



BULGARIAN ASSOCIATION OF THE METALLURGICAL INDUSTRY

METALLURGY IN BULGARIA

2022

SOFIA, 2023

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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,



The assessment of the passing year we all carry out when crossing the threshold of the next one, for 2022 is impressive with the scale of the challenges the Bulgarian economy has had to face. Difficulties after Covid crisis, geopolitical uncertainty resulting from the Russian invasion of Ukraine and consequent restricted supply of energy products and other raw materials in Europe led to an energy crisis and record upward global inflation dynamics.

Against the background of the slowdown of economic activity and lower growth rates in the world markets, the industry in Bulgaria had to cope with political instability and delaying of urgent economic reforms. Therefore, the Bulgarian metallurgical industry is proud of the impressive achievements and sustainability displayed in these abnormal circumstances. The Bulgarian metallurgical enterprises in 2022 have also managed to maintain and build upon good practices and invest millions in projects for reducing greenhouse gases and improving energy efficiency and nature conservation.

For me personally, the year 2022 has been extremely important after being elected as a chairman of our professional organization, a responsible position entrusted with high expectations. I take my duties seriously with the ambition to maintain and build on the achievements of my predecessors. Therefore, continuing a long-standing tradition, again we are presenting the contribution of the Bulgarian metallurgical industry to the national economy and its place on the industrial map of the EU.

I would like to thank all the members of the Bulgarian Association of the Metallurgical Industry who placed their confidence in me, all our partners and friends, and the participants in the preparation of the edition “Metallurgy in Bulgaria in 2022”.

Yours faithfully,

Ph. Eng. Nicola Rangelov

Chairman of the Board

The Bulgarian Association of the Metallurgical Industry (BAMI) prepared and has been presenting another specialized annual edition on the situation and progress of the Bulgarian metallurgical industry, on the European and global production and consumption of metals and the prospects for the industry.

Once again, in this edition there is 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, producers of metals, metal products and articles of the processing industry are important sources of information about the Bulgarian metallurgy. BAMI team aggregated, processed, and organized the data into sections in order to provide a complete picture of the sector and its achievements. 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 2022”**.

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).

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

SECTION ONE

ECONOMY IN 2022

1.1 POPULATION, LABOR MARKET, WAGES

The past 2022 has been a year characterized by the official end of the global pandemic crisis and the beginning of economic recovery in various regions and countries. Being part of the EU as well as integrated into international markets, the Bulgarian economy also experienced growth. However, high inflation was observed during the period, triggered by the increase in the price of energy carriers that began in 2021. For these reasons, the industrial sectors in many countries received financial aid that was unprecedented for Europe and the world. The purpose of the financial assistance was to compensate for the high prices of electrical energy and the resulting cost increases, as well as to preserve the competitiveness of producers in the national and global markets. The Bulgarian industrial and service sectors also received such financial aid.

Throughout a large part of 2022, our country was without a regular government and without a working parliament, that made it difficult to undertake vital economic reforms, improve legislation and solve market problems.

The most distinctive event of the year was the Russian invasion of Ukraine. This started a war that currently shows no indications of ending in the foreseeable future. The entire democratic world condemned the aggressive behavior of Russia and imposed numerous restrictive measures and sanctions on the country-addressor. Furthermore, Ukraine has received both military and humanitarian aid. Bulgaria also participates in this process. Notwithstanding the impact of various global events and a number of additional factors of national and European importance, including the policies of the European Commission for digitalization and decarbonization of the economy, the metallurgical industry continued to operate successfully and invest. The imposed goals on resource independence and supply security of strategic and critical raw materials for the transformation of the economy, as well as the expected metal consumption growth have provided a new opportunity for innovation in technology and product development. This is a chance for a new modernization in metallurgy.

After a decline in GDP of 4.2% in 2020 (in the EU it was -5.7%), in 2021 a growth of 4.2% was achieved (EU +5.4%), with the upward trend was maintained. For 2022, a growth of 3.4% was reported, compared to an average for the EU of 3.5%.

And in the past year, the demographic characteristics, such as population count, age, and education, continued to deteriorate. This is evident from the latest NSI data from the population census conducted in 2022.

Table 1.1 shows the data of population count by years and the changes in its structure.

Table 1.1

Population by age and place of living, thousands of people

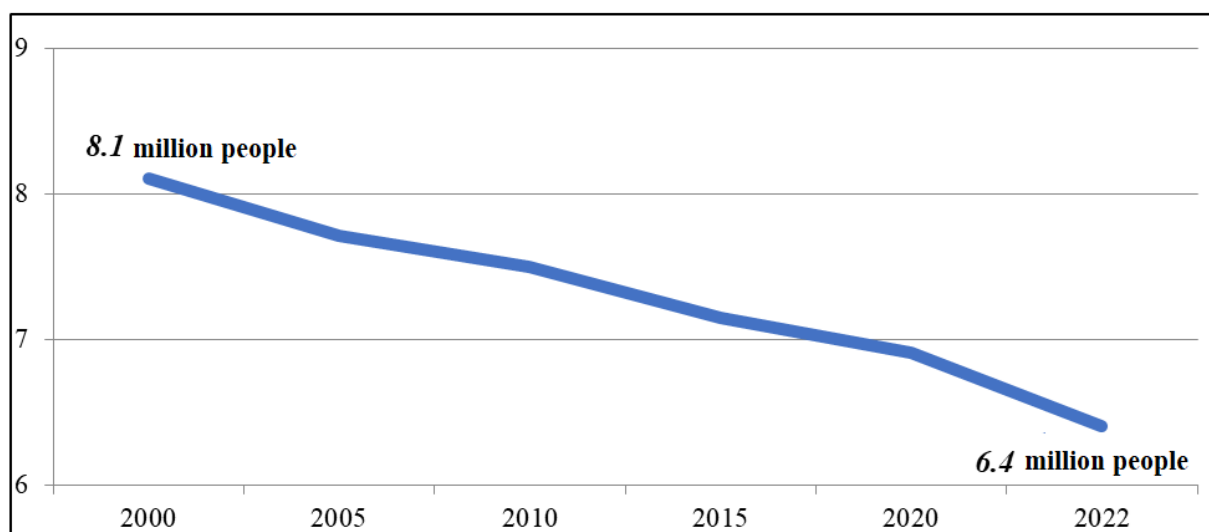
Population categories	2019		2020		2021		2022	
	Thousands of people	%	Thousands of people	%	Thousands of people	%	Thousands of people	%
City/town population	5 125.4	73.7	5043.2	72.9	5 000.5	73.1	4 746.7	73.6
Village population	1 826.1	26.3	1873.3	27.1	1 838.4	26.9	1 701.0	26.4
Males	3 369.7		3349.7		3 311.3		3 099.5	
Females	3 581.8		3566.8		3 527.6		3 348.2	
Population Categories -Total:	6 951.5	100.0	6916.5	100.0	6 838.9	100.0	6 447.7	100.0

Source: NSI

The ratio between the urban population and that in the villages has changed and from 2.7:1 in 2021 it becomes 2.6:1 in 2022, i.e. the proportion of people living in cities was growing. The situation in 2020, when the number of people living in the villages increased at the expense of the urban dwellers, was not repeated. The urban population decreased by 253.8 thousand people, and the rural population by 137.4 thousand people.

According to the national census, in 2022 the population count decreased by **391.2** thousand people compared to 2021, which is 4-5 times more than the average value for previous years. The high COVID-19 mortality is one of the explanations, but the statistical errors of previous years and the resulting cumulative difference are also undoubtedly influential. It can be seen from the data in the table, that for the specified four years a decrease of 503.8 thousand people has been reported, which is twice as much as the previous data and **really brings us closer to a demographic catastrophe.**

Figure 1.1 shows the downward population trend from 2000 to 2022. There is no explanation for the decline of nearly 400 thousand people in the last year apart from accumulation of statistical errors in previous periods, which resulted in the 2021-2022 census data.

Population of Bulgaria, millions of people

The total decrease in the graph of 1.7 million for the period under consideration shows that in Bulgaria the population "melts" every year by an average of 74 thousand people.

In a situation of a population ageing, high mortality and low birth rates, the efforts to achieve population growth must be directed towards migration processes. By 2019, the indicator of mechanical population growth is negative. The people who settled in the country were fewer than the people who left the country in the same period. After 2019, this indicator has a positive value, but does not cover the natural negative growth. The overall result is negative.

According to data from the National Statistical Institute (NSI), the migration to and from the country in 2022 was as follows:

- Settled persons (immigrants) – **40 619 people** (39 461 people in 2021)
- Displaced persons (emigrants) – **13 175 people** (26 755 people in 2021)
- **Mechanical population growth** – **27 444 people** (12 706 people in 2021 and 30 715 in 2020).

The demographic processes also affect the age structure of the population. The non-working age population, including individuals aged up to 16 years and above 65 years, is 41.45% of the total population in the country, while the number of working age individuals, who are between the ages of 16 and 65, accounts for 58.55%. This metric has improved compared to 2021 by almost 2%. However, the composition of the non-working age population remains unfavorable, with children accounting for 36.6% of the total number. This marks an improvement, as for years up to that point the ratio has been hovering around 1:4. The cause

is the increased number of immigrants, including young ethnic Bulgarians with children.

The demographic characteristics are also influenced by the life expectancy in the country. According to NSI data, the **average life expectancy in Bulgaria has been decreasing in recent years and for the period 2020-2022 was 71.92 years**, compared to 73.6 years for 2019-2021 and 74.64 years for 2018-2020. The decrease in 2022 was high- over 1.6 years and cannot be justified by the high COVID-19 mortality. Bulgarians have the shortest life of all the inhabitants of Europe, including the countries of the Balkan region outside the EU. The difference between the average level in the EU is about 5 years for women and up to 7 years for men.

The trend for women to live longer continues. The average life expectancy for women in 2022 was 75.81 years (77.40 in 2021 and 78.22 in 2020). This is 7.44 years more than men (68.34 years).

There are many factors that influence the labor market but in terms of the number of incoming new labor force, the demographic structure has the strongest influence.

The recovery of the European and global economy, which began at the end of 2021, continued in 2022. During this period, the Bulgarian metallurgical enterprises, whose production is mainly for export also worked successfully. Despite the good results for the manufactured products, the financial and economic indicators of some enterprises, especially in non-ferrous metallurgy for 2021, have deteriorated. One of the main reasons is the high price of electricity and the lack of financial aid in the first months of rising prices. This greatly affected the added value, which was reduced more than 3 times in the energy-intensive production of non-ferrous metals.

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 2018 - 2021.

The shortage of skilled labor in the industry remains and is deepening. The recovery and expected growth will increase the demand for personnel and will expand the scope of sectors affected by shortages. This requires urgent measures in labor legislation and the labor market. A much stronger policy for attracting the workforce from third countries is also necessary.

Table 1.2

Average number of employed people, level of unemployment, inflation

Indicators	2018	2019	2020	2021	2022
Average annual number of employed people (national calculations), in thousands	2 238.4	2 322.5	2 165.3	2 275.8	2 195.5
Average annual level of unemployment (NSI), %	5.2	5.9	6.7	5.3	4.3
Inflation/deflation rate	2.4	3.1	- 0.8	3.3	15.3
Average monthly wage of persons on labor and service contracts, BGN	1 135	1 274	1 387	1 550	1 760
- public sector	1 165	1 296	1 441	1 674	1 818
- private sector	1 126	1 267	1 369	1 510	1 742
- incl. processing industry	1 018	1 127	1 204	1 308	1 487
Average monthly wage in activity 24 “Production of basic metals”:	1 489	1 617	1 656	1 903	2 180
• Steel industry	1 664	1 768	1 800	1 980	2 218
• non-ferrous metallurgy	1 911	2 126	2 158	2 506	2 807
• metal casting	1 003	1 071	1 129	1 245	1 382

Source: NSI, *preliminary data

As a result of the recovery that has begun, the unemployment rate has fallen - from 6.7% in 2020 to 5.3% in 2021 and 4.3% in 2022, reaching pre-crisis levels. In 2022, the income of persons employed under labor and service legal relations increased. In general, the increase in the average salary for the country was 111.4%. In the public sector, the increase was 108.6%, and in the private sector – 115.4%. The significant growth in the private sector is due to the compensations agreed with employers for the high inflation in the current year.

Overall, for all industrial sectors in the **processing industry**, the average monthly salary is **1 487 BGN**. It is lower than the average salary for the country (**1 760 BGN**), despite the high amount of annual increase - by 113.7%, compared to the average increase of 111.4%. The situation is different in the extraction and processing of metals. The average salary for **ferrous and non-ferrous metallurgy is over 2 200 BGN** and exceeds the average salary in the processing industry by 150%.

Non-ferrous metallurgy continues to be one of the leading industries in terms of average monthly salary. In 2022 the average monthly salary reached 2 800 BGN, higher than the average salary in the extractive industry (2 398 BGN) and the energy sector. (2 665 BGN).

In addition to wages, employers' labor costs also include other costs incurred for employees under labor and service legal relations. In the metallurgical industry these additional costs for personnel have a significant share of the total costs (about 8%) and they are related to the specific characteristics of the processes and working conditions, requirements of the national legislation and social policies of the companies.

Table 1.3 shows the structure of employers' costs per employee per hour on average for the country and for some activities, including metallurgy. For comparison, the costs in the IT sector, where the salary has the highest share in total labor costs among all economic activities in the country, are also included.

Table 1.3

Sectors of the Economy	Wage	Insurances by the Employer	Compensations	Other Social Allowances*
Total for the country, %	82.34	14.58	1.47	1.49
Extractive industry	72.36	18.06	2.84	6.74
Processing industry incl. metallurgy	82.18 72.43	14.84 17.81	1.44 2.03	1.54 7.73
Energy	69.95	16.05	3.01	10.99
Information technology and telecommunications	88.12	10.24	0.97	0.67

* *incl. taxes*

The data show that labor costs in industries with high social costs, the relative share of wages are lower, compared to other economic activities, where wages are the main (or even the only) source of income. The information products and services sector has the highest percentage of labor costs (88.12 %) among all sectors of the economy. On the other hand, the share of other social costs is very low -only 0.67 %. Energy, metallurgy, extractive industry, and transport, have the opposite pattern of costs - the share of the direct costs for wages is lower (about 70%), whereas additional labor costs are high (over 25%). They include social benefits and insurance paid by the employer for the different categories of labor. Actually, these funds are also employee earnings, including deferred income. Therefore, comparison remunerations in certain sectors only on

the basis of average salary does not reflect the actual situation. As a result, metallurgy, especially non-ferrous metallurgy, does not find its respectful place in national rankings.

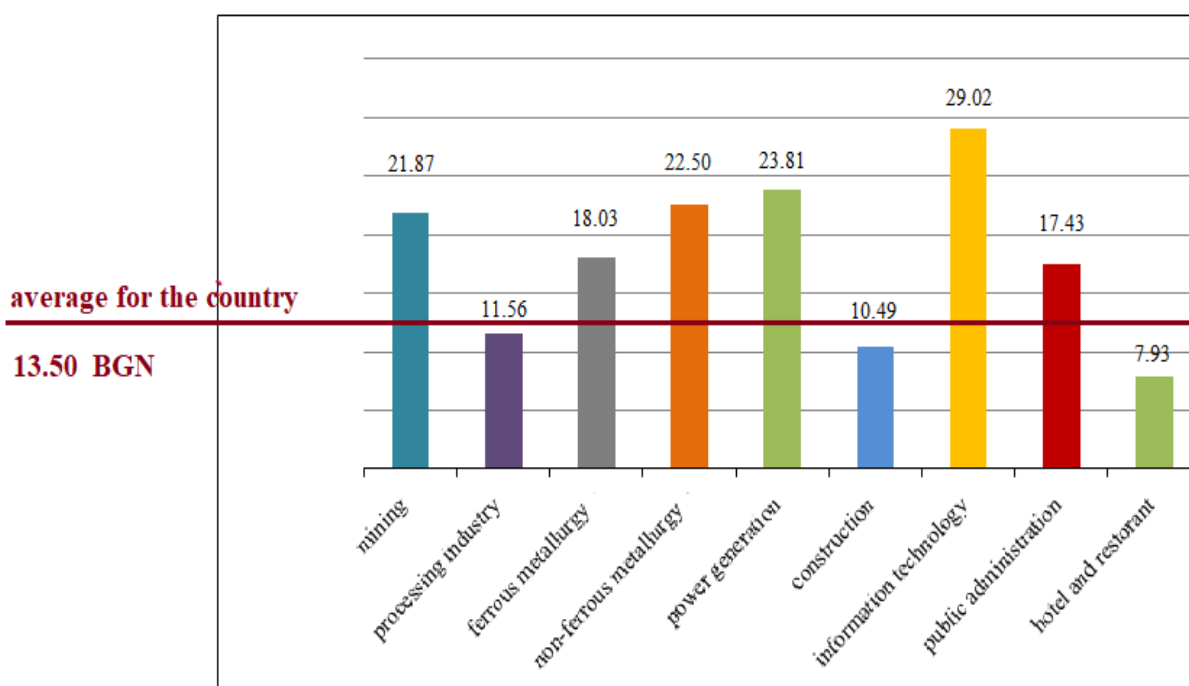
Another benchmark of NSI is the **expenses of one employee under labor and service legal relations per hour worked** by specific economic sectors. Figure 1.2 presents the latest data of NSI for 2021 - overall for the country, ferrous and non-ferrous metallurgy, and other economic activities with the highest or lowest labor costs.

Again, the IT sector reports highest labor costs (29.02 BGN per hour), for wages mainly, followed by the energy sector with two values: public sector 31.23 BGN and private sector –17.57 BGN.

Non-ferrous metallurgy ranks third with 22.50 BGN labor costs per hour worked per employee. For years, industry has been occupying the same place, and as long as there is state energy, the non-ferrous metallurgy would hardly move higher.

Figure 1.2

Employer’s labor costs, BGN per working hour



The situation is similar in the ferrous metallurgy, which ranks fifth, after the extractive industry, with costs of 18.03 BGN per hour worked. Here the value in the public and private sector differs. The costs were 26.54 BGN and 19.30 BGN respectively. The public/private sector mainly includes coal mines.

Costs in the "accommodation and food service activities " sector remain the lowest, only 7.93 BGN per hour worked, which is nearly 2 times lower than the

average costs for all economic activities in the country (13.50 BGN/hour). Indicators are also low in the construction sector (10.49 BGN/hour). An explanation can be found in the relatively high percentage of the shadow economy in these almost entirely private sectors, including working without employment contracts, thus avoiding taxes and insurances.

Compared to the previous year, total labor costs in the country increased by 110 %, with a report of 112.5 % in 2020. **The non-ferrous metallurgy reported a growth in the costs of 112.5 %. In and in the ferrous metallurgy the growth was 105 %**

1.2. GDP, GVA, PRODUCTIVITY

After the peak of the COVID-19 pandemic in 2020 and the economic decline in Europe and other parts of the world, the following two years were characterized by gradual economic growth and normalization of live in the affected countries. Unfortunately, the recovery process was hampered in the second half of 2021 by the massive increase in energy prices, mainly electricity. Energy-intensive industries, including the producers of metals and metal products, were strongly affected. Some production was stopped, and the respective companies reported losses. Nevertheless, the Bulgarian economy achieved growth.

According to the preliminary NSI data for 2022, GDP produced in Bulgaria at current prices (with inflation of 5.3 %) was **165 384 million BGN, which is a growth of 3.4 %** compared to the average for the EU (27) of 3.5 %. The updated indicators for 2021 are: GDP - 139 012 million BGN, i.e. a change of 104.2%. The EU reported a growth of 5.4%.

The productivity of the Bulgarian economy has increased, with industrial production making the biggest contribution to growth. The share of the industry alone (extracting, processing, and energy) in the produced Gross Domestic Product (GDP) increases from 20% in 2021 to **26% in 2022**. Due to the low domestic consumption, Bulgarian industry is mainly export oriented. The reported growth shows **good competitiveness of industrial goods and increased market opportunities**.

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

In 2022, significant growth was reported in all economic sectors. In the real economy – agriculture, industry and construction, the increase in GVA and GDP was 15 billion BGN, which is 5 billion BGN more than the values in the service sectors (BGN 10 billion).

Due to the high annual inflation (15.3%) and rising energy prices, it is impossible to assess how these factors contribute to the increased levels of product price growth or output growth. For this purpose, it is necessary to analyze at the sectoral and national level. Regarding metallurgical industries, it is clear that their contribution is significant. Growth was recorded in the main products of extracting and processing metallurgy.

Table 1.4

GDP by sectors and groups, million BGN

Economic sectors and groups by economic activities	2019	2020	2021	2022
- agriculture and forestry	3 879	4 048	6 071	7 276
- mining and processing industry, power generation, water, and sanitation (B-E)	21 274	22 248	24 405	37 820
- construction (F)	4 619	4 997	4 573	5 156
-----	-----	-----	-----	-----
- trade, food, transport and communications (G-J)	29 664	27 749	37 556	42 801
- finance, insurance, real estate and other business services (K,L,M,N)	24 147	23 869	27 654	29 838
- public administration, education, healthcare (O-Q), others (R-U)	18 200	19 738	21 621	23 720
=====	=====	=====	=====	=====
Total economy (GVA)	103 383	102 649	121 607	145 614
=====	=====	=====	=====	=====
- adjustments (taxes)	16 400	15 957	17 405	19 770
Gross Domestic Product (GDP), million BGN	107 925	119 772	139 012	165 384

Source: NSI, *preliminary data

In recent years, except 2020, the economy has been growing at around 3-4%, which is far insufficient to change the country's place in the ranking of EU living standards. So far, in all the years of membership, we have taken last place in terms of GDP per capita, including as determined by purchasing power standards.

With an almost equal start in the period 2007-2008, in 2022 GDP per capita in Romania reached 15 010 EUR, but in Bulgaria it was 12 400 EUR, or only 35% of the average GDP per capita of 35 280 EUR in EU (27). By purchasing

power standards, this percentage was higher and reached 59% of the average in the EU, but for Romania it was 77%.

Overall, in 5 member states (Poland, Romania, Hungary, Croatia, and Bulgaria) the absolute value of GDP per capita was below 50% of the average value for the EU. Comparing the indicators on the basis of purchasing power, the number of countries that are below the EU average for 2022 was 12.

These 12 countries, in addition to the new member states from Central and South-Eastern Europe, include countries such as Spain, Portugal, Greece, and Cyprus. This hints at a real economic disparity between the EU countries. Differences in standards between Member States have also increased as a result of the two crises – COVID-19 and the subsequent global economic crisis.

There are discrepancies between the economic positions and the performance of the sectors in the Union. In Bulgaria, a complete product restructuring and modernization of the metallurgical capacities has been carried out. Furthermore, good competitiveness and sustainability of production has been achieved. Jobs and employee incomes have been preserved. Lastly, stability and opportunities for development are available. However, young people do not recognize professions in the industry as a good opportunity for work and career development. The labor problem is serious. It is difficult to overcome without national policies and measures to increase the workforce, including through stimulation of the migration processes from third countries and additional training according to the needs of the industry.

Table 5 shows NSI main indicators by aggregated industry sector for a 4-year period, including the metallurgical industry - one of the main sectors of the processing industry. Obviously, after the worsening indicators in 2020, the economy is now recovering. Already in 2021, a higher value of industrial production was recorded compared to the period before the crisis. The total industrial production in 2021 has increased by nearly 14 billion BGN compared to 2020 and has exceeded the volume of production before the crisis by 8 billion BGN.

Sectors in the processing industry have formed the highest production volume and growth - BGN 37.8 billion, or an increase of + BGN 8 billion. The contribution of metallurgical production to this growth is also substantial at nearly 3 billion BGN (37%).

High electricity prices increased the value of the production in the energy sector by 4.5 billion BGN and this growth was borne by consumers through the price. Companies that failed to pass the increased costs on to the prices of their goods and services lost markets, incurred losses and in some cases went to bankruptcy. Metallurgy, which sells at world exchange prices, also found itself in such a situation.

