away from coal to alternative energy sources can cause social and economic problems, including job losses and income declines in mining communities. Therefore, the economic transition to

more sustainable energy sources requires careful planning and support for the affected communities.

Although coal is economically attractive, its environmental impacts are significant and often negative. Burning coal produces a large amount of carbon dioxide (CO_2), the main greenhouse gas, as well as other pollutants such as sulfur dioxide (SO_2), nitrogen oxides (NOx) and particles that harm human health:

- Climate change: Coal is one of the main sources of CO_2 emissions, which contributes to global warming and climate change. According to the International Energy Agency (IEA), burning coal is responsible for approximately 40% of global CO_2 emissions from the energy sector. In order to achieve the goals of the Paris Agreement and limit the increase in global temperature, it is necessary to significantly reduce the use of coal.
- Air pollution: In addition to CO_2 emissions, burning coal produces other pollutants that negatively affect air quality and human health. Sulfur dioxide, nitrogen oxides and particulate matter from coal can cause respiratory problems, cardiovascular disease and other health problems. Many countries, especially those with high levels of pollution, are introducing stricter regulations to reduce these emissions and improve air quality.

Technological progress can play a key role in reducing the negative impacts of coal on the environment and improving its sustainability. There are several technological solutions that can help reduce emissions and pollution from coal:

- Carbon Dioxide Capture and Storage (CCS) Technologies: CCS technologies enable the capture of CO_2 from energy and industrial plants and its storage in underground formations. Although these technologies can significantly reduce CO_2 emissions, their widespread application is still limited by high costs and technical challenges.
- Cleaner combustion processes: Improvements in combustion technologies, such as supercritical and ultra-supercritical boilers, can increase the efficiency of coal-fired power plants and reduce emissions. These technologies enable the production of more energy with less coal consumption and lower emissions per unit of energy produced.
- Cogeneration and integrated systems: Cogeneration plants, which simultaneously produce electricity and heat, can improve overall energy efficiency and reduce emissions. Integrated systems that combine coal with renewable energy sources, such as solar and wind power, can contribute to reducing the overall ecological footprint.

Data on greenhouse gas emissions per unit of coal produced [20] were statistically processed for each of the largest countries and for Serbia in different years and presented in Table 2. The decrease in greenhouse gas emissions is evident, which is the result of the application of technological progress.

Table 2, Contribution of contemporary technologies to the reduction of greenhouse gas emissions (kg CO_2 per ton of coal) in the largest countries of the world and in Serbia (https://app.electricitymaps.com/map)

Year	China	USA	India	Indonesia	Australia	Russia	Serbia
1980	1000	950	1100	1200	900	1000	1050
1990	950	900	1050	1150	850	950	1000
2000	900	850	1000	1100	800	900	950
2010	800	750	900	1000	700	800	850
2020	700	650	800	900	600	700	750
2023	650	600	750	850	550	650	700

The future of coal as a basic energy source in Serbia also depends on political and social factors. Many countries are introducing policies to support the transition to sustainable energy sources, while others retain coal as a key part of their energy strategy:

- Regulations and policies: Many governments are introducing stricter regulations to reduce emissions from coal and promote the use of cleaner energy sources. The implementation of these regulations can accelerate the transition to more sustainable energy systems. For example, the European Union has set ambitious targets for reducing emissions and increasing the share of renewable energy sources by 2030.
- International agreements: Global agreements, such as the Paris Agreement, set targets for reducing greenhouse gas emissions and promote the transition to renewable energy sources. These agreements play a key role in shaping energy policies and encouraging the global transition to more sustainable energy sources.
- Public awareness and pressure: Growing awareness of environmental issues and public pressure can encourage governments and companies to accelerate the transition from coal to clean energy sources. Research in the field of protection

By 2050, the future of coal as a primary energy source will depend on the balance between economic, environmental, technological and political factors. Although coal is likely to remain part of the energy mix in some countries [21], global trends point to a gradual reduction in its use and a shift to more sustainable energy sources:

- Phase-out: Many developed countries are expected to reduce their use of coal and increase the share of renewable energy sources. Technological advances, stricter regulations and international agreements will play a key role in this transition.
- Transition in developing countries: Developing countries, which rely on coal for economic reasons, will face challenges in transitioning to clean energy sources. However, international support, financing and technology transfer can help these countries accelerate their energy transition.
- Innovation and sustainability: Innovations in carbon capture technologies, more efficient combustion and integrated energy systems can reduce coal's

environmental footprint and enable its more sustainable use. These technologies will be crucial for countries planning to keep coal as part of their energy mix.

