



**BULGARIAN ASSOCIATION OF THE METALLURGICAL INDUSTRY**

# **METALLURGY IN BULGARIA 2023**

**SOFIA, 2024**

This specialized annual edition of the **Bulgarian Association of the Metallurgical Industry (BAMI)** presents the situation and progress of the Bulgarian metallurgical industry, the European and global production and consumption of metals, the position of the country on the map of global and European producers in metallurgy. The edition contains data on the volume and value of the production, on the investments undertaken in the renovation and modernization of the capacities and technologies, on the realization of the production and foreign trade of metals and metallurgical products.

The publication "Metallurgy in Bulgaria" is intended for a wide range of managers and specialists from metallurgical companies, lecturers, students and undergraduates from technical colleges and universities, Bulgarian and foreign partners, external experts, and readers interested in metallurgy.

Companies producing metals, products and articles along the chains of added value with wide application in industry and household are the main sources of information on indicators of national production. The Management of BAMI expresses its gratitude to the work team and all the companies that helped in the preparation of **“Metallurgy in Bulgaria in 2023”**.

We are grateful to the Ministry of Economy and Industry for the provided data on the import and export of metal products, which helped us to objectively present the metallurgical industry and its participation in the international trade and foreign trade balance of the country.

Additional information about the activities of the Bulgarian Association of the Metallurgical Industry is available on the website of the Association ([www.bami.bg](http://www.bami.bg)).

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Apart from the indicated national sources, materials, and publications from external organizations such as Eurofer ([www.eurofer.eu](http://www.eurofer.eu)), World Steel Association ([www.worldsteel.org](http://www.worldsteel.org)), Eurometaux ([www.eurometaux.eu](http://www.eurometaux.eu)), Eurostat ([www.ec.europa.eu](http://www.ec.europa.eu)) and other international structures of ferrous and non-ferrous metallurgy were used during the preparation of the edition.

# CONTENTS

<b>SECTION ONE.....</b>	<b>6</b>
<b>ECONOMY IN 2023.....</b>	<b>6</b>
1.1. <i>POPULATION, MARKET AND LABOUR COSTS</i> .....	6
1.2. <i>GDP, GVA, PRODUCTIVITY</i> .....	11
1.3. <i>ENERGY CONSUMPTION, FREIGHT TURNOVER</i> .....	16
1.4. <i>FOREIGN TRADE EXCHANGE, IMPORT AND EXPORT</i> .....	19
<b>SECTION TWO.....</b>	<b>22</b>
<b>FERROUS METALLURGY IN BULGARIA .....</b>	<b>22</b>
2.1. <i>PRODUCTION OF FERROUS METALS AND ROLLED FERROUS METALS</i> .....	22
2.1.1. <i>STEEL PRODUCTION IN THE EU AND IN THE WORLD IN 2023</i> .....	22
2.1.2. <i>CRUDE STEEL PRODUCTION IN BULGARIA</i> .....	24
2.1.3. <i>PRODUCTION OF ROLLED FERROUS METALS</i> .....	25
2.1.4. <i>PRODUCTION OF ROLLED FERROUS METAL ARTICLES</i> .....	28
2.2. <i>TRADE TURNOVER AND CONSUMPTION OF ROLLED FERROUS METALS AND PRODUCTS THEREOF</i> .....	30
2.2.1. <i>IMPORT OF SCRAP, ROLLED FERROUS METALS AND ARTICLES THEREOF</i> .....	30
2.2.2. <i>EXPORT OF SCRAP, ROLLED FERROUS METALS AND ARTICLES THEREOF</i> .....	33
2.2.3. <i>FOREIGN TRADE EXCHANGE OF ROLLED FERROUS METALS AND FINISHED PRODUCTS</i> .....	36
2.2.4. <i>SALES OF ROLLED FERROUS METALS AND PRODUCTS THEREOF</i> .....	40
2.2.5. <i>ACTUAL DOMESTIC CONSUMPTION (ADC) OF STEEL PRODUCTS</i> .....	42
2.3. <i>PRODUCTION OF REFRACTORY MATERIALS AND PRODUCTS</i> .....	46
<b>SECTION THREE.....</b>	<b>47</b>
<b>NON-FERROUS METALLURGY IN BULGARIA .....</b>	<b>47</b>
3.1. <i>PRODUCTION OF NON-FERROUS METALS</i> .....	47
3.1.1. <i>PRODUCTION OF COPPER (ANODIC AND ELECTROLYTIC)</i> .....	48
3.1.2. <i>LEAD PRODUCTION</i> .....	53
3.1.3. <i>ZINC PRODUCTION</i> .....	59
3.1.4. <i>PRODUCTION OF PRECIOUS, BYPRODUCT METALS, ALLOYS AND CHEMICAL PRODUCTS</i> .....	63
3.1.5. <i>PRODUCTION OF ROLLED/PRESSED NON-FERROUS METALS AND ALLOYS</i> ...	64
3.1.6. <i>UTILIZATION OF NON-FERROUS METAL WASTE</i> .....	68
3.2. <i>TRADE EXCHANGE AND CONSUMPTION OF NON-FERROUS METALS</i> .....	69
3.2.1. <i>IMPORT OF NON-FERROUS METALS AND FINISHED PRODUCTS</i> .....	71
3.2.2. <i>EXPORT OF NON-FERROUS METALS AND FINISHED PRODUCTS</i> .....	74
3.2.3. <i>SALES OF NON-FERROUS METALS AND R/P METALS</i> .....	77
3.2.4. <i>CONSUMPTION OF NON-FERROUS METALS AND ROLLED/PRESSED PRODUCTS</i> .....	79
<b>MEMBERS AND MANAGEMENT OF BAMI.....</b>	<b>81</b>

***PERCEIVED ABBREVIATIONS:***

BAMI	-	Bulgarian Association of the Metallurgical Industry
GDP	-	Gross domestic product
GVA	-	Gross value added
BCLA	-	Branch Collective Labor Agreement
AC	-	Apparent Consumption
ACPC	-	Apparent Consumption Per Capita
RHC	-	Real Home Consumption
RFM	-	Rolled Ferrous Metals
HR	-	Hot-rolled (rolled steel)
EU ETS	-	European Union Emissions Trading Scheme
ZGP	-	Hot galvanizing plant
KCM	-	Non-ferrous metals plant
MSST	-	Minimum Social Security Threshold
NSSI	-	National Social Security Institute
CIS	-	Commonwealth of Independent States (former USSR)
PPS	-	Purchasing Power Standard
CR	-	Cold-rolled (rolled steel)
ASST	-	Average Social Security Threshold
HNFM	-	Heavy non-ferrous metals
CEE	-	Central and East Europe
<i>NAFTA</i>	-	North American Free Trade Agreement



***DEAR LADIES AND GENTLEMEN,***

Another annual edition of BAMI for the Bulgarian metallurgical industry in 2023 is before you. The assessment shows that the sector continues to develop successfully, overcome problems and cope with the challenges of today.

Despite the negative consequences of the current economic and political crises, wars in the region and uncertain political background in the country, good indicators show sustainability, responsibility and professionalism in the management of enterprises. The metallurgical industry continues to be a leader in the indicators of the national economy, exports of goods, investments made during the year and social responsibility.

Today we face the challenges of the Green deal, the goals of decarbonizing the economy based on a zero emission industry and digital transformation. For the sector, this is a new opportunity to develop and meet the growing demand of Europe for metals and metal products. We are responsible to use this opportunity and develop the potential of the Bulgarian basic industry, to increase the production and processing of metal raw materials. In this context, our members will receive support and assistance from the Bulgarian Association of Metallurgical Industry for the implementation of each project.

The past 2023, has been an important one on a personal level, being the first since my election as Chairman of the Board. I had to justify the vote of confidence, to work actively for the benefit of our members, preserving and building on the successes achieved so far. I hope that we are on the right track and together we will achieve the desired results!

I express my gratitude to the members of the Bulgarian Association of the Metallurgical Industry for the provided data and information for the yearbook! I also thank the BAMI team, who prepared the content, design and publication of "Metallurgy in Bulgaria in 2023"!

**Good luck and useful work to all!**

A handwritten signature in blue ink, appearing to read 'Nikola Rangelov', written in a cursive style.

Yours faithfully,

**PhD Eng. Nikola Rangelov**  
**Chairman of the Board**

## **SECTION ONE**

### **ECONOMY IN 2023**

#### *1.1. POPULATION, MARKET AND LABOUR COSTS*

The Bulgarian metallurgical industry continued to operate successfully in 2023, despite the effects of the COVID and economic crises. Throughout the year inflation remained high although lower than the previous year. The prices of electricity have stabilized but also at high levels. For these reasons many countries continued to support crises-affected industries in order to maintain their competitiveness. The number of EU Member States that, following the Commission's verification and in accordance with its new Guidelines, grant state aid to energy-intensive industries to compensate indirect costs in the price of electricity has increased. In Bulgaria, this is not yet a fact and there is a lack of understanding and support from the responsible governmental structures.

The year 2023 was characterized by early parliamentary elections, appointed caretaker governments and unstable legislative and executive power. Such a situation had not created a long-term vision of the industry for development, but delayed investments and implementation of reforms. It has a particularly negative impact on the perspectives for sustainable economic growth and the EU funds and programs usage. The country has fallen behind the set-up goals for catch-up development, social-economic cohesion and higher standard of living of the population.

Regardless of the impact of the important for the year national and global events, including Russia's ongoing war with Ukraine, Europe continues to work towards a transition to a low-carbon and digital economy. The metallurgical industry has been assigned the leading role in the process to meet the growing needs for metal and metal products and to guarantee the independence of the European industry from imports of raw materials from third countries.

The set goals for resource independence of the EU and own production of strategic and critical raw materials for the transformation, as well as the expected high consumption of metals provides a new opportunity for product and technological restructuring of the metallurgical sector, for the absorption of new products and development.

The changing socio-economic environment, the crises and the existing disparities in living standards and conditions are leading to changes in the location of the population, life expectancy and natural increase in the country. These factors continue the negative impact, and the population has been declining significantly over the last two decades.

Again, in the last year there was a decline, but the population decreased by only 2.2 thousand people, compared to an average for the previous years of around and above 70 thousand people (Fig.1.1).

Table 1.1 shows population data for the last four years and the changes in the structure and location.

Table 1.1

*Population by age and location, thousands of people*

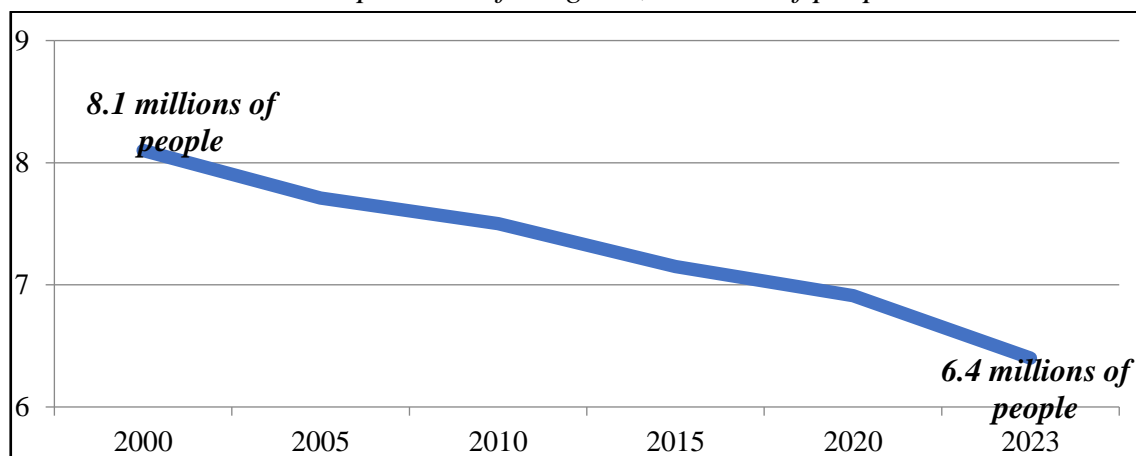
Population categories :	2020		2021		2022		2023	
	Thousands of people	%	Thousands of people	%	Thousands of people	%	Thousands of people	%
City/town	5 043.2	72.9	5 000.5	73.1	4 746.7	73.6	4 738.5	<b>73.5</b>
Village	1 873.3	27.1	1 838.4	26.9	1 701.0	26.4	1 707.0	<b>26.5</b>
Males	3 349.7	48.4	3 311.3	48.4	3 099.5	46.7	3 097.7	<b>48.0</b>
Females	3 566.8	51.6	3 527.6	51.6	3 348.2	53.3	3 347.8	<b>52.0</b>
<b>Total:</b>	<b>6916.5</b>	<b>100.0</b>	<b>6 838.9</b>	<b>100.0</b>	<b>6 447.7</b>	<b>100.0</b>	<b>6 447.7</b>	<b>100.0</b>

Source: NSI

As a result of internal migration, the ratio between the urban population and that in the villages has changed in the period 2020-2023 in favor of those living in the cities. An exception was observed in 2023, when people in villages increase by 6 thousand people. A similar situation was also observed in 2020 as a response to the growing epidemic COVID crisis. The urban population decreased by 8 thousand people.

Fig. 1.1 shows the declining number of the population for the last 2 decades – from the beginning of the 21st century to 2023, according to NSI data and from the conducted census.

Figure 1.1

*Population of Bulgaria, millions of people*

Throughout the period women are more than men and the difference is growing. The difference in 2023 was 250 thousand more women than men, but 3 years earlier it was 217 thousand.

For the first year in Bulgaria, the birth rate is higher than the average indicator in the EU 27. In 2023, the number of children born was 601 more than in the previous year, and a growth of 1.1% was reported. **The total fertility rate in 2023 was 8.9 ‰.** According to Eurostat data, the rate for the EU-27 in 2022 was 8.7‰. Cyprus (11.2‰) has the highest fertility rate among EU member states, followed by France (10.7‰), Ireland (10.5‰) and Sweden (10.0‰). Italy has the lowest fertility rate in the EU of 6.7‰

The demographic characteristics are influenced by the life expectancy in the country. Unfortunately, life expectancy in Bulgaria is the shortest compared to all EU member states, even the neighboring non-EU countries. **According to NSI data life expectancy is on average 79.6 years for women and 72 years for men.** COVID impacted negatively on this indicator reducing it from an average of 75.1 years in 2019 to 71.4 years in 2021. The indicator began to rise over the following two years and has already exceeded pre-crisis levels.

We are still behind compared to life expectancy in other European countries with a difference of 5.7 years (EU average is 81.5 years). The difference is smaller for women – 4.6 years (for EU - 84.1 years), while it reaches 6.9 years for men (the average for 2023 is 78.9 years). In general, the population lives longer in richer countries (Liechtenstein - 84.8, Luxembourg - 83.4), as well as in Mediterranean countries. For example, in Spain the average life expectancy is 84 years and in Italy – 83.8 years.

In a situation of an aging population, high mortality and low fertility rate, demographic policies should be focused on migration processes, with the aim of positive mechanical growth. The growth in Bulgaria was negative until 2019, i.e. those who settled in the country are fewer than those who emigrated during the same period. Despite the positive value of the growth after 2019, the overall result for the national growth is still negative.

According to NSI data, in 2023 the following movement of persons from and into the country was reported:

- Settled persons (immigrants) – **56,807 people** (16,188 more than in 2022).
- Displaced persons (emigrants) – **15,227 people** (2,052 more than in 2022).
- **Mechanical growth - 41,580 people** (27,444 in 2022 and 12,706 in 2021).

Almost 75% of the mechanical growth is formed by people who arrived and settled from third countries. The migration processes of the Bulgarian population are changing positively. Returnees are over 5 thousand more than emigrated from the country people over the year.

The demographic processes change the age structure of the population. They are also related to the labor market. In 2023, the share of the non-working age population (individuals aged up to 16 and above 65 years) is 58.5% of the total population. This metric decreases, compared to the previous year, by 0.05%. The majority of non-working age people are aged above 65 years. The ratio between the two groups - aged up to 16 and above 65 years is 1:3 in favor of the above the retirement age group. The metric has been improving in the last two or three years in favor of children and young people. The higher share of young people, the better prospects in the labor market. Migration processes also have an influence. However, the growing percentage of young people who leave the education system and do not work (13% in Bulgaria compared to 10% in the EU) has a negative impact.

Table 1.2 presents data on the average annual number of people employed under labor and service legal relations, workers income and other social indicators for the period 2019-2023.



Table 1.2

*Average number of employed people, level of unemployment, inflation*

<b>Indicators</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023*</b>
Average annual number of employed people (national calculations) in thousands	2 322. 5	2 165. 3	2 275.8	2 195. 5	2 218
<b>Average annual level of unemployment %</b>	<b>5.9</b>	<b>6.7</b>	<b>5.3</b>	<b>4.3</b>	<b>4.3</b>
<b>Inflation/deflation rate</b>	<b>3.1</b>	<b>- 0.8</b>	<b>3.3</b>	<b>15.3</b>	<b>9.5</b>
Average monthly wage of persons on labor and service contracts, <b>BGN</b>	<b>1 274</b>	<b>1 387</b>	<b>1 550</b>	<b>1 760</b>	<b>2 012</b>
- public sector	1296	1 441	1674	1 808	<b>2 077</b>
- private sector	1 267	1 369	1510	1 758	<b>1 991</b>
<b>- for the processing industry</b>	<b>1 127</b>	<b>1 204</b>	<b>1308</b>	<b>1 511</b>	<b>1 714</b>
<b>Average monthly wage in activity 24 “Production of basic metals”, incl.</b>	<b>1 617</b>	<b>1 656</b>	<b>1 903</b>	<b>2 180</b>	<b>2 372</b>
• <b>Steel industry</b>	<b>1 768</b>	<b>1 800</b>	<b>1 980</b>	<b>2 500</b>	<b>2 800</b>
• <b>Non-ferrous metallurgy</b>	<b>2 126</b>	<b>2 158</b>	<b>2 506</b>	<b>2 687</b>	<b>3 008</b>
• <b>Metal casting</b>	<b>1 071</b>	<b>1 129</b>	<b>1 245</b>	<b>1 382</b>	<b>1 568</b>

Source: NSI, \*preliminary data

The recovery of the European and world economy, which began in the second half of 2021, continued in 2022 and 2023 and led to an increase in production and jobs. The number of persons employed on labor contracts in Bulgaria increased by 22.5 thousand. The unemployment rate remained low. Inflation was also reduced.

But problems related to the high electricity price, disrupted external and internal markets and hindered deliveries of raw materials exist. The enterprises of ferrous and non-ferrous metallurgy managed to maintain their capacities in this environment, but some productions were reduced (lead, rolled aluminum).

In 2023 incomes from labor and service contracts are growing. In general, the increase in the average wage for the country was 114.3%. In the public sector, the increase was 114.9%, and in the private sector – 113.3%. This increase exceeds by almost 5% the annual inflation rate of 9.5%.

For the sectors of the processing industry, a growth of 113.4% of the average wage was reported. It amounts to 1 714 BGN. The increase per month is 203 BGN. But compared to the average wage for the country, the average wage in sectors of the processing industry is lower by 298 BGN. For individual sectors of this industry the differences in both directions (higher or lower) are much bigger.

The average monthly wage in the ferrous and non-ferrous metallurgy reaches 3 000 BGN, which ranks it on a higher level among the processing industries and other economic activities. Non-ferrous metallurgy is one of the leading sectors in terms of remuneration.

In addition to salaries, employers' labor costs also include other additional funds that employees on labor and service contracts use. These additional personnel costs have a significant share of the total volume of costs (around and over 8%) in the metallurgical industry, which is related to social policies and the resulting costs of enterprises.

**Table 1.3 presents the structure of employer's costs per employee** on average for all economic activities in the country, for metallurgy and related activities. The costs are separated by types of expenses, according to the remuneration. The data show the existence of industries with high additional income and a relatively lower share of wages received, as well as other industries where the labor remuneration comes only from wages. For comparison, the costs in the IT sector are included, where the salary is the highest among all economic activities in the country. The salary there has the highest share in total labor costs (88.39 %), but the share of social costs is very low, only 0.71%. The pattern of costs in energy, metallurgy, mining industry and transport is opposite. In these sectors, the remuneration for wages has a low share (about 70%), while the additional costs are high (over 25%).

Table 1.3

Sectors of the Economy	Wage	Insurances by the Employer	Compensations	Other Social Allowances*
<b>Total for the country, %</b>	82.27	14.29	1.65	<b>1.79</b>
Extractive Industry	69.64	17.72	2.74	69.64
Processing Industry, <b>incl. Metallurgy</b>	81.72 <b>71.43</b>	14.54 <b>17.82</b>	1.48 <b>2.01</b>	2.26 <b>8.74</b>
Energy	69.97	15.33	3.98	10.72
Information Technology and Telecommunications	88.39	9.85	1.05	0.67

*\*incl. taxes*

Comparison between the remunerations received in the individual sectors on the basis of the average wage only according to the reports of NSI and NSSI does not reflect the actual situation. The remunerations received in metallurgy are high, but as a sector of the processing industry it does not find its respectful place in national rankings.

Another benchmark that determines employers' costs for labor is the expenses of **one employee under labor and service legal relations per hour worked**. It includes all the costs and is more objective.

Fig. 1.2 presents the data of NSSI for 2022 for the values of this benchmark in major industrial activities. In addition to ferrous and non-ferrous metallurgy, landmark in terms of wage sectors with the highest and lowest rates are included.

The employers from the IT sector report the highest labor costs (33.60 BGN per hour). Next comes energy, but the value differs depending on the form of ownership. The overall cost for the sector is 28.64 BGN per hour worked, but **in the public sector it is 37.39 BGN, and in the private sector - 22.29 BGN**. There is no acceptable economic justification for the big difference, but the high costs are included in the electricity price of all consumers. The mining industry has an average cost of 25.91 BGN per employee per hour worked. Here again the value in the public and private sector differs. The labor cost is 32.81 BGN/hour and 22.00 BGN/hour respectively. To some extent the differences in the labor

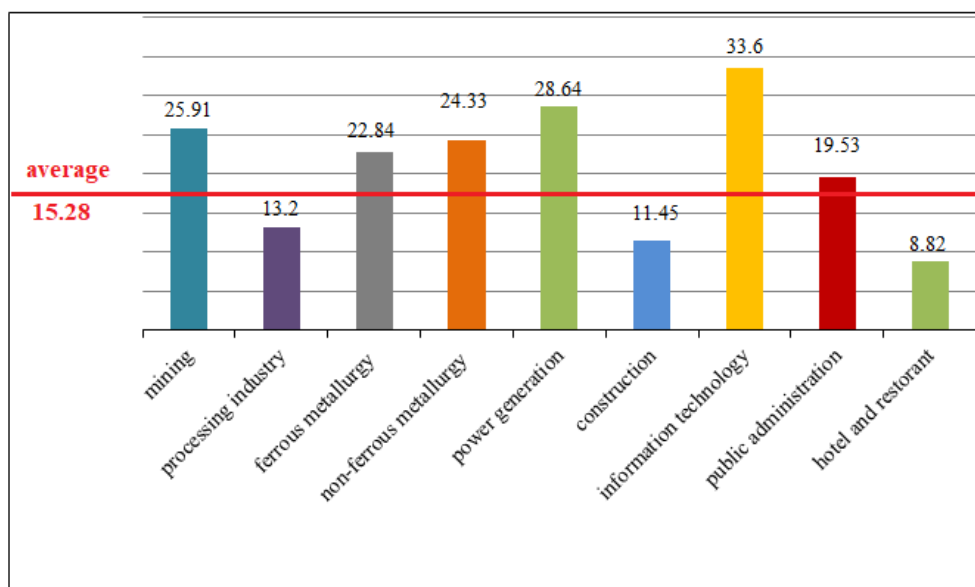
costs are due to the dissimilar working conditions in the individual sub-sectors and production volumes and values.

Non-ferrous metallurgy reports labor costs of 24.33 BGN per hour worked and 108 % growth compared to the previous year. Ferrous metallurgy with an average of labor costs of 22.84 BGN/hour reports a high annual growth of 126%.

The average labor costs for the country is 15.28 BGN per employee hour worked and a growth of 113.2 % compared to the previous year is reported.

Figure 1.2

**Employer's labor costs, BGN per working hour**



Source: NSI

Labor costs in the sector "Hospitality and restaurant industry" are the lowest- 8.82 BGN per hour worked. This is nearly 2 times lower than the average costs (15.28 BGN/hour) for all economic activities. Labor costs also remain low in construction (11.45 BGN/hour).

Despite the ongoing crises since 2020, labor costs, mainly wages, have increased and covered the high inflation during this period. Thus, the total costs of employers for one hour worked for the country increased by 124.4% for the period 2020-2022. In ferrous metallurgy, this growth was 133%, and in non-ferrous metallurgy - 122%.

**1.2. GDP, GVA, PRODUCTIVITY**

In 2023 the Bulgarian economy reported a real **GDP growth of 1.8%, which is lower compared to 3.9% in 2022**. Although being higher than the EU average growth by 0.5 %, it is not sufficient to reach the average levels of standard and pull the country from the last place in the EU (27) ranking.

Table 1.4 presents the Gross Value Added (GVA) and the Gross Domestic Product (GDP) for the period of four consecutive years, organized by economic activities.

Table 1.4

*GDP by sectors and groups, million BGN*

<b>Economic sectors and groups</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023*</b>
- agriculture and forestry	4 048	6 071	7 276	5 571
- mining and processing industry				
Power generation, water and sanitation (B-E)	<b>22 248</b>	<b>24 405</b>	<b>37 820</b>	<b>40 430</b>
- construction (F)	4 997	4 573	5 156	6 180
-----	-----	-----	-----	-----
- trade, food, Transport and communications (G-J)	27 749	37 556	42 801	47 696
- finance, insurance, real estate and other business services (K,L,M,N)	23 869	27 654	29 838	33 613
	19 738	21 621	23 720	27 706
- public administration, education, healthcare (O-Q), others (R-U)	=====	=====	=====	=====
	<b>102 649</b>	<b>121 607</b>	<b>145 614</b>	<b>161 195</b>
<b>Total economy (GVA)</b>	<b>15 957</b>	<b>17 405</b>	<b>19 770</b>	<b>22 549</b>
=====				
- adjustments /taxes/				
<b>Gross Domestic Product /GDP/, Million BGN</b>	<b>119 772</b>	<b>139 012</b>	<b>165 384</b>	<b>183 743</b>
<b>Labor productivity, total:</b>				
<b>GDP per person employed, BGN</b>	<b>34 908</b>	<b>40 186</b>	<b>48 687</b>	<b>52 789</b>
<b>GVA per person employed, BGN</b>	<b>28 034</b>	<b>32 788</b>	<b>40 592</b>	<b>43 546</b>
<b>GDP per person employed in the industry, BGN</b>	<b>30 276</b>	<b>33 079</b>	<b>49 550</b>	<b>54 391</b>

Source: NSI, \* preliminary data

According to the preliminary NSI data for 2023, the GDP produced in Bulgaria at current prices was 183 743 million BGN, and GVA was 161 195 million BGN. The achieved growth of 101.8% was lower than the reported values for all the previous years following the COVID-crisis.

In 2023, the reported growth at current prices for the industry only was 3.8 billion BGN. 2.8 billion BGN of them were in industry and almost 1 billion BGN in construction. **There was a drop of 1.7 billion BGN in agriculture.**

Industry retained a high 25% share in the added value of the country (26% in 2022), while this share was around 20 % in 2021 and before.

The achieved high share corresponds to the new policy of the EU that member states should increase their own production after the recent crises and reduce their dependence on imports of raw materials and goods from third countries. This policy enhances the opportunities of Bulgarian producers as well.

The reported growth in GDP and GVA was higher in the other sectors of services of over 8 billion BGN. The increase in trade, transport and tourism was around 4 billion BGN, and in information technologies and telecommunications – over 1 billion BGN.

The annual NSI data on the overall labor productivity of the Bulgarian economy, defined as GDP and GVA per person employed, are as follows:

For 2022 – GDP per person employed - 48 697 BGN and GVA per person employed - 40 592 BGN

For 2023 - GDP per person employed - 52 789 BGN and GVA per person employed - 43 546 BGN

GVA, calculated as produced per person employed for the industry sectors only, in the recent years has changed as follows:

<u>Industry</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
<b>Overall GVA</b>				
BGN per person employed	30 276	33 079	49 550	54 391

Although metallurgy is a raw material industry, it produces exchange-traded products and sells on the world markets at international market prices. Enterprises cannot determine and build higher added value by themselves. In our country, **one employed in the sector creates value twice as high as the average for the industry and the economy as a whole.** It is due to the restructured capacities and technologies in metallurgy, renewed in accordance with the best global practices. New high-tech metal products and products with high added value have been mastered for the main users of metals like automotive, construction, energy, etc.