Table 1.5

Industry, economic indicators

CEA 2008 /INDICIES	2018	2019	2020	2021
INDUSTRIAL PRODUCTION, TOTAL, mln. BGN	77 091	80 606	74 582	88 176
Mining /Sector B/				
-output produced, BGN million	2 760	2 587	3 097	3 713
- value added, BGN million	1 345	1 277	1 790	2 045
- employed, number	21 659	19 144	20 249	19 529
- value added /employee, BGN thousand	62.1	66.7	88.4	105
Processing industry /Sector C/				
- output produced, BGN million	65 631	68 924	62 626	70 930
- value added, BGN million	15 233	16 268	15 918	16 170
- employed, number	554 398	539 990	504 587	502 912
- value added /employee, BGN thousand	27.5	30.1	31.5	32
24. Production of basic metals				
- output produced, BGN million	10 195	9 721	10 255	13 142
- value added, BGN million	931	1 056	922	770
- employed, number	13 332	14 581	13 030	13 151
- value added per employee, thousand BGN	69.9	72.4	70.7	59
incl. in the NF metallurgy, thousand BGN	109.8	121.3	121.1	31
Power generation /Sector D/				
-output produced, BGN million	7 003	7 263	7 062	11 571
- value added, BGN million	3 635	4 021	3 884	3 907
- employed, number	31 771	31 436	31 435	32 282
- value added /employee, BGN thousand	114.4	129.8	123.6	121.0
Water supply, sanitation, waste management /Sector E/				
- output produced, BGN million	1 697	1 832	1 796	1 962
- value added, BGN million	844	921	974	919
- employed, number	32 793	32 826	32 311	30 990
- value added /employee, BGN thousand	25.7	28.1	30.1	29.7

Source: NSI

In 2021 the share of the metallurgical production was 18.5 % of the production of the processing industry. It was 14.9 % of the total industrial production of the country. In 2020 these shares were 16.4 % and 13.7 % respectively.

All aggregated sectors and groupings reported growth in added value. However, the energy sector reported a slight decrease in the added value per employee, due to the increase in the number of personnel during the year.

The biggest increase in added value was in the extracting industry - over 250 million BGN or 114%. However, neither the share of the different subsectors of the extracting industry, nor the specific contributions of the main industries (mining and coal mining), are clear.

The data provided by NSI to BAMI shows a severe downturn in the average value for the entire sector, due to the collapse of the indicator for **non-ferrous metallurgy**. The added value in this economic activity (24.4), both in total and per employee, in 2021 was 4 times lower than the previous levels. This result is subject to further analysis and clarifications. In case there is no technical or statistical error, the negative impact of high electricity prices remains a factor. In certain parts of ferrous metallurgy, the indicator remains at the levels of previous years. Even in lower energy intensive productions (pipes, profiles, wires, etc.) growth is observed.

1.3. ENERGY CONSUMPTION, FREIGHT TURNOVER

Energy consumption per unit of production in Bulgaria is more than twice higher than the average in the EU. There are two main reasons behind this. The first is the unsatisfactory share of total production of final products (products having high added value) compared to the development level of energy-intensive basic industries (metallurgy, chemistry, cement). The second is the unfinished modernization of industrial enterprises with respect to the techniques and equipment, along with the incomplete replacement of inefficient old electrical appliances in the households with new energy-saving ones, which would increase the overall energy efficiency in the country.

Metallurgy is an energy-and material-intensive industry and companies in the sector are among the biggest shippers and biggest consumers of energy resources in the country. The development of ferrous and non-ferrous metallurgy cannot sharply improve the energy and resource efficiency indicators in the country, without increasing the consumption and processing of their production into products with new added value.

To increase energy efficiency in metallurgy, dozens of projects for hundreds of millions BGN were implemented, and as a result, the cost per unit produced

was reduced. Thus, the total **expenditure of energy resources per unit produced in kind** for the production of steel and rolled ferrous metals has **decreased by about 5% in the last two years.**

The processing of large quantities of primary and secondary metal raw materials, both from own extraction of ores and concentrates, and from imports, leads to an unsatisfactory coefficient for the efficiency of the resources used, since the consumption of large quantities of metallurgical scrap from the processing of concentrates is low. The current EU policies for the development of the circular economy aim to improve this indicator, but Bulgaria is far behind. No industrial scrap utilization program has yet been adopted. The main priority of the national recovery and sustainability plan should be the implementation of circular models for the sustainable development of mining and metallurgy in our country.

Both characteristics - energy intensity and material intensity determine the strong dependence of the metallurgical industry on energy prices, and on the quality and value of transport services.

The surge in electricity prices for non-household consumers, that began in the second half of 2021 was crushing for large, energy-intensive consumers. A number of Member States introduced mechanisms for granting state aid and preferential electricity supply under long-term contracts for energy-intensive productions. These are the key elements for the functioning of the European Single Market. Such measures are not introduced in Bulgaria. Despite taking active actions, Bulgarian producers continue to work in a non-competitive market compared to producers from the EU and other countries in the region.

In the last energy balance of the country **for 2021, the final consumption for the industry was 2 807.7 thousand tons of oil equivalent, compared to 2020 (2 646 thousand tons). There was a growth of 106%. For the same year, the reported growth in GDP was 4.2%, i.e. the growth in the consumption of energy resources was ahead of the growth of industrial production.**

All types of fuels were used in industry. The distribution thereof from the total consumption was as follows:

Natural gas – 33.4%; El. energy – 29.7%; Liquid fuels – 14.1%.

Solid fuels – 8.6%; RES and bio-fuels – 8.0%; Others – 7.2 %

Compared to the previous period, there was a pronounced tendency in the industry for the share of natural gas to grow - from 30.8% in 2019 to 33.4% in 2021. For the same period, the share of used electrical energy decreases - from 31.6% to 29.7%. The policy of regulated household prices led to a higher consumption of electricity in households (1,028 thousand tons) than in industry (834 thousand tons). A few years ago, the ratio was reversed, and energy efficiency measures also had an impact on this process.

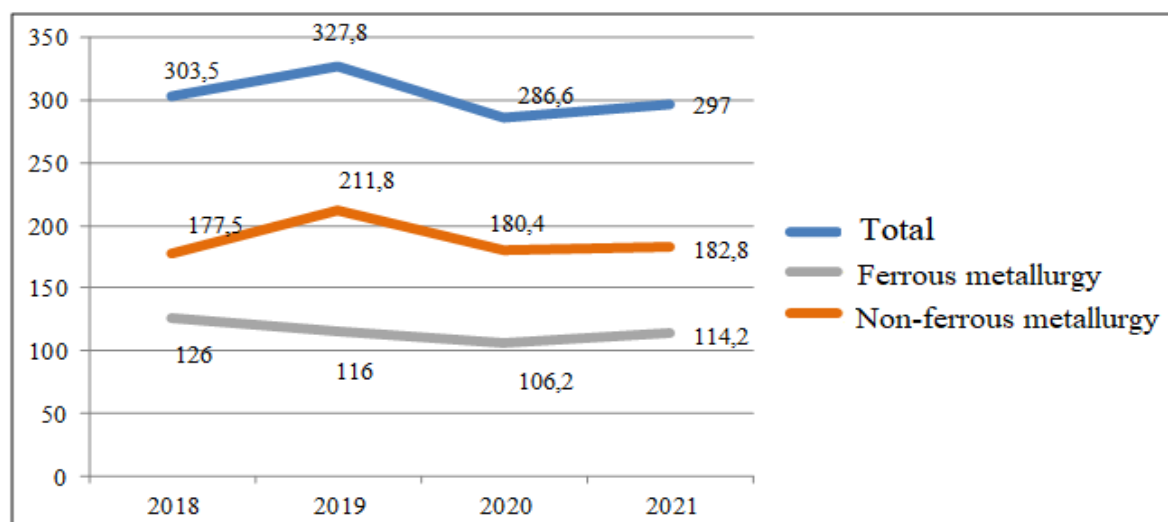
In 2021, compared to 2020, there was a rise in the **total energy consumption in metallurgy, which was due to the growth in the ferrous metal production and rolled non-ferrous metals. There was a drop in the extractive metallurgy. The increase in ferrous metallurgy was 8 thousand tons, and in non-ferrous metallurgy 2,4 thousand tons (total 10.4 thousand tons or 103.6 %).**

Figure 1.3 presents the energy consumption in ferrous and non-ferrous metallurgy and the cumulative amounts for six consecutive years. For the whole period, consumption in non-ferrous metallurgy was higher, given the specifics of the technological processes and the big share of this production in the total metallurgical production. In 2021, the share of energy consumption was as follows: non-ferrous metallurgy - 61.5% and ferrous metallurgy - 38.5% of the total consumption in the sector.

In 2021, the energy consumption in ferrous metallurgy was **114.2 thousand tons, or 107.5 % growth, of which** 60.7 thousand tons (53.2 %) was electricity consumption and 52.8 thousand tons (46.2 %) was the consumption of natural gas.

Figure 1.3

Energy consumption in metallurgy, thousand tons of oil equivalent



Non-ferrous metallurgy reports consumption of 182.8 thousand tons compared to 180.4 thousand tons in 2020. There was a growth of 2.4 thousand tons or 101.3 %. The share of non-ferrous metallurgy in the total energy balance of consumption in metallurgy decreased from 63 % to 61.5 %, due to a higher growth in ferrous metallurgy (112.5 %). This ratio has changed within a limited range and has corresponded to the relative share of the two sectors in the general indicators of metallurgical production.

Metallurgical industry remains the largest consumer of electricity among all industrial sectors with an amount of 53 thousand tons in 2021 and maintains its share of 18.4 % of the total industrial electricity consumption (18.4% in 2020). It is followed by the chemical and petrochemical industry with a consumption of 116 thousand tons and close to it is the production of food, beverages and tobacco.

Electricity consumption in non-ferrous metallurgy is 92.3 thousand tons, with a share of 63 % in the total consumption and decreases with 1.4 % compared to 2020. The high consumption of electricity in non-ferrous metallurgy is due to the electrolytic refining of copper and zinc. Electricity consumption in ferrous metallurgy in 2020 is 60.7 thousand tons, a growth of 107 %. The relative share in the energy balance of the sector is 37 %.

The consumption of **natural gas is 104.5 thousand tons**, compared to 99.1 thousand tons in 2020, or a **growth of 105.4 %**. There is growth in both sectors, with ferrous metallurgy having a slight advantage. Consumption is 52.8 thousand tons and 51.7 thousand tons, respectively. The share of metallurgy in natural gas balance of the industry decreases from 12 % in 2020 to 11 % in 2021. However, metallurgy remains a large consumer and retains third place after the non-metallic minerals and chemical products.

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 and in solid form. About 25% of the total amount is liquid load - sulphuric 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) - 1.6 – 1.8 million tons**
- **solid massive (raw materials, finished products) - about 4 million tons.**

The bigger quantities in the total volume of transported cargo are from the enterprises producing non-ferrous metals **in blocks (copper, zinc, lead, accompanying metals and products) 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. Some companies have organized their own transport, but they cannot handle the large turnover of goods.

The difficulties in the transport activity are related to the organization of the transport of secondary raw materials and other products by rail across the country, especially in case the route has been changed due to railway repairs.

Security of cargo from interference is also an important issue and does not always meet the requirements for reliable protection and control, especially given the high value of the metals.

The detected infringements and damages for companies are numerous and require additional measures and a responsible attitude of the state and the transport business.

1.4. FOREIGN TRADE EXCHANGE, IMPORT AND EXPORT

The foreign trade exchange of goods in recent years according to published data from the BNB and NSI is shown in Table 1.6. NSI data for the period after 2020 are preliminary and in practice are subject to periodic adjustments. However, the values do not change significantly and do not reflect the real situation in a satisfactory manner.

Inflation after 2020 and especially the economic crisis resulted in a significant increase in the exports value, which reached 93.5 billion BGN in 2022, which is 25.1 billion BGN more or a growth of 137%. Imports also increased by 31.4 billion BGN or 141%. As a result, the negative balance exceeds 14 billion BGN.

The value of exported goods from the EU countries has increased by 16 billion BGN, as they retain the share of 66 %. A positive balance of 1.5 billion BGN was formed in the period 2018-2022, but the balance was negative for 2021 - just over 1 billion BGN. Despite this high growth in the export of all goods, metallurgy remains the leading export industry with a share of 11% and a positive balance of 3.4 billion BGN.

The import from the EU remains the largest and represent 54.5% of the total value of 108.1 billion BGN. There was still high import from third countries. The main importers are Russia and Turkey. We have a negative balance with both countries-5 billion BGN and 2 billion BGN, respectively.

Table 1.6

Foreign trade balance in trade exchange, billion BGN

Indicators:	2018	2019	2020	2021	2022
Imports of goods, incl.	62.9	65.1	60.1	76.7	108.1
from the EU (27)	40.0	41.1	-	46.3	58.9
- basic metals and products	4.3	4.5	3.7	5.5	7.6
relative share, %	6.8	7.0	6.2	7.1	7.0
Foreign trade balance, incl.	56.0	58.4	54.7	68.4	93.5
from the EU (27)	37.7	38.8	35.8	45.3	61.4
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- basic metals and products	7.8	6.7	8.3	8.2	10.3*
relative share, %	14.1	11.5	15.1	12,1	11.0
Foreign trade balance, incl.	-6.9	-6.7	-5.4	- 8.3	-14.6
- basic metals and products	+3.5	+2.2	+4.6	+2.7	+3.4

Source: NSI/BNB, final data up to 2020, preliminary for 2021 and 2022

* BNB Table 1.7

There is no alteration regarding our major trading partners. Germany ranked first again with a share of 12% of the total imports of Bulgaria and 15% of exports, followed by Romania with a 6.5% share of imports and nearly 10% of exports of Bulgaria. Italy and Greece occupy 3rd and 4th place respectively with similar indicators. A positive or close to zero balance has been achieved with these major European partners. In fact, the negative results of foreign trade turnover of Bulgaria are mostly formed by third countries, with the highest imports of energy resources.

Table 1.7 shows the values published by the BNB for 2022 in EUR of the country's exports by commodity groups and by main types of products.

In 2022, all commodity groups reported export growth, which increased by 13 billion EUR, or 137.1%. This increase by product group was comprised as follows: consumer goods - 2.2 billion EUR (mostly food - an increase of 1.3 billion EUR); raw materials and components - 3.7 billion EUR, of which 1.2 billion EUR was the contribution of metals. Investment goods grew by 2.7 billion EUR, and energy resources of 7.1 billion EUR were by 4 billion EUR (2.5 times) more than exports in 2021.

Among all the products included in the commodity groups, **exported non-ferrous metals had the highest value (over 4.1 billion EUR). Throughout the entire period, non-ferrous metals contributed to the country's annual exports around 9-10%.** This is a clear indicator that Bulgaria has a developed non-ferrous metallurgy and is a factor in this production which is essential for the EU and important for the Green Deal.

Data by year for the imported and exported products of ferrous and non-ferrous metal products, by types, quantities and their total value are also given in Section II, Table 2.3 and Table 2.4 for ferrous metals and in Section III, Table 3.15 and Table 3.16 for non-ferrous metals. Official customs statistics for the relevant period are used.

There are some differences between the BNB data in table 1.7. and data that BAMI uses from the Customs Agency. It is due to differences in the product scope of the Customs Tariffs. There are metal products that the BNB refers to the group of other raw materials. The differences are not large and do not change the indicated volumes and trends in the export of metallurgical products. Bulgarian productions are exclusively oriented towards foreign markets. The export is over 70% and for some goods it exceeds 90%.

Table 1.7

Foreign trade – export by types of goods, billion euros

	2018	2019	2020	2021	2022
Consumer goods, incl.	7098.8	7582.8	7646.8	8428.4	10780.1
• Foods	1697.9	1788.2	1881.3	2322.5	3654.8
• Cigarette	92.8	63.3	53.5	54.0	82.9
• Beverages	112.5	179.2	210.4	158.9	142.9
• Clothes and shoes	1614.2	1620.0	1372.7	1383.6	1701.2
• Pharmaceuticals and cosmetics	1092.8	1260.9	1336.5	1269.3	1415.5
• Furniture and home interior	1122.1	1227.1	1274.0	1600.2	1646.7
• Other consumer goods	1255.1	1444.3	1518.4	1639.9	2136.0
Raw materials, incl.	11382.5	11668.6	11644.0	15030.7	18774.7
• <i>Pig iron, iron, and steel</i>	<i>676.3</i>	<i>608.1</i>	<i>534.0</i>	<i>976.2</i>	<i>1100.9</i>
• <i>Non-ferrous metals</i>	<i>2758.9</i>	<i>2323.1</i>	<i>2555.2</i>	<i>3202.9</i>	<i>4142.9</i>
• Chemical products	459.4	493.9	436.4	541.5	777.0
• Plastics, rubber	1005.6	1147.1	1178.2	1472.5	1757.1
• Fertilizers	189.7	236.1	157.7	297.5	639.5
• Textiles	592.5	603.8	494.5	571.0	709.9
• Raw materials for food production	1960.2	2335.5	2254.4	2987.8	3730.9
• Wood and paper, cardboard	526.3	555.2	520.6	674.4	853.9
• Cement	23.0	20.1	23.8	31.2	27.0
• Tobacco	118.6	122.0	109.5	111.1	108.8
• Other raw materials	2919.4	3223.7	3379.5	4164.6	4927.0
Investments goods, incl.	7203.6	7266.4	6897.4	8419.3	11138.9
• Machines, apparatus	1670.7	1855.6	1736.5	2082.0	2700.4
• Electrical machines	1029.4	1183.1	1120.5	1474.9	1807.4
• Vehicles	579.2	651.0	568.4	636.5	727.4
• Spare parts and equipment	1756.6	1850.7	1667.6	2012.1	2443.8
• Other investments goods	2134.8	1726.0	1804.5	2213.8	3459.8
Total non-energy goods, incl.	25686.9	25517.8	26188.1	31878.4	40693.7
Total energy resources	2901.5	3268.9	1696.1	2889.7	7110.6
• Petroleum products	2066.1	2345.6	1008.2	1120.9	3981.6
• Other non-petroleum products	821.7	923.4	687.9	1768.7	3129.0
Other	59.5	69.3	84.3	98.9	959.1
Exports total	28648	29856	27969	34866.9	47804.2

Source: BNB

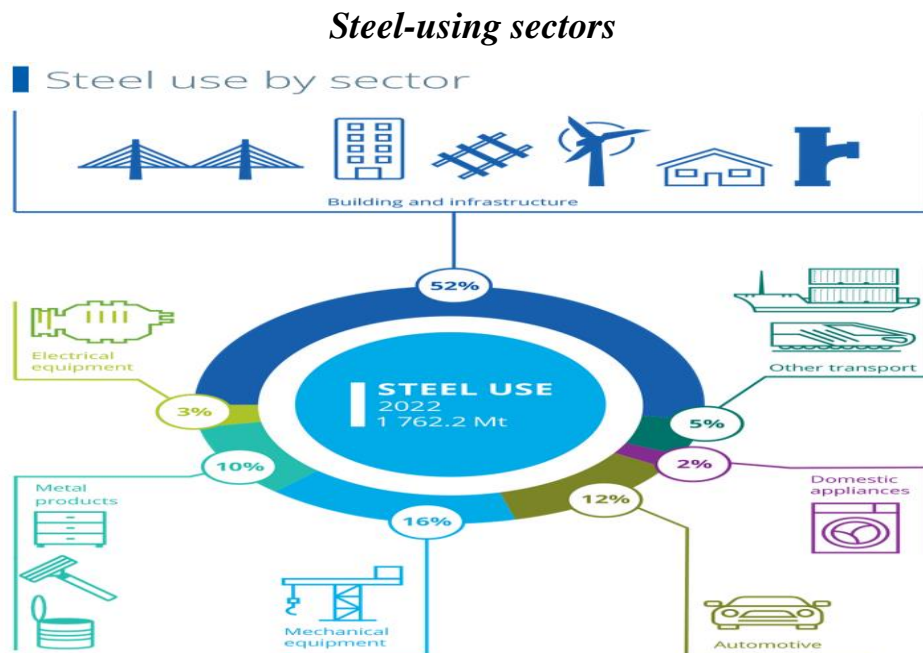
SECTION TWO FERROUS METALURGY IN BULGARIA

2.1. PRODUCTION OF FERROUS METALS AND ROLLED FERROUS METALS

2.1.1. STEEL PRODUCTION IN THE EU AND IN HE WORLD IN 2022

Steel is the world's most universal industrial material. The thousands of different grades and types of steel developed by the industry make the modern world possible. Steel is 100% recyclable and therefore is a fundamental part of the circular economy. What makes steel crucial to achieving a circular economy is that steel is a metal with an almost infinite life cycle, as it is recycled over and over again without losing its qualities. As a basic engineering material, steel is also an essential factor in the development and deployment of innovative, CO₂-mitigating technologies, improving resource efficiency and fostering sustainable development in Europe. Figure 2.1 shows the biggest steel-using sectors in 2022.

Figure 2.1



The worldwide consumption of steel and steel products in 2022 amounted to 1,762.2 million tons. Construction and infrastructure are the main consumers of steel and steel products with a share of 52% of total consumption. Mechanical equipment accounts for 16%, followed by the automotive sector with 12%. Other users are manufacturers of metal products and packaging with a share of 10%, other transport equipment with 5%, electrical equipment with 3% and 2% for household appliances.

World crude steel production in 2022 amounts to 1 885.4 million tons, 3.9% less than what was produced in 2021. The main producer is China with 1 018 million tons, followed by India with 125.3 million tons, Japan-89.2 million tons, the USA-80.5 million tons and Russia-71.5 million tons.

Top 10 steel producing companies in the world

	Company	Production in 2022
1	China Baowu Group (1)	131.84 million tons
2	ArcelorMittal (2)	68.89 million tons
3	Ansteel Group (3)	55.65 million tons
4	Nippon Steel Corporation (4)	44.37 million tons
5	Shagang Group	41.45 million tons
6	HBIS Group	41.00 million tons
7	POSCO Holdings	38.64 million tons
8	Jianlong Group	36.56 million tons
9	Shougang Group	33.82 million tons
10	Tata Steel	30.18 million tons

The European steel industry is a world leader in innovation and environmental sustainability. It has a turnover of around 130 billion euro and directly employs about 306 000 highly skilled people in the EU, producing on average 152 million tons of steel per year. More than 500 steel production sites across 22 EU Member States provide direct and indirect employment to millions more European citizens. Closely integrated with Europe’s manufacturing and construction industries, steel is the backbone for development, growth, and employment in Europe.

The EU crude steel production in 2022 was 136.2 million tons, a sharp decline (-11%) in comparison to 2021.

The increase of crude steel production seen in 2021 (considerable recovery of +16% after the lows seen in 2020 due to the impact of the COVID-19) was a result of a strong recovery in demand from steel-using sectors after the end of the COVID-19 restrictions. This upward trend ended in the first half of 2022 as a consequence of multiples shocks – the war in Ukraine, supply-chain disruptions, lack of components for the industry, rising energy prices and record inflation rate. The soaring energy prices, especially natural gas which peaked in August 2022 with a 20-fold increase compared to the historical average, have led to inflation rates in EU member states reaching levels unseen since 1985. Another driver behind these inflation dynamics, albeit to a lower extent, was the continued supply chain issues.

EU member states - the leading producers in 2022 are:

Germany	36.8 million tons
Italy	21.6 million tons
France	12.1 million tons
Spain	11.5 million tons
Austria	7.5 million tons
Poland	7.4 million tons
Belgium	7.0 million tons
The Netherlands	6.1 million tons
Sweden	4.4 million tons
Czech Republic	4.3 million tons

Production of crude steel in neighboring Romania of 2.6 million tons in 2022 ranked the country as the 42nd largest producer in the world. In 2022 Turkey ranked eight with its production of 35.1 million tons. Serbia and Greece ranked 46th and 48th with crude steel production of 1.7 and 1.5 million tons respectively.

The multitude of crises also reflected on global crude steel production, which saw a decline of 3.9% in 2022 compared to 2021. Globally, 1 018 million tons of crude steel were produced in 2022. China remains the largest producer with a share of 54% of the world production, followed by India, Japan and the USA with significantly smaller shares of 6.6%, 4.7% and 4.3% respectively.

Bulgaria is among the small producers of steel and steel products, which is a result of the closure of the largest facilities for liquid steel production in blast furnaces. In 2022, the share of Bulgarian steel production in European crude steel production was 0.35% and 0.03% in the world crude steel production.

2.1.2. CRUDE STEEL PRODUCTION IN BULGARIA

The only producer of crude steel in Bulgaria is “Stomana Industry” JSC in Pernic. The production of crude steel is from secondary raw materials (scrap) melted in electrical furnaces – an example of green and low-carbon production. Steel cast by continuous method undergoes further processing in hot rolling mills to flat and long products, as well as to produce various types of products from them.

