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SOCIO-ECONOMIC ANALYSIS OF THE BULGARIAN MINING INDUSTRY AND THE IMPORTANCE OF THE BRANCH TO THE NATIONAL ECONOMY AND TO SOCIETY

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Abstract. This paper aims to present the results of a socio-economic analysis of the Bulgarian mining industry and its importance to the national economy and to society during the period 2018 ÷ 2023 based on an analysis of available branch and statistical information. It presents the relative shares of the Bulgarian mining industry in the Bulgarian economy by key indicators for the period 2018 ÷ 2023. On this basis, the importance of the mining industry for the national economy, the national energy, employment and wages, and corporate social responsibility of enterprises in the branch is justified. Changes in environmental protection and restoration costs in the mining industry, the number of occupational accidents and lost calendar days due to occupational accidents in the Mining and quarrying subsector during the period 2018 ÷ 2022 have been analysed. All the researched data for the analysed period emphasise the important socio-economic importance of the Bulgarian mining industry to the national economy and to society.

Keywords: socio-economic analysis; Bulgarian mining industry; employment; corporate social responsibility

JEL: L60; L71

Introduction

According to Rong Yan (2023), "socio-economic research holds immense importance in unveiling the complex dynamics of human progress within societies and economies". On the other hand, according to Escosura (2021), "by using rigorous analysis and robust methodologies, socio-economic research aims to uncover patterns, trends, and causal relationships in societies and economies, shedding light on the underlying drivers of progress". According to Gasper (2002), "understanding the dynamics of human progress requires a holistic approach that recognizes the interaction between social and economic factors".

The Bulgarian mining industry is of strategic importance for the national economy of the Republic of Bulgaria. It is an important factor for the economic stability

and mineral independence of the country and is of great importance for the national economy, society, regions, and municipalities with developed mining.

Bulgaria also takes a leading position in the European mining industry, ranking among the top producers of copper, gold and lignite coal in Europe. The increased global production and consumption of metallic, non-metallic, energy, and construction raw materials proves to be a favourable factor for the development of the extraction and processing of a number of types of underground natural resources, and, hence, for the sustainable development of the Bulgarian mining industry.

According to Shterev et al. (2023), at this stage, there is good legislation, good examples, and practices both in the EU and in Bulgaria that regulate and create prerequisites for the development of the sector.

Research data and methods

The sources of information for the study are: national and international databases with scientific information, statistical data of the National Statistical Institute of the Republic of Bulgaria[1], its INFOSTAT information system, the Ministry of Economy, and the Ministry of Energy.

The methods used in the development of this study are: research of scientific literature and statistical information, analysis and synthesis, systemic approach, the method of inter-economy comparisons, and graphical methods for time series analysis.

The aim of this study is to present the results of the socio-economic analysis of the Bulgarian mining industry for the period 2018 ÷ 2023, as well as its importance to the national economy and to society, based on an analysis of the available branch and statistical information.

Main economic indicators of the Bulgarian mining industry

Table 1 presents the relative shares of the Bulgarian mining industry in the Bulgarian economy for the period 2018 ÷ 2023. The table is built based on data from the INFOSTAT information system of the National Statistical Institute (NSI). The following sectors are not included in the data for Bulgaria: "State governance" (O); "Unidentified activities of households as employers and undifferentiated activities of households in the production of goods and services for own consumption" (T); "Activities of extraterritorial organisations and services" (U).