Table 1.5 shows NSI main indicators by aggregated industry sectors for a 5-years period including the mining and processing industry, energy and water management. There is also data for the metallurgy industry, one of the main sectors of the processing industry.

Table 1.5

## Industry, economic indicators

<b>CEA 2008 / INDICIES</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>INDUSTRIAL PRODUCTION, TOTAL /REVENUES/, mln. BGN</b>	<b>77 091</b>	<b>80 606</b>	<b>74 582</b>	<b>88 176</b>	<b>120 195</b>
<b>Mining /Sector B/</b>					
- output produced, BGN million	2 760	2 587	3 097	3 713	4 306
- value added, BGN million	1 345	1 277	1 790	2 045	1 911
- employed, number	21 659	19 144	20 249	19 529	18 800
- value added/employee, BGN thousand	<b>62.1</b>	<b>66.7</b>	<b>88.4</b>	<b>105</b>	<b>102</b>
<b>Processing industry /Sector C/</b>					
- output produced, BGN million	65 631	68 924	68 893	70 930	90 929
- value added, BGN million	15 233	16 268	15 918	16 170	19 358
- employed, number	554 398	539 990	504 587	491 793	499 977
- value added/employee, BGN thousand	<b>27.5</b>	<b>30.1</b>	<b>31.5</b>	<b>32</b>	<b>39</b>
<b>24. Production of basic metals</b>					
- output produced, BGN million	<b>10 195</b>	<b>9 721</b>	<b>10 255</b>	<b>13 142</b>	<b>15 884</b>
- value added, BGN million	<b>931</b>	<b>1 056</b>	<b>922</b>	<b>1 599</b>	<b>1 587</b>
- employed, number	<b>13 332</b>	<b>14 581</b>	<b>13 030</b>	<b>13 151</b>	<b>12 983</b>
- value added/employee, BGN thousand	<b>69.9</b>	<b>72.4</b>	<b>70.7</b>	<b>106</b>	<b>122</b>
<b>incl. in the Non-ferrous metallurgy, BGN thousand</b>	<b>109.8</b>	<b>121.3</b>	<b>121.1</b>	<b>131</b>	<b>142</b>
<b>Power generation</b>					
<b>The energy sector doubled the production produced in 2022, compared to 2021, by 197 %.</b> /Sector D/					
- output produced/revenues, BGN million	7 003	7 263	7 062	11 571	22 635
- value added, BGN million	3 635	4 021	3 884	3 907	7 837
- employed, number	31 771	31 436	31 435	32 282	32 938
- value added/employee, BGN thousand	<b>114.4</b>	<b>129.8</b>	<b>123.6</b>	<b>121.0</b>	<b>238</b>
<b>Water supply, sanitation, waste management /Sector E/</b>					
- output produced, BGN million	1 697	1 832	1 796	1 962	2 325
- value added, BGN million	844	921	974	919	864
- employed, number	32 793	32 826	32 311	30 990	30 865
- value added/employee, BGN thousand	<b>25.7</b>	<b>28.1</b>	<b>30.1</b>	<b>29.7</b>	<b>30</b>

Source: NSI

The processing industry reported the largest volume and growth - 90 billion BGN, or an increase of + 20 billion BGN. The contribution of metallurgical production to this

growth is also high - nearly BGN 3 billion, which represents 14%. Energy doubles its output produced in 2022, compared to 2021, by 197% due to increased production and high growth in electricity prices, which have not yet recovered to old levels. The economy is recovering from the COVID crises. Contrary to the deteriorating performance in 2020, industrial production increased in 2021. Added value per person employed is the lowest in the water and waste management sector among all the sectors of the Bulgarian industry.

The processing industry follows with 39 thousand BGN per person employed for 2022, which is lower than the average productivity of the industry (49.4 thousand BGN) and the overall productivity for the country (40.6 thousand BGN per person employed).

The highest added value per person employed is in energy. It is growing in 2022, compared to 2021, by 197 % due to the high electricity prices throughout the year.

The average productivity in basic metals, calculated as added value per person employed, is comparable to that in energy, except for 2022. According to NSI data productivity in metallurgy is more than 3 times higher than the average in the processing industry. Productivity in non-ferrous metallurgy is higher than in ferrous metallurgy due to the investments made for the development and absorption of new high-tech products for the automotive industry and construction.

Added value per capita is an indicator on which basis the EU evaluates the economic development and prosperity of its member states. Data show a considerable disparity between West European member states and those of Central and Eastern Europe. The rate of the indicator for Bulgaria in 2022 is 13 271 EUR per capita, which is which is 37.4% of the average for EU (27) – 35 463 EUR per capita. Bulgaria is on the last place in the EU (27) ranking, after Romania with 15 008 EUR per capita. Bulgaria ranks even after Croatia, Hungary and Poland which level is slightly above 17 000 EUR per capita, but 50% below the EU average. And such a ratio has been maintained for years between the countries.

Converting the indicator into purchasing power standards (PPS) once again rank us on the last place of all countries, with 22 015 EUR per capita and 62% of the EU average. Before us is Greece with 67 % of the EU average, but by 1 800 EUR per capita more than Bulgaria. Other countries with indicators below 75 % of the EU average are Slovakia, Lithuania and Croatia. Romania reports 26 835 EUR per capita which is 76 % of the EU average

These indicators show rather big gaps in the economic development of EU member states. Unfortunately, these gaps deepen with the enlargement of the EU. The EU policies implemented so far lack the potential and sufficient financial resources to bring about change. Bulgaria is an example, because after 16 years of membership it remains relatively at the same level. Bulgaria has the lowest GDP, both in absolute rate and per capita and a 9 times difference from the highest in the EU (Luxembourg).

It is difficult to achieve the aims set by the European Commission in the New Strategic Program 2024-2029 **for harmonious development of the EU, improvement of economic, social and territorial cohesion, upward convergence and reduction of differences.** The differences also affect the internal migration within the community, the labor market, the unequal distribution of the workforce and the level and quality of education and qualifications.

In this complex economic and social environment in the EU and Bulgaria, the metallurgical industry has successfully restructured and modernized its capacity and improved the competitiveness. Therefore, the metallurgical industry can meet the objectives for a new future for Europe and its transformation into an economically

independent leader and the engine of the decarbonization and digitalization of the modern world. This is achievable with a strong and competitive European industry.

Metals are an important part of this process. Bulgarian producers have the potential to be part of the upcoming transformations. They have the capacity to produce critical and strategic raw materials necessary for the transition and rendering the European economy independent from raw-materials deliveries from third countries.

Metals and metallurgical products continue to achieve **a high share of the total industrial output and in those of the processing industry. Indicators for 2022 are 13.2% and 17.5% respectively**, compared to 14.9% and 18.5% in 2021.

### *1.3. ENERGY CONSUMPTION, FREIGHT TURNOVER*

The high energy consumption in the production and processing of ferrous and non-ferrous metals is determined by high-temperature technologies and electrolytical processes. The share of energy resource costs in total production costs is high. It ranges from 20% to 30% for individual enterprises and reaches up to 40% in some industries.

One of the main goals of the restructuring and renovation of the capacities is to increase the energy efficiency in the sector on the basis of new high-tech processes and reducing heat and electrical energy losses.

However, the metallurgical industry remains a highly energy intensive industry and is the largest industrial consumer of electricity in the country. Metallurgical industry is also material-intensive, processing large quantities of raw materials and the volume of the finished products is also significant. These two characteristics – energy-intensity and material – intensity determine the strong dependences of the metallurgical industry on the prices of energy carriers, the quality and rate of transport services. The sustainable development of the metallurgical industry is associated with the improvement of energy and resource effectiveness, circular economy models application and enhancing the processed secondary metal raw materials.

Enormous funds are constantly being invested to increase the energy and resource efficiency in metallurgy. As a result, the unit costs have decreased. **The overall consumption of energy resources per unit in steel and rolled metals production from rolled ferrous metals decreased in 2022, compared to 2021, by 2%. In non-ferrous metals production the same consumption decreased by 3.4%.**

Electricity prices for non-household customers became prohibitive for large consumers with high energy intensity after their surge in the second half of 2021. In order to compensate for the increase of the prices and costs of emissions, the European Commission adopted mechanisms for granting state aid. This is an enforced practice in most EU countries. Despite the active actions of the businesses, in our country this opportunity has not been used. Bulgarian enterprises continue to work in an environment that is not competitive with the environment of the EU countries, as well as other countries of the region and the world.

According to the NSI energy balance the final consumption of energy resources in the industry in 2022 was 2 700.7 thousand tons of oil equivalent. It decreased, compared to the previous year, by 107 thousand tons of oil equivalent (96.4 %). This amount represents 27.4% of the final energy consumption in the country for the same year.

All types of fuels are used in the industry **with a breakdown** in the energy mix as follows:



Natural gas – 28.3%; Energy – 30.6%; Liquid fuels – 16.7 %.

Solid fuels – 7.8%; RES and bio-fuels – 9.6%; Others – 7.0 %

Compared to the previous one-year period, the distribution has changed due to new market conditions and import supply problems. The share of natural gas decreased by more than 5%. The total consumption of liquid fuels and energy, incl. RES and bio-products, is growing by approximately the same percentage.

The policy of regulated household electricity prices and their subsidization continues. The consumption of electricity in households is growing with small amounts in 2022 due to a lack of economic incentives (1000 tons of oil equivalent, reaching 1 029 thousand tons). In 2022 the industry reported reduction of 8 thousand tons of oil equivalent compared to 2021 with a total electricity consumption of 826 thousand tons.

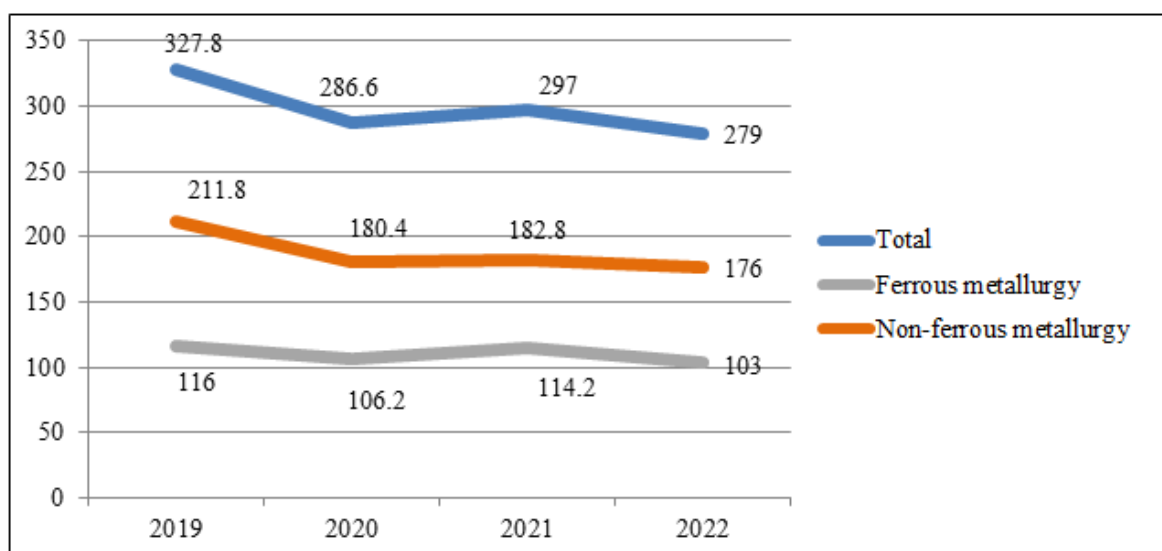
Figure 3.1 shows the energy consumption in ferrous and non-ferrous industry and cumulative amounts for 5 consecutive years. For the whole period energy costs in non-ferrous metallurgy were higher, given the specific of the technological processes and the big share of the mining of block metals in the total metallurgical production.

**In 2022, the total consumption was 279 thousand tons of oil equivalent, the consumption in non-ferrous metallurgy was 176 thousand tons of oil equivalent representing a share of 63% and in ferrous metallurgy it was 103 thousand tons of oil equivalent and 37% share of total consumption.**

The energy costs in non-ferrous metallurgy marked a drop of 6.8 thousand tons of oil equivalent in 2022 compared to 2021. They decline in the ferrous metallurgy by 11.2 thousand tons of oil equivalent. Therefore, the application of the energy costs to the metals production during the cited period means that **the energy production costs per unit in ferrous metallurgy decreased by 2%, and in nonferrous metallurgy by 3.4%.**

Figure 1.3

*Energy consumption in metallurgy, thousand tons of oil equivalent*



The total energy consumption in 2022 in ferrous metallurgy was 103 thousand tons of oil equivalent, incl. 55.3 thousand tons of oil equivalent electrical energy and 47.2 thousand tons of oil equivalent natural gas, representing 53.7 % and 45.8 % respectively.

In 2022 the non-ferrous metallurgy reported an overall energy consumption of 176 thousand tons of oil equivalent, 93.3 thousand tons of oil equivalent of them was the

electricity energy with a share of 53 %, and 47.2 thousand tons of oil equivalent natural gas with a share of 26.8 %. Small quantities of heat energy and liquid fuels were used.

Regardless of measures to improve energy efficiency, the metallurgical enterprises remain one of the largest consumers of electricity in the country.

The overall amount of electricity was 148.6 thousand tons of oil equivalent and was the largest consumption of all production activities, representing 18% of the total industrial consumption. The chemical and petrochemical industries follow with a consumption of 119 thousand tons of oil equivalent and food, beverages and tobacco production with 111 thousand tons of oil equivalent.

In 2022 the overall consumption of natural gas in ferrous and non-ferrous metallurgy was 94.4 thousand tons of oil equivalent compared to 104.5 thousand tons of oil equivalent in the previous year. This was a decrease of 10 thousand tons of oil equivalent or almost 10 %. But despite this, the sector remained a large consumer of natural gas and retained the third place among industrial users.

**Metallurgical companies are among the biggest shippers in the country.** Both raw materials and finished products pass through the territory of the entire country in large volumes. The main quantities are solid freight, both in bulk (ores, concentrates and additives) and in solid (finished products, secondary raw materials) form. About 1.5 million tons of the total amount is liquid load – sulfuric acid, which is a product ready for domestic sales and for export.

The transport schemes in the territory of the country have operated mainly by railway transport or road transport. Waterway transport is also used outside the country. The total freight turnover in recent years has remained around 7 million tons, distributed by types of cargo:

- **bulk (raw materials) – up to 2 million tons**
- **liquid (mainly finished products) – 1.5-1.6 million tons**
- **solid massive (raw materials, finished products) – about 4 million tons.**

The biggest quantities in the total volume of transported cargo are from the enterprises producing non-ferrous metals, followed by steel and steel products producers, of all physical forms (bulk, massive and liquid cargo). Good logistics, prompt supplies of raw materials and transportation of finished products are important for the management and insurance of the normal course of the technological process and continuity of the technological schemes.

Companies processing metals into products and finished products, mainly transport raw materials and finished products in massive solid form. They also have uninterrupted processes. Regular deliveries are a prerequisite for reliable work.

In transport, partners of the metallurgical companies are “BDZ – Freight Transport” EOOD, private railway carriers, motor transport companies, sea carriers, etc.

In 2022, according to NSI data, the total volume of transported cargo was 19 291 thousand tons, of which 12 236 were inside the country. “BDZ – Freight Transport” EOOD reports 7 016 thousand tons transported cargo for 2022, or only 36% of the total cargo volume. Private carriers have transported the rest. Similar is the situation in 2023. The total cargo volume is 17 105 thousand tons (a decrease of 2 186 thousand tons, 88.6%). The share of the state carriers is 3%.

Approximately 50% of raw materials and finished products in metallurgy are transported by railway transport, which represents 20% of the total railway freight transport in the country. Expanding the use of railway transport instead of road transport will reduce

carbon emissions from metallurgical transport activities. For that purpose, high quality and safety must be ensured for this transport service.

#### 1.4. FOREIGN TRADE EXCHANGE, IMPORT AND EXPORT

The products of metallurgy are partially realized on the domestic market, but the industry mainly exports to EU and third country markets. The value of the exported goods exceeds the value of the imports, and as a result a positive foreign trade balance of about 3 - 4 billion BGN was formed annually.

Table 1.6 presents the official BNB and NSI data on foreign trade exchange. Although being preliminary for the recent two years, the data clearly demonstrates the high share of metals in the exports and their contribution to reducing the negative balance.

Inflation during and especially after the economic crisis led to a significant increase in product prices, incl. metal prices. The sharp increase in the value of exported and imported goods exceeded 100 billion BGN in 2022. Due to falling international prices and market fluctuations in 2023 Bulgarian exports also reported a drop of 6.4 billion BGN (93.1 %), and imports decreased by 11 billion BGN (89.9 %).

Table 1.6

##### Foreign trade balance in trade exchange, billion BGN

<b>Indicators:</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Imports of goods, incl. the EU (27)</b>	62.9 40.0	65.1 41.1	60.1 No data	76.7 46.3	107.9 59.6	<b>96.9</b> <b>58.1</b>
- basic metals and products	4.3	4.5		5.5	11.4	<b>10.1</b>
<b>relative share, %</b>	6.8	7.0	3.7 6.2	7.1	7.0	<b>10.4</b>
<b>Exports of goods, incl. the EU (27)</b>	56.0 37.7	58.4 38.8	54.7 35.8	68.4 45.3	92.9 60.6	<b>86.5</b> <b>55.1</b>
--	-	-	-	-	-	<b>12.6</b>
- basic metals and products	7.8	6.7	8.3	8.2	14.9	<b>14.6</b>
<b>relative share, %</b>	14.1	11.5	15.1	12,1	11.0	
<b>Foreign trade balance, Incl. metals and products</b>	-6.9 +3.5	-6.7 +2.2	-5.4 +4.6	- 8.3 +2.7	-14.9 +3.5	<b>-10.4</b> <b>+2.5</b>

Source: NSI, final data up to 2021, preliminary for 2022 and 2023

\* BN (Table.1.7)

In these two years, metallurgy also recorded a drop in both exports and imports by 2.3 billion BGN (84.6 %) and 1.3 billion BGN (88.6 %) respectively.

Table 1.7 shows the data from the BNB on export value in EUR by main products and commodity groups for a five-year period. The total exports of goods in 2023 decreased

by 3,283 million EUR. With an annual decline of 7%, the export value in 2023 dropped to 93% of the 2022 level.

Table 1.7

*Foreign trade – export by types of goods, billion EUR*

<b>Commodity groups</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Consumer goods, incl.</b>	<b>7582.8</b>	<b>7646.8</b>	<b>8428.4</b>	<b>10780.1</b>	<b>10163,4</b>
• Foods	1788.2	1881.3	2322.5	3654.8	3047,8
• Cigarette	63.3	53.5	54.0	82.9	113,6
• Beverages	179.2	210.4	158.9	142.9	156,5
• Clothes and shoes	1620.0	1372.7	1383.6	1701.2	1612,4
• Pharmaceuticals and cosmetics	1260.9	1336.5	1269.3	1415.5	1623,4
• Furniture and home interior	1227.1	1274.0	1600.2	1646.7	1450,1
• Other consumer goods	1444.3	1518.4	1639.9	2136.0	2159,6
<b>Raw materials, incl.</b>	<b>11668.6</b>	<b>11644.0</b>	<b>15030.7</b>	<b>18774.7</b>	<b>17481,2</b>
• <i>Pig iron, iron, and steel</i>	<i>608.1</i>	<i>534.0</i>	<i>976.2</i>	<i>1100.9</i>	<i>894,8</i>
• <i>Non-ferrous metals</i>	<i>2323.1</i>	<i>2555.2</i>	<i>3202.9</i>	<i>4142.9</i>	<i>3466,1</i>
• Chemical products	493.9	436.4	541.5	777.0	675,9
• Plastics, rubber	1147.1	1178.2	1472.5	1757.1	1662,6
• Fertilizers	236.1	157.7	297.5	639.5	385,2
• Textiles	603.8	494.5	571.0	709.9	656,4
• Raw materials for food production	2335.5	2254.4	2987.8	3730.9	3895,7
• Wood and paper, cardboard	555.2	520.6	674.4	853.9	656,7
• Cement	20.1	23.8	31.2	27.0	25,8
• Tobacco	122.0	109.5	111.1	108.8	115,6
• Other raw materials	3223.7	3379.5	4164.6	4927.0	5046,5
<b>Investments goods, incl.</b>	<b>7266.4</b>	<b>6897.4</b>	<b>8419.3</b>	<b>11138.9</b>	<b>12353,1</b>
• Machines, apparatus	1855.6	1736.5	2082.0	2700.4	2738,2
• Electrical machines	1183.1	1120.5	1474.9	1807.4	2037,4
• Vehicles	651.0	568.4	636.5	727.4	819,0
• Spare parts and equipment	1850.7	1667.6	2012.1	2443.8	2749,7
• Other investments goods	1726.0	1804.5	2213.8	3459.8	4008,8
<b>Total non-energy goods, incl.</b>	<b>25517.8</b>	<b>26188.1</b>	<b>31878.4</b>	<b>40693.7</b>	<b>39997,7</b>
<b>Total energy resources</b>	<b>3268.9</b>	<b>1696.1</b>	<b>2889.7</b>	<b>6723.1</b>	<b>4227,5</b>
• Petroleum products	2345.6	1008.2	1120.9	3982.8	2681,8
• Other non-petroleum products	923.4	687.9	1768.7	2740.3	1545,7
<b>Other</b>	<b>69.3</b>	<b>84.3</b>	<b>98.9</b>	<b>613.1</b>	<b>516,0</b>
<b>Exports total</b>	<b>29856</b>	<b>27969</b>	<b>34866.9</b>	<b>47508.1</b>	<b>44225,2</b>

Source: BNB

The European Union is our major trading partner. Goods for 55 billion EUR were exported by Bulgaria to the European markets in 2023. This export takes a share of 64% of our total exports, but with a negative balance of 3 billion BGN.

In 2023, Bulgarian export declined, compared to the previous year, by more than 5 billion BGN as a result of deteriorating EU economy with an annual growth of only 0.5%. Our main trading partner is Germany with a share of 21% of total exports. Other partner is Turkey with a share of 9%. Imports from the EU are also the largest, reaching 60% of the total Bulgarian imports, compared to 54.5% in 2022.

The data show that in 2023 the export of a large part of industrial goods decreased, including energy resources. The reduction in the export of consumer goods is by 617 million BGN, and in the export of raw materials and materials by 129 million BGN. The value of the exported energy resources decreases significantly by 2 496 million BGN due to the drop in the electricity export in terms of quantities and prices.

There is growth in the export of all products from the group of investment goods, with an increased total value of 1,214 million BGN. Achieving an outpacing growth in the export of investment goods relative to non-energy goods has been a permanent trend in recent years.

Despite the changes in the export structure and over 6 billion BGN annual decline, of which over 2 billion BGN in metals, their share in exported goods remains big - 14.6% in 2023 compared to 11% in 2022. Table 1.7 shows that the total value of copper (3 466 million EUR) and steel (899 million EUR) exceeds the value of all the rest of the goods. The other exported metals and products from “Other raw materials and substances” group are - steel products (866 million EUR), aluminum and products (599 million EUR), zinc and lead (669 million EUR).

According to the data of BNB for 2023, the total value of exported base metals is 6 462 million EUR – 1 765 million EUR exported by the ferrous metallurgy and 4 697 million EUR by non-ferrous metallurgy. The ratio between ferrous and non-ferrous export is 25% : 75% and corresponds to the proportion of these industries in Bulgarian metallurgy.

Non-ferrous metallurgy, even without taking into account the additional contribution from the export of precious and related metals and manufactured chemical products, remains the most exportable sector of the Bulgarian industry. Non-ferrous metals are also significant for the European economy, with the potential to contribute to achieving raw material independence of the EU for the implementation of the Green Deal.

## SETION TWO

### FERROUS METALLURGY IN BULGARIA

#### 2.1. PRODUCTION OF FERROUS METALS AND ROLLED FERROUS METALS

##### 2.1.1. STEEL PRODUCTION IN THE EU AND IN THE WORLD IN 2023

Steel is the most important engineering and construction material in the world and will be irreplaceable as long as humanity exists and develops. It is an essential factor in the development and implementation of innovative technologies to reduce CO<sub>2</sub>, to improve resource efficiency and promote sustainable development.

According to the World Steel Association, the global crude steel production in 2023 was 1 892.5 million tons, produced in more than 90 countries around the world. The 10 largest crude steel producing countries provide 85 % of the world production. China retains its first position in the world production of crude steel. In 2023 China has produced 1019 million tons or 54 % of the world production. India takes the second place with a share of 7.5%. Japan and the USA occupy the third and the fourth position respectively with shares of about 4.5 %. Russia ranks the fifth with a share of 4 %. Germany, Turkey, Brazil and Iran occupy positions from sixth to tenth with their shares ranking from 1.6 % to 1.9 % of global crude steel production.

Table 2.1 presents the companies that are the largest producers of crude steel in 2023. Total production of the 10<sup>th</sup> main companies has a share of 27.4 % of the world production of crude steel.

**Table 2.1**

***Top 10 steel producing companies in the world in 2023***

	<b>Company</b>	<b>Millions of tons</b>	<b>Share of global production (%)</b>
1	China Baowu Group	130.77	6.9
2	ArcelorMittal, Luxembourg	68.52	3.6
3	Ansteel Group, China	55.89	3.0
4	Nippon Steel Corporation, Japan	43.66	2.3
5	HBIS Group, China	41.34	2.2
6	Shagang Group, China	40.54	2.1
7	POSCO Holdings, South Korea	38.44	2.0
8	Jianlong Group, China	36.99	2.0
9	Shougang Group, China	33.58	1.8
10	Tata Steel Group, India	29.5	1.6

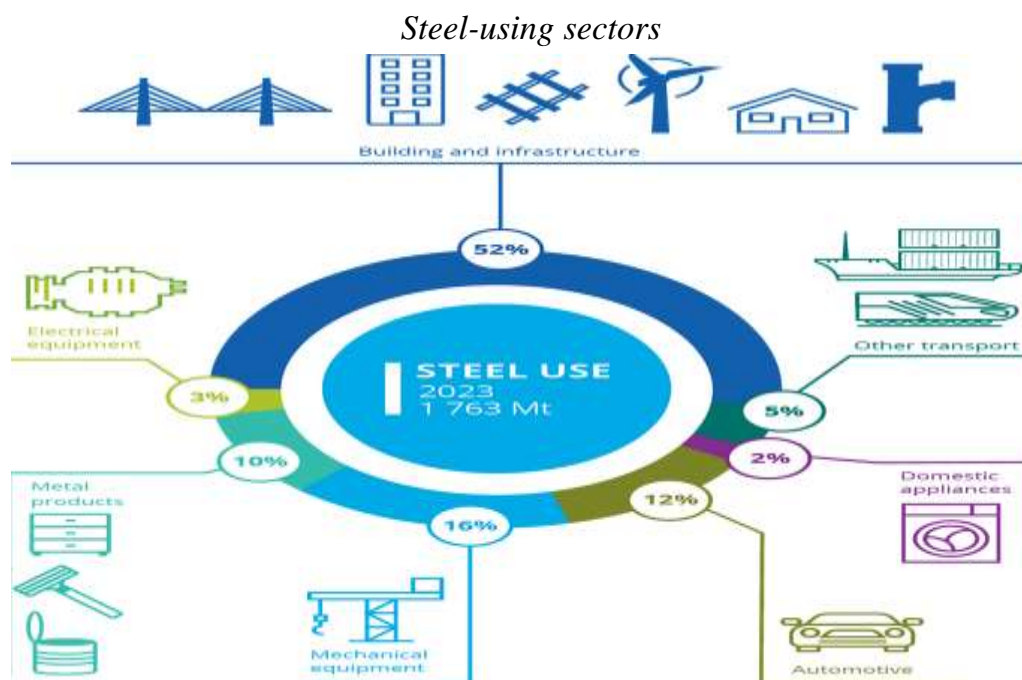
Source: World Steel Association

World consumption of steel and steel products in 2023 was 1 763 million tons. It slightly exceeds consumption in 2022 by 0.8 million tons. The geographical allocation of steel consumption shows that the biggest consumer is China with a share of 50,8% of global

steel consumption. On the second and on the third position in terms of steel consumption in 2023 are Asian countries and North America with a share of 9.6 % and 7.7 % respectively. EU (27) occupies the fourth place in the world steel consumption with a share of 7.2 %. In 2023 the consumption in the EU (27) was 127.6 million tons, which is less than that of 2022 by 7.2 million tons (10.5 %). The first 10 large steel consumers in the world report a decline in the consumption in 2023 except for India, South Korea and Russia where the consumption is growing.