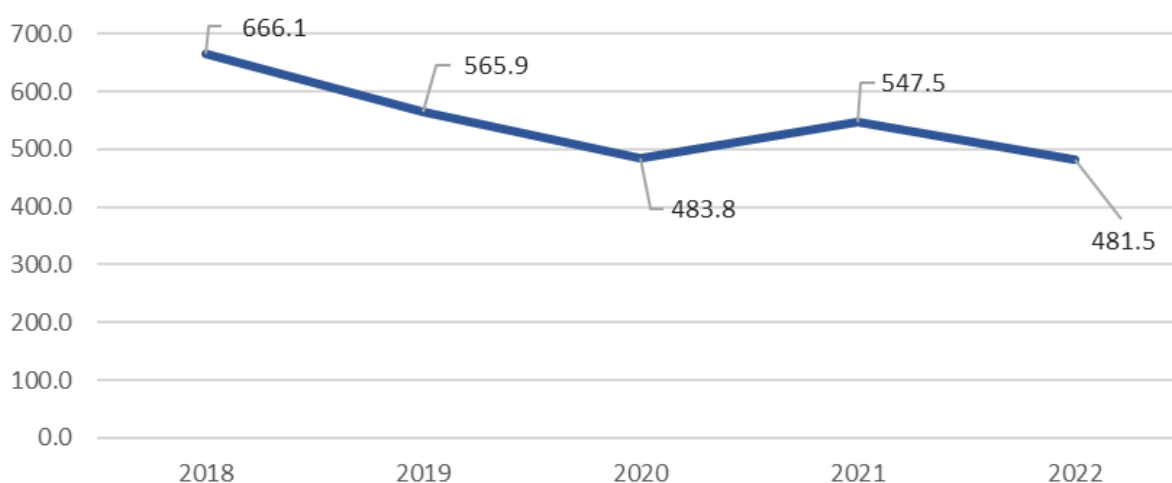
In 2022, Bulgaria produced 481.47 thousand tons of crude steel, which is 66 thousand tons (12.1%) less than the amount of crude steel produced in 2021.

Crude steel production in the country in 2022 reached its lowest level in the last 5 years. The 12.1% decline is comparable to the sharp contraction (-11%) in EU crude steel production.

“Stomana Industry” JSC continued in 2022 as well to invest in projects to improve the working environment and create safe and healthy working conditions, protect the environment, increase energy efficiency and maintenance of facilities. The total value of investments again exceeded 10 mln. Euro.

Figure 2.4

Crude Steel Production in Bulgaria, thousand tons



2.1.3. PRODUCTION OF ROLLED FERROUS METALS

Producers of rolled ferrous metals (RFM) in Bulgaria are “Stomana Industry” JSC in Pernic and “Promet Steel” JSC in Bourgas. Both enterprises produce long hot-rolled metal, and “Stomana Industry” JSC is the only producer of flat hot-rolled meals. Production data are given in Table 2.3 and Figure 2.5.

In 2022 the total production of rolled ferrous metals (RFM) in the country was 963.44 thousand tons. A decline in production of 86.3 thousand tons was reported, representing a decrease of 8.2% compared to the RFM, produced in 2021.

Long hot-rolled products produced in 2022 were 734.5 thousand tons, 8.6% less than the previous 2021. “Stomana Industry” JSC had produced 48,5 thousand tons more than in the previous year. The production of "Promet Steel" JSC marked a drop of 118 thousand tons, which reversed the trend established in the country until 2021 of an increase in the production of long rolled products. The total production of long rolled products in 2022 is 69.5 less than that produced in 2021.

Table 2.3

Production of rolled ferrous metals (RFM), thousands of tons

Types of RFM	Company	2018	2019	2020	2021	2022	2022/21	2022/21
							+/-	%
Hot-rolled long	Promet Steel JSC	458.6	428.9	501.1	585.1	467.1	-118.0	79.8
	Stomana Industry JSC	399.3	297.1	230.2	218.9	267.4	48.5	122.2
	Hot-rolled long total	857.9	726.0	731.3	804.0	734.5	-69.5	91.4
Hot-rolled flat	Stomana Industry JSC	273.0	242.1	199.5	245.8	229.0	-16.8	93.2
Hot-rolled metal total	Promet Steel JSC	458.6	428.9	501.1	585.1	467.1	-118.0	79.8
	Stomana Industry JSC	672.3	539.2	429.7	464.7	496.4	31.7	106.8
Total		1 130.9	968.1	930.8	1 049.8	963.5	-86.3	91.8

Source: Company data

The hot-rolled flat metal produced in 2022 was 229.1 thousand tons, 16.7 thousand tons (6.8 %) less than that produced in 2021. “Stomana Industry” JSC in 2022 compared to 2021 reported an increase in the production volume of long products by 22.2% (an increase of 48.5 thousand tons) and a decrease in the production volume of flat products by 6.8% (a decrease of 16.7 thousand tons). Traditionally, "Stomana Industry" JSC produces more long rolled steel. That trend was observed in 2022 as well, notwithstanding the precedent in 2021, when the produced flat-rolled products exceeded the long-rolled products by about 30 thousand tons. Despite the reported decline in the production of flat-rolled products by "Stomana Industry" JSC in the current year, there is an overall increase of 15.4% in the total production volume of hot-rolled products in 2022 compared to the previous year.

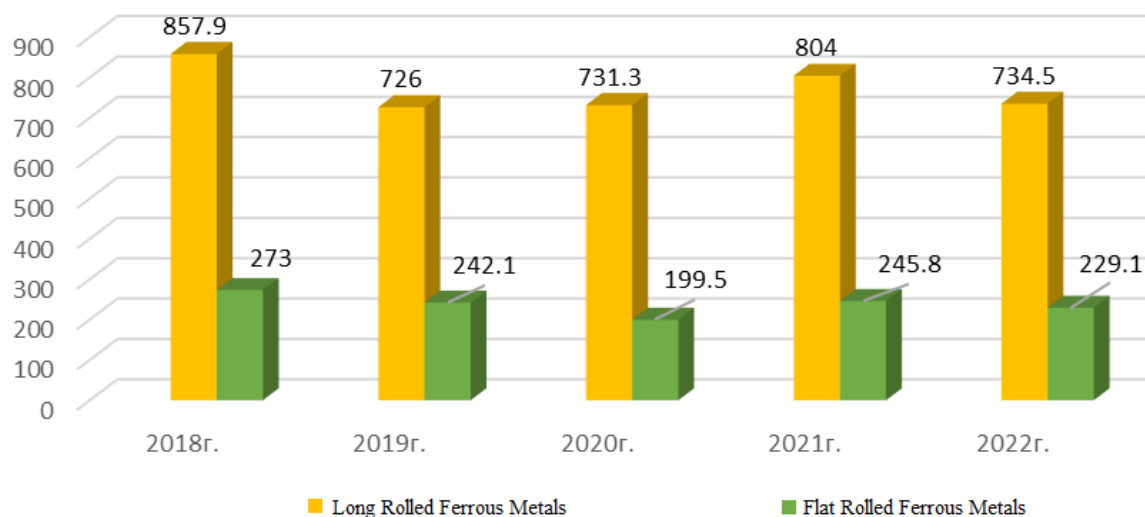
“Promet Steel” JSC, the other producer of long-rolled products, contrary to the steady trend towards production growth in recent years, in 2022 reported a drop of 18% compared to 2021. In the period 2018 – 2021 the production of “Promet Steel” JSC sustained an upward trend from 458.6 to 585.1 thousand tons, or by more than 27 %, regardless of the fluctuation in 2019 when the production level decreased by about 30 thousand tons. In 2022, however, the production volume of “Promet Steel” JSC almost approached its 2018 level. The main reason for the enterprise's reduced production is the continued disruption in billet supply chains due to the conflict in Ukraine and subsequent economic uncertainty resulting from the significant increase in energy prices and production costs. As a

result, capacity utilization was almost 20% lower than in 2021. The company continued to invest (4,34 mln. BGN in 2022) in energy efficiency technologies and equipment maintenance.

Figure 2.5 shows the dynamic of the country's total production of rolled ferrous metals over a period of five years.

Figure 2.5

Production of hot-rolled ferrous metals by assortment



Traditionally, the produced quantities of rolled long products are 2-3 times more than those of rolled flat products, which corresponds to the capacity of the existing installations in the country. The same correlation was preserved also in 2022, when the number of long products was 3.2 times more than that of flat ones.

Figure 2.6 shows the correlation between long and flat rolled products in 2022.

Figure 2.6

Production of long and flat rolled metals in 2022

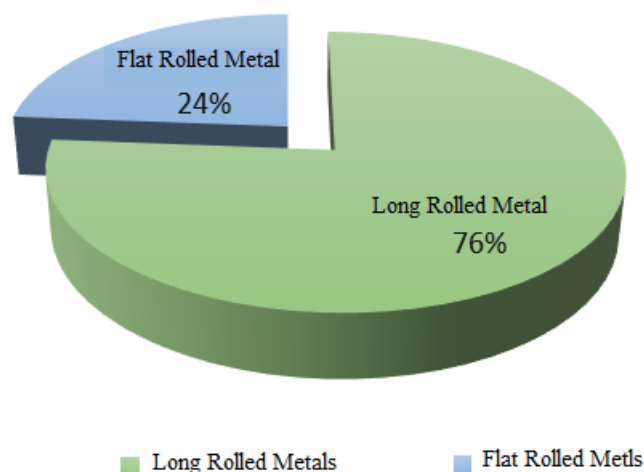
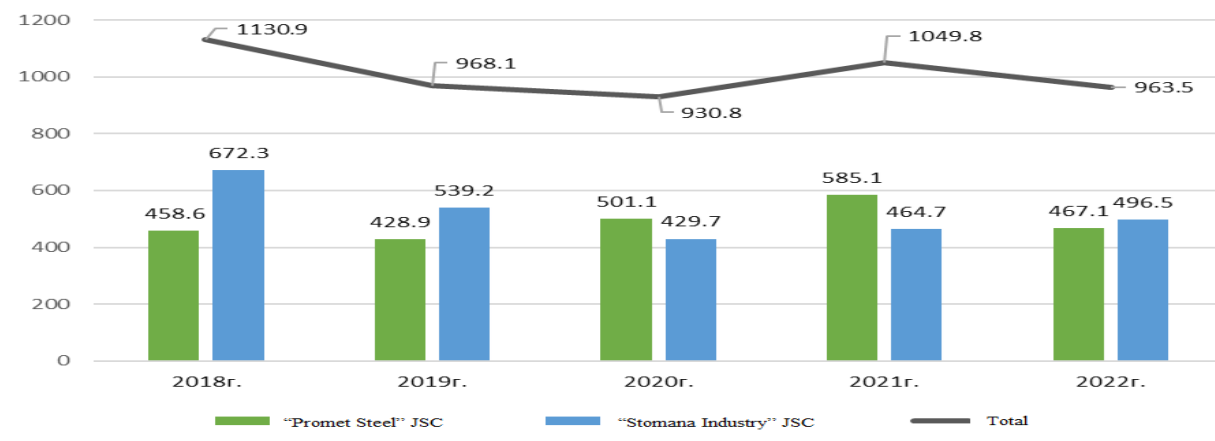


Figure 2.7 shows the dynamic of the production of hot-rolled metal by producers and types (long and flat rolled metals) over a period of five years.

Figure 2.7

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

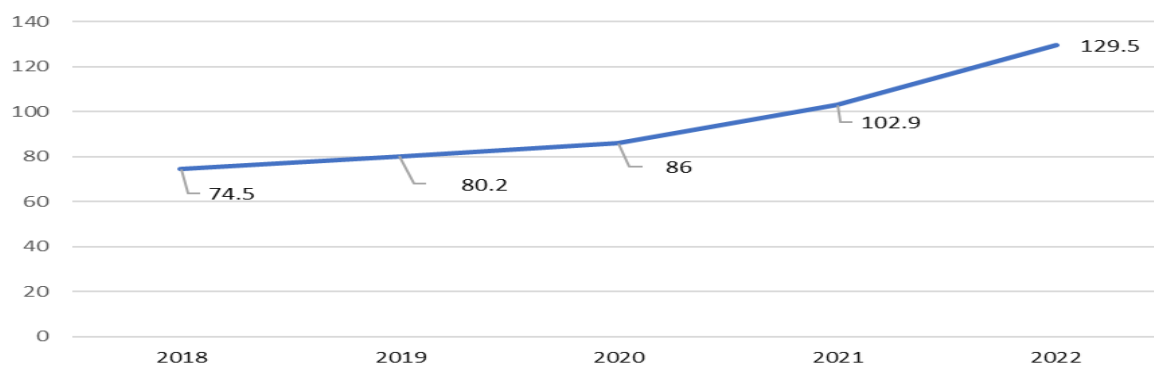


2.1.4. PRODUCTION OF ROLLED FERROUS METAL ARTICLES

Finished products of rolled ferrous metals are the subsequent products in the value chain. That includes steel pipes, zinc coated steel sheets, steel balls for mills, wire and wire articles, etc. The raw materials for the articles of rolled ferrous metals are provided by the metallurgical enterprises in Bulgaria or from imports (sheets, strips, wire rod). Table 2 shows the data on the production of products from rolled ferrous metals by the BAMI member companies only. There are also other producers of welded pipes and various steel products in the country. Production has increased almost twice. Figure 2.8 presents the chart of the dynamic of production of RFM products over a period of five years. Production has almost doubled.

Figure 2.8

Production of RFM products, thousand tons



The production of steel articles in 2022 has increased by 26.6 thousand tons. The growth of 25.9 % compared to 2021 was driven by increased production of steel balls for mills, while steel pipe and wire production was declining.

Table 2.4

Production of RFM articles by companies, thousand tons

Articles	Company	2018	2019	2020	2021	2022	2022/21	2022/21
							+/-	%
Steel pipes, welded	„EMC Distribution“Ltd	42.6	43.3	37.7	41.8	36.2	-5.6	86.6
	„ Stomana Industry“JSC	0.0	0.0	4.4	16.2	14.3	-1.9	88.3
Steel balls for mills	“Stomana Industry“JSC „El Stomana“ Ltd	22.0	25.9	31.7	32.3	38.9	6.6	120.6
Wire and wire articles	„ZHITI“JSC	10.4	11.0	12.2	12.6	11.4	-1.2	90.5
Total RFM articles		74.5	80.2	86.0	102.9	129.5	26.6	125.9

Source: Company data

EMC Distribution' Ltd is a company specialized in the production of welded steel pipes and merchant bars in various shapes and sizes, including zinc coated ones. The company also produces pipes and fittings for electrical installations. Steel pipes production is also organized in “Stomana Industry“JSC and steel balls production takes place in both “ Stomana Industry“ JSC and „El Stomana“ Ltd. „ZHITI“ JSC, Ruse is an enterprise producing various types and sizes of wires and wire products in the country.

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

In 2022 the total quantity of rolled ferrous metals and articles thereof, imported into Bulgaria, including scrap, was 2 261.5 thousand tons, or 273.2 thousand tons more compared to 2021 which is an increase of 13.7%.

Table 2.5 shows the data on imports by commodity groups over the recent five years. The value of imported metal products in 2022 reached 4 441.3 mln. BGN, which is 1 449.5 mln. BGN more than the previous year or 48.4% growth.

In 2022, 157,6 thousand tons of ferrous metal scrap used as raw material for

crude steel production were imported. Compared to 2021 the imported quantity is 27.3 thousand tons (20,9 %) more. Ferrous metal scrap was imported into Bulgaria mainly from Romania, with a share of 80.3% of the total Bulgarian imports of the product. Serbia ranked second with a share of 15%. Metal scrap was imported from our neighboring countries - Macedonia, Greece, and Turkey, but the imported quantities were significantly smaller, 2.6 %, 1.3 % and 0.1 % respectively.

Table 2.5

Imports of ferrous metals and articles thereof, thousands of tons

<i>Goods</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>2022/21</i>	<i>2022/21</i>
						<i>+/-</i>	<i>%</i>
Non-alloyed total	1 735.00	1 805.40	1 734.70	1 676.50	1 739.2	62.7	103.7
cast iron - ingots, granules, powder	15.7	15.1	13	15.3	21.1	5.8	138.1
Ferro-alloys	15.5	16.5	15.3	14.6	20.8	6.2	142.7
Scrap	166	224	185	130.3	157.6	27.3	120.9
Semi-finished products	540.1	474.6	547.6	567.2	554.9	-12.3	97.8
Hot-rolled metal (coils and sheets)	494.6	546	557.4	486.6	491.5	4.9	101.0
Cold-rolled metal (coils and sheets)	121.7	112.2	103.1	126.6	102.0	-24.6	80.6
Wire rod	171.6	194.2	151.4	169.2	194.3	25.1	114.8
Bars	120.5	143.2	84.2	88.3	119.8	31.5	135.7
Merchant bars	89.3	79.6	77.7	78.4	77.2	-1.2	98.4
Alloyed total	64.8	101.1	87.5	105.4	218.5	113.1	207.3
Hot-rolled and cold-rolled coils and sheets	28	63.2	60.1	62.8	150.0	87.2	238.8
Bars and merchant bars	36.8	37.9	27.4	42.6	68.5	25.9	160.9
Articles from rolled FM	279.6	435.5	456.7	206.4	303.8	97.4	147.2
Seamless pipes	41.7	30.1	25.6	0	37.3	37.3	-
Welded pipes	34	190.3	204.4	0	32.5	32.5	-
Coated sheets	185.9	188.7	195.4	182	201.9	19.9	110.9
Wires ropes etc..	18	26.4	31.3	24.4	32.1	7.7	131.4
Total	2 079.40	2 342.00	2 278.90	1 988.30	2 261.5	273.2	113.7
Value, mln. EUR	1 193.00	1 430.60	1266.5	1529.7	2 270.8	741.1	148.4
Value, mln. BGN	2 333.30	2 798.00	2477.1	2991.8	4 441.3	1 449.5	148.4

Source: Custom statistics, NRA

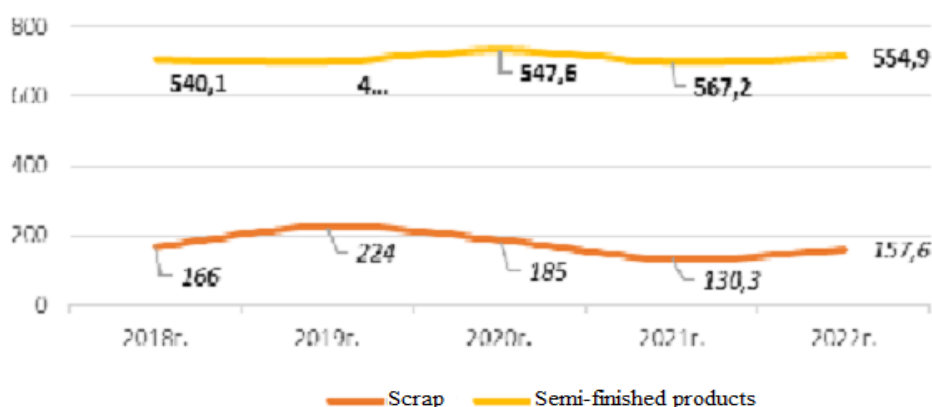
According to the Customs statistics data on imports into Bulgaria by product groups, in 2022 the trend of gradual increase of the import of semi-finished products, imposed over the recent 5 years, was interrupted. In 2022, 554.9 thousand tons of semi-finished products were imported, which is a decrease of 12.3% compared to their import in 2021. In 2021, the highest value was reached in the quantitative dimension of imports of 567.2 thousand tons semi-finished products. The reported decline in 2022 was due to supply constraints resulting from Russia's ongoing war in Ukraine.

The semi-finished products, raw materials for the production of “Promet Steel” JSC are mainly imported from Ukraine. The import from Ukraine account for 83.7% of the total import of semi-finished products in Bulgaria and the sources of that import are the are the owners of Promet Steel AD-steel companies, part of the Metinvest holding group.

Other sources of imports of semi-finished products are Greece and Turkey but their share is insignificant, 10.6% и 2.6% respectively. Figure 2.9 shows the dynamics of imports of scrap and semi-finished products in Bulgaria over the last five years. Imported products are realized on the domestic market or exported after processing them into products with new added value.

Figure 2.9

Imports of scrap and semi-finished products, *thousands of tons*



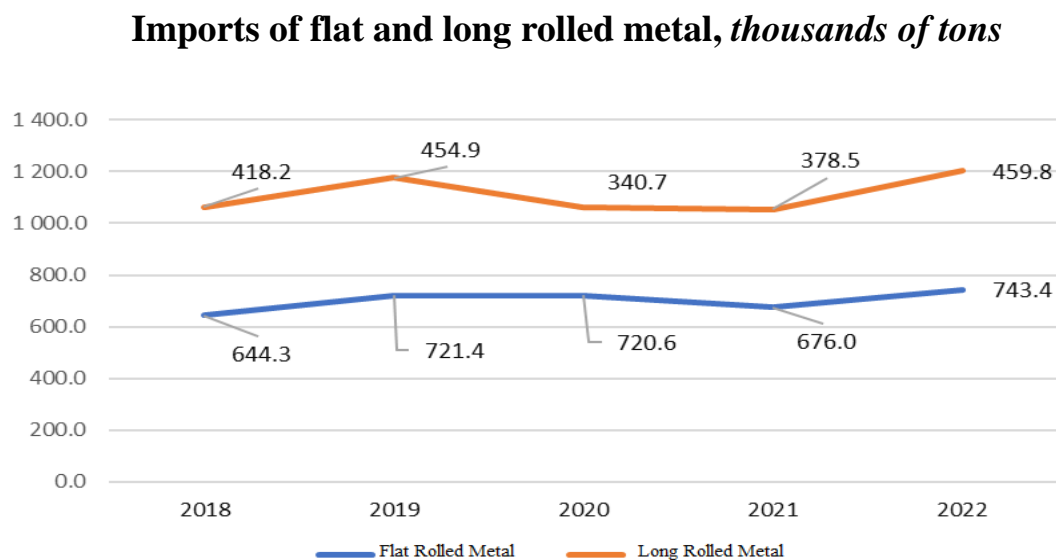
Imports in Bulgaria of flat and long rolled metal for the period 2018-2022 is presented on figure 2.10. In 2022, 743.4 thousand tons of flat hot-rolled metal and flat cold-rolled metal were imported into Bulgaria, which is an increase of 67.4 thousand tons, or 10% growth compared to 2011. Non-alloyed hot-rolled products-coils and sheets were 491.5 thousand tons, 4.9 thousand tons more than the previous year.

Flat cold-rolled metals are not produced in the country, but imports were comparatively lower - 102 thousand tons in 2022, 24.6 thousand tons (20%) less than the previous 2021. In 2022 flat rolled metals were imported mainly from

Ukraine (24.9%) and neighboring countries - Turkey (19.9%), Romania (18.4%), Serbia (10.7%) and Macedonia (2.7%).

The total imports of long rolled metals (**rods and merchant bars from ordinary and alloyed steel, wire rod**) was 459.8 thousand tons in 2022. Compared to 2021, it increased by 81.3 thousand tons or +21 %.

Figure 2.10



Imports of **bars and merchant bars** from non-alloy steel in 2022 reversed the established trend of gradual reduction. In 2022, 197 thousand tons of bars and merchant bars from non-alloy steel were imported, which is 30.3 thousand tons more than the imports in 2021, or an increase of 18.32%.