MAIN ECONOMIC INDICATORS	2018			2019			2020			2021			2022			2023		
	MI	Bulgaria	%	MI	Bulgaria	%	MI	Bulgaria	%	MI	Bulgaria	%	MI	Bulgaria	%	MI	Bulgaria	%
Number of enterprises, num.	368	413535	0,09%	343	419681	0,08%	350	411564	0,09%	338	412878	0,08%	336	449481	0,07%	315	462752	0,07%
Number of persons employed, num.	21522	2208432	0,97%	19022	2210488	0,86%	20084	2091074	0,96%	19406	2128574	0,91%	18700	2188285	0,85%	18666	2220451	0,84%
Tangible fixed assets, BGN '000	2474027	128663065	1,92%	2525260	137713692	1,83%	2436826	117739449	2,07%	1759214	123853235	1,42%	1798815	131756547	1,37%	1381536	140862830	0,98%
Operating income, BGN '000	2981356	315213790	0,95%	2727440	337440955	0,81%	3341833	329084714	1,02%	4012363	405921606	0,99%	5536084	547673793	1,01%	4602496	529691612	0,87%
Operating expenses, BGN '000	2562865	295925304	0,87%	2569378	315826750	0,81%	2637844	307140881	0,86%	3009184	372480807	0,81%	4620868	503218099	0,92%	3802872	489747456	0,78%
Financial result of the activity, BGN '000	418491	19288486	2,17%	158062	21614205	0,73%	703989	21943833	3,21%	1003179	33440799	3,00%	915216	44455694	2,06%	799624	39944156	2,00%
Profitability of operating income	14,04%	6,12%	229,39%	5,80%	6,41%	90,48%	21,07%	6,67%	315,92%	25,00%	8,24%	303,49%	16,53%	8,12%	203,66%	17,37%	7,54%	230,39%
Cost-effectiveness of the activity	16,33%	6,52%	250,52%	6,15%	6,84%	89,89%	26,69%	7,14%	373,54%	33,34%	8,98%	371,33%	19,81%	8,83%	224,20%	21,03%	8,16%	257,81%
Export of mining products, € '000	3287707	28647156	11,48%	3848548	29889052	12,88%	2293456	28007495	8,19%	3017475	29177864	10,34%	7059375	47506902	14,86%	5057451	44431969	11,38%
Import of mining products, € '000	6364848	32146962	19,80%	6136746	33739238	18,19%	4579977	30741712	14,90%	6041212	32934229	18,34%	12169804	55173528	22,06%	5657451	49631368	11,40%
Trade balance (Export - Import), € '000	-3077141	-3499806	87,92%	-2288198	-3850185	59,43%	-2286521	-2734217	83,63%	-3023737	-3756365	80,50%	-5110429	-7666626	66,66%	-600000	-5199399	11,54%
Foreign direct investment in non-financial sector enterprises, € '000	624912,6	24919589,3	2,51%	521619,6	25341512,8	2,06%	665161,4	26884352,0	2,47%	927720,9	28184293,0	3,29%	820992,4	29376480,0	2,79%	952269,6	32717943,7	2,91%

Table 1. Relative shares of the mining industry in the Bulgarian economy by key economic indicators for the period 2018 – 2023

Note: The abbreviation MI in the table refers to the Mining Industry
Source: per INFOSTAT data, compiled by the author.
https://infostat.nsi.bg/infostat/pages/module.jsf?x_2=242
https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=250
https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=782
https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=789
https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=1947
https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=2166

The data in Table 1 show the following change in the relative shares of the mining industry in the Bulgarian economy by basic economic indicators during the analysed period:

– The number of mining enterprises among enterprises in the country decreased from 0.09% in 2018 to 0.07% in 2023.

– The relative share of employed persons was 1% in 2018, decreasing to 0.84% in 2023.

– The value of tangible fixed assets during the period decreased from 2% to 1%.

– Revenues from operations during the period varied around 1% of the total for the country.

– Operating expenses during the period varied around 0.8% of the total for the country.

– The financial result of the activity during the period varied between 2 and 3% of the total for the country.

– The profitability of revenues and expenses from the activity was significantly higher than the national average. It ranged from 2.5 to 3.7 times higher than the national average.

– Exports of mining products during the period varied between 8 and 15%, and imports of mining products between 11 and 22%.

– The trade balance (Export - Import) for both the industry and the country remained negative throughout the analysed period.

– Foreign direct investment during the period varied between 2.1 and 3.3% of the total for the country.

It is noteworthy that the small number of mining enterprises and employees in the subsector realised significantly higher profitability of revenues and expenses than the national average.

In 2023, 315 enterprises operated in the mining industry, producing output worth 3.897 billion leva, according to NSI data. With operating revenues of around BGN 4.603 billion, enterprises in the extraction industry managed to generate BGN 1.930 billion of value added. The gross value added reached 49.5% of the produced output.