Coal is likely to remain part of the global energy mix until 2050, but its role will gradually diminish due to environmental, economic and technological pressures. The transition must be carefully planned and supported to avoid social and economic problems. The future of coal depends on our ability to innovate technologies and implement policies that enable a more sustainable energy mix. The main points of transition are reflected through:

- Gradual reduction of the role of coal: Many developed countries are expected to significantly reduce the use of coal and increase the share of renewable energy sources such as solar and wind energy. This process will be fueled by the development of energy storage technologies and smart grids that enable the integration of renewable sources.
- Support for developing countries: The international community must provide financial and technological assistance to developing countries to facilitate the transition from coal to clean energy sources. This can include investments in renewable resources, workforce education and training, and the development of sustainable energy infrastructure.
- Innovations and technologies for carbon capture and storage: Carbon capture and storage (CCS) technologies can play a key role in reducing emissions from coal-fired plants. Further research and development in this area can help reduce costs and increase the efficiency of these technologies.
- Changing policies and regulations: Governments around the world need to introduce stricter regulations that limit carbon dioxide emissions and support the transition to renewable energy sources. This may include setting targets to reduce emissions, subsidies for renewable energy sources, as well as penalties for excessive emissions.
- Public awareness and pressure: Growing awareness of environmental issues and climate change can encourage governments and companies to accelerate the transition from coal to clean energy sources. Environmental activism and campaigns often play a key role in promoting sustainable energy policies and practices.

Coal will continue to play an important role in many energy systems around the world, but it is clear that its role will need to be reduced in order to achieve global sustainability and emission reduction goals. The transition to more sustainable energy sources is inevitable, but requires coordinated efforts by governments, industry and society as a whole. Only through innovation, policy changes and global cooperation we can ensure a sustainable energy future that protects both people and the planet.

CONCLUSION

Management of the mining development strategy in Serbia, environmental rehabilitation and the transition to a circular economy and sustainable development represent key challenges and opportunities for the country's future. These three areas are interrelated

and require coordinated efforts to achieve the long-term goals of economic sustainability, environmental protection, and social well-being.

The mining development strategy in Serbia must focus on the sustainable use of mineral resources, balancing economic benefits with environmental and social responsibilities. This includes:

- Modernization of technologies: Innovative technologies can increase the efficiency of exploitation and reduce negative impacts on the environment. Automation, digitization and the application of artificial intelligence in mining operations can improve worker safety and reduce the environmental footprint.
- Diversification of mining activities: Focusing on different mineral resources can reduce dependence on certain ores and provide a more stable economic framework. This includes the exploration and exploitation of less traditional resources, such as lithium and rare metals, which are key to the technologies of the future.
- Strengthening regulations: The adoption and implementation of stricter environmental and social standards is necessary to ensure responsible mining. This implies regular inspections, transparency in work and the involvement of local communities in decision-making.

Remediation of the environment after mining activities is crucial for maintaining the ecological balance and protecting biodiversity. This process should include:

- Land reclamation and restoration: Returning mining areas to their natural state or converting them into useful spaces, such as agricultural lands, forests or recreational areas, can reduce negative impacts on ecosystems and improve the quality of life of local residents.
- Water and air pollution control: The establishment and maintenance of waste management and pollution prevention systems are essential. Wastewater treatment and air emission control technologies must be an integral part of mining operations.
- Biodiversity and protection of natural habitats: Implementation of strategies to preserve and enhance biodiversity, such as the creation of protected areas and replanting programs, helps to preserve natural resources and ecosystems.

The transition to a circular economy and sustainable development in mining implies maximizing the use of resources and minimizing waste. This can be achieved through:

- Recycling and reuse of materials: Encouraging the recycling of mining waste and the use of secondary raw materials can reduce the need for new exploitations and preserve natural resources.
- Energy-efficient technologies: The introduction of technologies that use less energy and generate less waste contributes to reducing the ecological footprint. Investing in renewable energy sources and improving the energy efficiency of mining operations is crucial.
- Integrating circular principles into business models: Mining companies should adopt business models that promote a circular economy, such as closed

production and consumption cycles. This includes product design that allows for easier recycling and longer-lasting use.

The sustainable development of mining in Serbia requires the integration of environmental, economic and social aspects into strategic planning and operational activities. Environmental rehabilitation and the transition to a circular economy are not only ecological imperatives, but also economic opportunities for creating new jobs, increasing competitiveness and improving the quality of life.

Cooperation between the government, mining companies, local communities and researchers is essential for the successful implementation of these strategies. Serbia can achieve sustainable and responsible mining development, while protecting its natural resources and improving the environment for future generations.

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