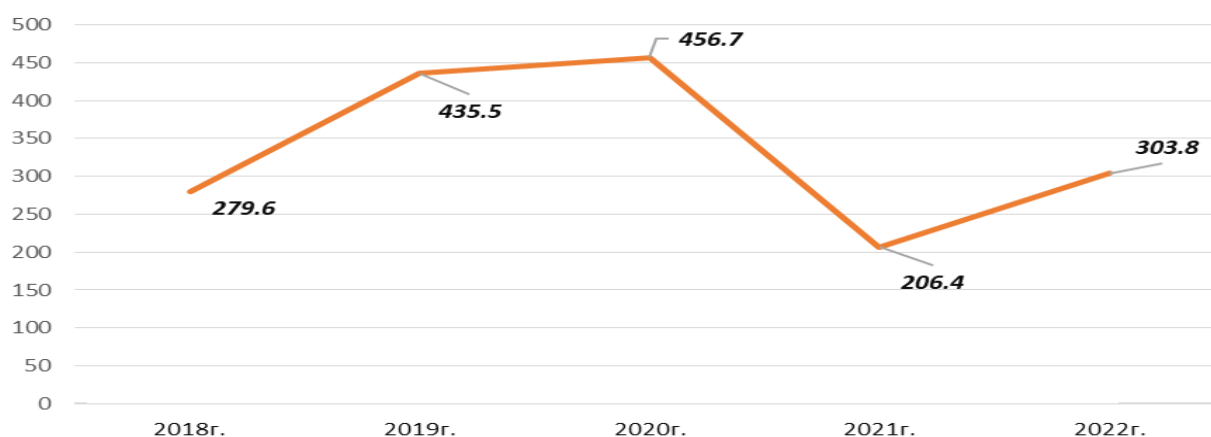
The imports of **wire rod** during recent years were between 150 and 190 thousand tons, reporting a 25.1 % rise compared to 2011.

Again in 2022, more than half (54%) of the import of **long products** in our country originated in Turkey. The second largest trading partner was Greece with a share of 38% of the total import of long products. Other sources of import were Romania - 9%, Ukraine - 6%, Macedonia - 2%.

Figure 2.11 shows the import of **rolled ferrous metal products** over the recent 5 years. There was a dramatic drop in imports of **rolled ferrous metal products** in 2021, by more than 50% compared to 2020, due to the lack of imports of steel pipes, owing to suspended or delayed implementation of gas infrastructure projects.

In 2022, 69.8 thousand tons of steel pipes were imported into Bulgaria. These imports, together with the increase in imports of coated sheet, resulted in a total increase of 47.2% in imports of **rolled ferrous metal products** in 2022 compared to 2021, or a total of 303.8 thousand tons of rolled ferrous metal products imported.

Imports of rolled ferrous metals products



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

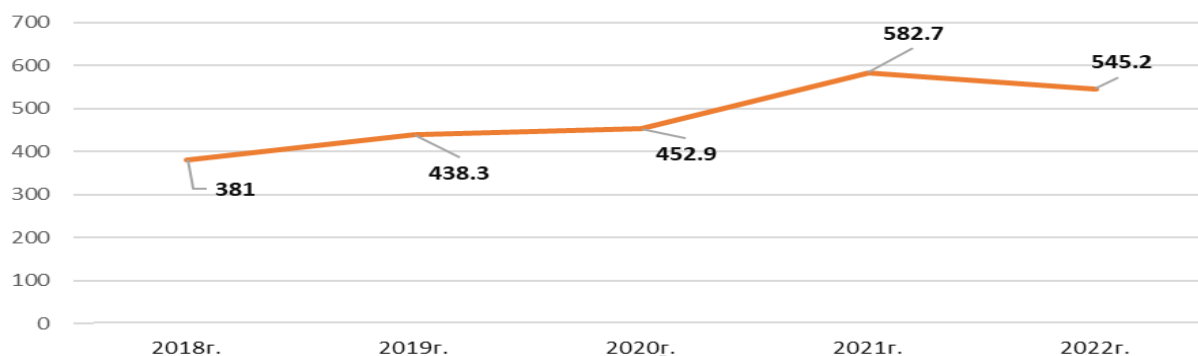
The total quantity of exported in 2022 metal raw materials (cast iron ingots, scrap, semi-finished products), rolled metal and rolled ferrous metal products was 1 567.54 thousand tons. This amount compared to the export of the same products in 2021 represents a decrease of 175.9 thousand tons, or a drop of 12.8 %. The export level in 2022 was approaching the level in 2020. The largest volumes of ferrous metal and articles thereof of 1 373 thousand tons for the last 5 years were exported in 2021, with a value of 2 379.9 million BGN. The decline in the export volumes of the domestic steel industry was caused by a series of challenges, including unfair trade and a lack of a level playing field with other regions, further exacerbated by many different ambitions in the transition to a low-carbon economy. Consequently, it is of utmost importance to find a solution to ensure the competitiveness of the Bulgarian steel exports and to protect the steel industry of the country in the context of the enactment of the border carbon correction mechanism and global requirements - overcapacity, decarbonization, etc.

Despite the lower exported quantity, in value terms the level of exports in 2022 was 2 857.9 million BGN, or 20% more than in 2021. This considerable growth was a consequence of increased world prices that are continuing to rise even in 2022. Table 2.6 presents the export data of ferrous metal products for the last five years.

The exports of scrap in 2022 showed a certain level retention, contrary to the trends in 2021. In terms of quantities the reduction was 6.4%. Figure 2.13 shows the dynamics of the exports of scrap from Bulgaria.

Figure 2.13

Exports of scrap, thousands of tons



In 2022, 545.2 thousand tons of scrap were exported from Bulgaria, which is 37.5 thousand tons less compared to 2021. Nevertheless, throughout the five-year period since 2018, annual scrap exports have increased by nearly 50%. The reason for this increased export is the unfair price competition in third countries due to the worldwide restrictions on the export of scrap. The ratio between the exports and the imports of scrap for Bulgaria was approximately 4 to 1.

Table 2.6

Exports of ferrous metals and articles thereof, thousands of tons

<i>Goods</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>2022/21</i> <i>+/-</i>	<i>2022/21</i> <i>%</i>
Non-alloyed total	1 190.70	1 141.00	1 160.70	1 373.00	1 197.05	-175.9	87.2
cast iron - ingots, granules, powder	6.3	5.5	0.7	1.3	0.1	-1.2	7.7
Ferro-alloys	3.6	5.3	6.3	5.2	7.5	2.3	144.4
Scrap	381	438.3	452.9	582.7	545.2	-37.5	93.6
Semi-finished products	0.2	7.3	2.6	16.2	3.8	-12.4	23.5
Hot-rolled metal (coils and sheets)	259.6	227.6	203.2	210.2	234.7	24.5	111.6
Cold-rolled metal (coils and sheets)	10	7.8	5.6	7.4	5.2	-2.2	69.9
Wire rod	2.4	2.3	1.9	1.1	0.7	-0.4	63.6
Bars	490.8	404.9	459.6	516.8	381.7	-135.1	73.9
Merchant bars	36.8	42	27.9	32.1	18.3	-13.8	57
Alloyed total	65.1	63.7	49.1	67.4	79.2	11.8	117.5
Hot-rolled and cold-rolled coils and sheets	0.6	11.4	12.2	17.7	23.3	5.6	131.9
Bars and merchant bars	64.5	52.3	36.9	49.7	55.9	6.2	112.4
Articles from rolled ferrous metals	270	306.5	336.8	325.6	291.3	-34.3	89.5
Seamless pipes	2.7	2.5	2	4.7	1.8	-2.9	37.3
Welded pipes	232.8	264.9	296.8	283.7	252	-31.7	88.8
Coated sheets	11.5	13.6	10.4	13.8	13.6	-0.2	98.5
Wires ropes etc..	23	25.5	27.6	23.4	24	0.6	102.5
Total	1 525.80	1 511.20	1 546.60	1 766.00	1 567.54	-198.5	88.8
Value, mln. EUR	819.1	790.1	720.7	1216.7	1 460.70	244	120.1
Value, mln. BGN	1 602.00	1 545.30	1409.6	2379.7	2 857.00	477.3	120.1

Source: Custom statistics, NRA

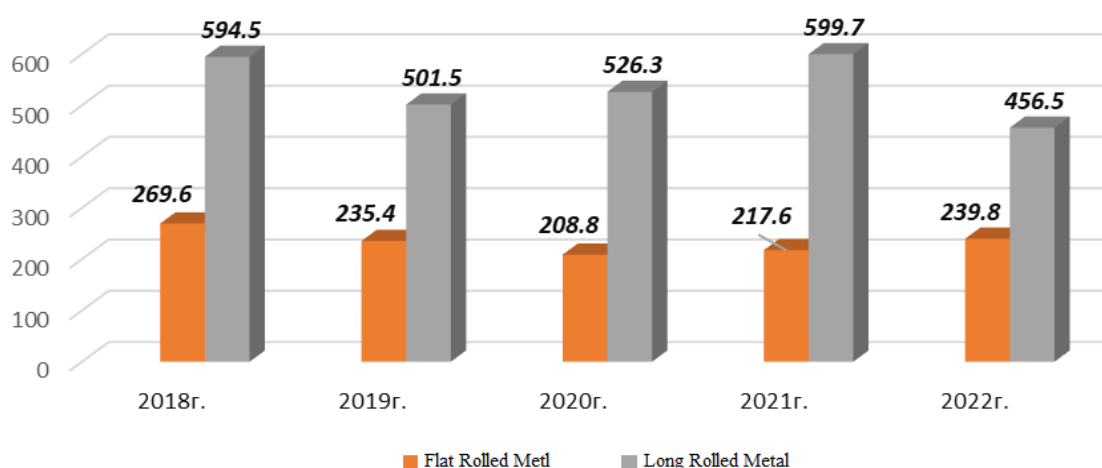
The key element of the EU's policy towards the Green transition is ensuring access to critical raw materials. Therefore, it is vital that ferrous scrap is included in the EU's list of critical raw materials, especially since there are already supply constraints worldwide, with over 40 countries around the world applying restrictions and bans on the export of scrap from ferrous metals.

As for value added products, in 2022 there was a decrease in the exports of long rolled metal products and a small increase of exports of flat rolled metal products compared to 2021. Figure 2.13 presents the export of flat and long rolled products, including alloyed articles for the period 2018-2022.

Despite the 14% growth in exports of long rolled metal products reported in 2021 by companies, producing long rolled metal in the (bars, merchant bars, reinforcing bars), 143.2 thousand tons less were exported in 2022. As a percentage, exports of long rolled metal products in 2022 have declined by 10.2% compared to 2021. The shortage of raw materials for production because of increasing exports of scrap was one of the reasons for the registered drop.

More than 80 % of the exports of long rolled metal was directed to the EU countries, with Romania taking the largest share of 58.7% of total Bulgarian exports of the product, followed by Greece with 9.2%, Hungary - 5.9%, Germany - 5.5%, Cyprus - 4.1%, etc. Approximately 5% of the exports of long rolled metal products were to neighboring countries - Macedonia, Serbia, Albania, and Turkey.

Figure 2.13



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

Exports of **flat rolled metal**, unlike the long-rolled products, increased by 22.2 thousand tons or 10.2% compared to 2021. In 2022 flat non-alloy rolled products were exported mainly (over 60%) to the EU countries as Romania, Hungary, Slovakia, Greece, etc. One-fifth of the exports (20.67%) were exported to Turkey and 1.76% to Mexico.

The exports in 2022 of **non-alloyed steel rods**, which is the main production of the Bulgarian steel industry, was 381,7 thousand tons, or 6.1 % decline compared to 2021 when the peak in exports for the last five years was reached. The level of exports in 2022 reached its largest decline in the five-year period, aligning with the level of exports in 2017.

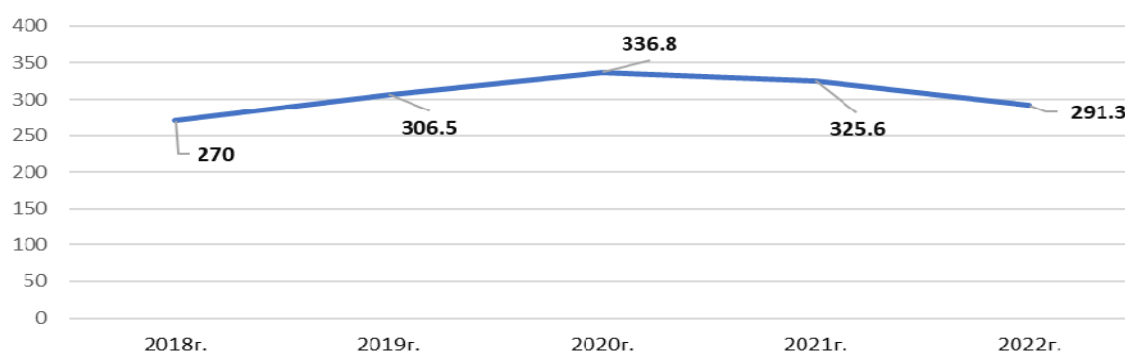
As in the previous years the export of **non-alloyed steel rods** was directed to the EU countries, of which Romania was the main destination - 62.2% of the total Bulgarian export of the product, followed by Greece - 10.5%, Hungary - 6.6%, Cyprus - 4.9%, Germany – 4.5% etc. There was a negligible export to Macedonia- 2.6%, as well as to Ukraine and Serbia.

Exports of **non-alloyed merchant bars** also followed the downward trend, reaching the greatest decline in the period 2018-2022. The exported 18.3 thousand tons in 2022 were twice as few (by 57%) as the quantity exported in 2021. The export to Romania was 32.4% of the total Bulgarian export of merchant bars, the share of Serbia, Macedonia, Bosnia and Herzegovina, and Ukraine was 13.2 %, 12.4%, 10.6 % and 9.7%. respectively.

As for the rolled ferrous metal articles, in 2022 there was a decrease of 10.5% in their export level compared to 2021. The export mainly consisted of welded pipes. The figures for production given in Table 2.4 are lower, as there are other pipe producers in the country. The imports and re-export of welded pipes for gas pipelines, which Bulgaria does not produce, directly affected the trade balance of the country.

Figure 2.14

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



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

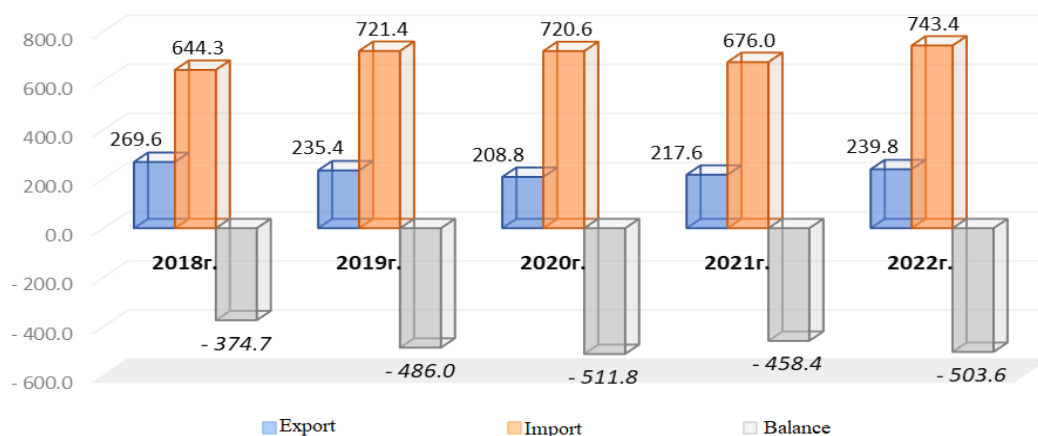
Data on imports and exports of ferrous metal products characterized the sector as a net importer with a negative foreign trade balance. Traditionally, the imports

of flat-rolled ferrous metal have been significantly higher than its exports, with imports exceeding exports by more than 3 times in 2022.

The diagram in Figure 2.15 shows the development of exports, imports, and trade balance of flat-rolled ferrous metal in the period 2018-2022. The trade balance of flat ferrous products was negative in 2022, as imports exceeded exports by 503.6 thousand tons.

Figure 2.15

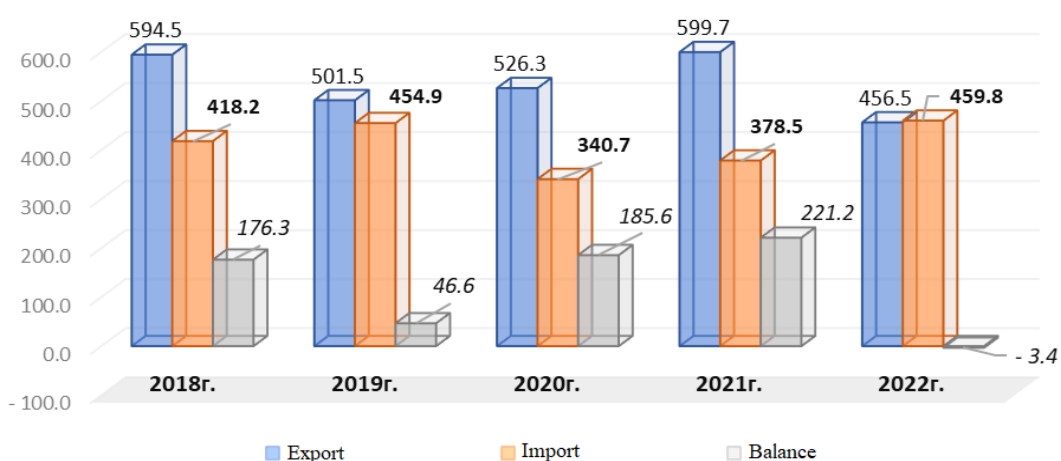
Exports and Imports of flat rolled metal, thousands of tons



That tendency was reversed for the long ferrous products (Figure 2.16). The trade balance was positive for the five-year period, as exports exceeded imports. That trend was however interrupted in 2022, as the imports reached 459.8 thousand tons, marking a peak for the last five years, exports fell to 456.5 thousand tons and the trade balance turned to negative of (-)3.4 thousand tons.

Figure 2.16

Exports and Imports of long rolled metal, thousands of tons



The existing capacities for the production of long products in the country create the prerequisites for a reduction in imports, but as already mentioned a number of negative factors affect our production and sales. Furthermore, imports from some third countries exercising unfair trade practices exert serious price pressure on fair competition in the Bulgarian steel market.

Regarding rolled ferrous metal articles there has been no clearly expressed trend. The volumes of exported and imported products have changed. Figure 2.17 shows exports and imports data for rolled ferrous metal articles in the last five years. The differences are not from fluctuations in regular consumption satisfied by captive production or imports, but of large deliveries of gas pipes for infrastructure projects and subsequent re-exports.

Figure 2.17

Exports and Imports of rolled ferrous metal products, thousands of tons

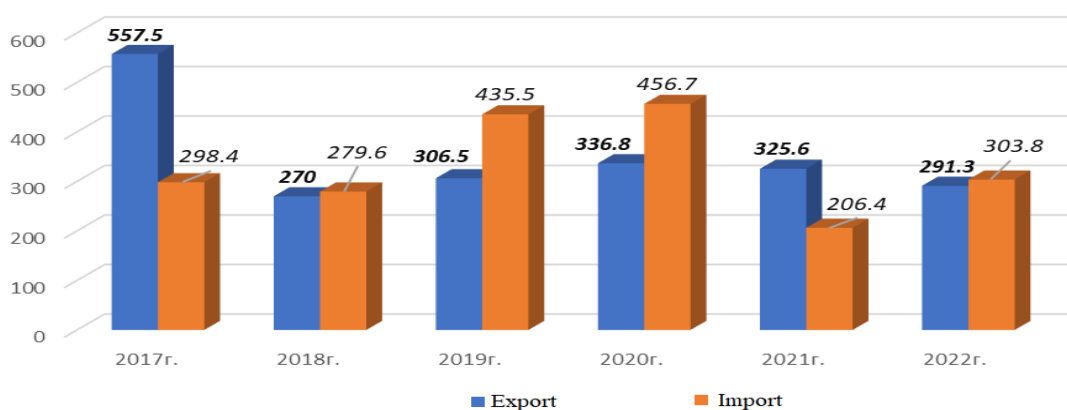


Table 2.7 shows the aggregated foreign trade balance, representing the difference between exports and imports of all raw materials, products, and ferrous metal articles. The negative trade balance was -659.6 thousand tons in 2022. For comparison, the balance was (-)288.8 thousand tons in 2021, (-)711.0 thousand tons in 2020 and (-)810.1 thousand tons in 2019.

The lowest negative balance was achieved in 2021, when the difference between production and import of ferrous products was negligible. After the liquidation of Kremikovtzi, the nomenclature of manufactured products was severely limited. The operating enterprises have overlapping capacities, and their product list cannot compensate for the production of the closed metallurgical plant.

Table 2.7***Foreign trade balance of ferrous metals in 2022***

Production:	Export/thousand tons	Import/thousand tons	Difference
Semi-finished products	3.8	554.9	-551.1
Flat rolled ferrous metal	263.2	743.4	-480.2
Long rolled ferrous metal	456.5	459.8	-3.4
Finished products	291.3	303.8	-12.5
Scrap	545.2	157.6	387.6
Total	1560.0	2219.5	-659.6

Source: Customs statistic, NRA

The data by product groups for 2022 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, which affects the negative foreign trade balance every year. In 2022, the trade balance was (-)551.1 thousand tons.

- **flat rolled metal** – in this category the country is also a net importer. In 2022, imports exceeded exports by 480.2 thousand tons.

- **long rolled metal** - for this group the trade balance is usually positive, which is determined by the production capacities in the country. However, in 2022, imports exceeded exports by 3.4 thousand tons and generated a negative trade balance.

- **rolled ferrous metal products** – the balance was negative (-12.5 thousand tons). Almost equal import and export volumes were driven by a 10.5% drop in exports in 2022 compared to 2021 and an increase of 47.2% in imports due to resumed imports of pipes and increased imports of coated sheet.

- **scrap** – the export of scrap exceeded the import by 387.6 thousand tons. The negative trend that our country is a net exporter of raw materials instead of value-added products continued.

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

Table 2.8

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

Rolled ferrous metals products and articles	2018	2019	2020	2021	2022	2022/21 +/-	2022/21 %
Rolled ferrous metals							
- Imports (incl. semis)	1 565.8	1 650.9	1 608.9	1 621.6	1 758.2	136.6	108.4
- Exports (incl. semis)	799.8	755.5	749.9	851.2	723.5	-127.7	85.0
Turnover total	2 365.6	2 406.4	2 358.8	2 472.8	2 481.6	8.8	100.4
Balance (Export-Import)	-766.0	-895.4	-859.0	-770.4	-1 034.7	-264.3	134.3
Rolled ferrous metal products							
- Imports	265.0	435.5	456.7	206.4	303.8	97.4	147.2
- Exports	247.2	306.5	336.8	325.6	291.3	-34.3	89.5
Turnover total	512.2	742.0	793.5	532.0	595.1	63.1	111.9
Balance (Export-Import)	-17.8	-129.0	-119.9	119.2	-12.5	-131.7	-10.5

Source: Customs statistic, NRA

The total trade turnover of ferrous metals, including billets for 2022 was 2 481.6 thousand tons, or an increase of 8.8 thousand tons (+0,4 %) compared to 2021. The imports of rolled ferrous metals and articles thereof have continued to grow over the recent five years. However, the exports dropped by 15 % in 2022 compared to 2021 which increased the negative trade balance to (-)1 034.7 thousand tons, the highest negative balance for the five-year period.

The total trade turnover of rolled ferrous metals products in 2022 was 595.1 thousand tons, an increase of 63.1 thousand tons compared to 2021. The growth was due to the increase in imports as the exports decreased by 43.3 thousand tons. The trade balance in 2022 is negative because the exports exceeded imports by 119.2 thousand tons.

2.2.4. SALES OF ROLLED FERROUS METALS AND ARTICLES THEREOF

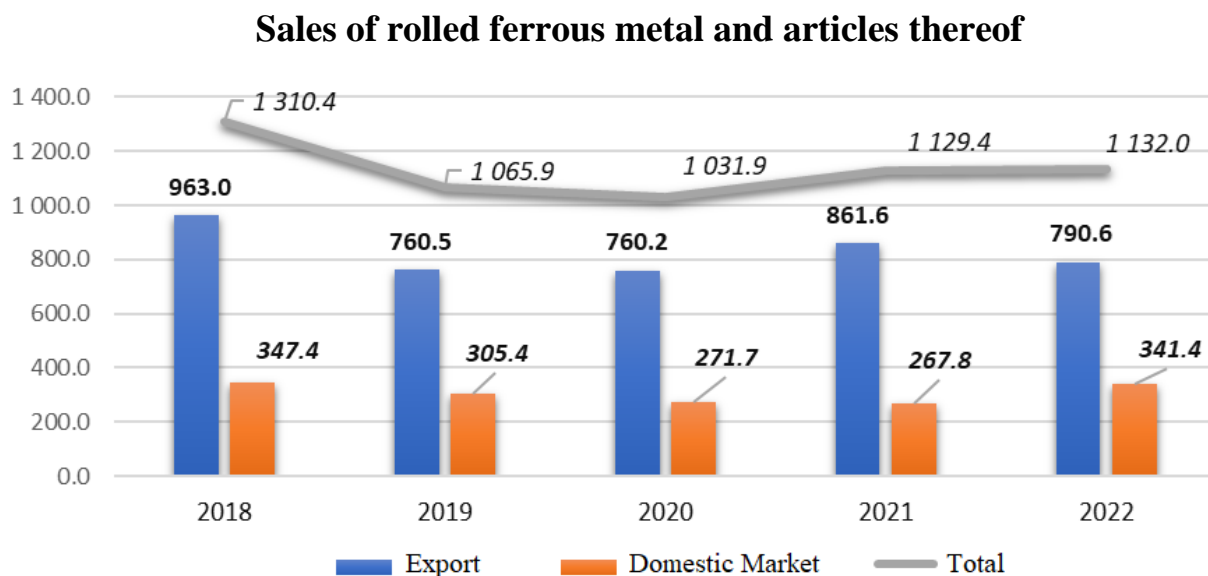
In 2022, Bulgarian producers of ferrous metals and products thereof, members of BAMI, sold 341.4 thousand tons of production on the domestic market. Compared to the previous year, an increase of 73.6 thousand tons (27.5% growth) was reported. In 2022, total sales of rolled ferrous metals and products thereof were 1 132 thousand tons, achieving an increase of 2.6 thousand tons compared to 2021. This was due to the increase in domestic sales.