Microenterprises predominated (212 units) in the subsector in 2023. Small enterprises were 71 units, medium-sized enterprises were 23 units, and large enterprises were only 9 units.

The mining industry is an important employer, providing employment for 18.666 thousand people in 2023. Personnel costs reached 841.599 million leva in 2023.

Despite the decrease in the value of tangible fixed assets during the analysed period, the profitability of revenues and expenses increased. This is only possible through their more efficient use. Similar results are observed in other sectors of the national economy for example, the sector "Manufacture of textile clothing" (Terzieva, 2024).

The mining industry occupies an important place in the Bulgarian economy, as it is at the heart of the mineral raw material chain and is a major supplier to many other sectors.

The raw materials mined in Bulgaria in 2023 mainly included lignite coal, lead-zinc, copper, and polymetallic ores, gypsum, limestone, bentonite, kaolin, quartz sands, refractory clays and marble, etc.

In 2023, the Bulgarian mineral and raw materials industry exported production worth 5.058 billion euro.

The importance of the Bulgarian mining industry for the energy sector

The mining industry in Bulgaria generated about 5% of GDP by 2022 and provided about 40% of the country's energy production based on solid fuels – as much as the production of the *Kozloduy* Nuclear Power Plant. In 2024, brown and lignite coal production decreased by 28.6% compared to 2023, and by 58.3% compared to 2022. Coal accounted for 96.4% of total solid fuel production and in 2023 it accounted for 33.30% of the energy mix of electricity produced.

The sharp contraction in solid fuel production is a result of the decarbonisation of the Bulgarian energy sector in line with the implementation of the Recovery and Resilience Plan and the Green Deal. This has led to serious imbalances in the Bulgarian energy system in recent years.

Employment and wages in the "Mining and Quarrying" subsector

The mining industry provided over 18 000 direct and 120 000 indirect jobs and ~~is~~ ranked fourth in terms of wage levels in 2023. In 2024, according to preliminary data from the National Statistical Institute, it rose to second place after the IT sector. The average monthly net salary in the mining industry exceeded 3 000 BGN in 2024, and in each year of the analysed period it increases by an average of 10%.

The change in the average gross annual salary in the "Mining and Quarrying" subsector and for the Republic of Bulgaria for the period 2018 ÷ 2024 is presented in Figure 1.

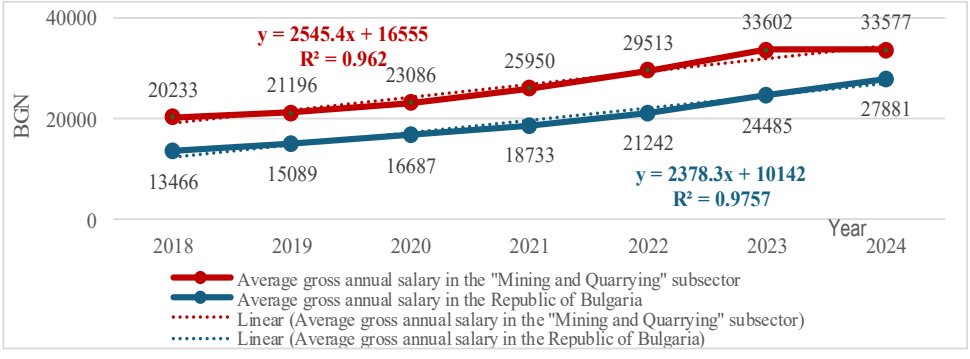


Figure 1. Change in the average gross annual salary in the "Mining and Quarrying" subsector and for the Bulgaria for the period 2018 ÷ 2024
Source: The graph is based on NSI data, 2025, https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=567

The data in Figure 1 shows that the average gross annual wage in the "Mining and Quarrying" subsector throughout the period 2018 ÷ 2024 was significantly higher than the average annual wage for the country. In their changes during the analysed period, clearly expressed very large correlation dependencies are observed, characterised by high coefficients of determination. The average gross annual salary in the "Mining and Quarrying" subsector for the period 2018 ÷ 2024 increased by 13 344 BGN or 65.95%, and in 2024 it decreased by 25 BGN or 0.01%.