The allocation of steel consumption by sectors shows that construction and infrastructure continue to be the main consumer of steel and steel articles with a share of 52% of the total steel consumption. Mechanical equipment takes 16 % followed by automotive sector with 12 %, production of metal articles and packaging – 10%, transport b- 10%, electrical equipment – 3%, household appliances – 2%. Figure 2.1 presents the sectors that are the biggest consumers of steel and steel products.

Figure 2.1



Source: World Steel Association

In 2023, the EU steel industry faced another sharp contraction in production, supply and demand as a result of the continuing impact of multiple global cataclysms. The production of crude steel in the EU in 2023 was 126 million tons, or a drop of 7% compared to 2022. In 2022 this drop reached 11 %. This is the lowest volume of production ever recorded. Production in 2023 was even lower than that after the financial crises in 2009.

In 2023 the apparent steel consumption in EU was 126 million tons or a decline of 9% compared to 2022 when a drop was also reported compared to the previous year.

The import of semi-finished and finished products decrease to 33.6 million tons, recording a decline of 8,5 % compared to 2022. However, steel imports remain at historically high levels and retain a 27% share of the EU market. Imports of finished products decreased, compared to the previous year, by 11 %. The decline was as a result of the lower import of flat products by 8% and long products by 22 %. The export of steel

products of the EU to third countries in 2023 decreased slightly by 1% following a more pronounced decline in 2022 by 16%. There is a decrease in the export of flat products by 7% and an increase in the export of long products by 10 %.

The development of the EU's trade balance with third countries generally reflects the increasing competition in the world steel market observed in recent years, the result of an unfavorable combination of many negative factors.

These are: global steel overcapacity, which continues to grow even after the pandemic; problems with global supply chains and war-related disruptions; the increasing protectionism and subsidization of the steel sector by national authorities, which continues to undermine the competitiveness of European steel production.

Table 2.2 presents the EU member states, the main steel producers in 2023.

Table 2.2

***EU Member states – main steel producers in 2023***

<b><i>EU ranking position</i></b>	<b><i>Member state</i></b>	<b><i>Production (million tons)</i></b>	<b><i>Position in the World production ranking</i></b>	<b><i>Share of the World production (%)</i></b>
1	Germany	35.4	7	1.9
2	Italy	21.1	11	1.1
3	Spain	11.4	17	0.6
4	France	10	19	0.5
5	Austria	7.1	22	0.4
6	Poland	6.4	23	0.3
7	Belgium	5.9	25	0.3
8	The Netherlands	4.7	33	0.2
9	Slovakia	4.4	35	0.2
10	Sweden	4.3	36	0.2

*Source: World Steel Association.*

In 2023, the total production of the main 10 EU member states occupied a share of 5.9% of world production. In neighboring Romania, crude steel production in 2023 was 1.6 million tons. Turkey has produced 33.7 million tons, Serbia and Greece 1.5 and 1.2 million tons respectively. In 2023, Bulgaria produced 0.49 million tons of crude steel. The share of Bulgarian steel production in European crude steel production is 0.39%, and in the world production it is 0.03%.

***2.1.2. CRUDE STEEL PRODUCTION IN BULGARIA***

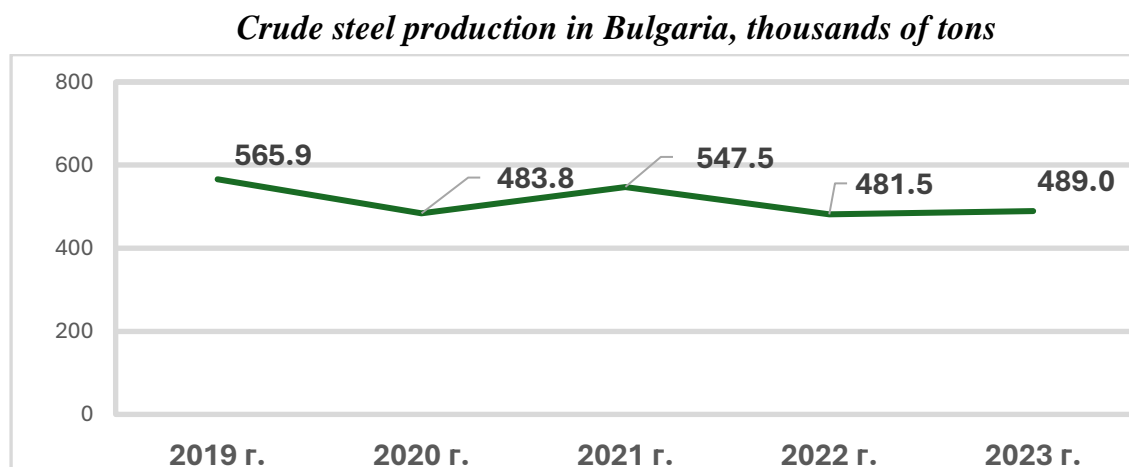
Modern steel production in Bulgaria is ecological and low carbon. The only producer of crude steel in our country is "Stomana Industry" JSC in Pernik. Steel is produced in electric arc furnaces (EAF). Liquid steel is processed in hot rolling mills into flat and long products. They are raw materials for the production of, various types of steel articles.

In 2023, 489 thousand tons crude steel were produced in Bulgaria, which was more



than 2022 by 7.5 thousand tons (1.6%). (Figure 2.2). In our country, in 2022 the production of crude steel in the country reached the lowest level of the last five years. The slight increase in crude steel production in 2023 was against the backdrop of the general collapse of production in Europe (drop in 2023, compared to 2022, by 7%).

Figure 2.2



Investments in sustainable practices and technologies, strengthening the raw material supply chain, and strategic planning can help the steel industry meet the challenges of market dynamics, as well as to ensure the long-term sustainability of steel production.

In 2023 "Stomana Industry" JSC continues to improve the energy efficiency of production processes through OpEx and CapEx initiatives. The most significant projects are - introduction of modern technologies to reduce natural gas for heating by up to 40%; reduction of electricity consumption in compressors and pumping stations; etc. Total investments in energy efficiency in 2023 account for 1.6 million EUR.

### *2.1.3. PRODUCTION OF ROLLED FERROUS METALS*

Producers of rolled ferrous metals (RFM) in Bulgaria are „Stomana Industry” JSC in Pernik and „Promet Steel” JSC in Bourgas. Both enterprises produce long hot-rolled metal. „Stomana Industry” JSC is the only producer of flat hot-rolled metal. In 2023 the total production of RFM in the country was 1 027.5 thousand tons. Compared to 2022 there was an increase in produced RFM by 64.0 thousand tons or 6.6 %. Table 2.3 and Figure 2.5 present the data for production.

Produced long hot-rolled metal in 2023 was 790 thousand tons, which is 7.6% more than in 2022. „Stomana Industry“ JSC had produced 239.2 thousand tons, which is 28.2 thousand tons more than in the previous year, or a decline of 10.5%. The production of „Promet Steel“ JSC in 2023 was 550.8 thousand tons, which is 83.7 thousand tons more compared to 2022, or a growth of 17.9%. In 2023 **flat hot-rolled metal** produced by „Stomana Industry“ JSC was 237.5 thousand tons, which is 8.5 thousand tons (3.7 %) more than in 2022.

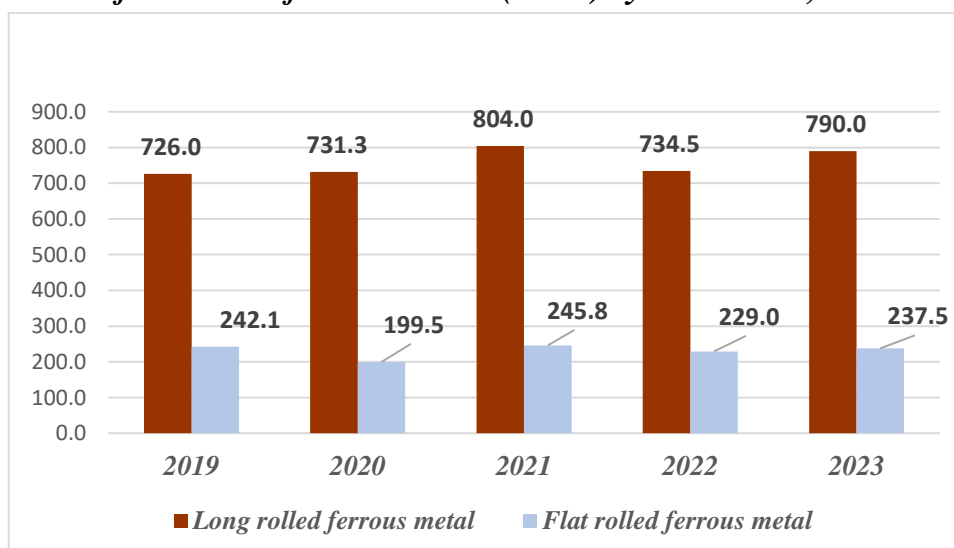
**Table 2.3***Production of rolled ferrous metals (RFM), thousands of tons*

Types of RFM	Companies	2019	2020	2021	2022	2023	2023/2 2 +/-	2023/2 2 %
<i>Hot-rolled long</i>	„Promet Steel” JSC	428.9	501.1	585.1	467.1	<b>550.8</b>	83.7	117.9
	„Stomana Industry” JSC	297.1	230.2	218.9	267.4	<b>239.2</b>	-28.2	89.5
	Total Hot-rolled long	726.0	731.3	804.0	734.5	<b>790.0</b>	55.5	107.6
<i>Hot-rolled flat</i>	„Stomana Industry” JSC	242.1	199.5	245.8	229.0	<b>237.5</b>	8.5	103.7
<i>Hot-rolled metal total</i>	„Promet Steel” JSC	428.9	501.1	585.1	467.1	<b>550.8</b>	83.7	117.9
	„Stomana Industry” JSC	539.2	429.7	464.7	496.4	<b>476.7</b>	-19.7	96.0
<b>Total RFM</b>		<b>968.1</b>	<b>930.8</b>	<b>1 049.8</b>	<b>963.5</b>	<b>1 027.5</b>	<b>64.0</b>	<b>106.6</b>

Source: Company data

Traditionally „Stomana Industry” JSC produces more long-hot-rolled metal. This trend has also been observed in 2023, despite reported drop and the small differences in the produced quantities of flat and long rolled ferrous metals.

Figure 2.3 presents the total production of rolled ferrous metals by *assortment* for a period of 5 consecutive years.

**Figure 2.3***Production of hot-rolled ferrous metals (RFM) by assortment, thousands of tons*

Traditionally, the produced quantities of long rolled metal in Bulgaria are 2-3 times more than those of flat rolled metal. This corresponds to the capacity of the existing installations in the country. The correlation between long/flat rolled metal was preserved also in the current year as well. In 2023 the produced long rolled metal was 3.3 times more than the produced flat rolled metal (Figure 2.4).

Figure 2.4

*Production of long and flat rolled metals in 2023*

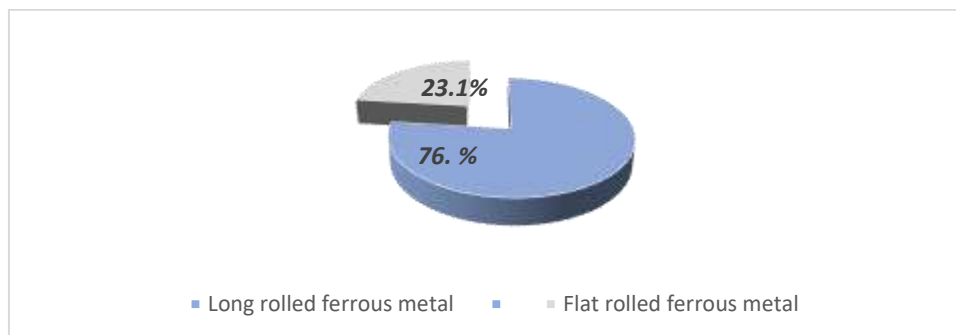
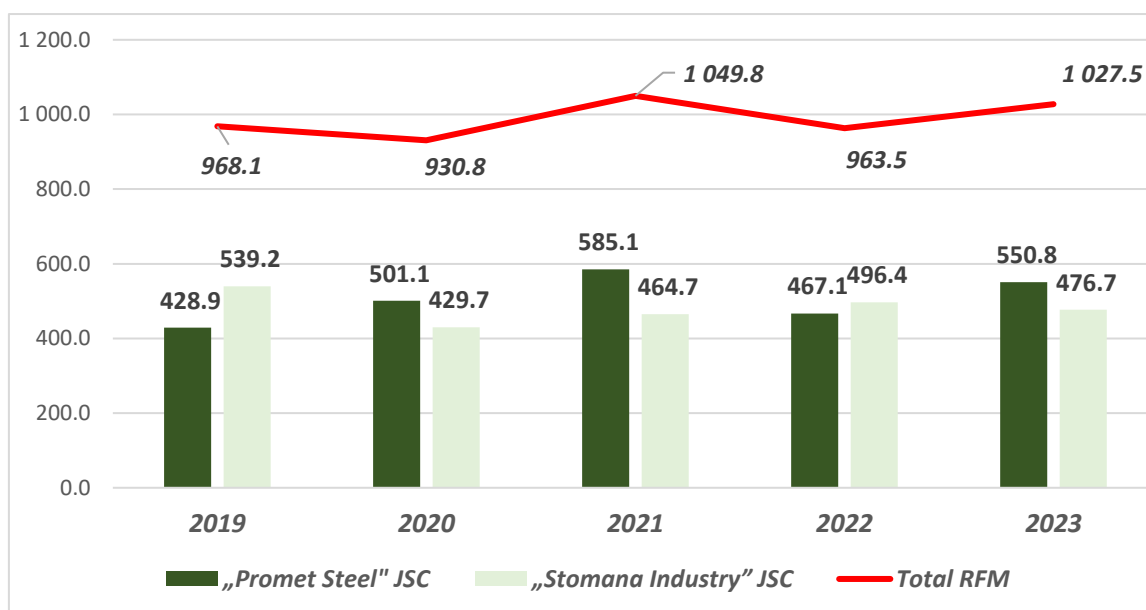


Figure 2.5 presents the dynamic of the production of rolled metal in total and by producers for the recent 5 years.

Figure 2.5

*Production of long and flat rolled metals, thousands of tons*



#### 2.1.4. PRODUCTION OF ROLLED FERROUS METAL ARTICLES

Subsequent products in the value-added chain are articles of rolled ferrous metals. These are steel pipes, steel balls for mills, wire and wire articles, etc. The raw materials for the production of rolled ferrous metals in Bulgaria are provided by the Bulgarian metallurgical enterprises or from imports (sheets, strips, wire rod).

In Bulgaria there are other producers of welded pipes and various steel and rolled ferrous metal products, but table 2.4 shows data on the production of rolled ferrous metals products only by BAMI members. In contrast to the steady growth in the production of steel articles in the period from 2019 to 2022, there is a sharp decline in 2023. The quantities produced in 2023 return to the levels of 2019.

The production of steel articles in 2023 has decreased by 49.1 thousand tons or a decline of 37.9%. The decline has been driven by the continued steel pipes production shrinking and almost double the reduction in the production of steel balls for mills.

*Production of RFM articles by companies, thousands of tons.* Table 2.4

Articles	Company	2019	2020	2021	2022	2023	2023/22 +/-	2023/22 %
Steel pipes, welded	„EMC Distribution“ Ltd	43.3	37.7	41.8	36.2	<b>30.7</b>	-5.5	84.8
	„Stomana Industry“ JSC	0.0	4.4	16.2	14.3	<b>15.3</b>	1.0	107.0
Steel balls for mills	„Stomana Industry“ JSC „El Stomana“ Ltd	25.9	31.7	32.3	38.9	<b>22.8</b>	-16.1	58.6
Wire and wire articles	„ZHITI“ JSC	11.0	12.2	12.6	11.4	<b>11.6</b>	0.2	101.8
<b>Total RFM articles</b>		<b>80.2</b>	<b>86.0</b>	<b>102.9</b>	<b>129.5</b>	<b>80.4</b>	<b>-49.1</b>	<b>62.1</b>

Source: Company data

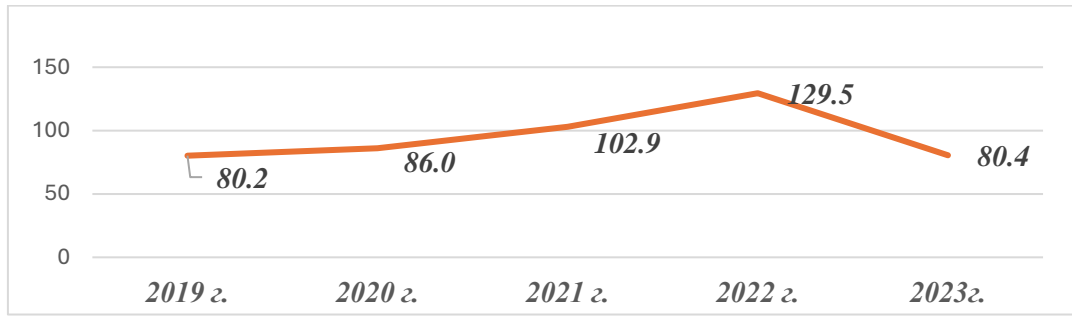
„EMC Distribution“ LTD in Ruse is a company specialized in the production of welded steel pipes and steel profiles of various shapes and sizes, including pipes with a surface protected against corrosion (zinc coated pipes). The company also produces pipes and fittings for electrical installations from imported low carbon cold-rolled steel sheet plates.

Steel pipes production is also organized in “Stomana Industry” JSC. The production portfolio covers a wide variety of round, square and rectangular profiles with different thicknesses.

Steel balls for mills take place in both „Stomana Industry” JSC and „El Stomana” LTD. „ZHITI” JSC in Ruse is an enterprise producing wires and wire products of various types and sizes. The graph in figure 2.6 presents the production of RFM articles for a period of five years by enterprises that are members of BAMI.

Figure 2.6

*Production of RFM products, thousands of tons*



## 2.2. TRADE TURNOVER AND CONSUMPTION OF ROLLED FERROUS METALS AND PRODUCTS THEREOF

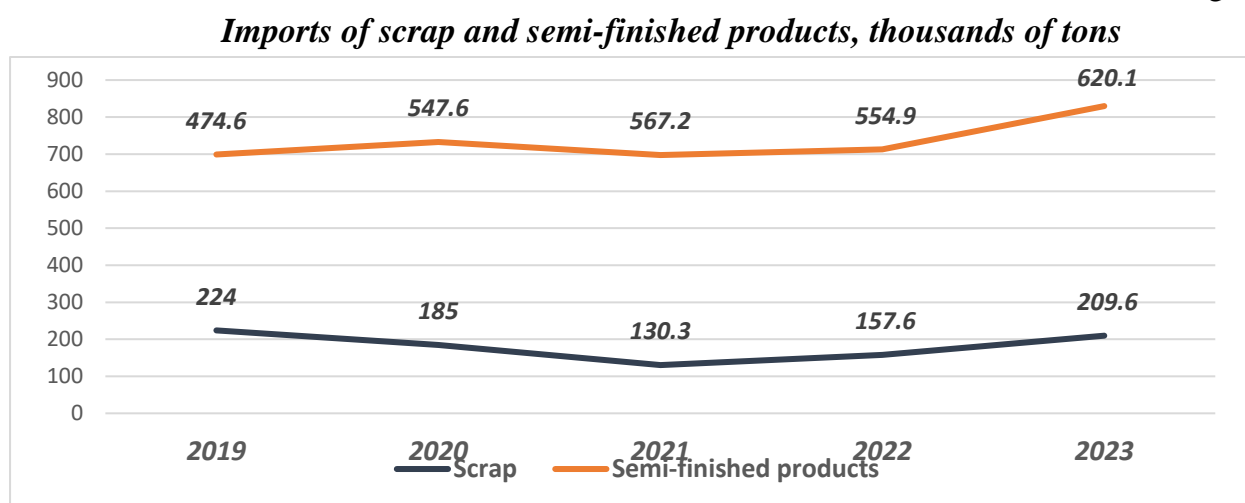
### 2.2.1. IMPORT OF SCRAP, ROLLED FERROUS METALS AND ARTICLES THEREOF

Customs statistics data indicate that the imports into Bulgaria in 2023 of rolled ferrous metals and articles thereof, including scrap, reached 2 226.5 thousand tons with a value of 3 406.5 million BGN. There is a drop of 1.5% compared to 2022. The imported rolled-ferrous metals and articles thereof (1034.8 million BGN) are less than those in 2022, by 35 thousand tons. Table 2.5 shows the imports by commodity groups in the last five years.

In 2023, the trend of gradual increase of the import of **ferrous metal scrap**, used as raw material for crude steel production, imposed over the resent 5 years, has continued. Imported scrap of 209.6 thousand tons was more than in the previous year, by 52 thousand tons (33%). Ferrous metal scrap was imported into Bulgaria mainly from Romania, with a share of 66.8 % of the total Bulgarian imports of the product. Serbia ranked second with a share of 30,6 %. Ferrous metal scrap was imported from Ukraine and our neighboring countries – Macedonia and Greece, but the imported quantities were significantly smaller, 1.3%, 0.7 % and 0.3 % respectively.

In 2023, the 620.1 thousand tons of semi-finished products imported into Bulgaria were the highest in terms of quantity for the entire five-year period and by 65.2 thousand tons more than the imported products in 2022, which is an increase of 11.8%. Figure 2.7 shows the imports of scrap and semi-finished products for the period 2019-2023.

Figure 2.7



The import from Ukraine takes a share of 82.8 % of the total Bulgarian imports of the product. There are also imports from Middle Eastern countries: Algeria - 8.2% and Oman - 4.8%. Other sources of imports are Balkan countries and EU countries, but their share is insignificant.

Semi-finished products are the main raw materials for Bulgarian steel industry, especially for the production of „Promet Steel” JSC. They are processed into products with new added value for the domestic market and for exports.

**Table 2.5***Imports of ferrous metals and articles thereof, thousands of tons*

<b>Goods</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<b>Non-alloyed total</b>	<b>1 805.40</b>	<b>1 734.70</b>	<b>1 676.50</b>	<b>1 739.2</b>	<b>1 795.2</b>	<b>56.0</b>	<b>103.2</b>
cast iron - ingots, granules, powder	15.1	13	15.3	21.1	26.4	5.2	124.8
Ferroalloys	16.5	15.3	14.6	20.8	19.0	-1.8	91.2
Scrap	224	185	130.3	157.6	209.6	52.0	133.0
Semi-finished products	474.6	547.6	567.2	554.9	620.1	65.2	111.8
Hot-rolled metal (coils and sheets)	546	557.4	486.6	491.5	446.0	-45.4	90.8
Cold-rolled metal (coils and sheets)	112.2	103.1	126.6	102.0	95.9	-6.1	94.1
Wire rod	194.2	151.4	169.2	194.3	169.0	-25.4	86.9
Bars	143.2	84.2	88.3	119.8	123.5	3.6	103.0
Merchant bars/profiles	79.6	77.7	78.4	77.2	85.8	8.6	111.1
<b>Alloyed total</b>	<b>101.1</b>	<b>87.5</b>	<b>105.4</b>	<b>218.5</b>	<b>118.7</b>	<b>-99.8</b>	<b>54.3</b>
Hot-rolled and cold-rolled coils and sheets	63.2	60.1	62.8	150.0	77.0	-73.0	51.3
Bars and profiles	37.9	27.4	42.6	68.5	41.7	-26.8	60.9
<b>Articles from rolled ferrous metals</b>	<b>435.5</b>	<b>456.7</b>	<b>206.4</b>	<b>303.8</b>	<b>312.6</b>	<b>8.8</b>	<b>102.9</b>
Seamless pipes	30.1	25.6	0	37.3	33.2	-4.1	89.1
Welded pipes	190.3	204.4	0	32.5	49.2	16.7	151.2
Coated sheets	188.7	195.4	182	201.9	191.3	-10.6	94.7
Wires ropes etc..	26.4	31.3	24.4	32.1	38.9	6.8	121.3
<b>Total</b>	<b>2 342.00</b>	<b>2 278.90</b>	<b>1 988.30</b>	<b>2 261.5</b>	<b>2 226.5</b>	<b>-35.0</b>	<b>98.5</b>
<b>Value, mln. EUR</b>	<b>1 430.60</b>	<b>1266.5</b>	<b>1529.7</b>	<b>2 270.8</b>	<b>1 741.7</b>	<b>-529.1</b>	<b>76.7</b>
<b>Value, mln. BGN</b>	<b>2 798.00</b>	<b>2477.1</b>	<b>2991.8</b>	<b>4 441.3</b>	<b>3 406.5</b>	<b>-1 034.8</b>	<b>76.7</b>

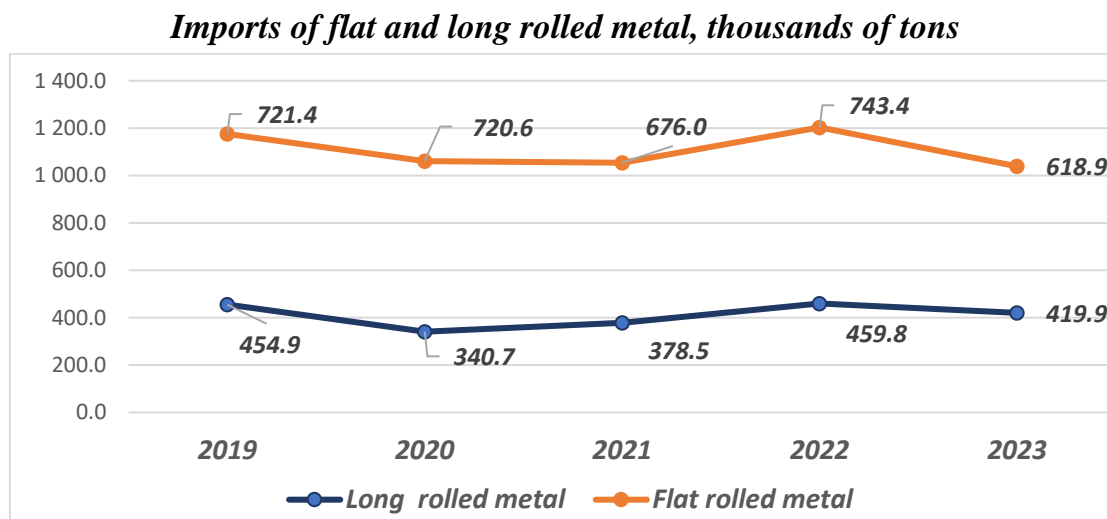
Source: Custom statistic, NRA

Imports in Bulgaria of flat and long rolled metal for the period 2019-2023 is presented on Figure 2.8. In 2023, 618.9 thousand tons of flat hot-rolled metal and flat cold-rolled

metal from ordinary and alloyed steel, were imported into Bulgaria. Compared to 2022 this import is a decrease by 124.5 thousand tons or 16.7%. Non alloy hot-rolled metal products (coils and sheets) were 446 thousand tons, 45.4 thousand tons less than the previous year.

The total imports of long rolled metals (rods, bars and profiles from ordinary and alloyed steel, wire rod) was 419.9 thousand tons in 2023. It decreased, compared to 2022, by 39.9 thousand tons, or 8.7%.

Figure 2.8



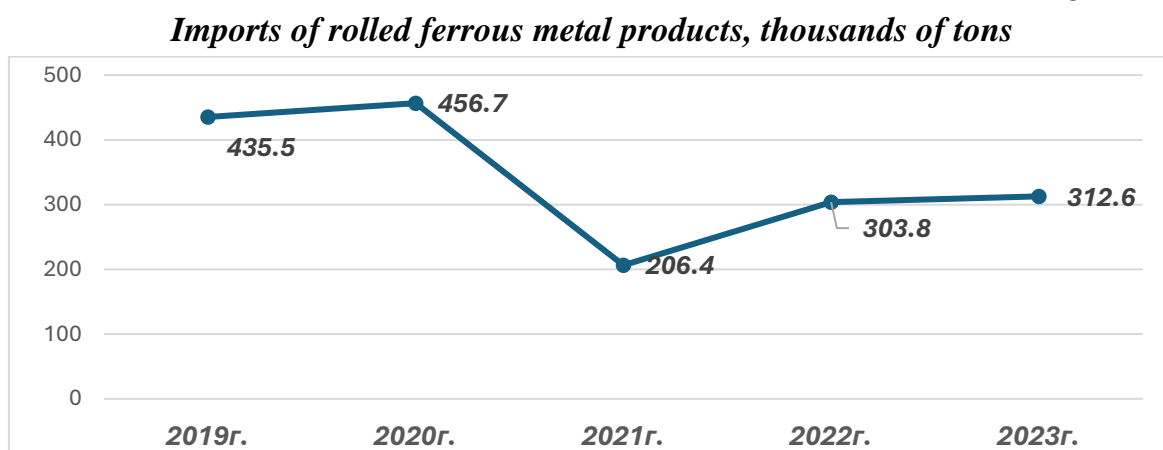
Flat cold-rolled metals have not been produced domestically, but imports of the product continued to decline. In 2023 95.9 thousand tons of flat cold-rolled metals were imported in Bulgaria, 6.1 thousand tons (5.9%) less than the previous 2022. The product was imported mainly from Ukraine (40.9 %) and our neighboring countries – Serbia (16.5 %), Romania (13.4 %), Turkey (11.3 %) and the Republic of North Macedonia (1.7 %). Small quantities were also imported from Vietnam, Egypt and EU countries.