In 2022, however, the imports declined to 790,6 thousand tons, almost to the level of 2020 (760.2 thousand tons). As a result of the reduction, the achieved

export growth of 13% for 2021 was hampered. The downturn in exports in 2022 expressed as a percentage compared to the level of 2021 was 8.2%.

Figure 2.18 shows the dynamics of sales of rolled ferrous metal and articles thereof for the period 2018-2022.

Figure 2.18



*Company data

Table 2.9 shows the sales of flat and long rolled metal products for the recent two years, excluding the products of rolled ferrous metals.

In 2022, the total sales of flat and long rolled metal products were 892.7 thousand tons, 135.3 thousand tons less than those in 2021, or a decrease of 3.2%. The Bulgarian industry of rolled ferrous metals and products thereof is export oriented.

Table 2.9

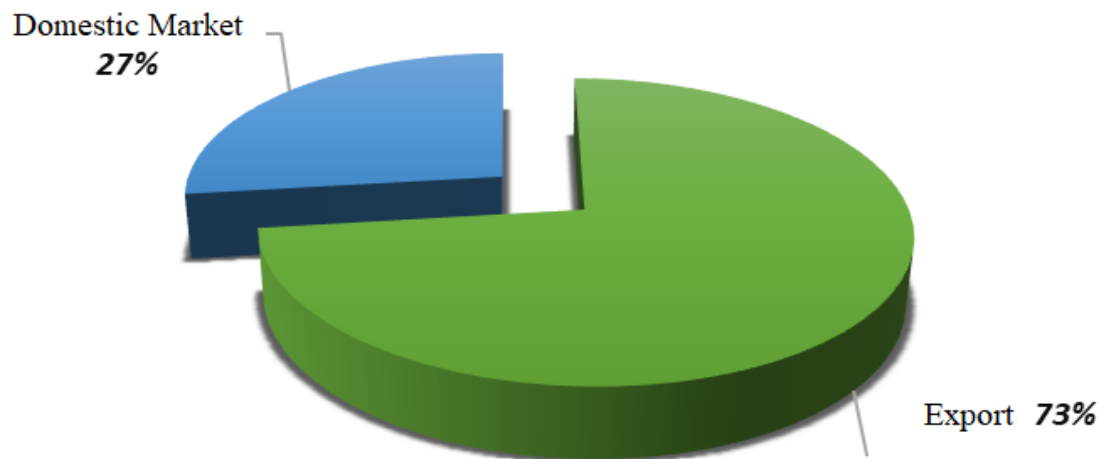
Sales of rolled metal products

Production	Exports		Domestic market		Total sales	
	2021	2022	2021	2022	2021	2022
Long rolled metal	582.4	451.35	209.2	211.2	791.6	662.5
Flat rolled metal	208.0	201.04	28.4	29.1	236.4	230.2
<i>Total rolled metal</i>	790.4	652.4	237.6	240.3	1028.0	892.7

Figure 2.19 shows the export/domestic market correlation in 2022 for the main metallurgical products (flat and long rolled metal). The proportion was 73/27.

Figure 2.19

Export/domestic market correlation for the main metallurgical products



Source: Company data.

The overcapacity for the production of steel and steel products in various regions of the world, the liberal trade policy and free market within the EU, as well as regionally and worldwide, remain a considerable challenge for Bulgarian companies. In this highly competitive environment, producers often face unfair imports from third countries, which is an obstacle to generating more sales on the domestic and EU markets.

2.2.5. ACTUAL DOMESTIC CONSUMPTION (ADC) OF STEEL PRODUCTS

Steel and steel products are the basis of several production chains. Therefore, their consumption is an important indicator of the state of other sectors, the industry, and indicates the upward or downward direction of development and the structure of the country's economy.

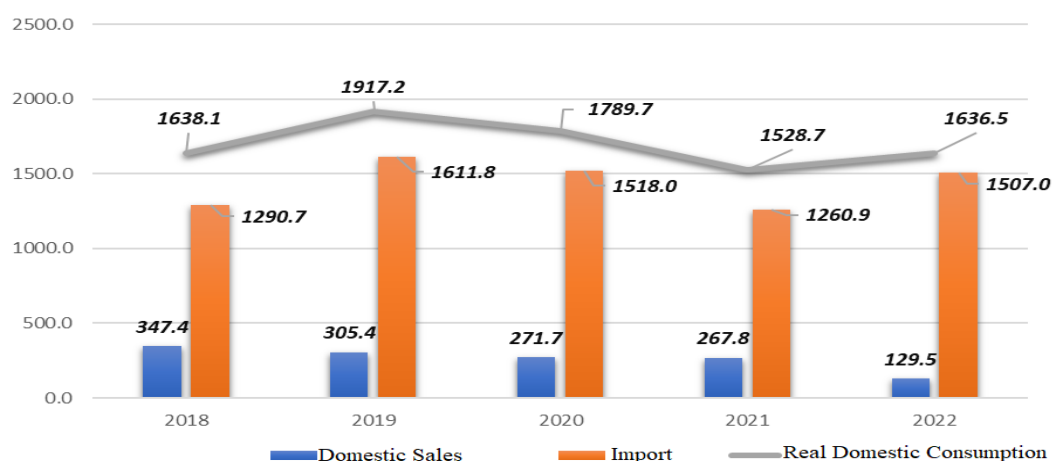
The real domestic consumption (RDC) of rolled ferrous metals and articles thereof is the amount of the domestic sales and imports into the country of these products. Table 2.10 provides RDC over the last two years.

Table 2.10**Real domestic consumption of steel products, thousands of tons**

Products	2021			2022			2022/2021	
	<i>Domestic sales</i>	<i>Imports</i>	<i>RDC</i>	<i>Domestic sales</i>	<i>Imports</i>	<i>RDC</i>	<i>Difference</i>	<i>%</i>
Long rolled ferrous metals	209.2	378.5	587.7	211.2	459.8	671.0	83.3	114.2
Flat rolled ferrous metals	28.4	676	704.4	29.1	743.4	772.6	68.2	109.7
<i>Total rolled ferrous metals</i>	237.6	1054.5	1292.1	240.3	1203.3	1443.6	151.5	111.7
Rolled ferrous metal products	30.2	206.4	236.6	53.2	303.8	357.0	120.4	150.9
Total	267.8	1260.9	1528.7	293.5	1507.0	1800.5	271,8	117.8

Источник: Custom statistics and NRA (import); Company data (domestic sales)

Figure 2.20 shows the developments in real domestic consumption for the period 2018-2022.

Figure 2.20**Real domestic consumption (RDC) of steel products, thousands of tons**

The real domestic consumption of steel products in the country in 2022 was 1636.5 thousand tons, an increase of 271.8 thousand tons (7.8%) compared to 2021. The growth was due to a global economic recovery following the collapse in 2020 as a result of the COVID-19 pandemic, as well as a rise in demand from steel-using sectors.

An important indicator for the industrial development of the countries is the apparent consumption in kilograms per capita (kgPC). The consumption of steel products, expressed by the so-called Apparent steel consumption (ASC), is calculated 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 per capita by year is presented in Table 2.11.

Table 2.11

Apparent consumption of steel products, *thousands of tons*

Year	Production	Imports	Exports	Apparent consumption	Apparent consumption per capita
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	1290.7	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	1518.0	1084.1	1 364.7	197.3
2021	1049.8	1260.9	1160.6	1 150.1	168.2
2022	963.5	1 507.0	1 010.9	1 459.6	225.8

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

In 2022 the apparent steel consumption (ASC) in Bulgaria was 1 459.6 thousand tons, 26.9 % increase compared to 2021.

The ASC per capita (ASCPC) index fluctuates on average around 86 kg per capita for Bulgaria, while the average level for the EU (27) varies around 330 kg per capita. In 2022 ASCPC for Bulgaria was 225.8 kg per capita and the EU (27) average level was 310.3 kg per capita. 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. This is an indicator for the state of the Bulgarian economy in the relevant period, as well as for changes in its structure, in particular growth in activities with high consumption of metals. Unfortunately, Bulgaria is far from the consumption of industrially developed countries.

In 2022, the countries with the highest ASCPC worldwide, including EU countries, were:

Sought Korea – 988 kg per capita.

Tawan (China) – 728.2 kg per capita.

China – 645.8 kg per capita.

Czeck Republic – 631.1 kg per capita.

Austria – 476.3 kg per capita.

Japan – 443.6 kg per capita.

Italy – 421.9 kg per capita.

Germany – 379 kg per capita.

Turkey – 359.8 kg per capita.

Sweden – 335.5 kg per capita.

Poland – 332.5 kg per capita.

In 2020 (the year of COVID-19), the average value of the ASCPC 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. Therefore, 2022 was a better year compared to the year of COVID-19, but a weaker one compared to 2021. The decrease of the value of ASCPC indicator for the EU (27) in 2022 compared to 2021 is a signal of a slowdown in the growth rate of the economy.

In 2021, a process of post-pandemic recovery of demand from steel-consuming sectors began globally. The steady increase in steel product consumption for the past five years stopped reaching its highest growth in 2021 at 1,841.7 million tons. In 2022, the world consumption of steel products was 1768.2 million tons and marked a decrease of nearly 4% compared to the previous year.

In 2022, despite the registered consumption declines of over 3% compared to the previous year, China remained the world's largest consumer with over 50% (920.9 million tons) of the global consumption of steel products. In 2022, the consumption in EU (27) was 138.8 million tons, with (-)15.2 million tons less compared to 2021. Globally, all regions of the world reported a decline in consumption, except for Middle Eastern countries (Iran, etc.), which reported an increase of 1.3 million tons.

2.3. PRODUCTION OF REFRACTORY MATERIALS AND PRODUCTS

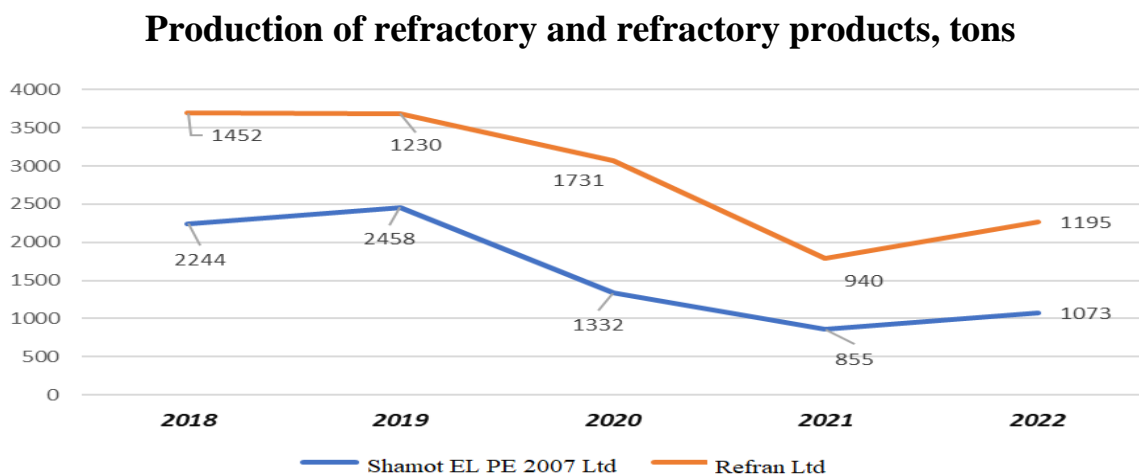
The production of refractory and refractory products is an activity directly related to the metallurgical industry. The main suppliers of refractory materials for lagging and coating of furnaces and aggregates for casting, storing, and spilling of liquid metal are the companies “Shamot EL PE 2007” Ltd and “Refran” Ltd, both are BAMI-members.

"Refran" Ltd is a company specialized in the production of high-value technological non-formed refractory products, insulation and construction materials and products, powder mixtures for metallurgy. The enterprise works according to the circular economy system and uses mainly secondary refractory materials as main raw materials. Production targets the demands of metallurgy, cement industry, thermal power plants, etc. The company undertakes construction and repair of heat-stressed objects.

In 2022, “Shamot EL PE 2007” Ltd has the capacity to produce semi-dry-formed fireclay refractory products and non-formed refractory materials (mertels and fractions), refractory concrete products on a chamotte, bauxite and corundum base for the needs of the steel industry. The enterprise also produces heat-insulating fireclay prod, acid-resistant bricks, clinker products for external and internal flooring and household products.

Data on the refractory and refractory products produced by both enterprises in the period 2018-2022 are given in Figure 2.21:

Figure 2.21



In 2022, the total refractories production of both enterprises was 2 368 tons, 573 tons (31.9 %) more than their production in 2021.

In 2022, "Refran" Ltd produced 1 110 tons non-formed refractories and 85 tons formed ones. Total production of the enterprise for 2022 was 255 tons more compared to the previous year, or a growth of 27.6%.

The production of “Shamot EL PE 2007” Ltd in 2022 was 1 073 tons, 218 tons (25.5 %) more, compared to 2021. The company's sales for the current year were 1,173 tons.

The production of both enterprises is mainly for domestic consumption, as the production depends on the quantities required for annual repairs and on the construction of new furnace units in various sectors of industry (metallurgy, energy). The enterprises produce refractories of limited type and quality, and the country's requirements are satisfied mainly by imports.

SECTION THREE

NON-FERROUS METALLURGY IN BULGARIA

3.1. PRODUCTION OF NON-FERROUS METALS

Non-ferrous metallurgy in Bulgaria is a sustainably growing industry with prospects for development in the upcoming European "green" transition. Achieving carbon neutrality and digital transformation will bring an increase in the consumption of both basic non-ferrous metals and a range of rare and rare-earth metal raw materials. Our country has experience as well as qualified personnel for the production of rare-earth metals, which is the cornerstone for being an active participant in this process. Bulgaria produces the basic non-ferrous metal (lead, zinc, and copper) from local and imported raw materials. These raw materials are primary concentrates, waste (scrap) and semi-products thereof. Throughout the metallurgical processing for the purpose of comprehensive utilization of the valuable components contained in the raw materials, other metals and by-products are also extracted that are then sold on the domestic market and for export.

Modern metallurgical facilities have been built along the processing chains for subsequent processing of non-ferrous metals and their alloys into finished products and products with high added value. Finished products and articles are used in construction, automotive, energy, engineering and other sectors of the economy, as well as in households. A considerable amount of lead is incorporated into the production of lead rechargeable batteries. As a result of that development, Bulgaria is one of the leading producers of non-ferrous metals in the EU. In recent years, in terms of production, our country has occupied either 5th or 6th place among all Member States.

In 2022 a number of internal and external factors influenced the non-ferrous metals production. The economic recovery in Europe and the rest of the world after the COVID-19 crisis led to increased consumption of metal raw materials and products in 2021 and a corresponding increase in their prices that continued in the first months of 2022. The war in Ukraine that began during the same period had a negative impact on the international markets. As a result, in the second half of the year the prices on the London Metal Exchange began to fall (Figure 13, 14, 15). The problems with high energy prices, which led to the growth of production costs and deterioration of financial results, continued throughout the year.

Therefore, there was no clear trend expressed in the production of base non-ferrous metals due to the fluctuating economic conditions, political instability in our country and the sanctions imposed on Russia. While copper production was growing along the entire value-added processing chain, lead and zinc production either remained at the level of the previous year or continued the decline that began in 2021. The production of rolled aluminum also decreased.

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 from primary and secondary raw materials. The modern production facilities for processing of ore concentrate and secondary metals are located in the town of Pirdop, where the final products are produced in separate technological chain units. The anodic copper, derived from the main metallurgical production is transferred for electrolytic refining. Part of it is delivered for direct export. The produced high-purity cathode copper is registered under the trademark "Pirdop" on the London Metal Exchange. The metals contained, mainly gold and silver, are concentrated in **anode sludges**, which are also exported for processing outside the country.

Facilities have been constructed to recover the sulphur from sulphide concentrates for the production of **sulphuric acid** in accordance with the best available techniques. 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) is then sold locally. The scheme closes the primary and secondary raw materials processing cycles with high utilization of useful components and protection of nature. There is an installation for extracting copper from old mines and processing it to cathode copper in "Asarel Medet" JSC, but the quantities are minimal.

"Aurubis Bulgaria" JSC is one of the major producers of copper in Europe and the EU, with high-tech solutions in production technology, energy efficiency, and nature protection, as well as a good working environment. In order to achieve these, over 1.5 billion BGN have been invested over a period of about 15-20 years. The programs for modernization are still on going.

Work on the construction of renewable energy capacities to meet the company's own needs for electricity continued in 2022. Work was also ongoing on the project for a photovoltaic installation with a capacity of 17 000 kWp for 8 million BGN. Technological equipment for 60 million BGN was replaced and modernized, while 7 million BGN were invested in objects to improve the infrastructure, building stock, etc. As a whole, more than 73 million BGN (**37.5 million EUR**) were invested.

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

In 2022, the amount of processed primary copper raw materials increased, compared to 2021, by 122.4 % while preserving the content of copper.

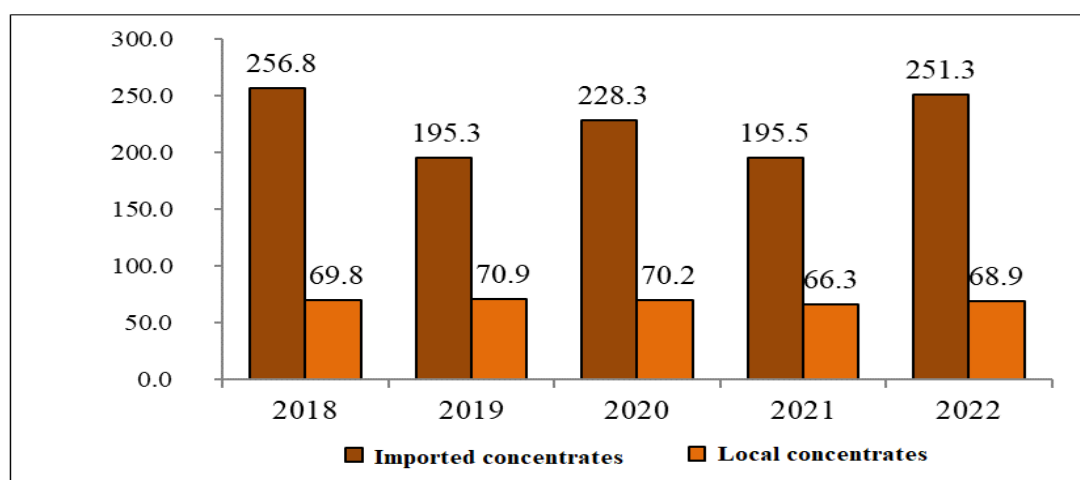
Table 3.1***Processed raw materials for the production of anodic and electrolytic copper***

Product	2018.	2019.	2020.	2021.	2022.	Difference 2022/2021	
						+/-	%
Concentrates, tons	1 364 490	1 160 132	1 346 197	1 177 643	1 441 149	263 506	122.4
copper contents, %	23.94	22.95	22.17	22.23	22.22		
metal contents, tons	326 661	266 250	298 452	261 790	320 257	58 467	122.3
incl. In imported	256 820	195 323	228 276	195 501	251 258	55 757	128.5
in local	69 841	70 927	70 176	66 312	68 999	2 687	104.1
Scrap (purchased), tons	41 844	39 814	43 759	36 701	45 283	8 582	123.4

Source: Company data.

Produced anodic copper marked the same growth of 122 %, mainly from imported concentrates. Imported concentrates were increased by 56 thousand tons. Only 2,7 thousand tons were processed into more raw materials from the local deposits (Assarel Medet and Elacite).

The local extraction of copper ores and concentrates cannot provide the necessary raw materials for capacity utilization. Therefore, more than three times more raw materials have to be imported from foreign markets, compared to local supplies. Thus, compared to local deliveries, over three times more raw materials have to be imported from foreign markets. The ratio between the domestic and imported raw materials for the recent five consecutive years is about 1:3 (Figure 3.1.). The increase in copper production is largely due to the increased amounts of imported raw materials. The relative share of imports in the overall processing is growing accordingly.

Figure 3.1***Processed concentrates, thousands of tons of metal***

For the second year now, the amount of recycled scrap is reducing, albeit slightly (-829 т.). As a result, the share of processed secondary metals in the total batch falls from 14% in 2021 to 10% in 2022, which is not due to a lack of raw materials in the country, since significant quantities are exported. Almost 11 thousand tons of copper waste were exported in 2022, which is 2.8 thousand tons more than the previous year. The entire amount of copper scrap that is being collected in the country can be processed in metallurgical enterprises, according to its quality and metal content.

The usage of secondary metals as raw materials in metallurgy has environmental, energy and financial effects. Therefore, a number of non-EU countries impose various restrictions on the export of scrap, which is a barrier to imports from these third countries. The EU has turned from being a net importer to a net exporter, contrary to the objectives of the circular economy and industrial decarbonization. However, there has been no change in the respective policies with a view to preserving the interests of European producers.

Table 3.2 and Figure 3.2 outline the production of anodic and electrolytic copper in “Aurubis Bulgaria” JSC for the period 2018-2022.

Table 3.2

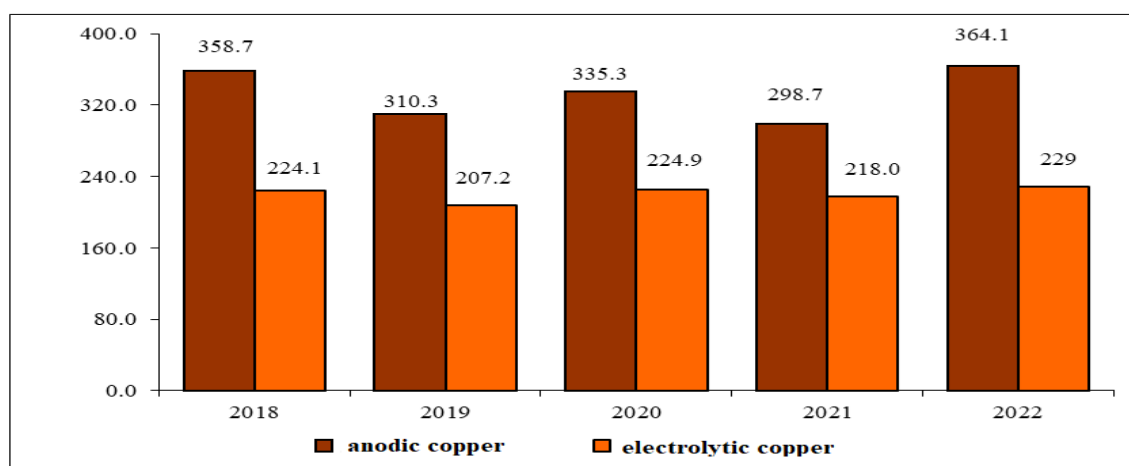
Production of anodic and electrolytic copper, tons

Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Anodic copper	358 676	310 245	335 306	298 728	364 178	65 450	121.9
Electrolytic copper	224 098	207 196	224 880	218 020	229 070	11 050	105.0

Source: Company data.