Of the ten municipalities with the highest average gross monthly salary of employees for 2023, four were traditional mining. Figure 2 presents the ten municipalities in Bulgaria with the highest average gross monthly salary of employees for 2023. The figure is based on data from the Institute for Market Economics (IME), with municipalities with traditional mining marked in red.

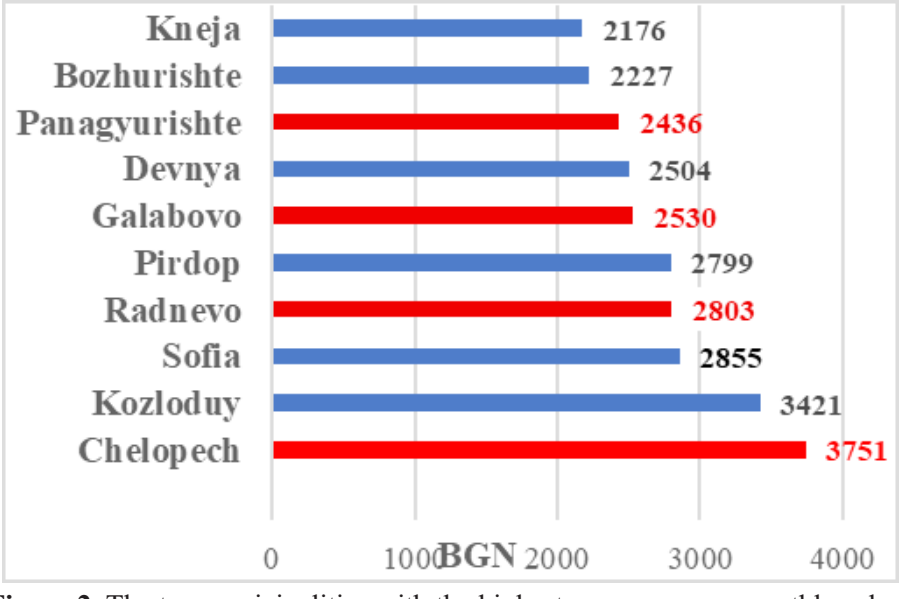


Figure 2. The ten municipalities with the highest average gross monthly salary of employees for 2023

Source: The graph is based on IME data, 265 stories about economics. https://265obshtini.bg/map/534

The settlements with traditions in the mining industry with high income per capita are: Chelopech; Radnevo; Galabovo; Panagyurishte; Etropole; Madan and Zlatograd.

The high profitability achieved is based on the increase in labour productivity, which allows mining companies to pay high wages. According to (Geshkov, 2024) "The basis of increasing labour productivity is effective human resource management.". According to (Shterev & Milusheva, 2024) "High profitability provides an opportunity for enterprises to increase competitiveness and develop innovative projects".

Corporate social responsibility

Mining companies in the branch are among the most socially responsible companies. They invest significant funds in training, improving working conditions, and social benefits for their employees. The mining subsector is also key to regional development. It provides jobs, generates high revenues for local municipalities, and supports related industries. The social impact of the mining business on local communities is significant thanks to investments in local infrastructure, improving

working and leisure conditions, and providing financial support for socially significant social and cultural projects.

Large and medium-sized companies in the mining industry traditionally implement a number of charitable and donation programs and projects in the communities where they operate.

Investment in environmental protection

The change in environmental protection and restoration costs in the mining industry during the period 2018 ÷ 2022 is presented in Figure 3.

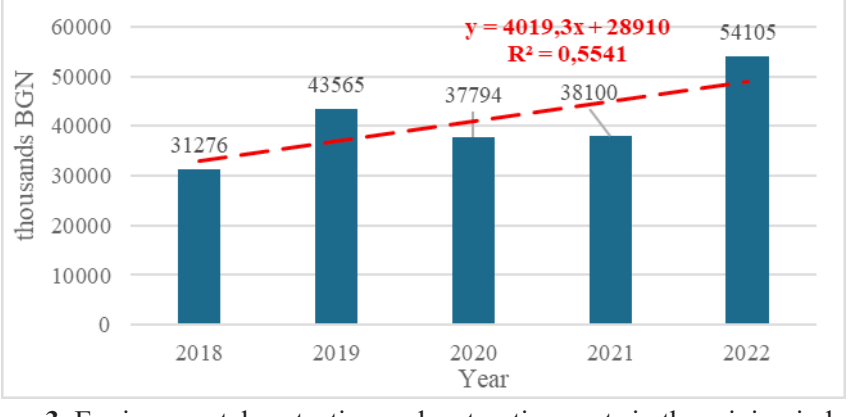


Figure 3. Environmental protection and restoration costs in the mining industry during the period 2018 ÷ 2022