In 2023, 209.2 thousand tons of bars and profiles from non-alloy steel were imported into Bulgaria. The imports of steel bars and profiles in 2023 were more than in 2022 by 12.2 thousand tons (6.2 %). Imports of **wire rods** fell to 169 thousand tons. In 2023, imported wire rod was less than 2022 by 25.4 thousand tons, or a decline of 13.1 %. The imports of long products in 2023 were originating in Greece (26.7 %), Turkey (23.6 %), Italy (9.2 %), Romania (4.5%) and Ukraine (2.3 %).

In 2023, continues the gradual increase of the import of rolled ferrous metal products. As a whole, 312.6 thousand tons of rolled ferrous metal products were imported, which was more than the imported quantities in 2022 by 8.8 thousand tons. A growth of 2.9% was reported.

Figure 2.9 shows the imports of rolled ferrous metal products over the recent 5 years. In 2023, the imports of seamless welded pipes reached 12.6 thousand tons. It was more, compared to 2022, by 12.6 thousand tons (18 %).





An increase in the imports of **wires and ropes** by 21.3 % was reported in 2023 as well. The rise in the imports of steel pipes and wires enlarged the total import of rolled ferrous metal products in 2023, compared to the previous year, by 2.9 %.

### *2.2.2. EXPORT OF SCRAP, ROLLED FERROUS METALS AND ARTICLES THEREOF*

According to the Customs statistics data on Bulgarian exports, total the total quantity of exported in 2023 metal raw materials, rolled metal and rolled ferrous metal products was 1 558.4 thousand tons, with a value of 2 117.2 million BGN.

This amount, compared to the export of the same products in 2022 represents a decrease of 9.1 thousand tons (0.6 %) with a value of 739.7 million BGN. Table 2.6 presents the export data of ferrous metal products for the last five years.

In 2023, among the exported quantities by commodity groups, the largest were those of ferrous metal scrap, although this export decreased, compared to 2022, by 58.7 thousand tons. This is a positive trend, bearing in mind that „Stomana Industry” JSC uses only ferrous metal scrap for its production and is strongly dependent on the domestic and regional scrap market. The scrap shortage on the market caused by increased exports resulted in a lack of raw material for production and this is one of the reasons why the enterprise operates at reduced capacity at certain times. Decarbonization, and resource and energy efficiency in the metallurgical industry are associated with the circular economy and secondary processing of metals.

In 2023, 486.5 thousand tons of scrap were exported from Bulgaria. More than 90% of this export was to the neighboring countries -Turkey, the Republic of North Macedonia, Serbia and Romania. The lowest level of the export of ferrous metal scrap in the five years period was in 2019. **The export/import ratio of metal scrap for Bulgaria is nearly 2.5 to 1. The reason**

Restrictions, imposed on scrap exports worldwide, followed by unfair price competition in third countries are the reason for the large Bulgarian exports of scrap. More than 40 states in the world continue to impose restrictions and bans on the exports of ferrous metal scrap.

Table 2.6

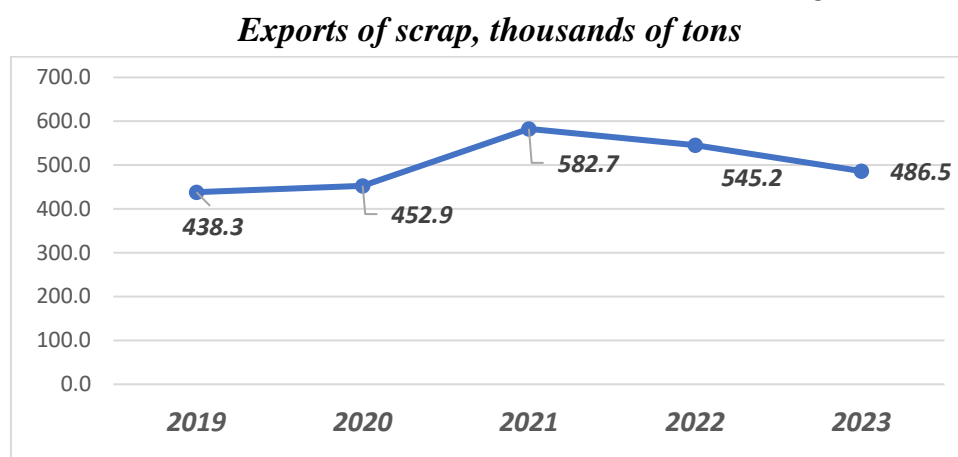
*Exports of ferrous metals and articles thereof, thousands of tons*

<b>Goods</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<b>Non-alloyed total</b>	<b>1 141.0</b>	<b>1 160.7</b>	<b>1 373.0</b>	<b>1 197.1</b>	<b>1 217.8</b>	<b>20.7</b>	<b>101.7</b>
cast iron - ingots, granules, powder	5.5	0.7	1.3	0.07	0.13	0.06	184.9
Ferroalloys	5.3	6.3	5.2	7.5	9.0	1.5	119.6
Scrap	438.3	452.9	582.7	545.2	486.5	-58.7	89.2
Semi-finished products	7.3	2.6	16.2	3.8	4.2	0.3	109.0
Hot-rolled metal (coils and sheets)	227.6	203.2	210.2	234.7	222.6	-12.1	94.9
Cold-rolled metal (coils and sheets)	7.8	5.6	7.4	5.2	3.4	-1.8	65.8
Wire rod	2.3	1.9	1.1	0.7	3.1	2.4	459.5
Bars	404.9	459.6	516.8	381.7	471.2	89.5	123.5
Merchant bars/profiles	42.0	27.9	32.1	18.3	17.8	-0.5	97.2
<b>Alloyed total</b>	<b>63.7</b>	<b>49.1</b>	<b>67.4</b>	<b>79.2</b>	<b>73.2</b>	<b>-6.0</b>	<b>92.5</b>
Hot-rolled and cold- rolled coils and sheets	11.4	12.2	17.7	23.3	20.2	-3.2	86.5
Bars and profiles	52.3	36.9	49.7	55.9	53.1	-2.8	95.0
<b>Articles from rolled ferrous metals</b>	<b>306.5</b>	<b>336.8</b>	<b>325.6</b>	<b>291.3</b>	<b>267.4</b>	<b>-23.9</b>	<b>91.8</b>
Seamless pipes	2.5	2.0	4.7	1.8	0.5	-1.3	28.1
Welded pipes	264.9	296.8	283.7	252.0	235.4	-16.6	93.4
Coated sheets	13.6	10.4	13.8	13.6	8.5	-5.1	62.6
Wires ropes etc..	25.5	27.6	23.4	24.0	23.0	-0.9	96.1
<b>Total</b>	<b>1 511.2</b>	<b>1 546.6</b>	<b>1 766.0</b>	<b>1 567.5</b>	<b>1 558.4</b>	<b>-9.1</b>	<b>99.4</b>
<b>Value, mln. EUR</b>	790.1	720.7	1 216.7	1 460.7	1 082.5	-378.2	74.1
<b>Value, mln. BGN</b>	<b>1 545.3</b>	<b>1 409.6</b>	<b>2 379.7</b>	<b>2 857.0</b>	<b>2 117.2</b>	-739.7	74.1

Source: Custom statistic, NRA

Figure 2.10 shows the dynamics of Bulgarian scrap exports over a five-year period.

Figure 2.10.

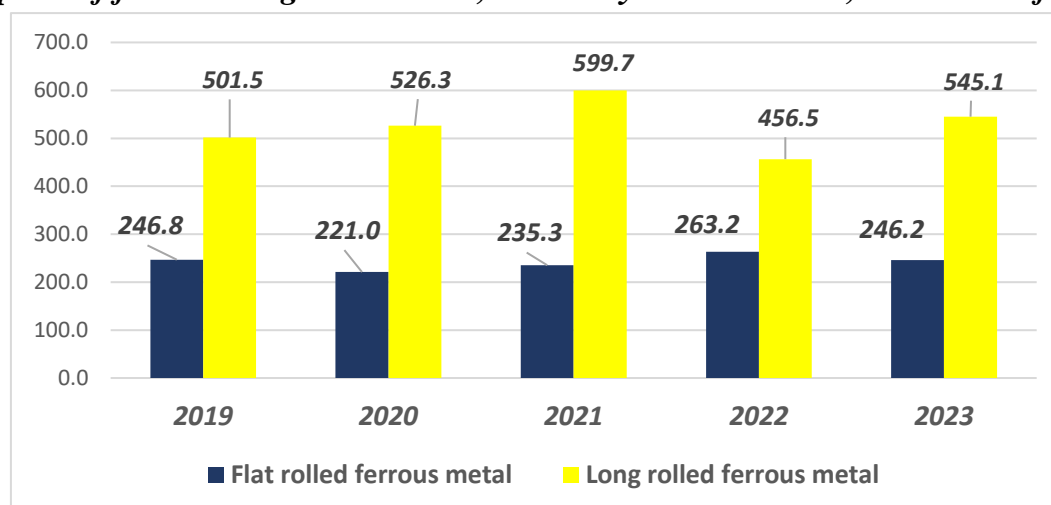


Data on exports in 2023 of flat and long rolled metal products, which are products with added value, indicate a decline of 6.5% compared to exports in the previous year. Bulgaria exported 246.2 thousand tons flat rolled metal, which is less, than the exported flat rolled metal in 2022, by 17 thousand tons less. More than 60 % of the exports of flat alloyed metal products in 2023 are intended for the EU countries -Romania (25.7%), Poland (13.8%), Hungary (8.5%), Greece (7.5%). The exports of flat metal products to Turkey account for 10.5%

A growth of 19.4 % was observed in the exports of **long metal products (bars, rods, profiles, reinforcing bars)**. In 2023, 545.1 thousand tons of long rolled metal were exported from Bulgaria, which is by 88.6 thousand tons more than the export in 2022. The current year has not yet reached the level of 2021, when the longest metal products were exported within the five-year period. Figure 2.11 presents the data of the exports of long and flat rolled metal.

Figure 2.11

**Exports of flat and long rolled metal, incl. alloyed rolled metal, thousands of tons**



More than 80% of the exports of metal bars, rods, profiles and reinforcing bars was directed to the EU countries, with Romania taking the largest share of 36.6% of total Bulgarian exports of the products, followed by Canada with 17.3%, and the USA with

10.5%. The exports of bars, profiles and reinforcing bars to the neighboring Balkan countries – the Republic of North Macedonia, Serbia, Bosnia and Herzegovina were approximately 5%.

The exports in 2023 of **non-alloyed steel rods**, which is the main production of the Bulgarian steel industry, were 471.2 thousand tons, or 23.5 % growth compared to 2022. Although the realized increase, the export level in 2023 remains below the level in 2021 when the peak in exports of 516.8 thousand tons for the last five years was reached. Traditionally, the export of non-alloyed steel rods was directed to the EU countries, of which Romania was the main destination - 38.1 % of the total Bulgarian export of the product, followed by Greece-12.3 %, Cyprus - 5.6 %, etc. Exports to Canada and the USA accounted to 18.8 % and 11.4 % respectively. There was a negligible export to the Republic of North Macedonia – 2.6 %, as well as to Ukraine – 2.4 %.

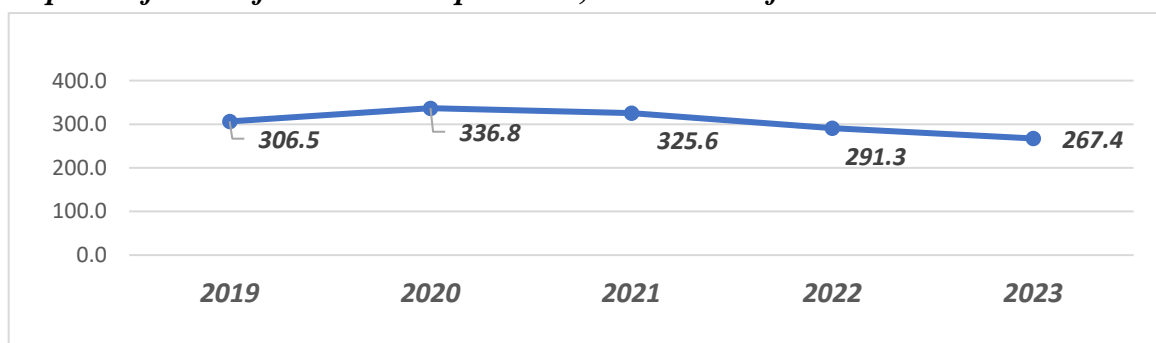
Exports of **non-alloyed steel profiles** continued to follow the downward trend. In 2023, 17.8 thousand tons of non-alloyed steel profiles were exported, which was less than 2022, by 500 thousand tons (2.8 %). In the current year was reached the largest drop in the export of non-alloyed steel profiles for the period 2019-2023. Ukraine was taking the largest share of 32 % of total Bulgarian exports of the products, followed by Romania - 25.1 %, Bosnia and Herzegovina - 11.5 %, the Republic of North Macedonia - 10.2 % and Serbia - 10 %.

As for the rolled ferrous metal products, in 2023 there was a decrease of 8.2 % in their export level compared to 2022. In the current year, 267.4 thousand tons of rolled ferrous metal products were exported, which is less, compared to 2022, by 23.9 thousand tons. Figure 2.12. presents the exports of rolled ferrous metal products. The export mainly consisted of welded pipes (88 % in 2023).

Data on pipe production presented in Table 2.4 are lower, because there are other producers in the country.

Figure 2.12

*Exports of rolled ferrous metal products, thousands of tons*



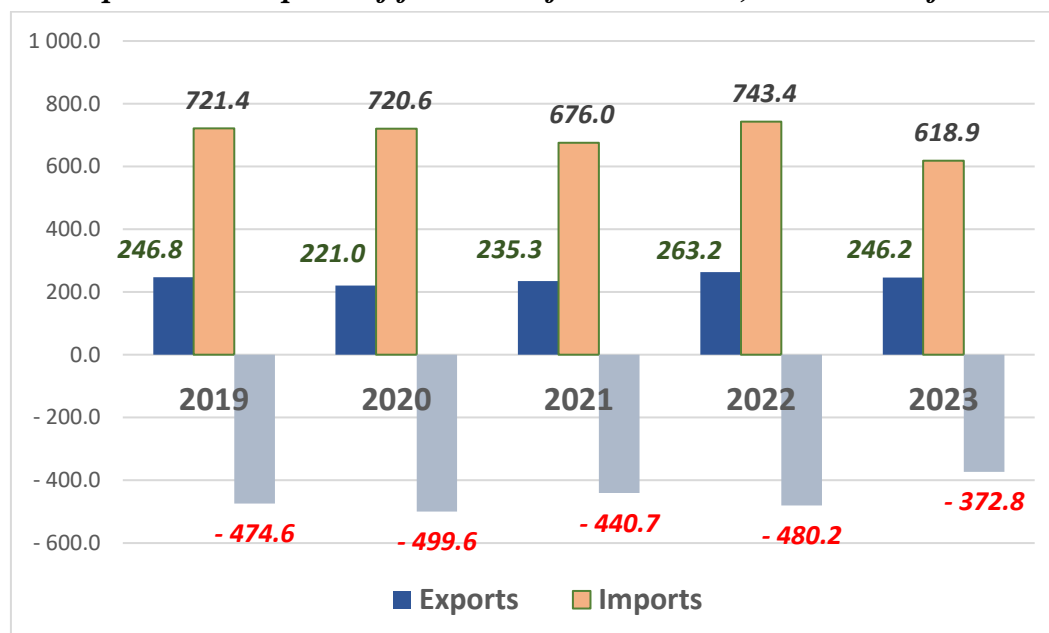
### **2.2.3. FOREIGN TRADE EXCHANGE OF ROLLED FERROUS METALS AND FINISHED PRODUCTS**

Bulgarian foreign trade statistics on exports and imports of ferrous metal products characterized the sector as a net importer with a negative foreign trade balance. Traditionally, the imports of flat-rolled ferrous metals have been significantly higher than its exports, with imports exceeding exports by more than 3 times. In 2023, this trend remains, with imports exceeding exports by 372.8 thousand tons.

The diagram in Figure 2.13 shows the development of exports, imports, and trade balance of flat rolled ferrous metal in the period 2019-2023.

Figure 2.13

*Exports and imports of flat rolled ferrous metal, thousands of tons*

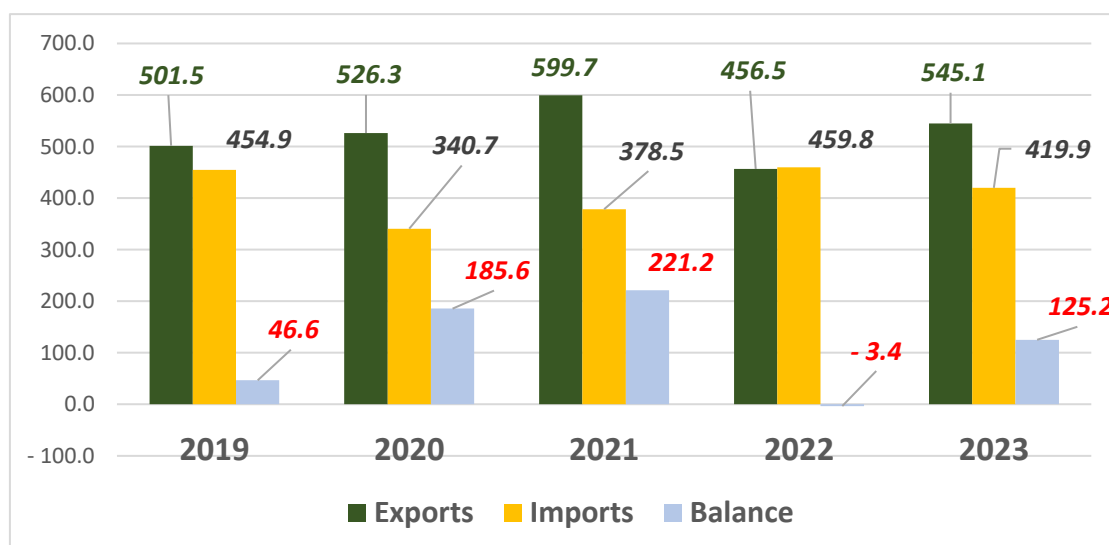


Notwithstanding some upward fluctuations in the 5-year period, both export and import volumes have generally shrunk, with the rate of decline in imports (-16.7%) anticipating that of exports (-6.5%).

The tendency was reversed for the long ferrous products (Figure 2.14). The trade balance was positive for the five-years period except for 2022. In 2023, the trade balance was 125.2 thousand tons, as the exports were 545.1 thousand tons and the imports - 419.9 thousand tons. The reason for the positive balance result was the advanced rate of export growth (19.4 %) and decreasing imports by 8.7 %.

Figure 2.14

*Exports and imports of long rolled metal, thousands of tons*



The existing capacities for the production of long ferrous metal products in the country create the prerequisites for a reduction in imports. However, several factors, such as unfair trade practices and the price pressure on the domestic market exerted by importers from third countries, have negatively affected our production, contributing to reduced domestic sales and the following decline in production. Despite the safeguard trade measures imposed by the EU, the imports from third countries in the region that are not EU members were enormous.

Figure 2.17 shows export and import data for rolled ferrous metal products in the last five years. There is no clearly defined constant trend in the rolled ferrous metal products and the quantities of imported and exported products vary within a wide range. The dynamics are driven by changes in demands of pipes that are imported for infrastructure projects. This year there has been an increase in the exports and decrease in the imports.

Figure 2.15

**Exports and imports of rolled ferrous metal products, thousands of tons**

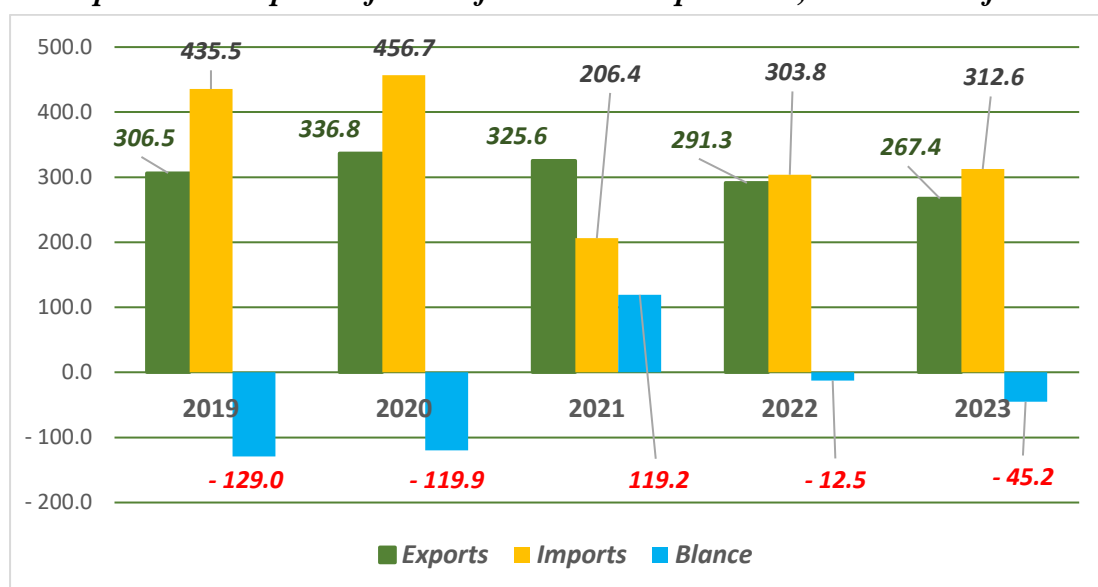


Table 2.7 shows the aggregated foreign trade balance, representing the differences between exports and imports of all raw materials and ferrous metal products. In 2023 the negative trade balance was (-)797.7 thousand tons. For comparison, the balance was (-)659.6 thousand tons in 2022, (-)288,8 thousand tons in 2021, (-)711.0 thousand tons in 2020, and (-)810.1 thousand tons in 2019.

Table 2.7

**Foreign trade balance of ferrous metals in 2023**

Production:	Износ/хил. тона	Внос/хил. тона	Разлика
Semi-finished products	4.2	620.1	-616.0
Flat rolled metal	249.2	787.9	-538.7
Long rolled metal	545.1	419.9	125.2
Finished products	267.4	312.6	-45.2
Scrap	486.5	209.6	276.9
<b>Total</b>	<b>1 552.4</b>	<b>2 350.1</b>	<b>-797.7</b>

Source: Custom statistic, NRA

The data by product groups for 2023 shows the following:

- **semi-finished products** – Bulgaria is a net importer of billets – raw materials for further processing in the value chain of the metallurgical industry. The foreign trade balance is always negative with the largest value among all the ferrous metal products. In 2023, the trade balance was (-)616 thousand tons, compared to (-)551.1 thousand tons in 2022.

- **flat rolled metal** – in this category the country is also a net importer. In 2023, imports exceeded exports by 538.7 thousand tons. For comparison the negative trade balance in 2022 was (-)480.2 thousand tons.

- **long rolled metal** – for this category the trade balance is usually positive, which is determined by the production capacities in the country. In 2023 the foreign trade balance was positive – 125.2 thousand tons.

- **rolled ferrous metal products** – the balance was negative (-)45.2 thousand tons ((-)12.5 thousand tons in 2022). The negative balance was a result of the exports declining by 8.2 % and the imports increasing by 2.9 %, compared to 2022.

- **scrap** – the export of scrap exceeded the import by 276.9 thousand tons. For comparison, the margin in 2022 was 387.6 thousand tons. The negative trend that our country is a net exporter of main raw materials for the steel production instead of value-added steel products continued.

Table 2.8 shows the foreign trade turnover in kind for five consecutive years of only rolled ferrous metals and products thereof. Cast iron, ferroalloys and scrap are not included.

The total trade turnover of rolled ferrous metals, including billets for 2023 was 2 626.4 thousand tons, or an increase of 144.8 thousand tons (105.8 %) compared to 2022. The imports of rolled ferrous metals and products thereof have continued to grow over the recent five years. However, the exports of these products have reversed both downwards and upwards and achieved growth of 110.4 % for 2023.

In 2023 the negative trade balance of rolled ferrous metals and products thereof was (-) 1 029.4 thousand tons. In the current year the trade balance declined, compared to 2022, by 0.5 %. 2022 was the year with the largest negative trade balance over the five-year period.

Table 2.8

*Foreign trade turnover of rolled ferrous metals and products thereof, thousands of tons*

<b>Rolled ferrous metals and products thereof</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<b>Rolled ferrous metals</b>							
- Imports (incl. Semi-finished products)	1 650.9	1 608.9	1 621.6	1 758.2	1 827.9	69.7	104.0
- Exports (incl. Semi-finished products)	755.5	749.9	851.2	723.5	798.5	75.0	110.4
<b>Turnover total</b>	<b>2 406.4</b>	<b>2 358.8</b>	<b>2 472.8</b>	<b>2 481.6</b>	<b>2 626.4</b>	144.8	105.8
<b>Balance (Export-Import)</b>	<b>-895.4</b>	<b>-859.0</b>	<b>-770.4</b>	<b>-1 034.7</b>	<b>-1 029.4</b>	5.3	99.5
<b>Rolled ferrous metal products</b>							
- Import	435.5	456.7	206.4	303.8	312.6	8.8	102.9
- Export	306.5	336.8	325.6	291.3	267.4	-23.9	91.8
<b>Turnover total</b>	<b>742.0</b>	<b>793.5</b>	<b>532.0</b>	<b>595.1</b>	<b>580.0</b>	-15.1	97.5
<b>Balance (Export-Import)</b>	<b>-129.0</b>	<b>-119.9</b>	<b>119.2</b>	<b>-12.5</b>	<b>-45.2</b>	-32.7	361.3

Source: Custom statistic, NRA

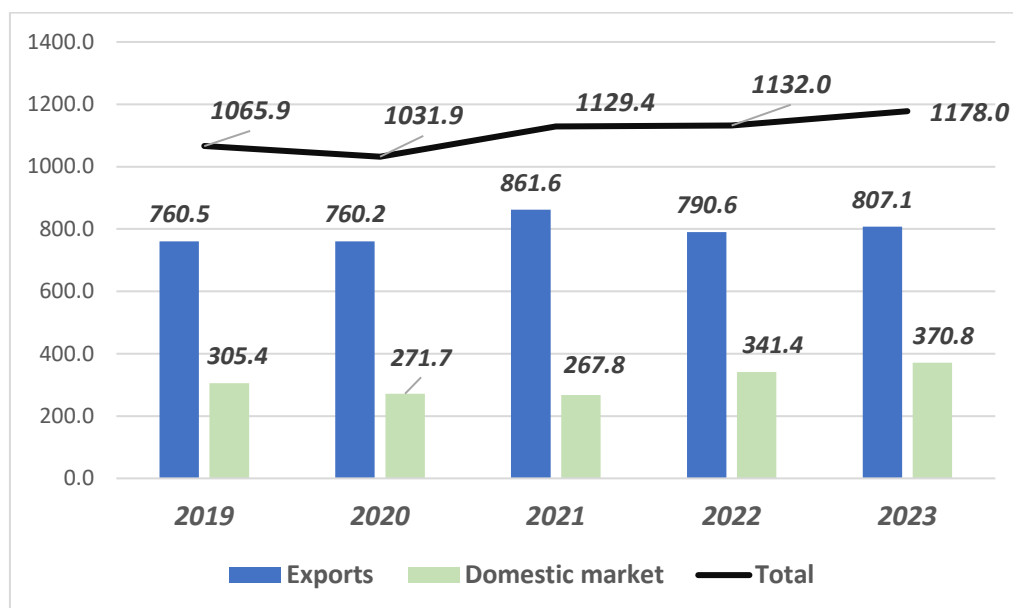
The total trade turnover of rolled ferrous metal products in 2023 was 580 thousand tons, a decline of 15.1 thousand tons. The negative trade balance of rolled ferrous metal products is formed by subtracting the imports, which have increased by 8.8 thousand tons, from the exports, which have decreased by 23.9 thousand tons.