In 2022 “Aurubis Bulgaria” JSC produced 364 thousand tons anodic copper, 65.5 thousand tons more compared to 2021, which was the peak for the indicated period. In 2022 there was also a 105 % growth in electrolytic copper production, which is the largest amount compared to previous years, as seen in Figure 3.2. At this stage, the copper electrolysis workshop capacity cannot cover the processing of the all anode copper produced in 2023. That is the reason why the company's annual export of anodes to other members of the Aurubis Group will also continue in the coming years.

Figure 3.2

Production of anodic and electrolytic copper, thousands of tons

Increased quantities of processed primary raw materials (copper concentrates) also resulted in an increase in the production of sulphuric acid. The sulphuric acid production in 2022 was 1 450 214 tons, 266 121 tons more compared to 2021 when 1 184 093 tons were produced.

The variety of global crises, e.g. economic, epidemic, political, etc., affected the metallurgical industry, since metal is the basis of the raw material balance of numerous sectors in today's world. However, different regions are affected to different extents. Globally, electrolytic copper production was also growing and reached 25 641 thousand tons in 2022 (Table 3.3), 816 thousand tons more compared to 2021, or a growth of 103.3 %.

Table 3.3**World production of electrolytic copper, thousands of tons**

Region	2020	2021	2022	Difference 2022/2021	
				+/-	%
Asia	14 169	13 462	14 130	668	105.0
America	4 382	4 394	4 214	-180	95.9
Europe	3 922	3 888	3 725	-163	95.8
Incl. EU-27	2 666	2 681	2 569	-112	95.8
Africa	1 536	1 685	2 163	478	128.4
Other	428	1396	1 409	13	100.9
Total	24 437	24 825	25 641	816	103.3

Source: ICSG

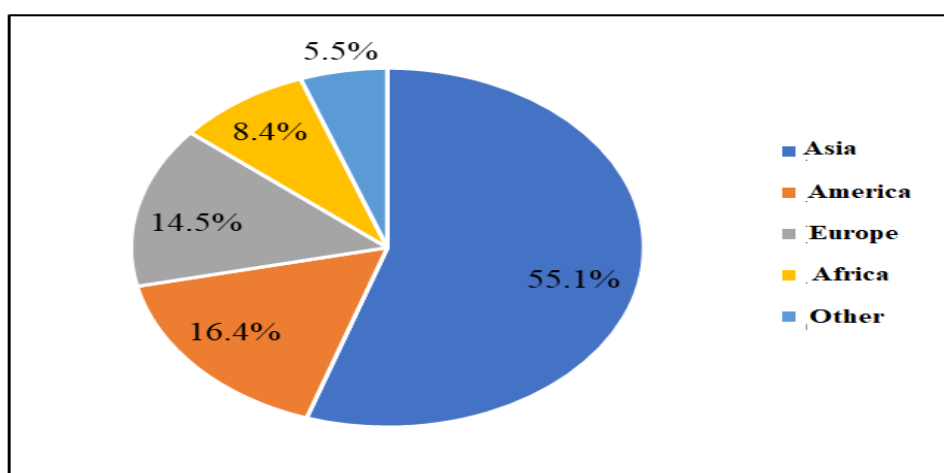
Asia was the largest producer among all regions with a share of 55.1 % of global electrolytic copper production and a growth of 105 %. America retained second place with a share of 16.4% (17.7% in 2021), but its production decreased by 180 thousand tons, which is almost 4%. In 2022 there was also a drop in the electrolytic copper production in Europe with 163 thousand tons fewer, or 95.8% compared to 2021. Nevertheless, it retained third place. The relative share of Europe of 17.7% in 2021 dropped to 14.5% in 2022.

In 2022, in the electrolytic copper production in Europe, the EU had the largest share of 69 %, maintaining the level of the previous year, but the production volume decreased by 112 thousand tons, or 95.8 %. **In the global electrolytic copper production, the EU's share of 11% in 2020 and 10.8% in 2021 has decreased to 10% in 2022.** Copper has an important role in the implementation of decarbonization policies. Therefore, high growth in consumption has been expected. The observed decline in copper production will make the EU economy heavily dependent on imports from third countries. For these reasons copper is subject to the new regulation that establishes a framework to ensure a secure and sustainable supply of critical raw materials, important to the EU economy (Critical Raw Materials Act).

Africa has also marked a high growth of 128.4 %. Africa has increased its electrolytic copper production by 478 thousand tons and is now a comparable producer with the EU. This could be considered as an indicator of the beginning processes of "carbon leakage" and the shift of the main industries to regions with low production costs and available resources.

Figure 3.3

Production of electrolytic copper by regions, 2022 г., %



The increased copper production in Bulgaria strengthens its role in providing resources for the European economy. In 2022, electrolytic copper produced in Bulgaria had a share of **8.9 % of the EU's production**, compared to 8.1 % in 2021 and 8.43 % in 2020. Bulgaria retained its share of 0.9 % in the

global production and marked an increase in the production of **Europe from 5.6 % to 6.1 %**.

Based on the overall copper production, incl. anodes, the relative share of Bulgarian producers is significantly higher - 1.4% in global production and 14.2% in the production of the EU. Figures in 2021 were 1.2%, and 11.2%, respectively.

3.1.2. LEAD PRODUCTION

Bulgaria produces lead from primary raw materials/concentrates, from secondary metals and end-of-life lead batteries. The amounts of processed secondary lead raw materials have been increasing annually and for the recent five years a growth of 280 % was reported (Table 3.4). The processing of battery waste into lead ingots and alloys is carried out in “KCM” JSC, “EL BAT” JSC and “Monbat Recycling” PJSC.

“KCM” JSC, Plovdiv is the largest producer of lead and zinc in South-Eastern Europe and the only enterprise in Bulgaria for processing primary and secondary lead and zinc raw materials into ingots with high purity. The company is part of KCM 2000 Group, a modern business structure, completely built with Bulgarian private capital. It develops extraction of lead and zinc ores, processing to concentrates, metallurgical production of metals and alloys, sulphuric acid and other chemical products, trade, technology engineering, complex industrial service, construction and business activities, etc.

Modern technologies ensure the extraction of precious metals and other accompanying elements (gold, silver, cadmium, tellurium, bismuth, antimony), as well as the use of sulphur from the concentrates for the production of sulphuric acid. On the basis of circular economy and the application of an integrated approach to the technologies for processing concentrates, intermediate products and waste, a deep and complex utilization of the raw materials used in lead and zinc production has been achieved.

Lead production is part of the “Technological renewal and expansion of production” project (TREP). With the completion of it, the investments made in “KCM” JSC exceeded 500 million BGN. New high-tech schemes for lead production, waste gas purification and sulphuric acid production have been installed and the capacity for processing of waste and intermediate semi-products has been increased.

The lead and zinc ores extraction in the country delivers about 30 % of lead concentrates and about 20 % of the zinc concentrates required for processing. Concentrates are imported every year to ensure normal operations and optimal capacity utilization. The volumes of processed primary concentrates, incl. local and imported, as well as the delivered secondary raw materials for the production

of lead in “KCM” JSC for the last five years are given in Table 3.4 and Figure 3.4.

In 2022, lead and processed concentrates were 5 375 tons fewer than in 2021. There was a decrease in the amount of lead in primary raw materials: 2.4 thousand tons fewer in local concentrates and 3 thousand tons in imports.

Table 3.4

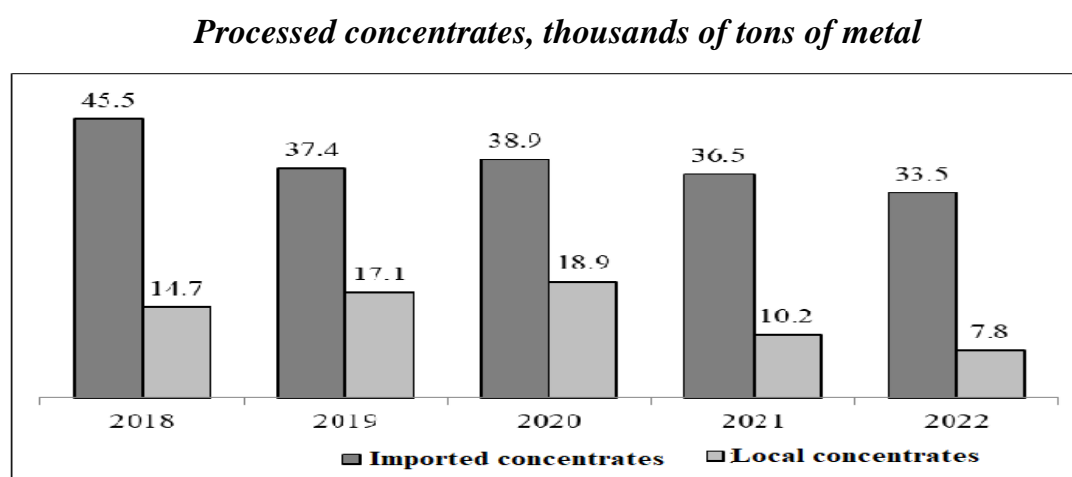
Raw materials for the production of primary lead, tons

Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Metal in concentrates	60 192	54 468	57 793	46 672	41 297	-5375	88.5
Incl.: in imported	45 469	37 371	38 873	36 479	33 472	-3007	91.8
in local	14 723	17 097	18 929	10 193	7 825	-2368	76.8
Waste/semi-finished products (imported)	11 809	18 356	18 226	24 967	33 101	8134	132.6
Total	72 001	72 824	76 019	71 639	74 398	2759	103.9

Source: Company data.

Processed secondary raw materials increased by 8.1 thousand tons, while the presence of metal in raw materials increased by 2759 tons. The ratio between the shares of processed own and imported concentrates changed. From levels around and slightly above 30% in 2021, in 2022 the processed own concentrates took a share of 19 %. The share of the concentrates from imports in 2022 was 81%.

Figure 3.4



Lead waste and semi-products processed in “KCM” JSC are increasing and in 2022 there was a growth of 132.6 % compared to 2021. In 2022, 33 thousand tons of lead were obtained from secondary products, or a share of 44.5% of the overall amount of metal gained from all processed raw materials. This is the

largest amount of processed secondary metal and is the result of the policies of the company to change the structure of raw materials, improve energy efficiency and protect the environment. Battery waste is processed in a specialized installation for separation and the resulting fractions are included in the technological scheme for lead production.

Modern facilities for the processing of lead battery waste and end-of-life lead batteries have also been built in the other two enterprises in the country - "Monbat Recycling" PJSC and "EL BAT" JSC.

"Monbat Recycling" PJSC processes waste batteries, plates, lead slags, pastes, fractions and other waste into lead and lead-calcium alloys. The company is a part of Monbat Group. It has closed-cycle production and sales, which mainly satisfies the metal needs of "Monbat" JSC - a company manufacturing finished products - lead batteries. The installed equipment complies with European requirements and environmental standards. Sodium sulphate is produced as a by-product (Table 3.12). The high requirements force the company to annually invest in modernization, new equipment and environmental protection. In 2022 the investments of the company accounted to 190 thousand BGN.

"EL BAT" JSC is a fast developing company with modern processing installations for separating and melting various types of lead and waste batteries. In recent years, the capacity has been doubled. The implementation of projects related to enhancing capacity, replacing equipment, improving working conditions and protecting the environment are ongoing. In 2022, the investments were 6 million BGN.

Data on locally produced 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

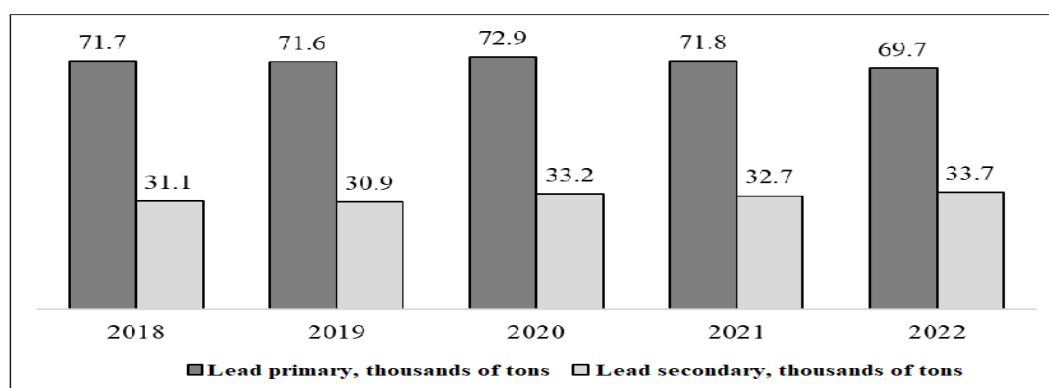
<i>Lead production, tons</i>							
Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Lead, block/primary/	71 697	71 595	72 992	71 822	69709	-2113	97.1
- KCM JSC	71 697	71 595	72 992	71 822	69709	-2113	97.1
Lead and alloys, secondary	31 111	30 878	33 153	32 673	33719	1046	103.2
Monbat Recycling PJSC	16 211	15 878	18 153	17 693	18729	1036	105.8
El Bat JSC	14 900	15 000	15 000	14 980	14990	10	100.1
Lead - total	102 808	102 473	106 145	104 495	103428	-1067	99.0

Source: Company data.

In 2022, “KCM” JSC reported a decrease in the primary lead production of 2.9%. In the case of secondary lead production, a growth of 3.2% was reported compared to 2021. For "Monbat Recycling" PJSC the increase was 5.8%, and for "EL BAT" JSC - 0.1%. Overall, 1 069 fewer tons of lead and alloys were produced in 2022, representing 99% of the 2021 production.

Figure 3.5

Lead production, thousands of tons



In 2022, production from secondary raw materials processing alone increased by 1 046 tons, accordingly the relative share also increased to 32.6%, compared to 31.2% in 2021.

In Bulgaria there is a system for controlling the entire cycle of consumption, end-of-use, collection, and utilization of products containing lead (lead batteries). These requirements meet European and Bulgarian legislation, and this determines the high rate of recovery of secondary lead raw materials.

Lead is the most recyclable material and production from secondary raw materials has a wide application. Secondary lead has a share of 55% of the global production. In the USA this share is 100%, and in the EU, incl. Bulgaria, it is 75%. For rechargeable batteries, recycling in the USA and in the EU reached up to 99% for all parts, without waste.

The main producers of lead in the world are China, the USA and Australia. Almost 50% of the global production of refined lead is in the USA, Japan, Germany, and Great Britain. The global lead production by regions and in the countries with the largest production in recent years are given in Table 3.6.

Table 3.6

World lead production, thousands of tons

Country/Region	2020	2021	2022	Difference 2022/2021	
				+/-	%
Asia, incl.:	7 491	7 917	8098	181	102.3
- China	4 966	5 203	5226	23	100.4
- India	818	893	966	73	108.2
- Republic of Korea	709	790	460	-330	58.2
Europe	1 885	2 032	1801	-231	88.6
- EU 27	1 338	1430	1300	-130	90.9
incl. Germany	320	310	227	-83	73.2
Spain	175	192	192	0	100.0
Poland	153	158	154	-4	97.5
Italy	140	158	133	-25	84.2
Belgium	101	122	110	-12	90.2
Bulgaria*	106	105	104	-1.0	99.0
America,	2 019	2 012	1973	-39	98.1
incl. USA	1 100	975	951	-24	97.5
Other	287	318	299	-19	94.0
Total	11 682	12 279	12171	-108	99.1

Source: ILZSG, *company data

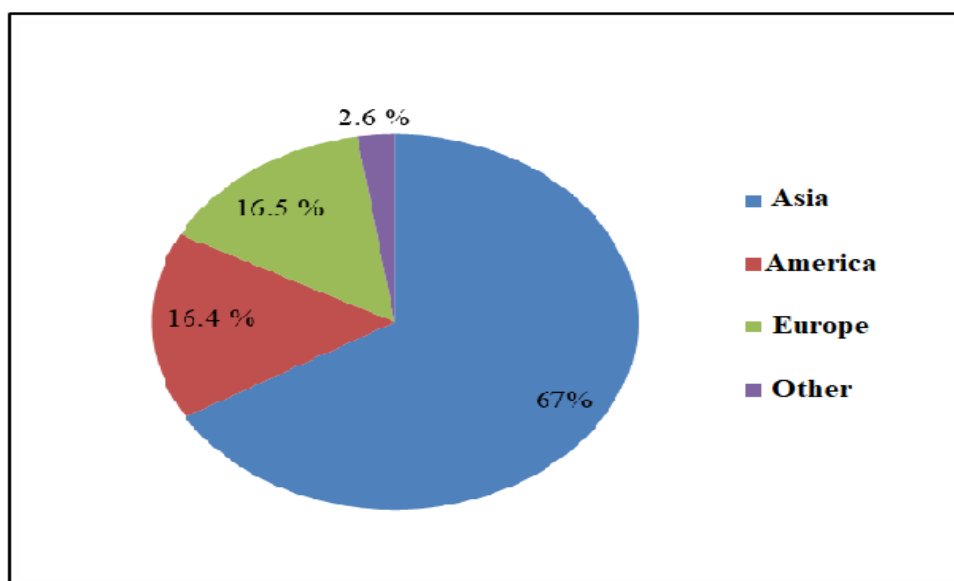
In 2022, a decline in lead production was observed in all the regions in the world apart from Asia, which reported growth of 2.3 % and increased production in almost all Asian countries.

Traditionally, Asia is the largest producer with a relative share of 66.5 % of global production. After 2020 lead production in Asia maintains a growing trend. In 2022, there was an increase of 181 thousand tons in lead production, or 102.3 % growth. China has a share of 64.5 % of the regional production and a share of 42.9 % of the world production of lead. For comparison, in 2021 this share was 42 %.

Europe, contrary to the progress achieved in 2021, reported a 11.4 % decline in lead production in 2022. Europe produced 231 thousand tons less than in 2021, which moved it to third place in the world ranking with a relative share of 14.8%. Figure 3.6 shows the relative shares in 2022 by region.

Figure 3.6.

Lead production by regions, 2022 z., %

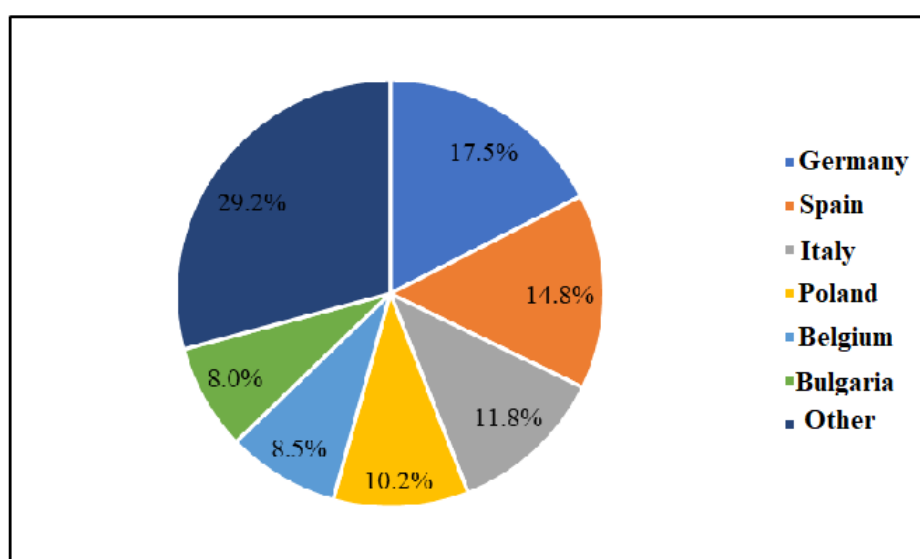


The 172 thousand tons more produced in America compared to Europe put America in second place in global production with a relative share of 16.4 %. In 2022, the share of EU (27) in lead production on the continent of Europe was 72 %. The largest producer was Germany, with 227 thousand tons produced in 2022, notwithstanding the drop of 26.8 % in 2022, compared to 2021. Spain ranked in second place with 192 thousand tons and 0% growth. Poland, Italy and Belgium rank third, fourth and fifth, with production of 158, 133 and 110 thousand tons respectively. Bulgaria occupied the sixth position in the production of EU (27) with 104 thousand tons lead produced in 2022.

Figure 3.7 shows EU countries producing over 100 thousand tons of lead and their shares in the overall EU production.

Figure 3.7

Countries – leading producers of lead in EU-27, 2022



In 2022, Bulgaria produced 1 067 tons of lead fewer than in 2021, **but nevertheless it remains a large producer in Europe and in the EU, with a share of 5.8% and 8%, respectively. It retains the sixth position in the ranking of EU (27) producers.**

3.1.3. ZINC PRODUCTION

“KCM” JSC is the only producer of zinc from ore concentrates in the country. It integrates the schemes of lead and zinc production and achieves complex utilization of useful components through the use of circular models for the processing of primary and secondary raw materials and technological semi-products. . As a result of this technology, in addition to zinc and lead, other metals, alloys and chemical products are also obtained (Table 3.12).

Table 3.8 shows the processed concentrates in 2022, both local and imported, as well as other waste products purchased and consumed in the production (in amount of metal).

Concentrates processed in 2022 contain **53 242 tons of zinc, which is 8 488 tons of metal fewer than in 2021 (61 730 tons)**. The own concentrates have a small decline, reducing the processed concentrate from imports by almost 8 thousand tons, which is partially compensated by the processing of secondary products, with 4.2 thousand tons more metal than the previous year.

Table 3.8

Processed raw materials for the production of zinc, tons

Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Metal in concentrates, incl.:	59 646	54 688	60 299	61 730	53 242	-8488	86.2
- in imported	48 279	40 118	44 610	47 174	39 480	-7694	83.7
- local	11 367	14 570	15 689	14 556	13 762	-794	94.5
Processed waste (imported)	18 191	19 231	18 907	14 855	19 055	4200	128.3
Total	77 837	73 919	79 206	76 585	72 297	-4288	94.4

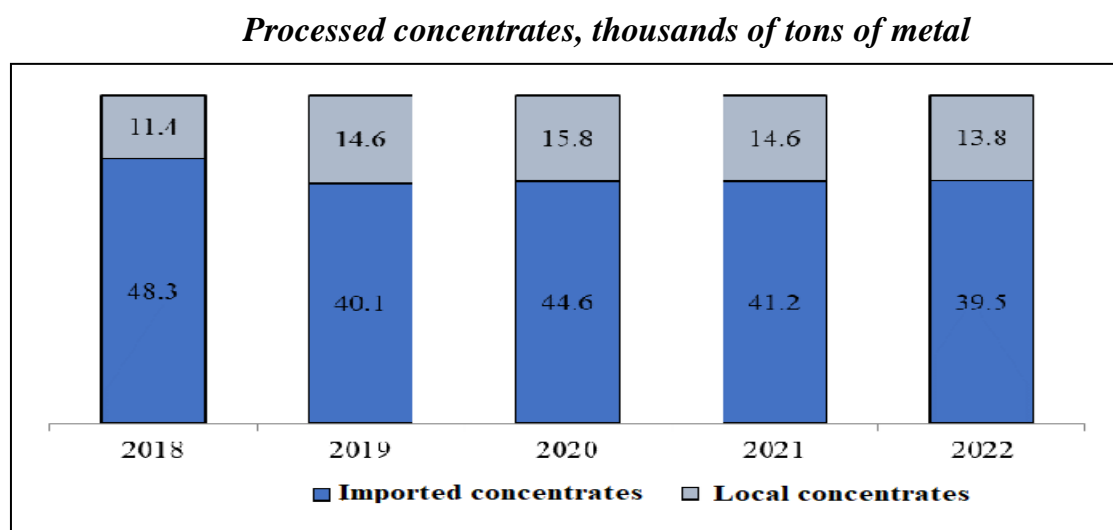
Source: Company data

Despite the reported decline of the metal in its own concentrates, the trend in recent years for its relative share to be over 25% is maintained. The share was

below 20 % before that. Figure 3.8 presents the ratio between imported and locally produced primary raw materials processed over the years.

Ore extraction is expected to grow following the acquisition of ownership of the extraction assets for lead and zinc by KCM 2000 Group. Accordingly, the quantity of own concentrates is expected to increase.

Figure 3.8



Secondary raw materials were also processed throughout the year. They contained 19 thousand tons of metal, which is 26.4 % of the overall batch. In 2021 these raw materials were 19.4 %.

Reconstruction and modernization of the facilities for the processing of more secondary zinc raw materials, including intermediate products from other productions, is one of the goals of the upcoming "Technological integration of KCM JSC" project.