Source: The graph is based on INFOSTAT data compiled by the author. https://infostat.nsi.bg/infostat/pages/reports/query.jsf?x_2=1695

In 2022, environmental protection and restoration costs in the mining industry accounted for 1.79% of the country's total.

Environmentally related expenditures in the mining industry have been stable and increasing throughout the period. The derived development trend of the indicator shows that it is growing, and the coefficient of determination justifies a large correlation dependence.

The structure of environmental protection and restoration costs in the mining industry in 2023 is presented in Figure 4.

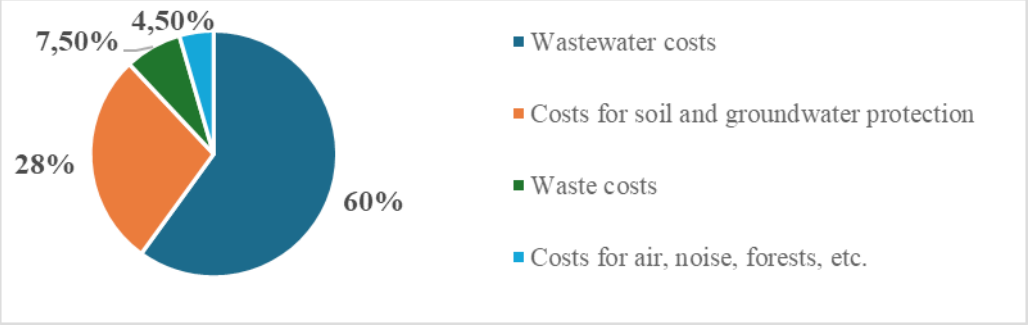


Figure 4. Structure of environmental protection and restoration costs for the mining industry in 2023
Source: The graph is based on INFOSTAT data compiled by the author. https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=1695

The increase in environmental protection and restoration costs in the mining industry is primarily a result of increasing environmental requirements and strict regulations for enterprises in the Mining and Quarrying subsector. European Union policies (the Green Deal and the waste and water management directives) have a significant impact on the priorities and scale of funding for such projects. Bulgarian legislation further increases the requirements for mining enterprises.

A significant part of the costs of environmental protection and restoration come from voluntary commitments made by businesses. It is also necessary to ensure the implementation of the ESG criteria by which mining companies will be reported.

In recent years, mining companies have implemented a number of good practices, green technologies, and projects to reduce the harmful impact of mining activities on environmental components.

Occupational safety and health

Despite the high risk of injury, mining enterprises are experiencing a steady decline in occupational injuries and lost working days due to occupational accidents. This is due to investments in improving production technologies, working conditions, and personnel training.

No deaths were recorded during the analysed period, and the change in the number of occupational accidents in the Mining and Quarrying subsector is presented in Figure 5.

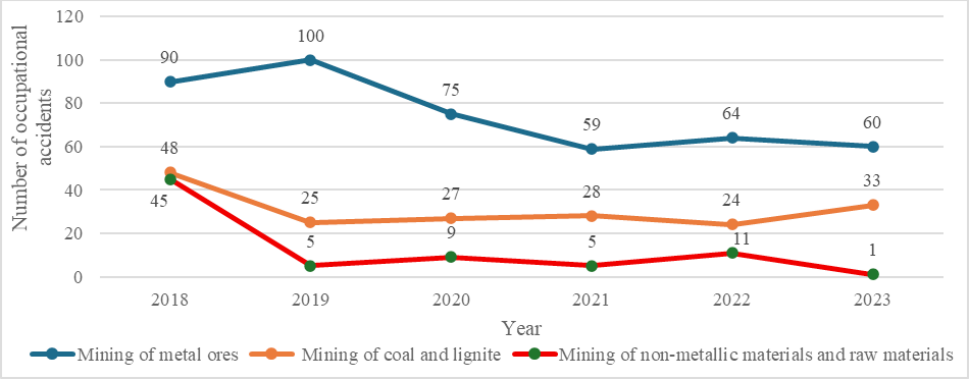


Figure 5. Change in the number of occupational accidents in mining enterprises during the period 2018 ÷ 2023