#### 2.2.4. SALES OF ROLLED FERROUS METALS AND PRODUCTS THEREOF

In 2023, Bulgarian producers of ferrous metals and products thereof, members of BAMI, sold 370,8 thousand tons of their production on the domestic market. Compared to the previous year, an increase of 29.4 thousand tons (8.6 %) in domestic sales was reported.

In 2023, total sales of rolled ferrous metals and products thereof were 1 178 thousand tons, achieving an increase of 4.1 %. The components of the total sales increase are both the domestic sales growth of 8,6 % and exports growth of 2.1 % (16.5 thousand tons). Figure 2.16 shows the dynamic of domestic sales over the period 2019-2023.



*Sales of rolled ferrous metal and articles thereof, thousands of tons*

\*Company data

Table 2.9 presents the sales of flat and long products for the last two years, excluding the products of rolled ferrous metals. In 2023, the total sales of flat and long rolled metal was 999 thousand tons, 40.5 thousand tons more than those in 2022, or an increase of 4.2 %. The Bulgarian industry of rolled ferrous metals and products of rolled ferrous metals is export oriented industry.

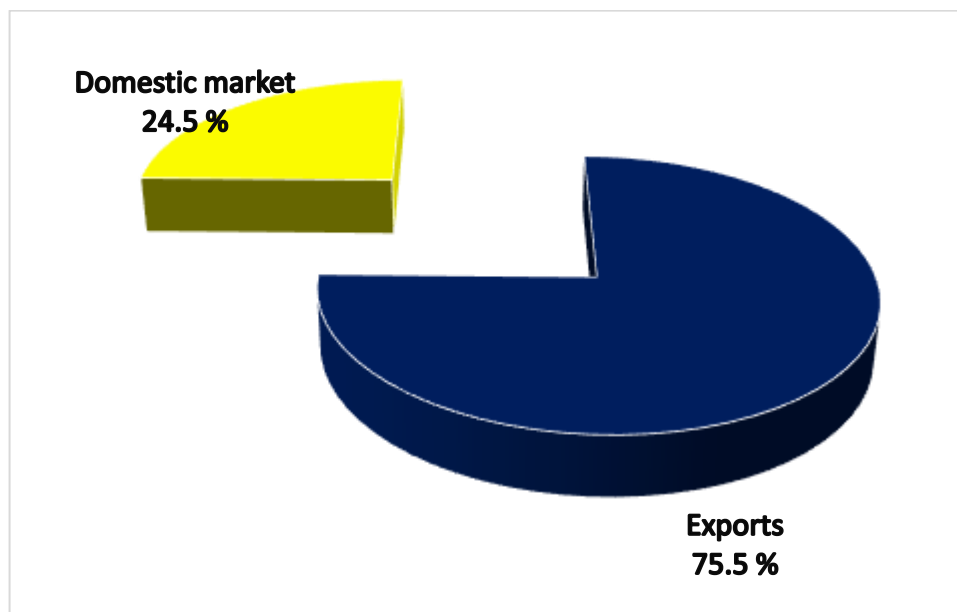
Table 2.9

*Sales of rolled metal products, thousands of tons*

Production	Exports		Domestic market		Total sales	
	2022	2023	2022	2023	2022	2023
Long rolled metal	517.1	547.3	211.2	213.5	728.3	760.8
Flat rolled metal	201.1	206.9	29.1	31.3	230.2	238.2
<b>Total rolled metal</b>	<b>718.2</b>	<b>754.2</b>	<b>240.3</b>	<b>244.8</b>	<b>958.5</b>	<b>999.0</b>

\*Company data

Figure 2.17 shows the export/domestic market correlation in 2023 for the main metallurgical products of ferrous metals (flat and long rolled metal).

*Export/domestic market correlation for the main metallurgical products*

*Source: Company data*

#### *2.2.5. ACTUAL DOMESTIC CONSUMPTION (ADC) OF STEEL PRODUCTS*

The consumption of steel and steel products is an important indicator of the state of the country's economy, as it is the basis of the industrial value-added chains that create prosperity, sustainability and strategic autonomy of the state

**The real domestic steel consumption (RDSC)** of rolled ferrous metals and products thereof is the amount of the domestic sales and imports into the country of these products. Table 2.10 provides RDC over the last three years, and Figure 2.18 shows the developments in RDC for the period 2019-2023.

Table 2.10

*Real domestic consumption of steel products, thousands of tons*

Products	2021			2022			2023			2023/2022	
	DS*	Import	RDC*	DS*	Import	RDC*	DS*	Import	RDC*	Difference	%
Long rolled ferrous metal	209.2	378.5	587.7	211.2	459.8	671.0	216.3	419.9	636.2	-34.8	94.8
Flat rolled ferrous metal	28.4	676.0	704.4	29.1	743.4	772.6	31.2	618.9	650.1	122.5	84.2
<b>Total rolled ferrous metal</b>	<b>237.6</b>	<b>1 054.5</b>	<b>1 292.1</b>	<b>240.3</b>	<b>1 203.3</b>	<b>1 443.6</b>	<b>247.5</b>	<b>1 038.8</b>	<b>1 286.3</b>	<b>157.3</b>	<b>89.1</b>
Rolled ferrous metal products	30.2	206.4	236.6	53.2	303.8	357.0	47.9	312.6	360.5	3.5	101.0
<b>Total</b>	<b>267.8</b>	<b>1 260.9</b>	<b>1 528.7</b>	<b>293.5</b>	<b>1 507.0</b>	<b>1 800.5</b>	<b>295.4</b>	<b>1 351.4</b>	<b>1 646.8</b>	<b>153.7</b>	<b>91.5</b>

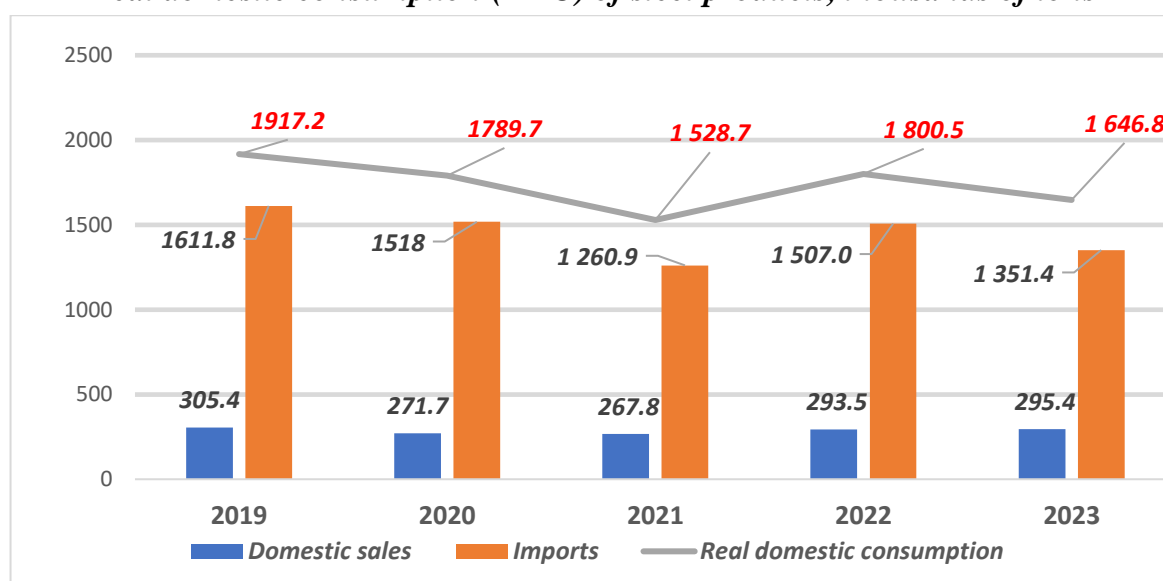
\*DS – Domestic sales

RDC – Real domestic consumption

Source: Customs statistics and NRA (import) & Company data (domestic sales)

In 2023, the real domestic production of steel products in the country was 1 646.8 thousand tons, a decrease of 153.7 thousand tons (8.5 %) compared to 2022.

Figure 2.18

*Real domestic consumption (RDC) of steel products, thousands of tons*

In 2021 the apparent consumption of steel has recovered after the sharp plummet caused by the pandemic in 2020. Nevertheless, the severe impact of the conflict in Ukraine on steel-using industries and the deteriorating perspectives resulted in an economic plunge in 2022, that continue to impact negatively on steel consumption also in 2023.

The consumption of steel products is expressed by the so-called **apparent steel consumption (ASC)** using the following formula:  **$ASC=(M+I)-E$** , where:

ASC – apparent steel consumption, thousands of tons

M - manufactured steel products, thousands of tons

I - imported steel products, thousands of tons

E - exported steel products, thousands of tons (excluding cast iron, ferroalloys, scrap)

The apparent consumption of steel products, including apparent consumption **in kilograms** per capita (ACkgPC) is presented in Table 2.11. In 2023 the apparent steel consumption (ASC) in Bulgaria was 1 317.3 thousand tons, a decrease of 3.2 % compared to 2022.

The indices real domestic steel consumption (RDSC) and apparent steel consumption (ASC) for Bulgaria provide different values. This was caused by a diversity of factors, such as stocks with producers, consumers and traders, re-exports, and other unreported quantities. However, both indices follow the same trend in terms of growth or decline in steel consumption for the respective year. Unfortunately, Bulgaria is far from the consumption of industrially developed countries.

Table 2.11

*Apparent consumption of steel products, thousands of tons*

<b>Year</b>	<b>Production</b>	<b>Imports</b>	<b>Exports</b>	<b>Apparent consumption</b>	<b>Apparent consumption per capita (kilograms)</b>
2012	895.1	1 028.8	951.8	972.1	133.5
2013	945.1	1 125.9	923.0	1 148.0	157.6
2014	1 016.2	1 487.1	984.9	1 518.4	210.8
2015	953.5	1 338.6	923.1	1 369.0	191.4
2016	1 023.2	1 473.3	1 039.3	1 457.2	205.2
2017	946.6	1 398.2	1 326.8	1 018.0	144.4
2018	1 130.9	1 290.7	1 111.9	1 309.7	192.4
2019	968.3	1 611.8	1 054.8	1 525.3	219.4
2020	930.8	1 518.0	1 084.1	1 364.7	197.3
2021	1 049.8	1 260.9	1 160.6	1 150.1	168.2
2022	963.5	1 507.0	1 010.9	1 459.6	225.8
<b>2023</b>	<b>1 027.6</b>	<b>1 351.4</b>	<b>1 061.7</b>	<b>1 317.3</b>	<b>204.4</b>

*Source: Company data (production), Customs data (Imports and Exports)*

An important indicator for the industrial development of the countries is the **apparent consumption in kilograms per capita (ACPC)**. For Bulgaria, the ACPC value is typically between 150-200 kg per capita, while the average ACPC value for the EU (27) is over 300

kg per capita. In 2023 ACPC for Bulgaria was 204.4 kg per capita.

In 2023, the average ACPC for the world was 219.3 kg per capita. ACPC indicates the structure of the economy. For developed countries the indicator is hovering around and above 500 kg per capita. Table 2.12 presents the countries with the highest ACPC worldwide, including EU countries in 2023.

Table 2.12

*Countries with the highest apparent consumption per capita in 2023*

<i>Country</i>	<i>Apparent consumption per capita(kilograms)</i>
South Korea	1056.6
Tacwan China)	725.9
China	628.3
Czech Republic	534.1
Turkey	443.8
Japan	432.5
Italy	399.6
Austria	356.5
Germany	336.5

In 2020(the year of COVID), the average value of the ACPC for EU (27) was 293.5 kg per capita. In 2021(the year of recovery after the pandemic) that value was 346.1 kg per capita, and in 2022 it was 310,3 kg per capita. In 2023 the value of ACPC for EU (27) was 284.3 kg per capita, which was lower compared to pandemic year. The indicator ACPC provides a clear view of the state of the EU economy, exactly the slowdown in the growth rate of the economy and the recession that started after 2022.

**In 2023, for Bulgaria ACPC was 72% above the EU average.**

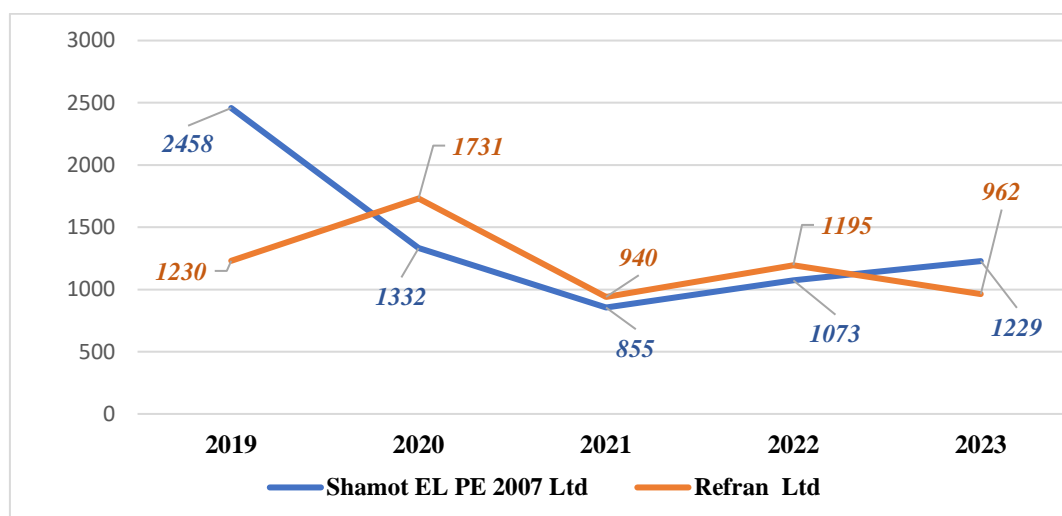
### 2.3. PRODUCTION OF REFRACTORY MATERIALS AND PRODUCTS

The production of refractory and refractory products is an activity directly related to the metallurgical industry. Producers and suppliers of refractory materials for heat lining of furnaces and aggregates for casting, storing, spilling and heat treatment of metals and alloy are the companies “Shamot EL PE 2007” Ltd and “Refran” Ltd. Both companies are BAMI-members.

Figure 2.19 presents data for refractory and refractory products produced by both enterprises over the period 2019-2023. In 2023, the total quantity of refractories produced by the two enterprises was 2 191 tons, which is less than 2022, by 77 tons (3.4 %).

Figure 2.19

*Production of refractory materials, tons*



“Refran” Ltd is a company specialized in the production of high-value technological non-formed refractory products, isolation and construction materials and products, powder mixtures for metallurgy. The enterprise works according to the circular economic system and processes large amounts of industrial waste from metallurgy, energy and chemistry. Production targets the demands of metallurgy, cement industry, thermal power plants, etc. The company repairs construction and heat-loaded objects.

“Shamot EL PE 2007” Ltd has the capacity to produce fireclay refractory products and clinker ceramics for the demands of metallurgy, energy and chemistry. The company also produces thermal insulation fireclay products, acid-resistant bricks, clinker products for exterior and interior flooring, and household articles.

In 2023, “Refran” Ltd produced 938 tons of non-formed refractories, and 24 tons formed ones, which was less than the previous year, by 233 tons, or a drop of 19.5%. The company sold on the market 114 tons of refractory products and 18 m<sup>3</sup> insulation products and materials.

The production of “Shamot EL PE 2007” Ltd in the current year was 1229 tons, more, compared to 2022, by 156 tons (14.5 %). In 2023, the sales of the company were 1076 tons. Both enterprises sell their production on the domestic market. Production depends on the quantities, required for the construction of new furnace units and for annual repairs of operating furnaces in various sectors of the industry, such as metallurgy, energy, etc.

The Bulgarian production of refractories is limited in type and quality. The country's requirements for other types of refractories are satisfied by imports.

## **SECTION THREE**

### **NON-FERROUS METALLURGY IN BULGARIA**

#### ***3.1. PRODUCTION OF NON-FERROUS METALS***

Non-ferrous metallurgy in Bulgaria remains an important player in the economy of the country and merchandise export. The capacities for base non-ferrous metals and associated products extraction from primary and secondary raw materials, as well as the processing of ingot metals and alloys (copper, aluminum) into products and articles with high added value, are sustainably developing.

As it is shown in Table 1.7 in the product mix of Bulgarian exports, the copper group was with the highest value. It is the result of both the higher price of copper and copper products on the London Metal Exchange and the fact that “Aurubis Bulgaria” JSC in the town of Pirdop is one of the largest producers of refined copper in Europe.

The processing of copper along the added value chain to rolled copper and products of copper and alloys has been successfully developed. The production of rolled copper has almost doubled over the recent ten years.

Bulgaria has capacities for the processing of lead and zinc concentrates and secondary raw materials, mainly end-of-life lead batteries. "KCM" JSC in Plovdiv is the only producer in the country of lead and zinc from primary and secondary raw materials, as well as the largest producer in the region. The company uses an integrated technological scheme for processing to achieve the complex utilization of lead and zinc raw materials

Other processors of battery waste using modern technologies to produce lead ingots and alloys are "Monbat Recycling" PJSC and "EL BAT" JSC. The total annual lead production of the three companies has been reaching and exceeding 100 thousand tons, ranking Bulgaria at the prestigious 5th-6th position among the countries-producers in the EU (27).

Bulgaria also produces a diversity of long and flat aluminum products from aluminum and alloys thereof. Primary aluminum is not produced in our country, and is imported from EU countries - Greece, Romania, the Netherlands and from third countries - Turkey, Russia, United Arab Emirates (UAE), Bahrain. Imports of aluminum ingots take the highest share of the non-ferrous metal imports. This share has been about 35% over the years. (Table 3.13)

Non-ferrous metals are commodities, traded at stock exchanges and Bulgarian production has been strongly export oriented. We sold on the European and world markets at exchange prices for the metals. London Metal Exchange (LME) prices are mostly the prices at which our producers trade. These markets are affected by globally significant events, such as COVID, economic and political crises, military conflicts, and others. The graphs in Figures 3.13, 3.14, 3.15 and 3.16 present the annual changes in the price of the base metals that affect the production, economic indicators and investments.

### *3.1.1. PRODUCTION OF COPPER (ANODIC AND ELECTROLYTIC)*

“Aurubis Bulgaria” JSC, part of the Aurubis Group, Germany is the only producer in the country of anodic and electrolytic copper and other finished products from primary and secondary raw materials.

The production site in the town of Pirdop is equipped with modern technology and metallurgical facilities for autogenic smelting of ore concentrate, using the heat from the combustion of the contained in the raw materials sulfur. The majority of the anodic copper is refined by electrolysis to cathode copper and the rest anodic copper is exported for processing to other companies within the Aurubis group.

The anode copper is refined to high purity in the electrolytic unit. The produced high purity cathode copper is registered under the trademark “Pirdop” on the London Metal Exchange. The contained metals, mainly gold and silver, are concentrated in anode sludges, which are exported for processing in Germany.

The sulfur gases produced in the smelting process of the copper concentrates are input for processing and utilization of the sulfur for production of sulfuric acid.

Extraction of residual copper from metallurgical slags takes place in the concentration plant. The resulting copper concentrate is reused in the production cycle, while the resulting fayalite product (ferrous silicate), with main application in construction, is then sold locally.

The implemented scheme is a model for a circular economy. It closes the primary and secondary raw materials processing cycle with high utilization of useful components and protection of nature.

There is a hydrometallurgical installation for extracting copper from old mines and electrolysis of solutions for copper precipitation in “Asarel Medet” JSC, but the quantities are minimal-about 2 thousand tons annually.

Table 3.1. presents the data for the processed primary raw materials/concentrates and secondary metals for a period of five consecutive years.

In 2023 a major renovation has undergone in metallurgical production with a shutdown of the capacities for a longer period. Therefore, the processed primary copper raw materials were less, compared to 2022, by 229 thousand tons. Despite the higher metal content in the processed raw materials, the copper content was by 50.5 thousand tons less than in the previous year, which along with the decrease in the processed copper waste by 4.4 thousand tons resulted in a decrease in the produced copper in 2023 compared to 2022.



**Table 3.1**

**Processed raw materials for the production of anodic and electrolytic copper**

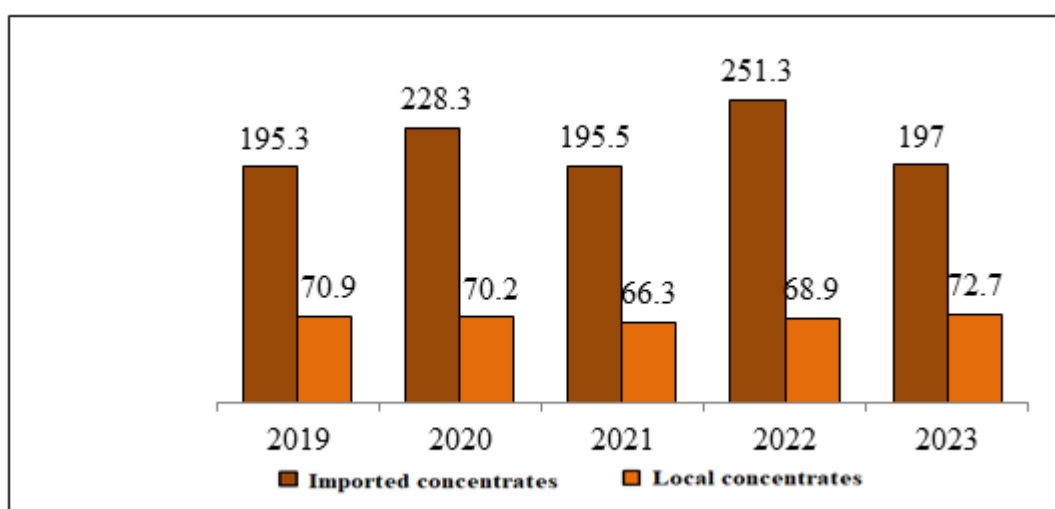
Product	2019	2020	2021	2022	2023	Difference 2023/2022	
						+/-	%
<b>Concentrates, tons</b>	<b>1 160 132</b>	<b>1 346 197</b>	<b>1 177 643</b>	<b>1 441 149</b>	<b>1 211 822</b>	<b>-229 327</b>	<b>84.09</b>
- copper contents, %	22.95	22.17	22.23	22.22	22.26		
- metal contents, tons	<b>266 250</b>	<b>298 452</b>	<b>261 790</b>	<b>320 257</b>	<b>269 752</b>	<b>-50 505</b>	<b>84.23</b>
incl.: in imported	195 323	228 276	195 501	251 258	197 090	-54 168	78.44
In local	70 927	70 176	66 312	68 999	72 698	3 699	105.36
<b>Scrap (purchased), tons</b>	<b>39 814</b>	<b>43 759</b>	<b>36 701</b>	<b>45 283</b>	<b>40 858</b>	<b>-4425</b>	<b>90.23</b>

Source: Company data.

The local extraction of copper ores, even if developed, provides only 25% - 30 % of the raw materials needed for capacity utilization. The remaining quantities are imported from foreign markets. The ratio between the domestic and imported raw materials for the recent five consecutive years has been around 1:3 to 1:4. (Figure 3.1). In 2023, the processed copper concentrates from the indigenous deposits (“Asarel Medet” JSC and “Ellatzite-Med” JSC) were by 3.7 thousand tons more than in 2022, or there was a growth of 105.36 %.

Figure 3.1

**Processed concentrates, thousands of tons of metal**



Secondary raw materials of varying purity and copper content are also used in the production of anodic copper. Their usage has environmental, energy and financial effects

and thus these raw materials are attractive to metallurgical enterprises and on global markets. In 2023, the quantities of secondary copper raw materials, used in anodic copper production, have decreased by 3,7 thousand tons. Our country has the capacity to effectively utilize the full diversity in terms of the quality of the locally extracted copper waste, but unfortunately, the exports of this valuable raw material still exist. The exported secondary copper raw materials were 10 855 tons in 2022 and 8 650 tons in 2023. The enterprises import secondary metals, but the deliveries are more and more difficult. In 2023, 71 347 tons copper waste were imported from 43 countries.

Table 3.2 and Figure 3.2 present the production, in terms of quantity, of anodic and electrolytic copper in “Aurubis Bulgaria” JSC for the recent five consequent years, incl. 2023.

Table 3.2

*Production of anodic and electrolytic copper, tons*

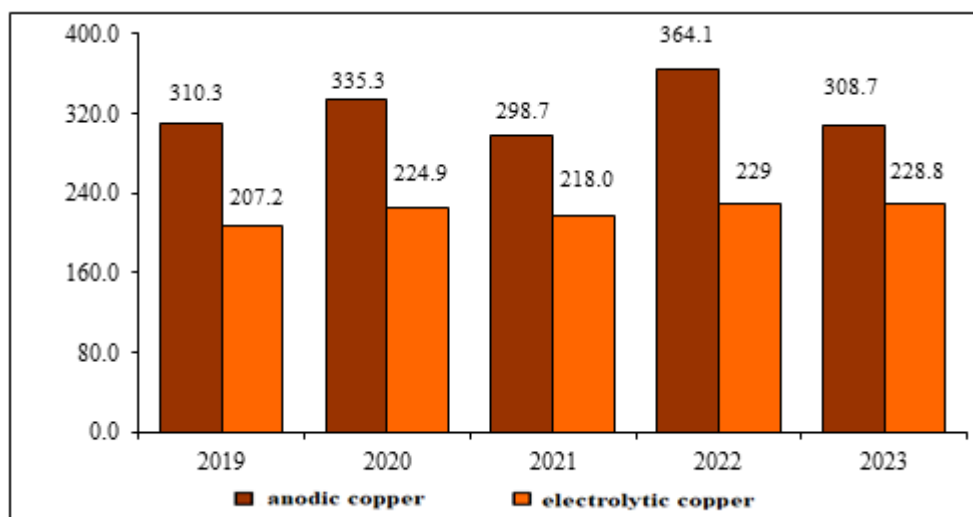
Product	2019	2020	2021	2022	2023	Difference2023/2022	
						+/-	%
Anodic copper	310	335	298	364	308	-55	84.7
	245	306	728	178	726	452	7
Electrolytic copper	207	224	218	229	228		99.8
	196	880	020	070	831	-239	9

*Source: Company data*

In 2023, 308.7 thousand tons of anodic copper were produced, that is less than in 2022, by 55.5 thousand tons. The production of electrolytic copper marked a negligible decrease by 228 tons. For the observed five-year period the production of electrolytic copper corresponds to the capacity of the electrolytic unit. A new electrolytic unit is under construction in order to eliminate the disparity in capacities of cathode and anodic copper production. The company currently has been exporting the remaining cathode copper.

Figure 3.2

*Production of anodic and electrolytic copper, thousands of tons*



The processing of copper concentrates (primary raw materials) also obtains sulfuric acid. For this purpose, the sulfur, oxidated in the furnaces and converted to sulfur oxides, is processing in the sulfuric acid unit with a high utilization percentage in line with best technological practices. In 2023, 1 211 712 thousand tons sulfuric acid were produced, less, compared to 2022, by 200 thousand tons. The quantity corresponds to the sulfur content in concentrates.

Copper is a strategic metal with widespread consumption. The emerging regional and global crises affect copper production and international prices. Electricity prices put additional pressure on production costs and efficiency due to the high electricity consumption in cathode refining. Contrary to the global increase in copper production, there was a drop in Europe and America. Copper producers in Asia and Africa reported growth owing to the low energy prices.

Table 3.3 shows the world production of electrolytic copper by regions. In 2023, the total world production was 26 547 thousand tons, more, compared to 2022, by 906 thousand tons.

Table 3.3

***World production of electrolytic copper, thousands of tons***

Regions	2021	2022	2023	Difference 2023/2022	
				+/-	%
Asia	13 462	14 130	14 907	777	105.50
America	4 394	4 214	4 113	-101	97.60
Europe	3 888	3 725	3 701	-24	99.36
incl.EU-27	2 681	2 569	2 467	-102	96.03
Africa	1 685	2 163	2 426	263	112.16
Other	1396	1 409	1 400	-9	99.36
<b>Total</b>	<b>24 825</b>	<b>25 641</b>	<b>26 547</b>	<b>906</b>	<b>103.53</b>

*Source: ICSG*

In 2023, the production of electrolytic copper in Asia reached 15 million tons and already took more than 56% of the total world production (55% in 2022), which is a growth of 105,5 %. African production in 2023 increased by 112 %, thus reaching the EU (27) level. For the last three years this increase has reached 150%.

America retains the second position in global production of electrolytic copper, despite the reported annual slowdown of over 100 thousand tons, with a share of 15.5 % in 2023, 16.4 % in 2022 and 17.7 % in 2021.

Europe ranks the third position with 3 701 thousand tons electrolytic copper produced in 2023, that was a share of 13.9 % of the global production of the product, compared to 14.5 % in 202 and 15.7% in 2021.