Table 3.9 shows the data of zinc production over the recent five years.

Table 3.9

Zinc production, tons

Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Zinc - total	75 150	73 512	74 520	72 418	72 527	109	100.2

Source: Company data

In 2022, 72 527 tons of zinc were produced, which is 109 tons more compared to 2021, or a growth of 100.2 %. The dramatic increase in electricity prices, which began in September 2021, and the high energy cost for producing the cathode zinc by solution electrolysis, had a negative impact on production performance. The slump in stock exchange prices that began in the second half of 2022 had an additional impact.

The completed modernization of the unrefined lead production facilities and the installation of a high-tech smelting scheme for the raw materials have improved the working conditions, the working environment, energy efficiency and environmental protection. Nonetheless, investment continues. A new project for the "Technological Integration of KCM Plc" has started.

In addition to the planned "New Refinery" for lead, the project covers a large-scale renovation of the facilities at the zinc enterprise, including a "New Electrolytic Shop" and modernization of the waelz kilns. This allows the processing of additional quantities of secondary zinc products and increasing quality and energy efficiency.

Overall, **in 2022, more than 26 million BGN have been invested** for the basic engineering of sub-projects of the new project, reconstruction of the casting line, reconstruction of blast furnace 2, replacement of technological equipment, social facilities, etc.

Global production and consumption of zinc are expected to grow, given the application of zinc in galvanization. Zinc coated steel due to its low-carbon transformation is used in fundamentally important sectors of the economy such as renewable energy sources, electric cars, heat pumps, construction, etc.

Table 3.10 outlines the global zinc production by region, the largest producers and their rise/fall compared to the previous year. **Figure 3.9** presents the share of each region in global production.

Global zinc production in 2022 was 13.3 million tons. It had fallen to 96.4 % of the quantity produced in the previous year. The decrease was 492 thousand tons.

Like other non-ferrous metals, Europe and America decreased their zinc production by 253 thousand tons (89.7%) and 169 thousand tons (90.6%), respectively. The decrease in Europe was solely the result of the decrease in production in the EU.

Table 3.10

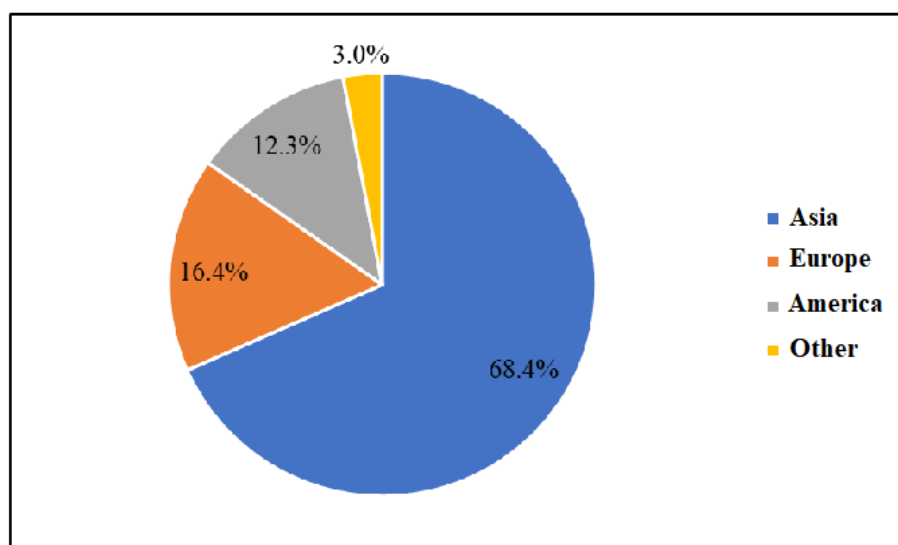
World zinc production, thousands of tons

Country/Region	2020	2021	2022	Difference 2022/2021	
				+/-	%
Asia, incl.	9 017	9 118	9 121	3	100.0
• China	6 342	6 408	6 358	-50	99.2
• Republic of Korea	904	840	881	41	104.9
• India	716	779	838	59	107.6
Europe, incl.	2 425	2 445	2 192	-253	89.7
• EU-27	2 023	2 068	1816	-252	87.8
incl. Spain	504	509	505	-4	99.2
Finland	297	291	294	3	101.0
Belgium	273	267	263	-4	98.5
The Netherlands	250	260	180	-80	69.2
America, incl.	1 799	1 804	1 635	-169	90.6
• Canada	685	643	485	-158	75.4
Other	459	467	394	-73	84.4
Total world	13 700	13 834	13 342	-492	96.4

Source: ILZSG

Asia retained the volumes of the previous year, with a small increase of 3 thousand tons. The region was again the largest producer of zinc with 9.1 million tons and an enlarged share of 68.4%, compared to 66% in 2021. The share of China of zinc production in Asia was 70%, and in global production was 48% (46% in 2021). Zinc production in China was almost twice that of the EU (27) and America combined. **America occupied third place with a share of 12.3%**, compared to 13% in the previous year and produced 169 thousand tons fewer.

Figure 3.9

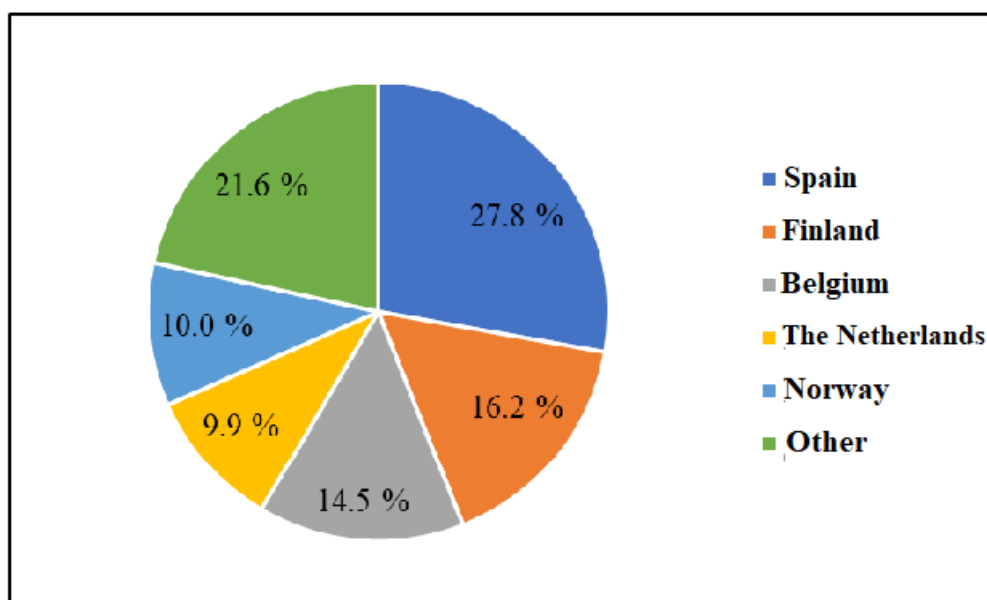
World zinc production (by region), 2022, %

Europe retained the second place in zinc production among all regions with a relative share of 16.5% (17.7 % in 2021 and 18 % in 2020), despite the annual decline of 253 thousand tons (89.7%). The reported decrease was formed entirely by the reduced production in the EU (27). The share of EU (27) in the overall European zinc production in 2022 was 82.8 % (84.6 % in 2021) and it was 13.6 % of world production(14.9 % in 2021). Figure 3.10 presents the partitions in the total zing production in the EU (27) by leading producers.

Spain was the largest zinc producer in Europe with a relative share in the EU (27) of 27.8 %. Spain has maintained its production volume for the past three years. Finland was next with a share of 16.2 %, followed by Belgium with 14.5 %. Both have preserved their production volumes, with small differences, during the same period. Among the major producers, the Netherlands reported a very large drop in production – nearly 30%.

Figure 3.10

Leading EU-27 zinc producers



Base metal production figures for 2022 show that the EU was losing ground as a producer of important raw materials for the economy. The adoption of the **Critical Raw Materials Act (CRM)** is a means to stabilize and increase the production of important raw materials and reduce dependencies on third countries in the process of achieving the goals of decarbonization of economies and zero emissions from industry. Zinc and lead are not included in the list of critical raw materials. EUROMETAUX, being a representative organization of European producers of non-ferrous metals, proposed the inclusion of zinc in the list of strategic raw materials. BAMI supports EUROMETAUX's proposal, and the competent Bulgarian institutions have been informed about it.

Zinc, produced in Bulgaria in 2022 accounted for 4% of the total zinc production of the EU (27), compared to 3.5 % in 2021.

3.1.4 PRODUCTION OF PRECIOUS, BYPRODUCT METALS, ALLOYS AND CHEMICAL PRODUCTS

The integrated technological schemes for the processing of lead and zinc raw materials in "KCM" JSC are an example of the effective application of circular economy in the metallurgy of Bulgaria, because a number of other precious and rare metals and chemical products (sulphuric acid, cadmium, tellurium, bismuth, gold, silver) are extracted in the processing chains of the intermediate and waste products with the main metals.

The volume of **precious and associated metals** depends on their content in the processed basic raw materials. **Table 3.12** shows the production of metals and chemical products in 2022 and in each of the previous four years.

Sulphuric acid in the country is produced only by metallurgy as a by-product of waste metallurgical gases. In both extraction enterprises - "KCM" JSC and "Aurubis Bulgaria" JSC, sulphide ore concentrates are processed. Sulphuric acid is produced from the sulphur contained in the ore concentrates under a high degree of utilization. The installed capacities are on par with the best contemporary technologies and the EU environmental legislation. Sodium sulphate is obtained as a by-product in the technological process at "Monbat Recycling" PJSC.

Table 3.12

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

Product	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Cadmium ingots, tons	313	315	311	343	315	-28	91.8
Silver, kilograms	41 315	35 145	32 760	31 816	20 247	-11 569	63.6
Gold, kilograms	296	295	70.52	53.76	33.88	-19.88	63.0
Tellurium, kilograms	3 931	2 944	3 676	2 797	2790	-7	99.7
Sodium sulphate, tons	785	1 260	3 139	1 928	908	-1 020	47.1
Sulphuric acid, tons	1 449 979	1 295 322	1 519 940	1 328 712	1 576 459	247 747	118.6

Source: Company data

In 2022 the processing of primary lead and zinc concentrates in “KCM” JSC decreased, at the expense of secondary raw materials, which resulted in reduced production of associated metals and sulphuric acid contained in the primary concentrates. Sulphuric acid produced in “Aurubis Bulgaria” JSC, which is the main producer of the product, achieved a high growth, while the share of “KCM” JSC declined. The ratio between the two producers was 8.7%:91.3%, and production was 126 thousand tons and 1 450 thousand tons, respectively.

Notwithstanding the correlation between produced associated metals and processed primary raw materials, the expanded processing of secondary metals has led to improvement in important economic and production indicators. This is a part of the circular economy and a permanent goal for any metallurgical production.

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

Bulgarian non-ferrous metallurgy is developing sustainably in the subsequent chains from metal processing to high added value 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, the capacity and nomenclature of production has increased over the years.

In 2022, copper-based **heavy non-ferrous metal** products (copper and brass) and products from light metal - aluminum and aluminum alloys - were produced in the country. **Table 3.13** shows production in 2022 and in each of the previous four years. The total production in non-ferrous processing enterprises has marked sustained growth for a period of about 20 years. In 2019 alone, at the beginning of the Covid-19 pandemic, a small drop (about 1%) was reported, as a result of the impact of the coronavirus crisis on consumption and logistics. After years of growth, 2022 is the first year when "Alcomed" JSC, the largest producer of aluminum rolled/pressed metal, reduced its production by almost 20%. An increase of 103.4 % was reported in the processing of heavy non-ferrous metals.

Bulgarian producers of finished products from non-ferrous metals work mainly for export and their share in the sales of each product ranges from 90% to 99%.

In 2022, the overall production of articles from heavy and light non-ferrous metals was 191 961 tons, which is 11 594 fewer than the previous year. Due to the high drop in aluminum rolled/pressed metal production, its share decreased, but remained quite high - 51.3 %, compared to 55.6 % in 2011.

Table 3.13

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

Product	2018	2019	2020	2021	2022		Difference 2022/2021	
					tons	%	+/-	%
<i>Rolled/pressed heavy non-ferrous metals and alloys, incl:</i>	80 539	79 678	82 913	90 447	93 491	48.7	3044	103.4
coper	64 197	62 531	66 665	73 139	79 404	84.9	6265	108.6
brass	16 342	17 147	16 248	17 308	14 087	15.1	-3221	81.4
<i>Rolled/pressed aluminum- Total, incl:</i>	94 424	92 862	98 297	113 108	98 470	51.3	-14638	87.1
Alkomet JSC	68 334	68 484	73 515	88 883	70 903	72.0	-17980	79.8
Etem Gestamp Aluminum Extrusions JSC	24 885	22 994	23 329	23 000	27 567	28.0	4567	119.9
EMC Distribution PLtd	1 205	1 384	1 453	1 225	1036	1.1	-189	84.6
Total:	174 963	172 540	181 210	203 555	191 961	100.0	-11594	94.3

Source: Company data

“Sofia Med” JSC is the only modern enterprise in the country, specialized in the production of rolled and pressed metal from heavy non-ferrous metals and alloys. It is part of the Greek holding group Viohalco, one of the largest investors in the industry of Bulgaria. At this stage, the company mainly processes copper and copper alloys into various types and sizes of sheets, strips, plates, circles, disks, rails, rods, profiles and components for mechanical engineering. They are widely used in industry, energy, construction, household and other sectors of the economy. Depending on the market demand, they can also produce products from zinc, lead and their alloys. Throughout the years, the quantities of copper products have increased and those of brass have decreased. For the specified five-year period, their relative share decreased by 5%.

In 2022, the total production increased by over 3 thousand tons (103.4 %), due to 108.6% growth (6 265 tons) of copper products. Brass products decreased by 3 221 tons, or up to 81.4 % of the production in 2021, with a share of 15 % of total production.

Figure 3.11 presents the production of copper rolled/pressed metal and copper alloys for the period 2018-2022. Mainly copper rolled/pressed metal (including special copper alloys) is produced, and over the years the share of

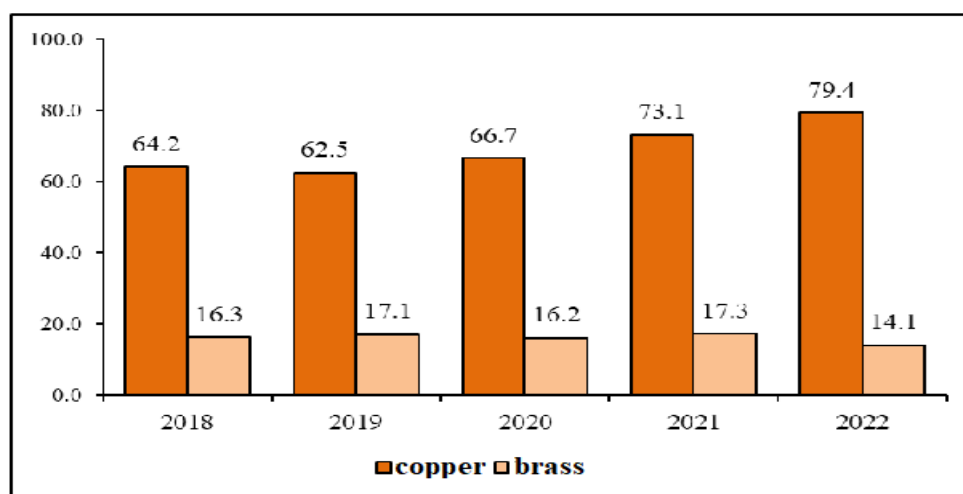
brass production in the total amount has decreased - from 20.2% in 2018 to 15.1% in 2022.

The company produces two types of copper products - rolled (flat) and pressed (long). Flat products have a higher relative share. In 2022, 45 714 tons rolled metal and 32 690 tons pressed metal were produced, with relative shares of 58.8 % and 41.2 %, respectively.

Only rolled products are produced from brass. Therefore, **rolled products represent 65% of the total production, and pressed products - 35%.**

Figure 3.11

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



In 2022, “Sofia Med” JSC processed **32 929 tons secondary copper, 2 594 more than in 2021** (30 335 tons) and 6 459 tons over the processed secondary copper in 2020 (26 494 tons). The brass contained in this quantity was only 921 tons, similar to 2021 (898 tons). In 2022, only 1540 tons copper waste were local deliveries, or 4.7% of the total amount of secondary copper. In 2021, the local deliveries were slightly higher - 2 326 tons or 7.7%.

The share of **secondary metals has already reached 35%** of processed raw materials during the year, which has led to an improvement in economic efficiency and, accordingly, the competitiveness of production.

“Sofia Med” JSC, annually invests in projects for dozens of million BGN with the aim to meet the requirements of the market and to improve its efficiency. **In 2022, 9.3 million BGN were invested** in completion works to increase the rolled products capacity and the quality of the production. In 2021, 12.5 million BGN were invested.

Among the members of BAMI, “Alcomet” JSC, Shumen and “Etem Gestamp Aluminum Extrusions” JSC, Sofia produce products and articles from light non-ferrous metals (aluminum and alloys thereof). Raw materials for their production are imported primary aluminum ingots, metal waste and aluminum blanks. "EMC Distribution" Ltd, Ruse produces welded tubes and profiles from

aluminum strips/sheets. There are other capacities for production of aluminum profiles by extrusion in the country, but their owners are not members of the Association and are not included in this analysis.

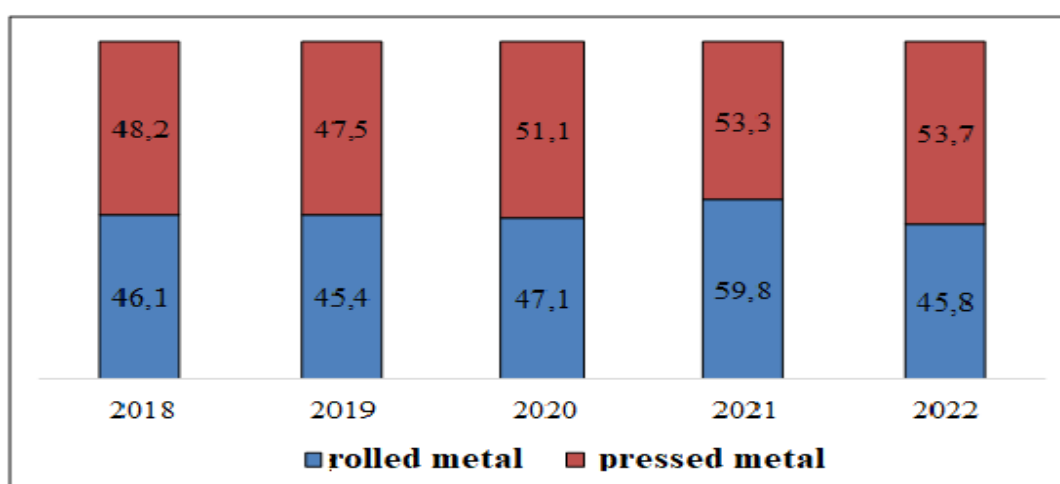
Table 3.13 shows the total production of aluminum rolled/pressed metal and by producers. Figure 3.12 gives quantities and shares of pressed and rolled aluminum. In 2022, total production of rolled/pressed aluminum was 98.5 thousand tons and decreased to the levels in 2020 before the crises (below 100 thousand tons). Compared to 2021, 14 638 tons fewer were produced, or a **drop of 87.1 %**.

“Alcomet” JSC, Shumen is the largest producer in the country of products made of light non-ferrous metals (aluminum and aluminum alloys) and the only enterprise with installed capacities for melting primary aluminum and casting blanks for the subsequent processing of the metal in rolling and pressing production. The company is the leading producer and exporter of aluminum foil in the EU. After the ownership changes and basically throughout the last decade, the company has implemented large-scale projects to increase capacity, expand the product range and to improve quality of production, the environment and the working environment. The production of high value-added products has been developed, including components for the automotive industry in Europe.

“Alcomet” JSC is the only producer of flat rolled/pressed metal in the country. All other capacities are for the production of extruded long products. The ratio between flat rolled and long pressed products in the company is 2:1. In 2022 it was 1.83:1. Figure 3.12 gives the quantities of aluminum rolled and pressed metal.

Figure 3.12

Total production of aluminum rolled/pressed aluminum metal, tons



In 2022, the company produced 70 903 tons rolled/pressed metal from aluminum and aluminum alloys, which is 17 980 tons fewer than in 2021. The reported decrease was 79.8 %. In 2021 there was a growth of 121 %. Aluminum rolled/pressed metal production in 2022 accounted for 72% of the company's total production, compared to 78.6% in 2021. The reason for the drop was overall lower production of rolled products, due to a decline in consumption and prices, as well as significant stockpiles in world markets resulting from overproduction in the previous year.

In 2022, “Alcomet” JSC invested **16.7 million BGN** in new lines for longitudinal cutting and anodizing, a wastewater treatment plant, construction of renewable energy sources, and optimizing the processes in the furnaces for heating and melting the metals. The implementation of projects in new capacities and technologies have continued, as well as the development of production of high value-added products.

The processed aluminum waste in 2022 was 2 014 tons and sharply decreased (almost 5 times) compared to the processed 9 590 tons in 2021. A problem for increasing the quantities delivered from the country is their mixed nature due to lack of good practices for separate collection and subsequent separation. The mixed waste deteriorates the quality and options for direct input as raw material in the smelting installations, subsequent rolling and pressing facilities and their further processing into quality products. At this stage recycling companies are directly exporting huge quantities of aluminum waste.

In 2022, **“Etem Gestamp Aluminum Extrusions” JSC** and **“Gestamp Etem Automotive Bulgaria” JSC** produced 27 567 tons aluminum profiles, 4 567 tons more than in 2021, i.e. a growth of 120 %. The annual production of aluminum profiles extended its share to 28 % of total production of the two enterprises, compared to 20.3 % in 2021. Investments of 15.6 million BGN were made throughout the year in capacity, for high-tech products for the automotive industry and for consumption in other sectors important for the economy.

“EMC Distribution” Ltd is a small producer of aluminum products with a share of 1.1 % of the total aluminum production in the country. In 2022 it produced 1 036 welded aluminum pipes and profiles, with 189 tons fewer than in 2021 and reported a drop for the second year.

3.1.6. UTILIZATION OF NON-FERROUS METAL WASTE

Metals are raw materials with an “infinite” circle of recycling. The waste utilization in extracting and processing metallurgical enterprises improves their economic indicators, energy, and environmental efficiency. Extending the share of waste in the raw material balance is important for producers and has been included in the sustainable development programs at the European, national and company levels. Bulgaria has a relatively strong system for collecting waste from

the main metals - iron, copper, lead, aluminum and zinc, and the country meets the goals laid down in the EU legislation for recycling of different metals. There are still no satisfactory results regarding the separate collection and recovery of metals from electronic scrap, as well as the usage of other industrial waste, e.g. slag, refractories, dusts, etc. There are also problems with the quality of secondary metals that recycling companies deliver to metallurgical enterprises. Because of insufficiently organized activities for separate collection and subsequent processing to improve quality, their usage in the production of final products is hampered, reducing the options for more efficient utilization.

Data for non-ferrous metals utilized by the metallurgical enterprises of non-ferrous metallurgy in the period 2018-2022 are given in Table 3.12.

The total amount of processed non-ferrous metal waste in 2022 reached 200 thousand tons, which is 36 898 tons more compared to 2021, or a growth of 123.2%. The secondary metals reported a growth. The largest amount of processed lead secondary metals was supplied from the local market (29 thousand tons), followed by the imports (51 thousand tons). Battery waste prevails in these quantities, such as end-of-life batteries or fractions, and parts thereof. The share of metal scrap and other lead-containing waste was 25%.

Table 3.14

Processed non-ferrous metals waste, tons

Waste	Total					Difference 2022/2021	
	2018	2019	2020	2021	2022		
						+/-	%
Copper	64 030	65 377	70 253	67 036	77 291	10 255	115.3
Lead	40 718	51 178	56 802	62 024	80 126	18 102	129.2
Zink	18 191	19 231	18 907	14 855	19 055	4 200	128.3
Aluminum	20 581	14 210	22 080	14 800	19 141	4 341	129.3
Total non-ferrous metals	143 520	149 996	168 042	158 715	195 613	36 898	123.2

Source: Company data

Despite the reported growth of utilized waste in non-ferrous metallurgy, there was a decline in processed aluminum waste from enterprises. For “Alcomet” JSC the reduction was almost five times.