Source: The graph is based on NSI data, 2025.

The data in Figure 5 shows that the most significant decrease in the number of occupational accidents was achieved in the mining of non-metallic materials and raw materials. A smaller decline was recorded in the mining of metal ores and coal. This is due to the higher risk of occupational accidents in these two mining activities.

Figure 6 presents the change in lost calendar days due to occupational accidents in the mining industry.



Figure 6. Change in lost calendar days due to occupational accidents in mining enterprises during the period 2018 ÷ 2023

Source: The graph is based on NSI data, 2025.

According to Maintaining healthy and safe working conditions, reducing injuries and morbidity, improving the psycho-climate, and managing all other elements related to human resources, directly or indirectly brings direct or long-term benefits to the existence of the company, its competitiveness, efficiency, ability to bring profit and return on investments.

The decrease in lost calendar days due to work accidents is a signal for improving the occupational environment, staff training, the so-called "golden" safety rules introduced in the industry, and improving production technologies. All of those lead to a decrease in the severity of work accidents.

Conclusion

The mining industry is a specific sector, because the number of enterprises in 2023 was relatively small (315), but they managed to generate production and added value, which in absolute terms exceeded the production of many other sectors.

The number of enterprises in the mining industry was only 0.07% of all operating companies in the country in 2023, but they generated 0.87% of the total revenue from operations in the national economy and 2.00% of the generated financial result of the activity.

Mining enterprises in Bulgaria in 2023 realised a 230.39% higher profitability of sales revenue than the average and a 257.81% higher of cost-effectiveness of the activity than the average. Due to their high efficiency, mining enterprises provide favourable working conditions and high wages, compared to most other sectors of the economy.

The export of mining products in 2023 constituted 11.38% of the country's total exports, and the import of mining products was 14.40% of the country's total imports of goods and services. The trade balance here was also negative and accounted for 11.54% of the country's negative trade balance in 2023.

Foreign direct investment in mining enterprises in 2023 accounted for 2.90% of that in the non-financial sector.

The importance of the mining industry for Bulgaria's energy sector is that by 2022 it produced nearly 40% of the country's energy production based on solid fuels. 2023 and 2024 saw a sharp decline in solid fuel production, which was the result of the decarbonisation of the Bulgarian energy sector in accordance with the implementation of the Recovery and Resilience Plan and the Green Deal. The consequences of this are the loss of the country's energy independence, difficult balancing of the national energy system, electricity deficit during the dark part of the day and the winter period, which increases the import of electricity and a strong imbalance in the National energy system. These adverse consequences for the National energy system necessitate the postponement or reasonable implementation of some of the measures from the Recovery and Resilience Plan. At this stage of implementation of green technologies in Bulgaria,

they do not allow for a drastic reduction in the production of electricity from our coal-fired power plants.

Employment in the Bulgarian mining industry provided over 18 thousand direct and 120 thousand indirect jobs, employed in suppliers, services, logistics, subcontractors and local businesses. Labour wages rose from the fourth place in 2023 to the second place in 2024 after the IT sector. This generated high incomes for the population, high revenues for local municipalities and the country's budget, and supported related industries.

The social impact of the mining business on local communities has been significant thanks to investments in local infrastructure, improving working and leisure conditions, and providing financial support for socially significant social, cultural, and infrastructure programs and projects.

Environmental protection and restoration costs in the mining industry have been stable and increasing throughout the period.

Despite the high risk of injury in mining, there was a steady decline in occupational injuries and lost working days due to occupational accidents during the analysed period. There has also been a decrease in the severity of work accidents.

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