The data clearly show the shrinking industrial potential in America and Europe, contrary to the growing industrial potential in Asia, especially China. Production in Africa is also on the rise.

In 2023, EU (27) again was the biggest producer in Europe, with 2 467 thousand tons copper produced and a share of 66.7 % of the total production in Europe. But in 2022, the copper production of the EU (27) was 102 thousand tons more with a share of 69 %. In 2023 only EU member states reported a decline in production among the countries in Europe.

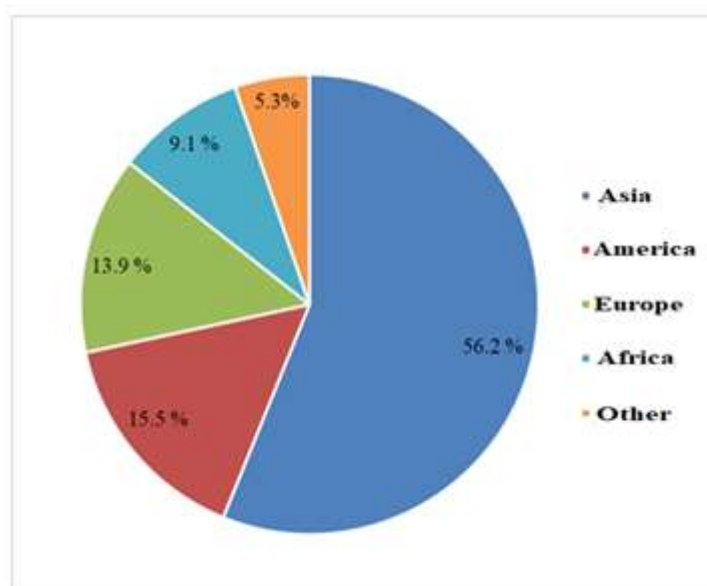
In 2023, Africa still occupies the 4<sup>th</sup> position in global production of electrolytic copper with a share of 9.1 % but has been equalizing the volume of its production to those of the EU (27). At this growth rate, Africa will become a significant player in the global electrolytic copper markets soon, which is a clear indication of the de industrialization of the EU.

Figure 3.3 shows the shares of the regions *in global production of electrolytic copper*.

The share of the EU in the global electrolytic copper production has been in steady decline from 10.8% in 2021 to 10.0% in 2022 and 9.3% in 2023. Copper is an important metal in implementing decarbonization policies, therefore high growth in copper consumption is expected. The EU production decline would make the Union heavily dependent on metal imports from third countries. In the EU Raw Materials Regulation (CRMA), copper is in the list of critical and strategic raw materials, with measures provided to support and increase production.

Figure 3.3

*Production of electrolytic copper by regions, 2023, %*



Bulgaria is a significant producer of electrolytic copper with a potential for growth. This strengthens its role in achieving the EU's goals of independence from raw materials supplies from third countries and meeting the growing needs for metals for Green Deal implementation.

The electrolytic copper produced in 2023 takes a share of 9.3 % of the total EU production, compared to 8.9 % in 2022 and 8.1 % in 2021. The share of Bulgaria in the global production is 0.86 %, close to the share in 2022 (0.89 %).

In 2023, the share of anodic copper produced in “Aurubis Bulgaria” JSC was 12.5 % of the total production of anodic copper in the EU, compared to 14.2 % in 2022. In the global production this share was 1.2 % in 2023 and 1.4 % in 2022.

These shares have been changing slightly over the different periods, with close values that depend on the planned repairs of the main capacities.

Bulgarian copper production is sustainable. Investments of over 1 million BGN were made in technological and environmental improvement. In 2023

In 2023, projects for 80 million EUR have been carried out in the following areas:

- energy efficiency – 8 million EUR for the installation of more energy-efficient electrical equipment and for the construction of photovoltaic installations.

- new technological equipment – 50 million EUR.

- logistics and transport – 17 million EUR for alteration of wagons used for concentrates.

- infrastructure – 4 million EUR.

In 2024, a large-scale four-year program "Investments for Progress. Bulgaria 2027" was launched for 800 million EUR. Envisaged projects ensure: the long-term production of the plant in Pirdop, the strategy of Aurubis for providing of crucial the European economy materials and achieving carbon neutrality by 2050.

### *3.1.2. LEAD PRODUCTION*

Bulgaria is a significant producer of lead and lead alloys, with modern metallurgical capacities for processing of primary raw materials (concentrates) and of lead-containing secondary raw materials, mainly battery waste. There are three producers of lead in the country - "KCM" JSC, "Monbat Recycling" PJSC and "EL BAT" JSC. "KCM" JSC in Plovdiv is the largest producer of lead and zinc not only in the country, but also in Southeast Europe.

The company is the only enterprise in Bulgaria processing primary lead and zinc concentrates into ingots with high purity. Lead is produced according to a new high-tech scheme that meets high environmental and energy standards. The technologies integrated into zinc production. The technological processes integrated with zinc production ensure the extraction of the contained precious metals and other associated elements (gold, silver, cadmium, tellurium, bismuth, antimony), as well as the use of sulfur from the concentrates for the production of sulfuric acid. Based on the circular economy, a comprehensive utilization of raw materials has been achieved in technological processing chains of waste, concentrates and intermediates.

The investments in "KCM" JSC for 2023 exceed 27,1 million BGN. Because of unexpected problems and breakdowns, investments have been prioritized for capital repairs of the utilizer and furnace in lead production. Repairs were also carried out to the Welz furnace, a sealer with a paddle mechanism, reconstructions of technological lines, construction of a desalination plant, etc.

Introduced new technology in lead production increased the processing of lead secondary waste and intermediates instead of primary concentrates. The extraction of lead-zinc ores in the country provides about 30-32% of lead and about 25-26% of zinc primary raw materials, necessary for the production, and for the optimal annual capacity utilization the company must import lead and zinc concentrates every year.

Table 3.4 and Figure 3.4 present the processed in "KCM" JSC primary raw materials, local and from import, and secondary raw materials for lead production for five-year period.

Table 3.4

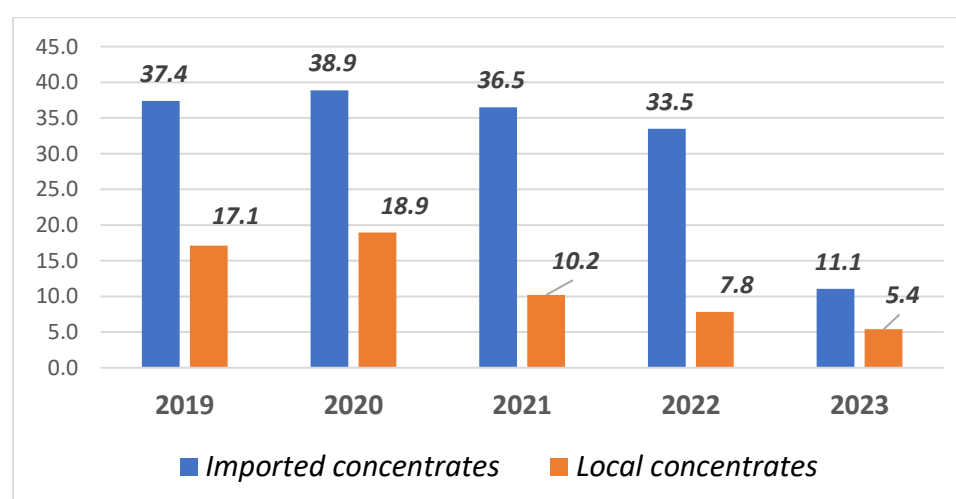
**Raw materials for production of primary lead, tons**

<i>Product</i>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<b>Metal in concentrates</b>	<b>54 468</b>	<b>57 793</b>	<b>46 672</b>	<b>41 297</b>	<b>16 439</b>	<b>-24 858</b>	<b>39.8</b>
incl.: in imported	37 371	38 873	36 479	33 472	11 057	-22 415	33.0
in local	17 097	18 929	10 193	7 825	5 382	-2 443	68.8
<b>Waste/ semi-finished (imported)</b>	<b>18 356</b>	<b>18 226</b>	<b>24 967</b>	<b>33 101</b>	<b>29 715</b>	<b>-3 386</b>	<b>89.8</b>
<b>Total</b>	<b>72 824</b>	<b>76 019</b>	<b>71 639</b>	<b>74 398</b>	<b>46 154</b>	<b>-28 244</b>	<b>62.0</b>

Source: Company data.

In 2023, processed secondary raw materials decreased, compared to 2022, by 3.4 thousand tons. Total metal content in raw materials declined by 28 244 tons.

Figure 3.4

**Processed concentrates, thousands of tons of metal/lead**

In 2023, the lead content in the processed concentrates was less, compared to 2022, by 24 858 tons, due to long-term repair of the furnace and the decline in the imported concentrates. The decrease in local concentrates was small, by 2.4 thousand tons only and modified the ratio between domestic and imported concentrates. The share of processed domestic concentrates increased to nearly 33%, compared to 19%. In 2023, 29.7 thousand tons of lead from secondary raw materials were used in the production, and their share was 65 % of total lead content in the processed raw materials.

Other two enterprises in the country with modern facilities for the processing the lead battery waste and end-of life lead batteries are “Monbat Recycling” PJSC in Montana and „EJI BAT“ JSC in Dolna Bania.

“**Monbat Recycling**” PJSC recycles waste batteries and lead scrap - batteries, plates, lead slags, pastes, fractions and other waste into lead and lead-calcium alloys. As part of Monbat Group, the company develops sustainably, implementing effective vertical integration from the raw materials supply to the lead batteries, its final product. The

installed equipment complies with European requirements and environmental standards. Sodium sulfate is produced as a by-product. The high requirements force the company to annually invest in modernization and new equipment. In 2023, an investment of 1,2 million BGN was made for a compressor for a recycling plant saving up to 85% of gas consumption.

„EL BAT“ JSC is a fast developing company with modern processing installations for separating, recycling, utilization and/or disposal of end-to-life batteries and accumulators. In recent years, the capacity has been doubled and has been achieving the other processing capacities in the country. In 2023, the biggest quantities of end-of -life lead batteries and battery waste were processed in the company. Investments were 4 million BGN in environmental projects, work improvement and capacity expansion.

In Bulgaria there is a system for controlling the entire cycle of consumption, end-of-life, collection and recovery of lead containing products (lead batteries) Lead is a high recycling material. The Production from secondary lead is much more energy efficient than production from ores, saves energy and reduces carbon emissions. Established installations comply with European and Bulgarian legislation and the best technics, which determines the high rate of recovery of secondary lead raw materials in the country.

Data on locally lead ingots and lead alloys from processing primary and secondary raw materials, by manufacturing companies, are presented in Table 3.5 and the relative shares of the total production are given in Figure 3.5.

Table 3.5

*Lead production, tons*

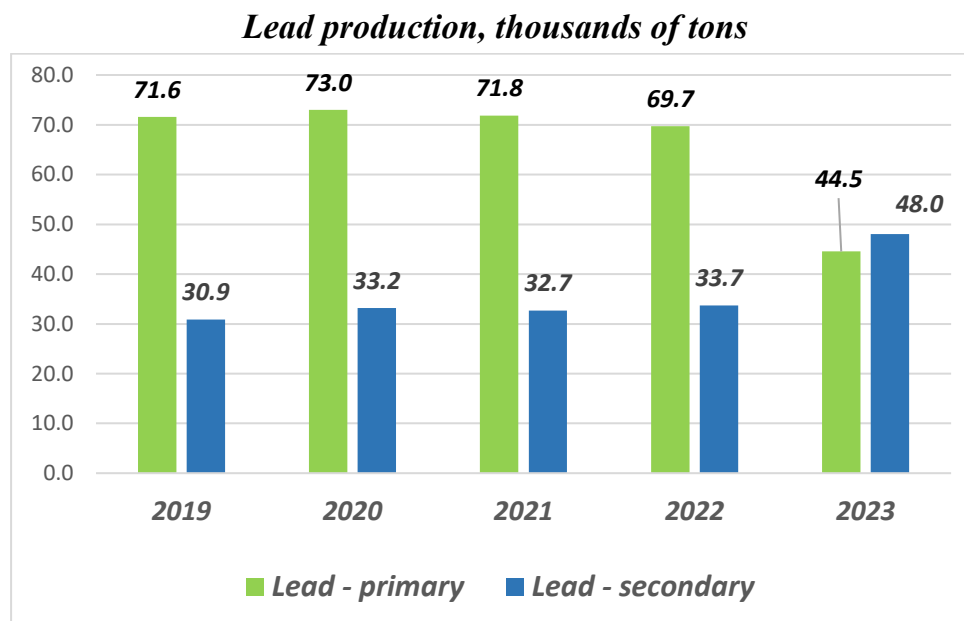
<i>Product</i>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<i>Lead, ingots /primary/</i>	<b>71 595</b>	<b>72 992</b>	<b>71 822</b>	<b>69 709</b>	<b>44 542</b>	-25 167	63.9
„KIJM“ JSC	71 595	72 992	71 822	69 709	44 542	-25 167	63.9
<i>Lead and alloys, secondary</i>	<b>30 878</b>	<b>33 153</b>	<b>32 673</b>	<b>33 719</b>	<b>48 032</b>	14 313	142.4
“Monbat Recycling” PJSC	15 878	18 153	17 693	18 729	19 252	523	102.8
“EL BAT” JSC	15 000	15 000	14 980	14 990	28 780	13 790	192.0
<i>Lead - total</i>	<b>102 473</b>	<b>106 145</b>	<b>104 495</b>	<b>103 428</b>	<b>92 574</b>	<b>-10 854</b>	<b>89.5</b>

Source: Company data

In 2023, „KCM“JSC reported a decrease in lead production by 25.1 thousand tons (36,1 %), the lowest level of production of the company for the recent years, which cut down the share of Bulgaria in the total lead production of the EU. For “Monbat Recycling” PJSC the increase in production was 2.8 % and for „EL BAT “JSC almost twice-192.0 %. Lead, produced in both companies, by secondary raw materials only was 48 032 tons, or by 14 313 tons more compared to 2022 (a growth of 142.4 %)

Overall, 92.6 thousand tons of lead and alloys were produced in the country, which was 89.5 % of the 2022 production.

Figure 3.5



In 2023, due to production problems in "KCM" JSC and diminished processed concentrates, the share of lead produced from secondary raw materials increased, reaching 52%, compared to 32.6% in 2022.

Global lead production by regions and countries – major producers for the last five years are given in Table 3.6.

China is the top producer of lead in the world. In 2023 China has produced 43% of the total lead production in the world. The second and third leading producers are India and the USA with almost equal shares of 7.7%. Forth was Germany with a share of 2.3%.



*World lead production, thousands of tons*

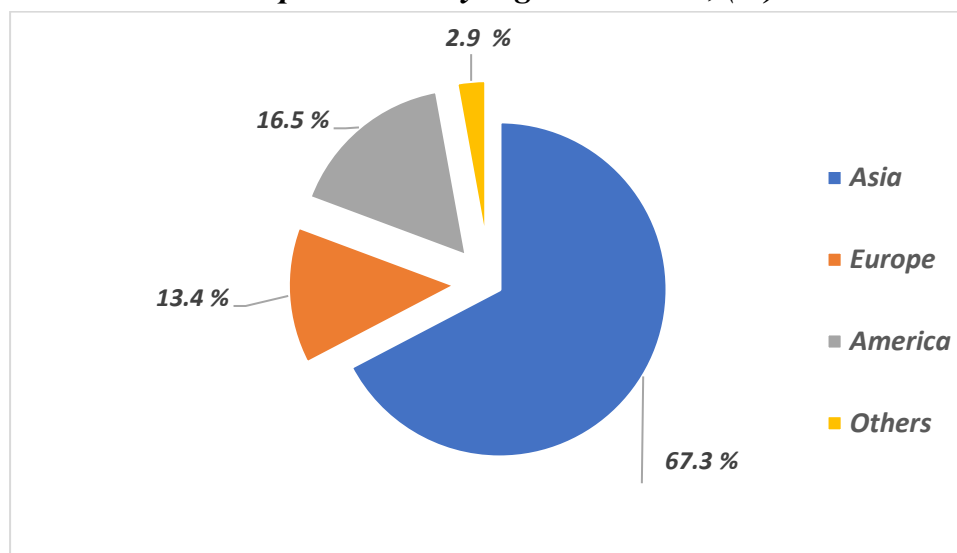
Страна/Region	2020	2021	2022	2023	2023/22 +/-	2023/22 %
<b>Asia, incl.</b>	<b>8 094</b>	<b>8 547</b>	<b>8 623</b>	<b>8 912</b>	<b>289</b>	<b>103</b>
- China	5 204	5 448	5 471	5 687	216	104
-India	818	923	966	1 022	56	106
- The Republic of Korea	770	790	760	776	16	102
<b>Europe</b>	<b>1 920</b>	<b>2 034</b>	<b>1 780</b>	<b>1 768</b>	<b>-12</b>	<b>99</b>
- EU (27)	1 372	1 431	1 299	1 302	3	100
incl. Germany	335	310	227	310	83	137
Spain	175	192	192	192	0	100
Poland	153	158	154	155	1	101
Belgium	101	122	109	116	7	106
Italy	140	158	133	66	-67	50
Bulgaria*	108	106	104	93	-11	89
<b>America,</b>	<b>2 229</b>	<b>2 100</b>	<b>2 081</b>	<b>2 178</b>	<b>97</b>	<b>105</b>
incl. the USA	1 151	976	960	1 019	59	106
Mexico	410	420	419	435	16	104
Brasil	258	265	278	286	8	103
Canada	189	203	182	191	9	105
<b>Total</b>	<b>12 552</b>	<b>13 019</b>	<b>12 801</b>	<b>13 237</b>	<b>436</b>	<b>103</b>

Source: ILZSG (International Lead and Zink Study Group), \*Company data

In 2023, compared to 2022, there was an increased production of lead almost in all regions in the world, except in Europe, where a slight decrease of 1% was reported. The EU increased production by only 3 thousand tons. Figure 3.5 shows the share of produced lead in each of the regions in the world in 2023.

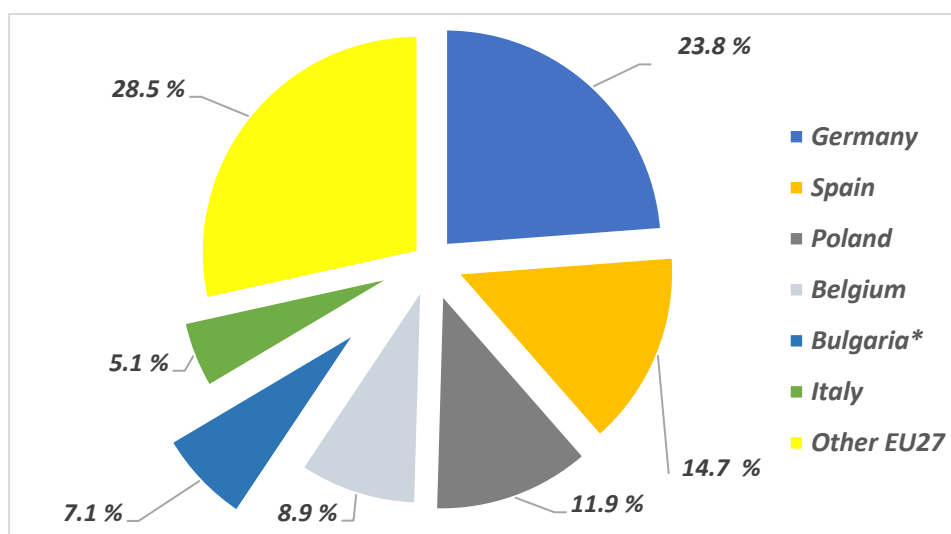
Lead production enlarged in almost all Asian countries. Traditionally, Asia is the biggest producer. After 2020, lead production in the countries of the continent has shown a steady growth trend. In 2023, Asia took a share of 67.3 % in the global lead production. In Asia were produced 8 912 thousand tons lead, more, compared to 2022, by 289 thousand tons, and the share of China was 63.8 %.

In 2023, countries in America have produced 2 178 thousand tons of lead, reporting a growth of 5% compared to 2022, which placed the continent second in the world ranking.

*Lead production by regions in 2023, (%)*

Lead production in Europe decreased for the third year in a row. In 2023, European lead production was 12 thousand tons less, compared to 2022, when a significant drop of 11.4 % was realized. The share of Europe in the global production was 13.4 %, placing the continent third in the world ranking.

Figure 3.7

*Countries – main producers of lead in EU-27 in 2023 (%)*

In 2023, Germany produced 310 thousand tons lead, increasing the production by 37 %, compared to 2022. Spain remained in second place, and the volume of its production compared to 2022. Poland and Belgium took third and fourth rank with a lead production of 155 thousand tons and 116 thousand tons respectively.

The enormous drop in lead production in Italy by 50% modified the followed ranking. Italy lost the fifth place and moved to a lower position, which automatically pushed Bulgaria one position ahead, despite our drop in the lead production. In 2023, our country ranked 5<sup>th</sup> position among the countries-lead producers in the EU (27), compared to 6<sup>th</sup> rank in 2022 and 2021. We have occupied the 5<sup>th</sup> position in 2020, but with a bigger production volume of 108 thousand tons.

Notwithstanding, that in 2023, Bulgaria produced 93 thousand tons lead, which was a drop of 11 thousand tons, the country remains a leader in production of lead ingots in European countries, with a share of 5.3 % (5.8 % in 2022). Our share in the lead production of the EU (27) countries was 7.1 %, compared to 8% in 2022.

### 3.1.3. ZINC PRODUCTION

“KCM” JSC is the only producer of zinc from ores concentrates in the country. In the company is established a hydrometallurgical scheme for integration of electrolytic zinc extraction from solutions with the production of lead and parallel utilization of other elements from raw materials as sulfur, sulfuric acid, cadmium, precious metals, and tellurium. This technology achieves a complex utilization of useful components from primary and secondary zinc and lead raw materials.

Table 3.7 shows the processed concentrates in 2023, both local and imported, as well as other waste products purchased and consumed in the production (in amount of metal).

Concentrates, processed in 2023 contain 55 795 tons of zinc, by 2 553 tons of metal more than in 2022 (a growth of 4.8 %). Compared to 2022, both have growth, own concentrates by 433 tons and imported concentrates by 2 120 tons. The processing of secondary raw materials has also increased by 135 tons.

Table 3.7

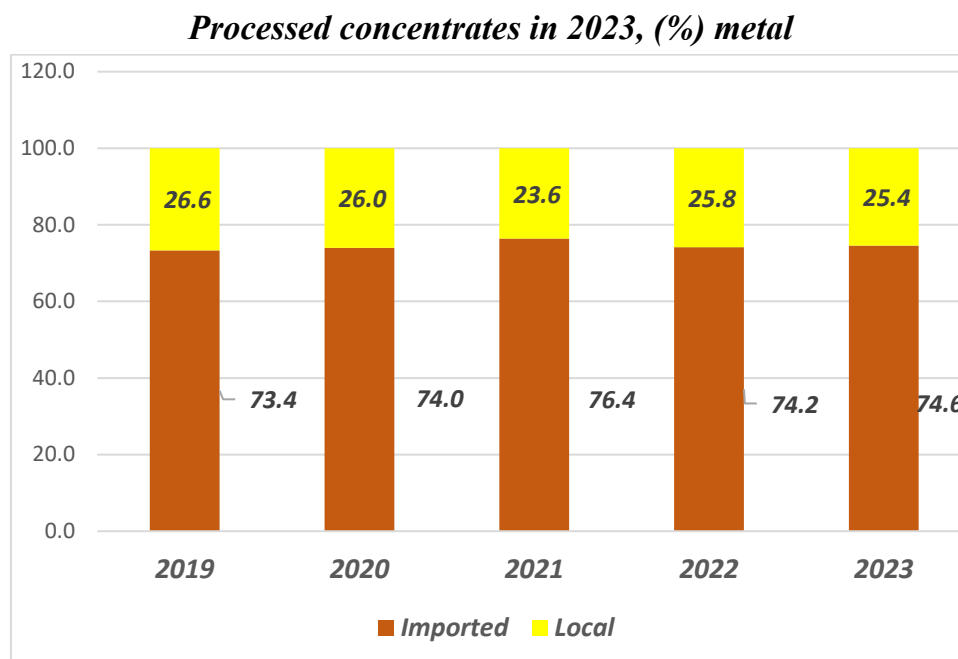
#### *Processed raw materials for the production of zinc, tons*

<i>Product</i>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2023/22 +/-</b>	<b>2023/22 %</b>
<b>Metal in concentrates, incl.:</b>	<b>54 688</b>	<b>60 299</b>	<b>61 730</b>	<b>53 242</b>	<b>55 795</b>	<b>2 553</b>	<b>104.8</b>
In imported	40 118	44 610	47 174	39 480	41 600	2 120	105.4
local	14 570	15 689	14 556	13 762	14 195	433	103.1
<b>Processed waste (imported)</b>	<b>19 231</b>	<b>18 907</b>	<b>14 855</b>	<b>19 055</b>	<b>19 190</b>	<b>135</b>	<b>100.7</b>
<b>Total</b>	<b>73 919</b>	<b>79 206</b>	<b>76 585</b>	<b>72 297</b>	<b>74 985</b>	<b>2 688</b>	<b>103.7</b>

Source: Company data

The ratio between imported and local concentrates was saved in recent years, as the local concentrates take a share of 25 % in the common batch. Secondary raw materials containing 19.2 thousand tons metal, have 25.6 % of the raw materials used. In 2022 this share was 26.4 %. Figure 3.8 presents the ratio (in %) between imported and locally produced primary raw materials processed over the years.

Figure 3.8



Holding KCM 2000 is expanding its ownership of lead and zinc mining landscapes. Thus, the extraction of lead and zinc is expected to grow and accordingly the volume of the own concentrates

Table 3.8

**Zinc production, tons**

<i>Product</i>	2019	2020	2021	2022	2023	2023/22 +/-	2023/22 %
<b>Zinc - Total</b>	73 512	74 520	72 418	72 527	72 324	-203	99.7

Source: Company data

In 2023 “KCM” JSC produced 72 324 tons of zinc, 203 tons less than in 2022, or a negligible drop of 0.3%. (Table 3.8).

In 2023, the global zinc production was 13.9 million tons, which was 527 thousand tons more, a growth of 3.9% respectively, compared to 2022. Production was increased in Asia, America and Oceania regions.

Table 3.9 outlines the global zinc production by region, and Figure 3.9-the shares of each region in global production.

In 2023, Asia produced 9.6 million tons zinc, 475 thousand tons more compared to 2022. Asia is the largest zinc producer in the world. In 2023, the region increased its share in global production to 69.2%. For comparison, in 2022, this share was 68.4 % and in 2021 – 66%. The biggest producer was China, with a share in the regional zinc production of 71 %, and in global production – 49%. Production of zinc in China exceeds three times the overall zinc production in Europe. Nevertheless, Europe produced 2 155 thousand tons of zinc in 2023 and keeps its second rank in the global zinc production.

*World zinc production, thousands of tons*

Country/Region	2020	2021	2022	2023	2023/22 +/-	2023/22 %
<b>Asia, incl.</b>	<b>9 049</b>	<b>9 168</b>	<b>9 162</b>	<b>9 637</b>	<b>475</b>	<b>105.2</b>
China	6 342	6 408	6 358	6 850	492	107.7
The Republic of Korea	904	840	868	862	-6	99.3
India	710	779	838	836	-2	99.8
<b>Europe, incl.</b>	<b>2 493</b>	<b>2 494</b>	<b>2 211</b>	<b>2 155</b>	<b>-56</b>	<b>97.5</b>
EU (27), incl.:	2 091	2 116	1 834	1 786	-48	97.4
Spain	511	509	505	520	15	103.0
Finland	297	291	294	294	0	100.0
Belgium	278	282	240	260	20	108.3
The Netherlands	260	282	209	239	30	114.4
Bulgaria*	75	73	73	73	0	100.0
<b>America, incl.</b>	<b>1 798</b>	<b>1 808</b>	<b>1 635</b>	<b>1 664</b>	<b>29</b>	<b>101.8</b>
Canada	684	643	485	504	19	103.9
Mexico	319	340	349	346	-3	99.1
Peru	319	340	349	346	-3	99.1
the USA	180	220	220	220	0	100.0
<b>Total world</b>	<b>13 823</b>	<b>13 939</b>	<b>13 408</b>	<b>13 935</b>	<b>527</b>	<b>103.9</b>

Source: ILZSG

In 2023, zinc production in Europe decreased by 56 thousand tons (97,5%). The decline was due to the zinc production drop in the EU (27), by 48 thousand tons less than in 2022. In 2023 Germany, even not a big producer, stopped the production of zinc. Poland marked a light drop. A small increase of zinc production was observed in other EU member states.

Zinc, produced in the EU member states was 83 & of the total production in the European continent and 12.8 % of global production. The share of zinc production of all the European countries was 15.5 5 of global production. For comparison, in 2022 this share was 16.5% and in 2021-17.9 %. The share of the EU member states was 15.2 %. In 2022 and 2023 there was a decrease in the production of the EU member states by more than 300 thousand tons, which again confirms the current deindustrialization processes in the area of raw materials.

In 2023, America produced 1.7 million tons of zinc, 29 thousand tons more compared to 2022. Thus, America ranked third position among the regions, with a share of 11,9 % of global zinc production. For comparison, in 2022 the share was 13 %.

*World zinc production (by regions), 2023, (%)*

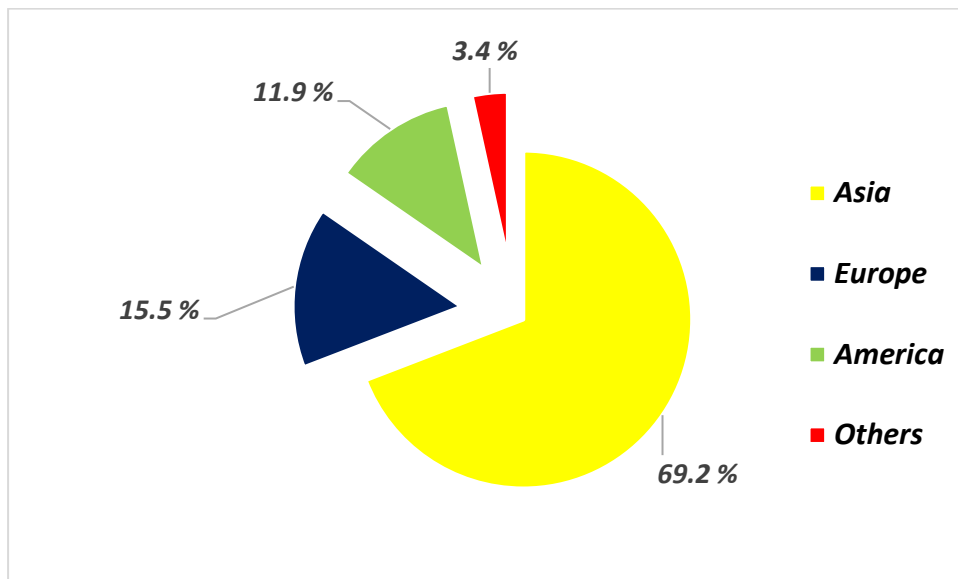
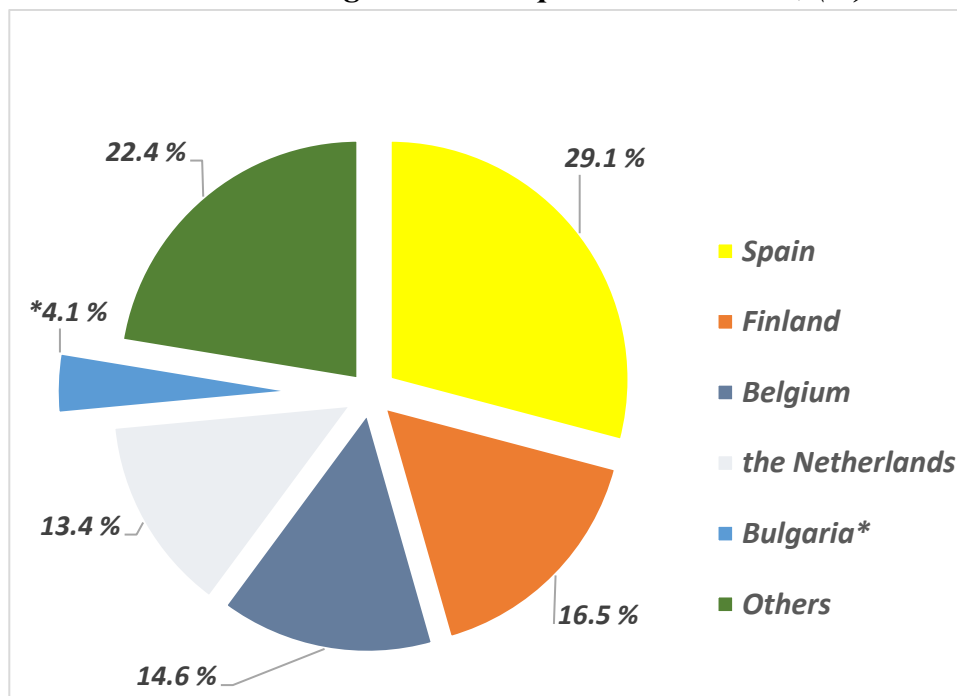


Figure 3.10 shows the participation of the countries-zinc producers in the EU in the total zinc production of the Union.

Figure 3.10

*Leading EU-27 zinc producers in 2023, (%)*



Spain was the largest zinc producer with a share of 29.1 % and a slight increase in the production in the recent three years. Next are Finland with a share of 16.25% and Belgium with 14.6%. Both countries preserved the level of their production and their share in the production of the Union. In 2023, Bulgarian zinc production takes a share of 4.1 % in the total EU (27) production.

Bulgarian zinc production is expected to increase through the installation in “Harmonee 2012” Ltd in Kardzhali, where the metal is extracted from waste slags and

secondary products. As the first stage the installation forms zinc-containing powders, but it is envisaged that in the second stage the final product to be zinc ingots.

Base metals are imported raw materials for the economy. Critical Raw Materials Act (CRM) of the European Commission envisages incentives and measures in order to increase existing capacities and production of new metals from the list of the critical for the EU raw materials. The regulation aims at reducing third country supply dependency and developing the strategic autonomy of the European Union. Accelerating circular technologies, including recycling, will contribute to stabilizing and increasing the production of critical raw materials for the implementation of decarbonization goals and developing zero-emission industries.

Lead and zinc are not in the critical raw material list. BAMI supports all the initiatives for adding the two metals in the Regulation.

#### *3.1.4. PRODUCTION OF PRECIOUS, BYPRODUCT METALS, ALLOYS AND CHEMICAL PRODUCTS*

The processed raw materials in metallurgy for ingots production of non-ferrous metals are complex in nature. They comprise other useful elements, with content that allow their effective extraction into final products. The integrated in KCM” JSC hydrometallurgical scheme for the processing lead and zinc raw materials, extracts from the waste products also other elements as sulfur, sulfuric acid, cadmium, tellurium, gold and silver. In “Aurubis Bulgaria” JSC, the co-products are concentrated in anodic sludge and exported for processing outside the country.

The amount of extracted co-products (metals and other products) depends on the volume and composition of the processed raw materials and concentrates. Table 3.10 shows the production of metals and chemical products in 2023 and in each of the previous four years.

Table 3.10

#### *Production of precious and byproduct metals, alloys and chemical products (tons, kilograms)*

Products	2019	2020	2021	2022	2023	Difference2023/ 2022	
						+/-	%
Cadmium, ingots, tons	315	311	343	315	306	- 9	97.1
Silver, kilograms	35 145	32 760	31 816	20 247	15 261	- 4 986	75.4
Gold, kilograms	295	70.52	53.76	33.88	66.95	33.07	197.6
Tellurium, kilograms	2 944	3 676	2 797	2790	1 087	-1 703	39.0
Sodium sulphate, tons	1 260	3 139	1 928	908	934	26	102.9
Sulfuric acid, tons	1 295322	1 519940	1 328712	1 576459	1 320 294	- 256165	83.8

*Source: Company data*

The only producers in the country of sulfuric acid from sulfur contained in metallurgical raw materials are the two extraction enterprises, processing non-ferrous metal concentrates, including sulfide ore concentrate. “Aurubis Bulgaria” JSC produces about and above 90 % of the total amount of sulfuric acid, produced in the country. In 2023, the share of the company was 92 %. “KCM” JSC produces the rest.

Sodium sulphate is obtained as a by-product in the technological process of recycling end-of-life batteries at “Monbat Recycling” PJSC.

Reduced production of by-products was related to reduced quantity of non-ferrous concentrates processed in 2023. The almost two times increased quantities of gold were obtained from the tolling processed products.

### *3.1.5. PRODUCTION OF ROLLED/PRESSED NON-FERROUS METALS AND ALLOYS*

Bulgaria has capacities for the processing of non-ferrous metal and alloys thereof to high added value rolled/pressed products. Sheets, strips, foil, pipes, various profiles and products are produced from copper, aluminum, zinc, lead and their alloys. As a result of restructuring and investments in new technologies and facilities, non-ferrous metallurgy is developing sustainably and is more competitive in foreign markets.

Table 3.11 shows production of rolled/pressed non-ferrous products in each of the previous five years. In this period, the ongoing crises in the European economy, increased imports from third countries, difficulties in raw materials deliveries and reduced consumption have caused a decline in the total volume of Bulgarian production.

In 2023, production of rolled/pressed non-ferrous metal and products was 174 521 tons, 18 476 tons less than in the previous year. This decline was entirely due to the drop in production of rolled/pressed aluminum in 2023, compared to 2022, by 20 thousand tons (20%), and compared to 2021, by 33 thousand tons.

“Sofia Med” JSC in Sofia is the only enterprise with modern metallurgical capacities, processing copper, copper alloys and other heavy non-ferrous metals and their alloys, such as zinc and lead. The company is part of the Greek holding group Viohalco, one of the largest investors in Bulgarian metallurgical industry.

The production of “Sofia Med” JSC has been increasing throughout the entire period. In 2023, the company produced 95,1 thousand tons, which is more, compared to 2022, by 1628 tons, or a growth of 101.7 %. For the first year, the relative share of rolled/pressed heavy non-ferrous metal exceeded the share of aluminum products. This success was due to the diversity of the company's product structure and the investments made in new technologies and facilities throughout the production chain.



Table 3.11

*Production of rolled/pressed non-ferrous metals and alloys, tons*

Product/producer	2019	2020	2021	2022	2023		Difference 2023/2022	
					tons	%	+/-	%
<b>Rolled/pressed heavy non-ferrous metals and alloys, “Sofia Med” JSC, incl.</b>	<b>79 678</b>	<b>82 913</b>	<b>90 447</b>	<b>93 491</b>	<b>95 119</b>	<b>50.9</b>	<b>1 628</b>	<b>101.7</b>
- copper	62 531	66 665	73 139	79 404	77 601	81.6	-1 803	97.7
- brass	17 147	16 248	17 308	14 087	17 518	18.4	3 431	124.4
<b>Rolled/pressed aluminum and alloys, - Total, incl.</b>	<b>92 862</b>	<b>98 297</b>	<b>113 108</b>	<b>99 506</b>	<b>91 723</b>	<b>49.1</b>	<b>- 7 783</b>	<b>92.2</b>
- “Alkomet” JSC, of which:	68 484	73 515	88 883	70 903	57 381	62.6	-	80.9
• rolled	45.4	47.1	59.8	45.8	32.4		13 522	
• pressed	38.2	26.4	29.0	25.1	24.9			
- “Etem Gestam Aluminum Extrusions”- pressed	22 994	23 329	23 000	27 567	21 007	22.9	-6 560	76.2
“Etem Gestam Automotive” – processed aluminum products	-	-	-	-	12 321	13.4	12 321	-
- “EMC Distribution” LTD	1 384	1 453	1 225	1 036	1 014	1.1	-22	97.9
<b>TOTAL</b>	<b>172 540</b>	<b>181 210</b>	<b>203 555</b>	<b>192 997</b>	<b>186 842</b>	<b>100.0</b>	<b>- 6 165</b>	<b>96.8</b>

Source: Company data

At this stage, “Sofia Med” JSC produces mainly copper, and brass rolled metals. In line with international market demand, the ratio between copper and brass is approximately 4:1. In 2023, the company produced 77.6 thousand tons rolled/pressed copper, which is less, compared to the previous year, by 1 800 tons. The increased production of rolled/pressed brass compensated for the decreased production of copper. In 2023, 17.5 thousand tons rolled/pressed brass were produced, which is more than in 2022, by 3 431 tons (a growth of 124,4 %).

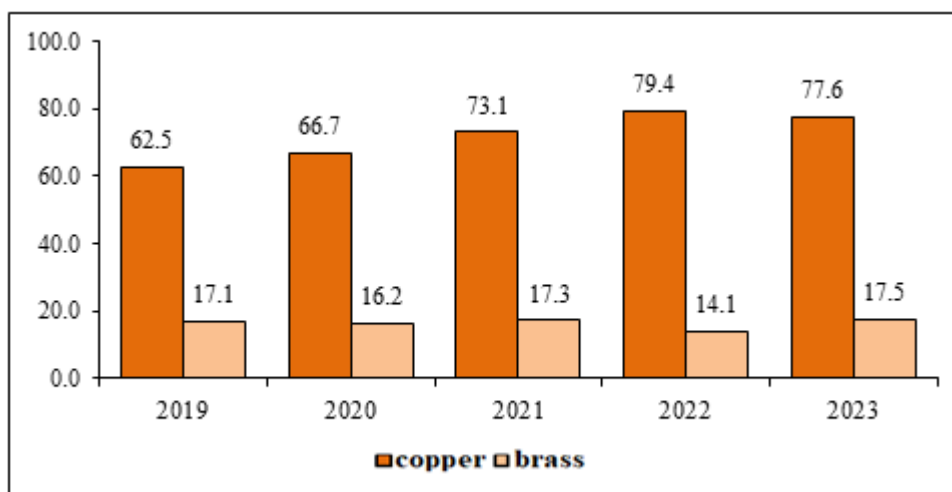
“Sofia Med” JSC produces mainly two types of copper products – rolled (flat) and pressed (long). The ratio between them is approximately 2:1. Rolled copper products have a higher relative share. From brass only rolled products are produced. In 2023, the production of rolled brass products was 61.5 thousand tons. The produced quantities of pressed copper were fewer. Technological renovation and product restructuring of the

capacities in the rolling production have been carried out in strengthening the quality and competitiveness of the manufactured products.

Figure 3.11 presents the production of rolled/pressed copper and copper alloys for the period 2019-2023. Mainly rolled/pressed copper (including copper special alloys) is produced, and the share of the brass production in the total amount has decreased over the years – from 21.4 % in 2019 to 18.4 % in 2023.

Figure 3.11

*Production of rolled/pressed heavy non-ferrous metals, thousands of tons*



In 2023, “Sofia Med” JSC processed 33 810 tons secondary copper, of which 32 915 tons copper waste and 895 tons brass waste. The processed metal waste was growing compared to previous years. In 2023, the amount of processed waste was 32 929 tons, that is more than in 2022, by 895 tons. In 2022, this amount was 30 335 tons, which is more than in 2021 by c 3 475 tons. Unfortunately, local deliveries are steadily decreasing - in 2023 they were only 915 tons, in 2022 - 1540 tons, and in 2021 - 2 326 tons. The exports of copper waste throughout the period were 9-10 thousand tons per year.

Increasing the share of secondary copper raw materials has a positive effect on the production costs and enhances the competitiveness of production. Being a strategic raw material, the exports of copper waste from the EU to third countries should be restricted.

“Sofia Med” JSC annually invests in projects for capacity renovation and technological innovations with the aim to meet the requirements of the market and improve its own competitiveness. In 2023, investments of 27.146 million BGN were made in improving production quality, expansion to new products, energy efficiency, improving the working environment and working conditions, and the use of resources.

"Alkomet" JSC, Shumen, is the largest company processing aluminum and alloys thereof in Bulgaria and in the region. It is the only enterprise with a complete cycle in three separate establishments: melting and casting of metal into billets, rolled production of flat products and pressing for long products.

**“Etem Gestamp Aluminum Extrusions” JSC** in Sofia processes imported aluminum billets to produce long products, including profiles for the automotive industry. “Gestamp Etem Automotive Bulgaria” processes aluminum profiles into finished details for global brands like **Porsche, BMW and Stellantis**.

“EMC Distribution” Ltd in Ruse, produces welded pipes and long profiles from aluminum strips/sheets. There are other capacities for production of aluminum profiles by extrusion in the country, but they are not included in this analysis.

Table 3.13 presents the total production of rolled/pressed aluminum by producers for the last five years. Figure 3.12 gives quantities and shares of pressed and rolled aluminum.

The production of rolled/pressed aluminum is the only metallurgical production that has been declining in huge volumes for the second year. In 2023, the total production of rolled/pressed aluminum was 79.4 thousand tons, which is less, compared to 2022, by 20 thousand tons, or a drop of 21.1 %. In 2022, 14.6 thousand fewer tons of rolled/pressed aluminum were produced. Therefore, the total decline for the last two years was 30%.

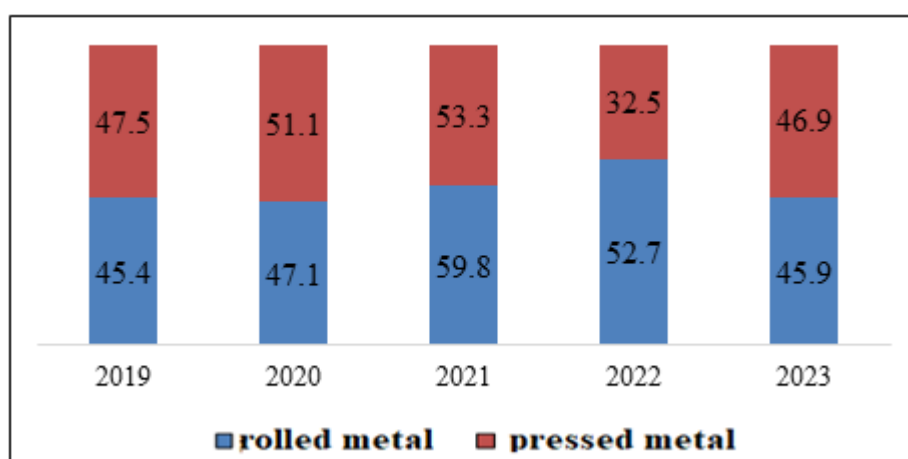
The reasons for reduced production of rolled/pressed aluminum and aluminum products in the country are complex. Significant was the drop in "Alkomet" JSC for the recent two years, mainly due to ongoing global economic crises and deteriorated international markets. As a result, metal consumption has plummeted in then basic industries as construction, automotive sector, etc. An additional effect has been exerted by high stockpiles of finished products unsold during the COVID period and increased imports from third countries at lower prices. In addition to the practice of direct subsidies received in third countries, there is also inequality in environmental requirements and the business environment compared to EU standards. This is especially relevant for China, whose low-priced imports including of aluminum foil, flooded European markets. Aluminum foil is the main export product of "Alkomet" JSC.

In 2023, the total production of rolled/pressed aluminum in "Alkomet" JSC was 57.4 thousand tons (only rolled one was 32.4 thousand tons). Being the sole producer of flat rolled aluminum, the company usually produces more rolled aluminum than long pressed aluminum (the ratio is around 2:1). When summing up the production of long rolled aluminum with other producers, long pressed products take a larger share, over 50% in the total production of the country. (Figure 3.12)

The primary aluminum ingots are the main raw material for the production of "Alkomet" JSC. In 2023, 122 thousand tons of primary aluminum ingots were imported from 29 countries. It was the biggest quantity of all types of metallurgical products. The largest importer was Turkey (24%), followed by Greece and Russia.

Figure 3.12

*Total production of aluminum rolled/pressed metal and articles thereof, thousands of tons*



In 2023, 8 703 tons of aluminum waste were processed - four times the processed waste in 2022. About two-thirds of the processed waste from the company was imported, due to the lack of good practices for separate collection and subsequent separation of aluminum waste in the country. The mixed nature of aluminum waste deteriorates the quality and options for direct input as a raw material in the smelting installations.

Sustainable development, high technological restructuring and product quality have been achieved with tens of millions of BGN, invested annually by "Alkomet" JSC. In 2023, investments of **23.5 million BGN were made in projects for high product quality, environment, energy efficiency**, coil annealing furnace, wastewater treatment plant, new renewable energy sources, etc. The company launched a "Priority investment project 2023-2026" for 140 million BGN and envisages capacity increase and enlarging the product mix by installing new equipment throughout the production chain.

In 2023, "**Etem Gestamp Aluminum Extrusions**" JSC produced 21 007 tons of aluminum profiles, 6560 tons less than in 2022. Part of them have been processed into new added value products by "Gestamp Etem Automotive Bulgaria", a member of the same group. In 2023, 12,321 tons of aluminum rolled products were produced for the most reputable brands in the automotive industry. In 2023, the two enterprises produced a total of 33 328 tons aluminum products, one part for domestic consumption and the other part, after further processing into added value products, for export.

In 2023, "Etem Gestamp Aluminum Extrusions" JSC made investments of 30 million EUR to maintain the high technological level and meet the requirements of the global and European markets, as follows:

-8.632 million EUR to expand the production capacity of aluminum extruded profiles; and

- 21.213 million EUR for the production of profiles in the automotive industry.

Thus, the mechanical processing of metal products was fully automated, management AI and of the internal transport was established, and new software was integrated.

In 2023, "EMC Distribution" Ltd produced 1 014 tons of welded aluminum pipes, by 22 ton less than in 2022. The enterprise is a small producer of aluminum products with a share of 1.3 % in the total annual production. (Table 3.13). In 2023, investments of 200 thousand BGN were made in improving the quality of production and production indicators.

### *3.1.6. UTILIZATION OF NON-FERROUS METAL WASTE*

Metals are raw material with an "infinite" circle of recycling. It is achieved through recycling and repeated use in mining and processing metallurgical enterprises. Bulgaria has a relatively good system for collecting waste from the main metals - iron, copper, lead, aluminum and zinc. Still there is no satisfying solution on separate collection and utilization of metals from electronic scrap, as well as utilization of some industrial waste (slag, refractory materials). Problems with the quality of secondary metals also exist and hinder their efficient utilization in rolling metallurgical production.

Data for non-ferrous metals utilized by the metallurgical enterprises of non-ferrous metallurgy in the period 2019 - 2023 are given in Table 3.12.

*Processed non-ferrous metal waste, tons*

Waste	Total					Difference2023/2022	
	2019	2020	2021	2022	2023	+/-	%
<b>Copper</b>	65 377	70 253	67 036	77 291	74 668	- 2 623	96.6
<b>Lead</b>	51 178	56 802	62 024	80 126	84 270	4 144	105.2
<b>Zinc</b>	19 231	18 907	14 855	19 055	19 190	135	100.7
<b>Aluminum</b>	14 210	22 080	9 590	2 014	8 793	6 689	332.1
<b>Total non-ferrous metals</b>	<b>149 996</b>	<b>168 042</b>	<b>153 505</b>	<b>178 486</b>	<b>186 921</b>	<b>8 435</b>	<b>104.7</b>

*Source: Company data*

The total amount of processed non-ferrous metal waste in 2023 was more, compared to 2022, by 8.3 thousand tons. Aluminum and lead waste have increased. Copper waste has decreased. Lead and zinc waste contain waste products from other productions.

The largest amount of processed waste is from lead-acid battery waste, which has increased by 165% in the last five years. The lowest is the utilization of secondary aluminum raw materials, although the quantities collected by recycling companies are high.

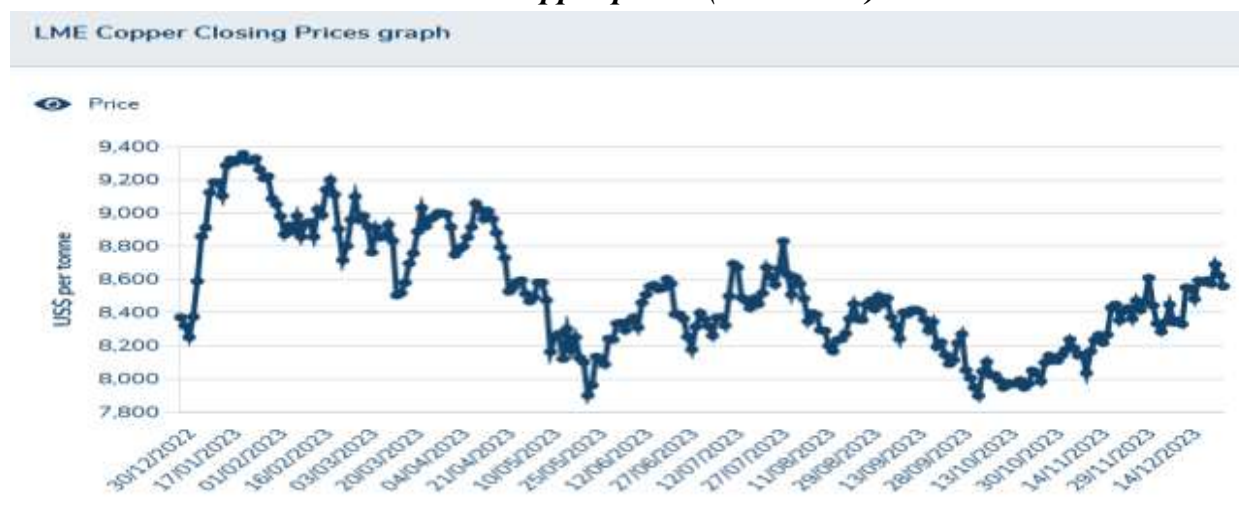
### 3.2. TRADE EXCHANGE AND CONSUMPTION OF NON-FERROUS METALS

Ingots of non-ferrous metals are commodities, traded at stock exchanges and sold on world markets at exchange prices of metals. Bulgarian primary metals are listed on the London Metal Exchange (LME) and their price determines the sales on international markets.

Figures 3.13 to 3.16 show the price of copper, lead, zinc and aluminum in 2023

Figure 3.13

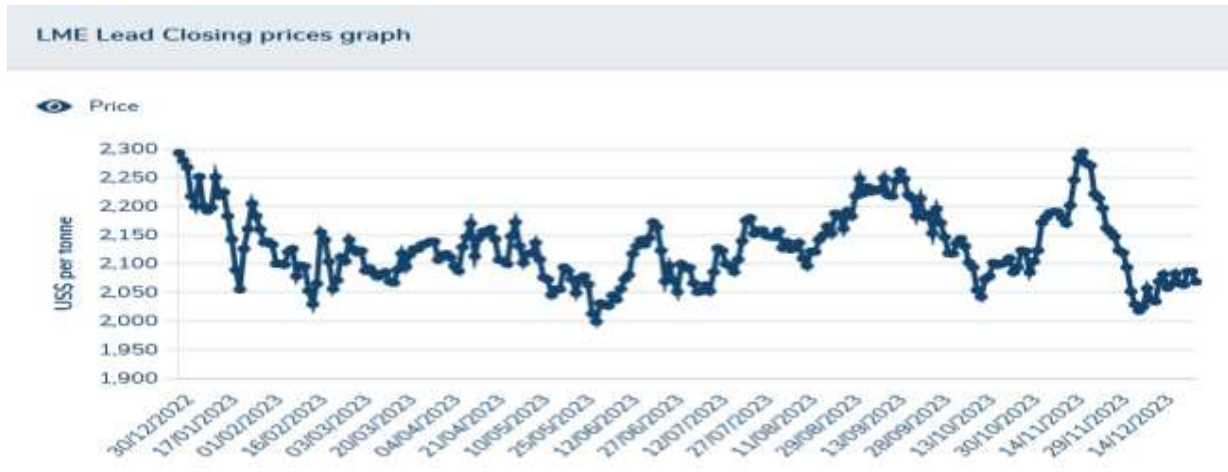
#### *Copper prices (USD/TNE)*



In 2023, the exchange price of copper changed again, but fluctuations were smaller than in 2022. The maximum price reached 9 400 USD/ton at the beginning of February. The minimum price of 7 800 USD/ton was achieved in May. The difference was below 20%. For 2022 there was a peak price of 11 000 USD/ton at 36 % difference from the minimum value.

Figure 3.14

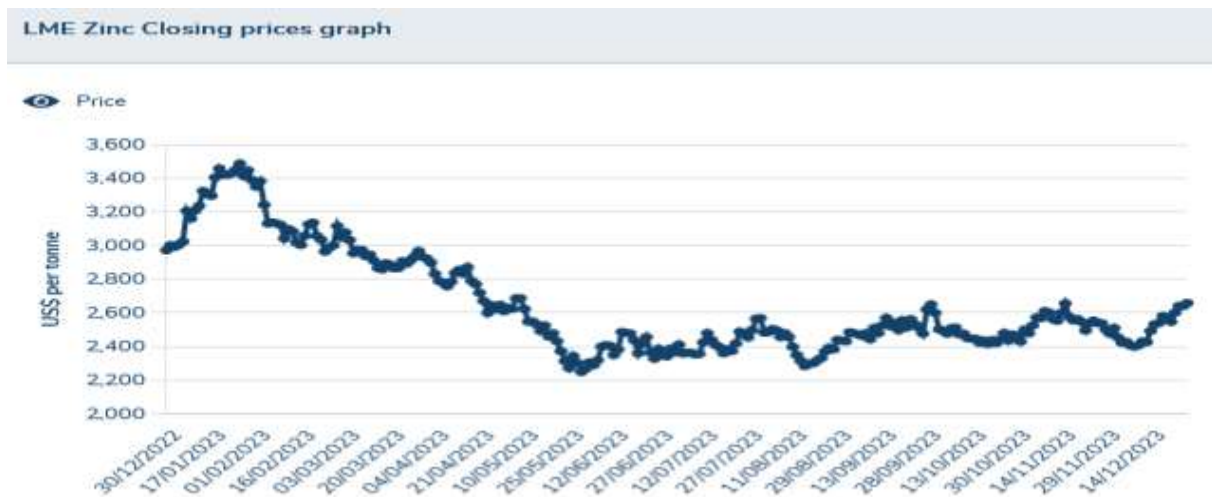
**Lead prices (USD/TNE)**



In 2023, exchange price of lead started from 2 300 USD/ton, as in the previous year, but after smooth changes the lowest price of 2 000 USD/ton was reached in the middle of the year (a drop of 14%). The processes in 2022 were more dynamic - from 2 500 USD/ton in the first quarter, the price reached 1 700 USD/ton in October (a difference of over 30%).

Figure 3.15

**Zinc prices (USD/TNE)**



Throughout 2023, except in January, exchange price of zinc stayed at low levels- below 3 000 USD/ton. It even fell below 2 500 USD/ton (a level not reached in the last two years) and remained there until the end of the year.

*Aluminum prices (USD/TNE)*

Exchange price of aluminum also started with a slight decline and a subsequent sharp rise to 2 650-2 680 USD/ton, the maximum for the year. Since February prices have been relatively stable. The diagram shows that for most of 2023, exchange price was between 2 200 USD/ton and 2 400 USD/ton (a difference of around 10%), while in 2022 the difference reached up to 50 % making the market more volatile.

Exchange trading is characterized by dynamic price changes influenced by variety of international political and economic factors. This is well illustrated by the above diagrams for the monthly prices of the main non-ferrous metals in 2023.

### 3.2.1. IMPORT OF NON-FERROUS METALS AND FINISHED PRODUCTS

Imported non-ferrous metals and metallurgical products including metal waste in the period 2019 – 2023 are presented in Table 3.13. The general trend over the years has been for imports to grow. The highest import volume was in 2022.



Table 3.13

*Imports of basic non-ferrous metals and products thereof, tons*

Products	2019	2020	2021	2022	2023	Difference 2023/2022	
						+/-	%
<b>Copper, total, incl.</b>	<b>90 709</b>	<b>112240</b>	<b>104 445</b>	<b>130 917</b>	<b>137 235</b>	<b>6 319</b>	<b>104.8</b>
Anodes	1	1	4.5	1 009	4	-1 005	0.5
Cathodes, alloys, billets	24 859	26 567	28 049	29 320	32 891	3 571	112.2
Scrap	48 099	60 873	52 300	68 739	71 347	2 608	103.8
Bars and profiles	5 471	5 619	5 648	4 749	4 721	-28	99.4
Wire	8 124	15 604	15 090	21 146	22 747	1 601	107.6
Sheet metal and foil	1 818	1 376	1 209	2 028	1 893	-135	93.3
Pipes, other	2 337	2 200	2 144	2 454	3 632	1 178	148.0
<b>Lead, total, incl.</b>	<b>34 196</b>	<b>36 634</b>	<b>35 423</b>	<b>60 592</b>	<b>54 571</b>	<b>-6 021</b>	<b>90.1</b>
Ingots and alloys	16 532	24 995	16 509	21 354	39 267	17 913	182.9
Scrap (metal)	15 656	10 203	13 939	34 843	11 705	-23 138	33.6
Rolled/pressed metal	2 008	1 436	4 975	4 394	3 599	-795	81.9
<b>Zinc, total, incl.</b>	<b>3 709</b>	<b>5 790</b>	<b>5 099</b>	<b>5 040</b>	<b>3 644</b>	<b>-1 396</b>	<b>72.3</b>
Ingots and alloys	3 487	5 257	4 768	4 368	2 585	-1 783	59.2
Scrap	9	16	75	21	1	-20	4.8
Rolled/pressed metal	213	517	256	650	1 058	408	162.8
<b>Aluminum, total, incl.</b>	<b>176 354</b>	<b>169 711</b>	<b>183 148</b>	<b>207 793</b>	<b>187 997</b>	<b>-19 796</b>	<b>90.5</b>
Ingots and alloys	137 776	120 516	129 589	144 931	121 914	-23 017	84.1
Scrap	1 711	2 217	1 739	4 838	5 963	1 125	123.2
Bars and profiles	17 014	18 444	29 649	27 367	30 730	3 363	112.3
Wire	3 640	4 449	4 373	6 116	7 342	1 226	120.0
Sheets and strips	10 500	18 354	13 262	18 556	13 620	-4 936	73.4
Foil	4 215	4 341	3 451	4 522	4 006	-516	88.6
Pipes	1 498	1 390	1 085	1 462	4 422	2 960	202.5
<b>Total, tons</b>	<b>304 968</b>	<b>324 375</b>	<b>328 115</b>	<b>402 873</b>	<b>383 447</b>	<b>-19 426</b>	<b>95.2</b>
<b>Value, EUR million</b>	<b>902.7</b>	<b>976.2</b>	<b>1 294.8</b>	<b>1 932.4</b>	<b>1 773.7</b>	<b>-158.7</b>	<b>91.8</b>
<b>Value, BGN million</b>	<b>1 765.5</b>	<b>1 909.3</b>	<b>2 532.3</b>	<b>3 779.4</b>	<b>3 469.0</b>	<b>-310.4</b>	<b>91.8</b>

Source: Custom statistic u National Revenue Agency



The total import increased by 125 % in volume and by 196 % in value in the period 2019-2020. The difference is the result of fluctuations in the prices of metals and their products on international markets.

The total import in 2023 was 383.4 thousand tons, 19 thousand tons less compared to 2022 and a drop of 5%. The total value of the import decreased by 310 million BGN, a decrease of 9% respectively.

By product groups and individual products, the situation is different and there is no clear consistent trend. Throughout the years, there has been both growth and decline in individual products, connected to consumption, inventories and prices. The relative shares of imported product groups of basic non-ferrous metals and their products are presented in Figure 3.17.

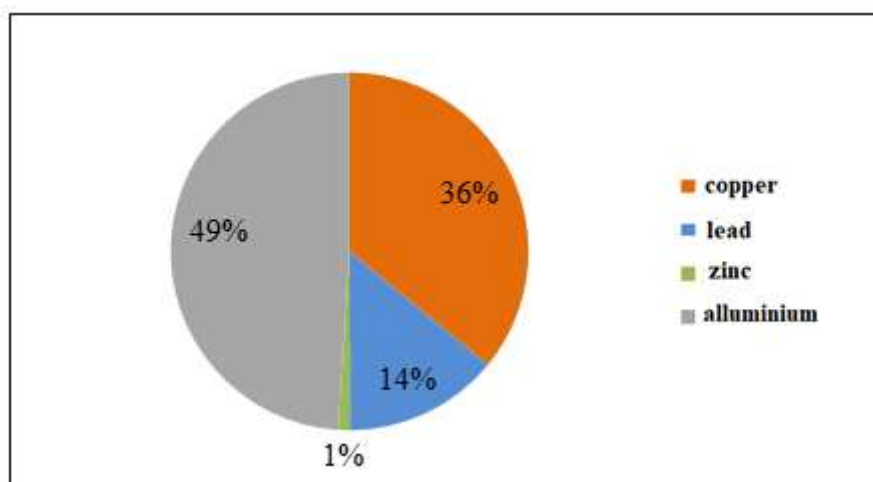
The largest remained the import of aluminum products, although its annual decrease by 20 thousand tons to 188 thousand tons, which was 49% of all imported non-ferrous metals. For comparison, this share was 51.4 % in 2022. Bulgaria has a developed metallurgical industry for processing of primary aluminum. Unfortunately, our country does not produce primary aluminum. So, the raw materials - aluminum primary ingots, alloys and billets - necessary for the production are imported. In 2023, 122 thousand tons of aluminum ingots and alloys (a share of 65% of the import of all aluminum products) were imported from 29 countries in Europe. The main importers were Turkey, with a share of 24 % of the total imports of aluminum primary ingots, followed by Russia with 20 %, Greece – 15 %, the Netherlands – 7 %, as well as Bahrein, UAE, Korea, etc.

The import of aluminum scrap was relatively small, although it has increased more than three times over the five-year period. The use of aluminum scrap as a raw material in the processing metallurgy requires high quality, but the supply markets are limited. The product was imported mainly from neighboring countries- Greece, the Republic of North Macedonia and Romania.

Long products - bars, rods and profiles are imported from 38 countries. The main import partner is Turkey with a share of 53 % of the total import of long products. The import of pipes also originates in Turkey – 66%. Flat products are imported from 32 countries, mainly from Europe. Imports of foil from China takes a share of 30% and from Turkey -15%.

Figure 3.17

*Structure of the imported non-ferrous metals and products thereof, 2023*



**Copper, copper products and copper waste** were in the second position in the structure of the imports with 137 thousand tons and share of 36% in 2023. (32.4% in 2022). The growth in the imported quantities of this group was 6.3 thousand tons, or 105%.

The imports of copper waste (scrap) have the largest relative share and growth with 71.3 thousand tons imported and a share of 51.8 %. There is an increase of 2.6 thousand tons. The main importers were “Sofia Med” JSC and “Aurubis Bulgaria” JSC. Imports were carried out by 42 countries. The largest importers were the EU member states, such as Greece (16 thousand tons, 23 %), Romania (14 thousand tons, 20%) and Italy (8 thousand tons, 11%). More significant imports of scrap were from Serbia, Turkey, Lebanon, UK, Saudi Arabia.

The imported quantity of refined copper was 33 thousand tons, with a growth of 3.5 thousand tons. The imports were from Tanzania-12 thousand tons, Serbia -9.5 thousand tons and South Africa – 4 thousand tons. For a large part of copper products, imports from Turkey have the highest relative shares - 81% for rods and profiles, and for copper wires and tubes - 90% and 40%, respectively.

**Lead** group has a share of 14% of the total imports in 2023, with 54.6 thousand tons imported. There is a decrease, compared to 2022, by 6 thousand tons. Lead ingots and lead scrap are important for the economy. In 2023, the import of unrefined lead sharply increased by 18 thousand tons reaching 39 thousand tons and a growth of 183 %. Imports were carried out by 20 countries. The largest imports were from Serbia (12 thousand tons, 30%), Italy and Turkey (6 thousand tons lead ingots, 15%) and Algeria (11%).

Secondary lead raw materials decreased by 23 thousand tons (from 34.8 thousand tons to 11,7 thousand tons) The imports were carried out by 20 countries. Three of them carried out 90% of the import - Romania (66%), Algeria (13%) and the Netherlands (10%). Lead producers, in addition to lead metal scrap, also process battery waste. In 2023, 50 508 tons battery waste were imported only from Romania.

Zinc products are imported in very limited quantities - throughout the period the imports were between 4 and 5 thousand tons. The imports of zinc ingots were mainly from Spain.

### *3.2.2. EXPORT OF NON-FERROUS METALS AND FINISHED PRODUCTS*

The Bulgarian metallurgical industry is export-oriented, exporting largely to the EU and other countries in Europe. In recent years, there has been an increase in exports to the Middle East, North Africa, America, etc. Exported non-ferrous metals and products thereof, including metal waste (scrap) for the last five years are given in Table 3.14

In 2023, total exports were 674 thousand tons, which is less, compared to 2022, by 63 thousand tons, or a drop to 91.4%. The value of the exported goods also decreased by over a million EUR (79.6 %). The decrease in export value was greater than the decline in its volume, due to low international metal prices in 2023.

Export volume data show a decline by almost all metal groups and a growth only in zinc. The situation was different for the groups of products where the export volume corresponds to the production volume throughout the year. Domestic consumption also had an impact, which varies within very wide limits for different metals. The whole non-ferrous metallurgy, from ingot metal production to the final products from non-ferrous metals and alloys, is extremely export oriented. Exports take a share of between 80% and 95% of production. For some goods such as copper products, the share was up to 98% of their production.

Table 3.14

*Exports of non-ferrous metals and products thereof and scrap, tons*

Products	2019	2020	2021	2022	2023	Difference 2023/2022	
						+/-	%
<b>Copper, total, incl.</b>	<b>342670</b>	<b>392 483</b>	<b>319 649</b>	<b>422 694</b>	<b>376 467</b>	<b>-46 227</b>	<b>89.1</b>
Anodic copper	93702	110 683	68 654	131 441	84 752	-46 689	64.5
Electrolytic copper	162028	190 639	168 584	183 195	187 258	4 063	102.2
Scrap	10962	7 868	8 357	10 855	8 201	-2 654	75.6
Bars and profiles	27811	25 690	22 448	31 870	32 239	369	101.2
Wire	1521	2 079	1 678	4 823	4 695	-128	97.4
Sheet metal and foil	46522	55 449	49 847	60 480	57 668	-2 812	95.4
Pipes	124	75	81	28	49	21	175
<b>Lead, total, incl.</b>	<b>78757</b>	<b>87 979</b>	<b>79 525</b>	<b>98 662</b>	<b>84 209</b>	<b>-14 453</b>	<b>85.4</b>
Lead ingots	75996	87 460	79 386	98 135	81 232	-16 903	82.8
Rolled/pressed metal	111	271	139	527	211	-316	40.0
Scrap (metal)	2650	248	0	0	2 765	2 765	
<b>Zinc, total, incl.</b>	<b>64411</b>	<b>69 768</b>	<b>61 324</b>	<b>63 922</b>	<b>72 989</b>	<b>9 067</b>	<b>114.2</b>
Zinc ingots	64085	69 344	60 922	63 518	72 694	9 176	114.4
Rolled/pressed metal	3	3	70	3	7	4	233
Scrap	323	421	332	401	283	-118	129.4
<b>Aluminum, total, incl.</b>	<b>128907</b>	<b>135 816</b>	<b>148 407</b>	<b>152 148</b>	<b>140 345</b>	<b>-11 803</b>	<b>92.3</b>
Aluminum ingots	7694	12 219	5 679	14 804	16 064	1 260	108.5
Scrap	32540	33 218	40 006	36 721	35 085	-1 636	95.6
Bars and profiles	38421	32 773	39 463	46 914	47 262	348	100.7
Wire	571	665	130	153	103	-50	67.3
Strips and sheets	13827	15 860	23 145	13 331	11 957	-1 374	89.7
Foil	26913	29 881	30 037	33 005	22 352	-10 653	67.7
Pipes	8941	11 065	9 947	7 217	7 521	304	95.8
<b>Total, tons</b>	<b>614 745</b>	<b>686 046</b>	<b>608 905</b>	<b>737 427</b>	<b>674 004</b>	<b>63 423</b>	<b>91.4</b>
<b>Value, EUR million</b>	<b>2 653.3</b>	<b>3 009.2</b>	<b>3 421.0</b>	<b>5 241.1</b>	<b>4 170.5</b>	<b>-1 070.6</b>	<b>79.6</b>
<b>Value, BGN million</b>	<b>5 189.4</b>	<b>5 885.5</b>	<b>6 691.9</b>	<b>10 250.8</b>	<b>8 156.8</b>	<b>-2 094.0</b>	<b>79.6</b>

Source: Custom statistic u National Revenue Agency

Throughout the period the exports of copper and copper products have the highest share of the total exports of non-ferrous metals – 56% in 2023 and 59% in 2022. In 2023, total exports were 376.5 thousand tons, decreasing by 46 thousand tons. The percentage of the decrease was different for the individual products. Electrolytic copper is an exception with an increase in exports of 4 thousand tons. The biggest drop was in the export of anodic copper, by 47 thousand tons due to the decrease in production of the product. Anodic copper markets are limited. Companies from Aurubis group export only to Germany and Belgium. Although, 187 thousand tons cathode copper exported to 17 countries, the main markets were Italy (80.5 thousand tons) and Turkey (54.3 thousand tons) that represent 72 % of the total exports. Traditional markets are China (11 thousand tons), Croatia (12 thousand tons), Serbia, Greece, etc.

In the exports of copper products, significant growth has been made by rolled copper and copper alloys. Flat rolled copper has a bigger share in production and exports of the product. In 2023, 57.7 thousand tons of flat rolled copper were exported to 46 countries in the world, but the exports decreased, compared to 2022, by 2.8 thousand tons. The largest export market were European countries like Germany (15 thousand tons, 26%), Italy (12.5 thousand tons, 21 %), France (5 thousand tons, 9%). There were also exports to other EU countries, as well as to the USA and Korea.

Exported long pressed copper products - bars, rods and profiles, were 32 thousand tons to 32 countries. Again, the largest was the export to the EU countries, like Germany and Poland (7 thousand tons, 22%, each), Spain and Italy (3 thousand tons, 10%, each).

In 2023, the exports of copper scrap decreased by 2.8 thousand tons, which is a decrease of 25% compared to 2022. There are conditions these 8,5 thousand tons to be sold on the domestic market, as the country has the capacity for environmentally friendly and energy efficient processing. Copper scrap was exported to China (4 thousand tons, 47%), Turkey (2,5 thousand tons, 29%) and rest quantities to other 10 countries.

Exports of lead and zinc products consist mainly of ingots. The exports of other products, like rolled metal and waste were negligible.

Bulgaria has a developed aluminum processing industry based on the import of raw materials – ingots and billets. Therefore, in the exports of aluminum the final products prevail - sheets, strips, foils, profiles, pipes. The registered exports of ingots are actually manufactured from aluminum waste secondary aluminum and aluminum alloys. There is no well-organized separate collection and subsequent separation of aluminum waste in the country. Therefore, the aluminum waste is sold directly in a mixed form. The mixed waste deteriorates the quality and options for direct input as raw material in the production of rolled/pressed aluminum. At this stage recycling companies are directly exporting huge quantities of aluminum waste.

Figure 3.18 presents the *structure of the exports of non-ferrous metallurgical products* according to NRA and Customs data. These data differ from the data of the producers, as the official data reflect the total exports from the country.

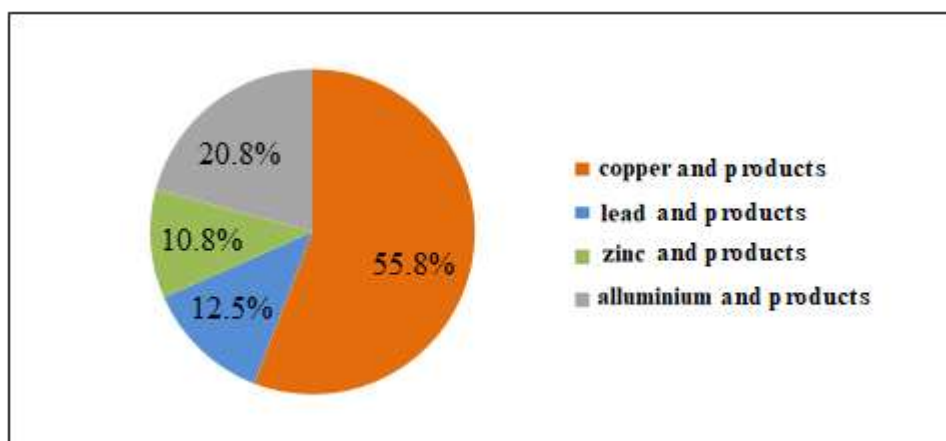
***Structure of the exports of non-ferrous metals and products thereof, 2023***

Table 3.15 for the imports and Table 3.16 for the exports of non-ferrous metallurgical products show that in the period 2019 – 2023 the volume of exports is twice the volume of imports. In terms of values, a strong dependence on price fluctuations on international markets is observed, that also affects the indicators in metallurgy. Notwithstanding, the contribution of non-ferrous metal producers to the foreign trade balance of the country is indisputable and permanent. Annually, they provide a positive balance of over 4 billion BGN. In 2023, the contribution was 4.6 billion BGN, with a negative trade balance of the country of over 10 billion BGN.

***3.2.3. SALES OF NON-FERROUS METALS AND R/P METALS***

Company data for the sales of non-ferrous metals by types and products for the period 2019-2023 are presented in Table 3.15. The trend for exports volume to be many times higher than the production volume sold on the domestic market is clearly expressed, defining the sector as extremely export-oriented and with a high share of the exports of the country.

The biggest sales volume on the domestic market was those of electrolytic copper. This is largely due to the production capacities available in the country for rolled/pressed copper and copper alloy products. In 2023, the domestic sales of cathode copper decreased, compared to 2022, by 12 thousand tons. Contrary, the exports increased by 10 thousand tons. The ratio between domestic sales and exports is approximately 1:4.

There was an increase of over 2 thousand tons in both the production and sales of zinc on the domestic market. The ratio between domestic sales and exports is 1: 8.

Notwithstanding the decrease in the production and sales of lead, in 2023, lead sales on the domestic market increased. The reduced production was only at the expense of exports. The volume of lead exports was two to four times greater than domestic sales.

Table 3.15

*Sales of non-ferrous metals and pressed/rolled metal, tons*

Items	Sales	2019	2020	2021	2022	2023
Electrolytic copper	Domestic market	34 190	30 820	34 636	54 135	42 090
	Exports	174 330	193 616	184 337	183 955	193 981
	Total	<b>208 520</b>	<b>224 436</b>	<b>218 973</b>	<b>238 090</b>	<b>236 071</b>
Lead and alloys	Domestic market	29 787	28 807	26 588	20 907	26 362
	Exports	73 230	80 890	80 748	84 112	66 253
	Total	<b>103 017</b>	<b>109 697</b>	<b>107 336</b>	<b>105 019</b>	<b>92 615</b>
Zinc and alloys	Domestic market	6 473	6 243	7 503	7 166	9 734
	Exports	65 825	68 619	64 244	62 570	64 093
	Total	<b>72 298</b>	<b>74 862</b>	<b>71 747</b>	<b>69 736</b>	<b>73 827</b>
Rolled/pressed metal of heavy non-ferrous metals	Domestic market	933	894	958	1 165	1 300
	Exports	78 324	81 585	88 405	91 592	93 517
	Total	<b>79 257</b>	<b>82 479</b>	<b>89 363</b>	<b>92 757</b>	<b>94 817</b>
Aluminum rolled/pressed metal	Domestic market	17 887	16 343	4 214	13 217	13 603
	Exports	73 117	81 172	104 319	86 740	75 187
	Total	<b>91 004</b>	<b>97 615</b>	<b>108 533</b>	<b>99 957</b>	<b>88 790</b>

*Source: Company data.*

International market sales of rolled/pressed copper and copper alloy products have increased in proportion to copper production each year. In 2023, both international sales and production increased, compared to 2022, by 2 thousand tons. Sales of the products on the domestic market were symbolic, about 1 % of annual copper production.

In 2023, the total amount of domestic sales and exports of rolled/pressed aluminum declined, compared to previous year, by 11 167 tons. Domestic sales volume in 2023 equals the volume in 2022. Decreased production and, respectively, sales of rolled/pressed aluminum were for the account of lesser exports. The ratio between domestic sales and exports is 15 % : 85 %.

In 2023, total sales of the above-mentioned non-ferrous metals and products thereof on the domestic market were 93 089 tons, compared to 96 590 in 2022. There was a decrease in sales of electrolytic copper. Sales of other products increased even slightly.

At the annual total amount of 586 thousand tons of domestic sales and exports of non-ferrous metals and alloys in 2023, only 16% were for the domestic market. The rest was

for exports. Exports followed the same scheme in the period 2019-2023. Non-ferrous metallurgy undoubtedly is an export-oriented industry. Its exports are primarily directed towards EU markets. Around 70% - 80% of the exports were realized in the markets of the member states. Despite the negative impact of several internal and external factors on production and prices, in 2023 non-ferrous metals created a positive trade balance of 2.5 billion EUR.

### 3.2.4. CONSUMPTION OF NON-FERROUS METALS AND ROLLED/PRESSED PRODUCTS

The real domestic consumption (RDC) is determined by the sales of producers on the domestic market, i.e. from their own production and imports of the same products in the country. Table 3.16 presents RDC according to the data of Bulgarian producers for their sales on the domestic market and the import of the same product according to the official data of the Customs Agency and National Revenue Agency.

Domestic consumption of product groups above is satisfied by the own production and by imports. The imports are larger for the products that are not produced in the country. The share of Bulgarian production in the annual consumption has changed for different goods. In practice, this share is higher for base metals. In 2023, the share of electrolytic copper was 56% (for 2022 65%), lead – 40% and zinc – 83%. For the non-ferrous metal products, the share of local production was relatively small.

Table 3.16

#### *Real domestic consumption of non-ferrous metals and rolled/pressed metal, tons*

Products	Origin	2019	2020	2021	2022	2023
Electrolytic copper	Domestic production	34 190	30 820	34 636	54 135	42 090
	Imports	24 859	26 567	28 049	29 320	32 891
	<b>Real internal consumption</b>	<b>59 049</b>	<b>57 387</b>	<b>62 685</b>	<b>83 455</b>	<b>74 981</b>
Lead	Domestic production	29 787	28 807	26 588	20 907	26 362
	Imports	16 532	24 995	16 509	21 354	39 267
	<b>Real internal consumption</b>	<b>46 319</b>	<b>53 802</b>	<b>43 097</b>	<b>42 261</b>	<b>65 629</b>
Zinc	Domestic production	6473	6 243	7 503	7 166	9 734
	Imports	3487	5 257	4 768	4368	2 585
	<b>Real internal consumption</b>	<b>9 960</b>	<b>11 500</b>	<b>12 271</b>	<b>11 534</b>	<b>12 319</b>
Rolled/pressed metal of heavy non-ferrous metals	Domestic production	933	894	958	1165	1 300
	Imports	19 971	26 752	24 091	30 377	32 993
	<b>Real internal consumption</b>	<b>20 904</b>	<b>27 646</b>	<b>25 049</b>	<b>31 542</b>	<b>34 293</b>
Aluminum rolled/pressed metal	Domestic production	17 887	16 343	4 214	13 217	13 603
	Imports	36 867	46 978	51 820	58 023	60 120
	<b>Real internal consumption</b>	<b>54 754</b>	<b>63 321</b>	<b>56 034</b>	<b>71 240</b>	<b>73 723</b>

Source: Custom statistic/National Revenue Agency (imports), and Company data (domestic sales).

The biggest was the consumption of electrolytic copper due to the well-developed production capacities and value-added products chains. The lowest was zinc consumption that was used for galvanizing.

Rolled/pressed aluminum takes the second place in the consumption of the country, given its wide application in construction, automotive and household, followed by lead, with the application in battery production.

There is a pronounced trend of a growth of real domestic consumption (RDC) in finished products. For the five-year period the consumption of rolled non-ferrous metal marked a growth mainly from imports. Regarding heavy non-ferrous metals (copper and brass) the increase was 162 %, and for aluminum products 133%.

Apparent consumption (AC) is an often-used indicator, calculated using the formula where from the sum of the manufactured and imported quantities. The exported quantities of metals are subtracted ( $AC=M+I-E$ ). Data for the AC of non-ferrous metals and rolled/pressed metal for 2023 are presented in table 3.17.

Table 3.17

***Apparent consumption of non-ferrous metals and rolled/pressed metal in 2023, tons***

<b>Products</b>	<b>M</b>	<b>I</b>	<b>E</b>	<b>AC</b>
Electrolytic copper	228 832	32 891	187 258	74 465
Lead	92 574	39 267	81 232	50 609
Zinc	72 324	4368	72 694	3 998
Rolled/pressed metal of heavy non-ferrous metals	95 119	32 993	94 651	33 461
Aluminum rolled/pressed metal	91 723	60 120	89 195	62 648

*Source: Custom statistic (imports and exports), Company data (Domestic sales)*

Regardless of the differences obtained through the two calculation methods, the findings and conclusions are consistent. In both methods, the highest and very close values are the consumption of electrolytic copper. Next are aluminum products. The values for rolled products from heavy non-ferrous metals are almost consistent. The lowest is the consumption of zinc.

There is a discrepancy in the consumption of lead and zinc determined by the two methods. It results from the increased quantities of exported metals according to Customs Agency data, compared to the data from the producers. The reasons could be different, but this does not change the conclusions regarding these metals. The existing economic structure with a high share of the metallurgical industry in the absence of consumption in the processing industry leads to high exports.

This situation will probably be maintained at least in the medium term. Therefore, Bulgarian metal producers aim to be competitive on international markets and, through new investments, to continue their sustainable and competitive development.



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“Polimetimportexport” Ltd	“Layer” PLtd

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