The volume of secondary raw materials for the production of anodic copper, copper products and brass products was increasing, with the major quantity being imported. Local deliveries took a share of only 14 %. There were exports of copper scrap that could be processed in the available capacities.

In 2022, in the closed lead/zinc plant, which is now owned by "Harmony 2012" Ltd, the construction was completed and commissioning on a trial basis of new capacities for the extraction of non-ferrous metals from available zinc production waste began.

3.2. TRADE EXCHANGE AND CONSUMPTION OF NON-FERROUS METALS

Ingots of non-ferrous metals are commodities, traded at stock exchanges and are sold on world markets at exchange prices of the metals. London Metal Exchange (LMB) prices are mostly the prices at which our producers trade. The final prices of the metal products manufactured along the processing chains are determined on LMB basis.

Dynamic changes, influenced by a variety of economic and political factors, characterize fluctuations in the levels of metal exchange prices. Graphs below reflect changes in 2022, by month, in the prices (in USD per ton of metal) of the basic non-ferrous metals that Bulgaria produces - copper, zinc, lead, as well as for the primary aluminum that Bulgaria imports and processes to long and flat products.

Figure 3.13

Copper prices (USD/TNE)

Copper price at the end of 2022 decreased by more than 10%, compared to the beginning of the year. The highest price was in March-11 USD'000/ton and the lowest in July-below 7 USD'000/ton, with a difference of 36%. While 2021 ended 2000 USD higher, in 2022 the gap was minus 1 000/ton.



2022 is characterized in price terms by a relative drop in average levels, compared to the previous year. As a result of these changes, the year ended with prices lower than those at the beginning of the period, by 600 USD/ton and 1 000 USD/ton for zinc and electrolytic copper, respectively. The difference is negligible for lead.

Figure 3.14

Lead prices (USD/TNE)

Lead started and ended the year at 2 300 USD/ton, but with wide amplitudes in the intermediate months. The highest price of over 2 500 USD/ton was in the first quarter, and the lowest at around 1 700-1 800 USD/ton was in October, or a difference of over 30%.

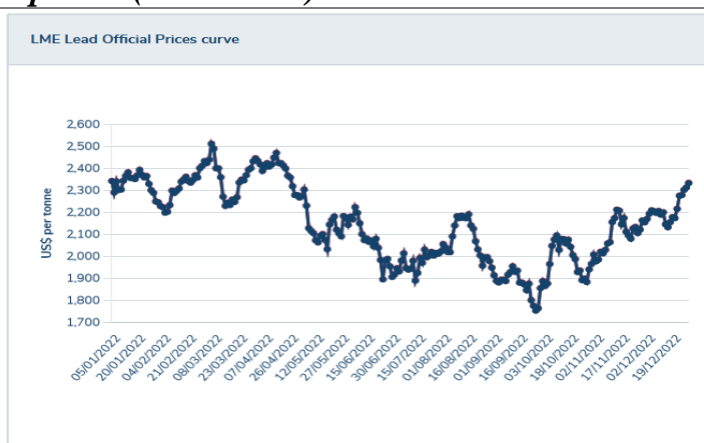


Figure 3.15

Zinc prices (USD/TNE)

Zinc followed the same trend - high prices at the beginning of 2022, with a peak at 4 500 USD/ton in April and declining since the second half of the year. The lowest price of 2 600 USD/ton was in November. The difference between the two levels was almost 50%.



Figure 3.16

Aluminum prices (USD/TNE)

Aluminum had a strong downtrend from the second half of 2022. The year started with a price of 2 800 USD/ton, which rose sharply to 4 000 USD/ton in March, but dropped to 2 000 USD/ton in September, which was a difference of 50%. The year ended at 2 400 USD/ton.



The practice shows that throughout the years there are changes in the prices of non-ferrous metals, but in the years of epidemic and economic crises more frequent and bigger changes have been noticed, which affects manufacturers.

The growth of the EU and world economies, which started in 2021, led to an increase in the consumption and prices of raw materials and metals respectively. Unfortunately, this period was very short. Again, reduced growth and consumption drop were observed. They resulted in a fall in the prices of raw materials on global markets that began in the middle of 2022 and is still continuing. The export oriented Bulgarian metallurgical industry has been affected by these processes, with some export related indicators reaching their lowest levels ever. The expected increase in consumption of metals and products, to meet decarbonization goals and the development of industries with zero emissions in the coming years, will also have an impact on international prices.

3.2.1. IMPORT OF NON-FERROUS METALS AND FINISHED PRODUCTS

Imported non-ferrous metals in the period 2018-2022 are presented in **Table 3.15**. Total imports in 2022 were **402 873 tons, which is** 74 758 tons more than in 2021(328 115 tons), or a growth of 122.8 %. The value of the imported products was **3 779.4 million BGN, which is** 1 247.1 million BGN more than 2021, or a growth of 149.2 %. The largest growth in value, compared to the rise in quantity (122.8 %) was due to the growth in prices on an annual basis.

By product groups and individual products, the largest import was aluminum at 208 thousand tons, of which 145 thousand tons were aluminum ingots. It was followed by copper (131 thousand tons) and lead (61 thousand tons). Zinc (5 thousand tons) had a small share.

The big segment of the import of aluminum products of 51,4 % (56 % in 2021 and 52 % in 2020) was due to the import of ingots and blanks for the aluminum processing industry developed in Bulgaria, which is not produced in our country. Different types of raw materials are used in the production of a wide range of products, as well as in the country's increasing capacity for extrusion of aluminum profiles.

The import volume increased by a total of 24.6 thousand tons, of which 18 thousand tons were from the increased import of raw materials - ingots and scrap.

Traditionally, even in 2022, the largest import of aluminum came from Russia, with 42 thousand tons and a share of 29 %, compared to 36.4 % in 2021. Russia is followed by Turkey with 42 thousand tons and Greece with 22 thousand tons. A total of 35 countries from different continents imported aluminum, such as Korea- 8 thousand tons, United Arab Emirates- 5 thousand tons, Bahrain, Vietnam, Kazakhstan, India and smaller amounts from several other EU countries (Poland, Slovakia, Romania, Czech Republic, Hungary).

Table 3.15

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

Items	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Copper, total, incl.	104 995	90 709	112240	104 445	130 917	26 472	125.3
Anodes	6	1	1	4.5	1 009	1 005	-
Cathodes, alloys,	36 010	24 859	26 567	28 049	29 320	1 271	104.5
Scrap	53 031	48 099	60 873	52 300	68 739	16 439	131.4
Bars and profiles	6 116	5 471	5 619	5 648	4 749	-899	84.1
Wire	6 156	8 124	15 604	15 090	21 146	6 056	140.1
Sheet metal and foil	1 507	1 818	1 376	1 209	2 028	819	167.7
Pipes	2 169	2 337	2 200	2 144	2 454	310	114.5
Lead, total, incl.	32 443	34 196	36 634	35 423	60 592	25 169	171.1
Ingot and alloys	14 584	16 532	24 995	16 509	21 354	4 845	129.3
Scrap (metal)	16 050	15 656	10 203	13 939	34 843	20 904	250.0
Rolled/pressed metal	1 809	2 008	1 436	4 975	4 394	-581	88.3
Zink, total, incl.	4 736	3 709	5 790	5 099	5 040	-59	98.8
Ingot and Alloys	4 528	3 487	5 257	4 768	4 368	-400	91.6
Scrap	4	9	16	75	21	-54	28.0
Rolled/pressed metal	204	213	517	256	650	394	253.9
Aluminum, total, incl.	178 482	176 354	169 711	183 148	207 793	24 645	113.5
Ingot and alloys	133 286	137 776	120 516	129 589	144 931	15 342	111.8
Scrap	1 622	1 711	2 217	1 739	4 838	3 099	278.2
Bars and profiles	18 820	17 014	18 444	29 649	27 367	-2 282	92.3
Wire	4 127	3 640	4 449	4 373	6 116	1 743	139.9
Sheets and strips	13 674	10 500	18 354	13 262	18 556	5 294	139.9
Foil	5 127	4 215	4 341	3 451	4 522	1 071	131.0
Pipes	1 826	1 498	1 390	1 085	1 462	377	134.7
Total, tons	320 656	304 968	324 375	328 115	402 873	74 758	122.8
Value, EUR million	1 033.7	902.7	976.2	1 294.8	1 932.4	637.6	149.2
Value, BGN million	2 021.7	1 765.5	1 909.3	2 532.3	3 779.4	1 247.1	149.2

Source: Customs statistics and National Revenue Agency

Copper, copper products and copper waste were in the second position in the structure of imports, with 131 thousand tons and a share of 32.4 % in 2022 (32 % in 2021 and 35% in 2020). There was an increase in the imported quantities from the group by 26 thousand tons, or 125.3 %.

The import of copper scrap had the largest share and growth with 69 thousand tons imported and a share of 52.7 %. There is an increase of 16.4 thousand tons, or 131.4 % growth, compared to the previous year.

The main importers with almost equal volumes were “Sofia Med” JSC and “Aurubis Bulgaria” JSC. Imports were carried out by 41 countries. The largest importers were EU countries, such as Greece (15 thousand tons, 22%), Romania (13 thousand tons, 19%) and Italy (9 thousand tons, 13%). More significant imports of scrap were from Lebanon (6 thousand tons), Turkey (4 thousand tons) and Serbia (3 thousand tons).

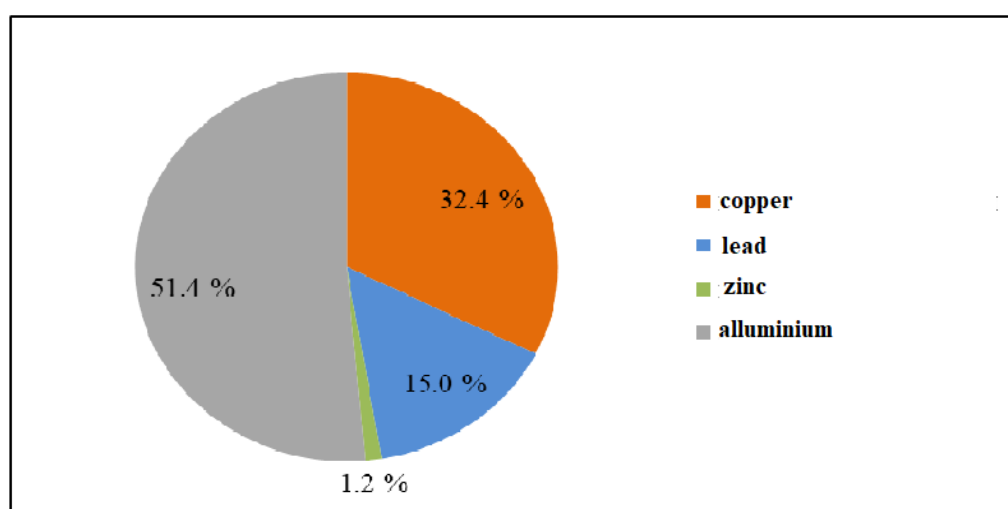
The imported quantity of cathode copper was significant - 29 thousand tons and a growth of just over a thousand tons. The import was from Russia (10 thousand tons, 35%), Tanzania, Turkey, Serbia, Mozambique. The import was carried out by 23 countries, including European countries the Netherlands, Greece, and Poland.

Other imported goods of this group were copper wires, which are not produced in the country. Of the total import of wires (21 thousand tons), the share of Turkey was over 95%. The main import of copper bars and profiles (about 4 thousand tons) originated in Turkey, but in 2022 it decreased.

The relative share of the imported non-ferrous metals and products thereof are shown in Figure 3.17.

Figure 3.17

Structure of the imported non-ferrous metals and products thereof (overall ingots, rolled/pressed metal and scrap) in 2022



In 2022, **lead marked a significant growth**, as the import increased to 60.6 thousand tons, compared to 35.4 thousand tons in 2021. The volume increased by 25.2 thousand tons or a growth of 171.1 %. The import of lead

ingots rose by 4 845 tons (129.3 %) to 21 thousand tons. It originated in Serbia (52 %), Turkey and Italy. The highest growth of 2.5 times was marked by lead scrap (the import of 35 thousand tons takes a share of 58 % of the total import of lead products). In addition to these amounts of secondary metal and other lead-containing waste products, 14 871 tons of spent batteries and their parts were imported into the country. Thus, the total import amounted to 51 thousand tons of lead in metal waste and secondary products. The largest import of 28 thousand tons and close to 60 % share of the import of both types of waste was from Romania, followed by the Netherlands with 16.8 thousand tons and 34%. Smaller quantities were imported from Italy, Great Britain, and Turkey. There were imports of lead rolled/pressed metal products, which due to negligible consumption, are not produced in the country.

Zinc products were of insignificant volume -a total of 5 thousand tons or only 1.2 % share of the total import of non-ferrous metals, of which 4.4 thousand tons were ingots. Deliveries were from Spain (3 thousand tons) and Germany.

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 more distant destinations, such as countries from 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 3.26.

In 2022, total exports were 737 427 tons, **28 522** tons more, compared to 2021, or a growth of 121,1 %. The value of the exported goods was **10 250.8** million BGN, which is an increase of **3 558.9 million BGN, or a growth of 153.2%.**

Data on the export volume and the growth achieved for the year show the high specialization of the country in basic non-ferrous metals production (copper, lead and zinc). In 2022, exported metal ingots were 30 thousand tons more than in 2021, but the relative share decreased from 68 % to 66 %, due to higher growth of other goods in the total volume. The export of final products based on copper increased by 23 thousand tons.

It was characteristic of 2022 that with high growth in the export volume of non-ferrous goods (121.1%) the increase in revenues was even higher, which was a growth of 153.2%, as a result of changes in exchange prices, illustrated in Figures 3.13, 3.14, 2.15 and 3.16. Notwithstanding the good performance, the EU metallurgy suffers the consequences of its higher production costs compared to the other competitors in third countries, due to obligations to protect the climate, the working environment, social and other costs, including energy resources. In order to support the basic industries essential to the EU economy and to preserve their competitiveness on global markets, in 2012 the European Commission

adopted Guidelines on State aid measures to compensate the rise in electricity prices from emissions costs. The scope of the Guidelines includes the production of ferrous and non-ferrous metals and metallurgical products. Despite the high contribution of these activities to the national economy, the financial instrument is still not implemented in Bulgaria. The high energy costs and low metal prices have worsened the sector's economic indicators, e.g. added value, despite increased production. These are external factors beyond the producers' control.

Table 3.16

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

Items	2018	2019	2020	2021	2022	Difference 2022/2021	
						+/-	%
Copper, total, incl.	411 751	342670	392 483	319 649	422 694	103 045	132.2
Anodic copper	135 072	93702	110 683	68 654	131 441	62 787	191.5
Electrolytic copper	191 192	162028	190 639	168 584	183 195	14 611	108.7
Scrap	9 130	10962	7 868	8 357	10 855	2 498	129.9
Bars and profiles	29 704	27811	25 690	22 448	31 870	9 422	142.0
Wire	766	1521	2 079	1 678	4 823	3 145	287.4
Sheets metal, strips, foil	45 779	46522	55 449	49 847	60 480	10 633	121.3
Pipes	108	124	75	81	28	-53	34.6
Lead, total, incl.	79 243	78757	87 979	79 525	98 662	19 137	124.1
Lead ingots	75 315	75996	87 460	79 386	98 135	18 749	123.6
Rolled/pressed metal	110	111	271	139	527	388	379.1
Scrap (pure)	3 818	2650	248	0	0	-	-
Zink, total, incl.	66 951	64411	69 768	61 324	63 922	2 598	104.2
Zinc ingots	66 340	64085	69 344	60 922	63 518	2 596	104.3
Rolled/pressed metal	109	3	3	70	3	-67	4.3
Scrap	502	323	421	332	401	69	120.8
Aluminum, total, incl.	135 472	128907	135 816	148 407	137 344	-11 063	92.5
Ingot	11 620	7694	12 219	5 679	14 804	9 125	260.7
Scrap	30 837	32540	33 218	40 006	36 721	-3 285	91.8
Bars and profiles	38 580	38421	32 773	39 463	46 914	7 451	118.9
Wire	270	571	665	130	153	23	117.7
Strips and sheets	13 659	13827	15 860	23 145	13 331	-9 814	57.6
Foil	30 830	26913	29 881	30 037	33 005	2 968	109.9
Pipes	9 676	8941	11 065	9 947	7 217	-2 730	72.6
Total	693 417	614 745	686 046	608 905	737 427	128 522	121.1
Value, EUR million	3 156.8	2 653.3	3 009.2	3 421.0	5 241.1	1 820.1	153.2
Value, BGN million	6 174.2	5 189.4	5 885.5	6 691.9	10 250.8	3 558.9	153.2

Source: Customs statistics and National Revenue Agency

There were significant differences between commodity groups in terms of exports by product types. For example, the share of anodic and cathode copper in the exports of copper products for the last two years was 74 %, while the share of lead and zinc ingots was almost 100%. Exports of secondary aluminum ingots

were only 10 %. This is even lower in previous periods. This depends on metal production and consumption. Aluminum metal is not produced in Bulgaria and the country imports ingots or blanks for processing along value-added chains into long and flat products. Long and flat products find a good realization in the country and for export.

The highest share in the exports of non-ferrous metals of the metallurgical industry had copper and copper products - 59 % in 2022 and 53% in 2021. In 2022 exported anodic and cathode copper was 77 thousand tons more, compared to the previous year and the products of copper and copper alloys were increased by 23 thousand tons. Anodic copper was exported mainly to Germany-60% and Belgium-40%. Cathode copper markets are mainly in Europe, with 73 thousand tons (40%) exported to Italy, 62 thousand tons (34%) to Turkey, and smaller amounts to Serbia and Croatia - 11-12 thousand tons. There were exports to China, but they decreased from 68 thousand tons to 16 thousand tons in 2022.

Bulgaria has a developed copper processing industry. Throughout the years the production of copper and brass products has been continuously growing (Table 3.13). In 2022 over 96 thousand tons of high value-added copper products were exported, which is 26 % share of the total copper exports. The share of long pressed products in exports was 33 %. They were exported to 38 countries, of which Germany-25 %, Poland-19 %, Spain-10 %. Sheet metal, sheets and strips were exported to 52 countries (50 in 2021). The total quantity was 60.5 thousand tons. Germany was with the largest share of 30%, followed by Italy-19 % and the USA-9 %. There were exports of smaller quantities, of 2-3% to Poland, Austria, Canada, Korea, etc.

Bulgaria does not produce aluminum ingots but has a developed aluminum processing industry. Therefore, **in the exports of aluminum, the finished products prevail - sheets, strips, foil, profiles, pipes**. In 2022, there were also exports of 14.8 thousand tons secondary aluminum ingots produced by secondary raw materials, compared to 5.7 thousand tons in 2021. **Direct exports of non-processed scrap were also carried out, the amount for last year was 37 thousand tons, representing 27%** of the total volume of exports of aluminum.

Data in tables 3.15 and 3.16 for the import and export of metallurgical production in 2022 leads to the following conclusions:

Metallurgical production of non-ferrous metals and alloys exported in 2022 increased by 128.5 thousand tons, or a growth of 121.1%, compared to the previous year. Said production also reported a greater growth in value of 153.2%. This is a result of high prices in 2021, preserved in the first half of 2022, and minimal impact of lower exchange prices on exports in the third quarter of the year.

Imports increased, less in terms of quantity - by 74 758 tons, or 122.8%. In terms of value, they reported a higher growth of 149.2%. Costs also increased by

1 247.1 million BGN. Notwithstanding the externalities on production, costs and prices the metallurgical production of non-ferrous metals achieved a positive **foreign trade balance, which for 2022 amounted to 6.5 billion BGN**, compared to 4.2 billion BGN in 2021 (+ **2.3 billion BGN**).

External and internal factors strongly alter the performance of export sectors when selling goods at exchange prices. In 2022 the big production and exports led to an increase in the positive balance of non-ferrous metallurgy, which covers the negative balance of -1.6 billion BGN of ferrous metallurgy. The overall trade balance amounts to +4.9 billion BGN. This amount includes more goods than the BNB data that includes some types of metal products in the "Other raw materials and materials" commodity group, such as metal scrap, zinc, etc.

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 2018-2022 are presented in Table 3.17. The sold non-ferrous metals and products thereof followed production changes in 2022. Electrolytic copper sold on the domestic market increased from 34 thousand tons in 2021 to 54 thousand tons in 2022, or a growth of 156%.

Table 3.17

Sales of non-ferrous metals and pressed/rolled metal

Items	Sales	2018 (TNE)	2019 (TNE)	2020 (TNE)	2021 (TNE)	2022 (TNE)
Electrolytic copper	Domestic market	32 378	34 190	30 820	34 636	54 135
	Exports	191 321	174 330	193 616	184 337	183 955
	Total	223 699	208 520	224 436	218 973	238 090
Lead and alloys	Domestic market	27 787	29 787	28 807	26 588	20 907
	Exports	74 018	73 230	80 890	80 748	84 112
	Total	101 805	103 017	109 697	107 336	105 019
Zinc and alloys	Domestic market	6 569	6 473	6 243	7 503	7 166
	Exports	66 766	65 825	68 619	64 244	62 570
	Total	73 335	72 298	74 862	71 747	69 736
Rolled/pressed metal of heavy non-ferrous metals	Domestic market	1 175	933	894	958	1 165
	Exports	78 668	78 324	81 585	88 405	91 592
	Total	79 843	79 257	82 479	89 363	92 757
Aluminum rolled/pressed metal	Domestic market	7 112	17 887	16 343	4 214	13 217
	Exports	83 626	73 117	81 172	104 319	86 740
	Total	90 738	91 004	97 615	108 533	99 957

Source: Company data.

There was a decline in lead production and sales, but only on the domestic market, while the exports increased by 105 %. The allocation between domestic market and export was 20 %: 80 %.

There was also a decline in the sales of zinc, which was much less pronounced on the domestic market compared to the exports (-2 thousand tons). About 10% of the produced zinc was sold on the domestic market while the remaining 90 % were exported.

Sales of copper rolled/pressed metal and copper and alloy products rose by 3.4 thousand tons in exports. Sales in the domestic market rose by only 200 tons. **Rolled/pressed metal from heavy non-ferrous metals was the product with the largest export share of all product groups. It reached 99% of total sales.**

Sales of **aluminum rolled/pressed metal** decreased by 8 576 tons, as a result of the production drop in 2022. Aluminum products sold on the domestic market varied widely from about 5 % to more than 20 %. In 2022, the share of sold aluminum products on the domestic market was 13 %, or 13 217 tons, and the share of exports was 87 %.

Total sales of the said non-ferrous metals and products thereof on the domestic market were **96 590 tons**, which is 22 691 tons more than in 2021 (73 899 tons). The share also increased compared to 2021 (12.4 % of 595 952 tons).

The data characterizes non-ferrous metallurgy as an extreme export industry. Despite the negative impact of externalities on production and prices, in 2022 the metallurgy remained the largest exporter with a positive foreign trade balance, in the order of billions of BGN.

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 (data from BAMI members) and the import of the same products according to official data of the Customs Agency and the National Revenue Agency. RDC data by year is presented in Table 3.18.

In 2022, around and over 50% of the RDC of the main metals was satisfied by own production. For copper it was 65%, for zinc - 62% and for lead a little lower - 49.5%. In the case of non-ferrous metal products, the share of local production was relatively small.

The highest was the consumption of electrolytic copper and the lowest was of zinc. Aluminum rolled/pressed metal was in second place in terms of consumption in the country, considering its wide application in construction, automotive and household.

There was a clear upward trend in RDC of non-ferrous finished products. For these heavy non-ferrous metals (copper and brass), the total growth for the last five years was 165%, and for aluminum – 141%. In 2022, the increases of RDC for copper/brass and aluminum were respectively 6.5 thousand tons and 15.3 thousand tons, compared to the previous year.

Table 3.18

Real domestic consumption of non-ferrous metals and rolled/pressed non-ferrous metal

Items	Origin	2018 (TNE)	2019 (TNE)	2020 (TNE)	2021 (TNE)	2022	
						TNE	% 22/21
Electrolytic copper	Domestic production	32 378	34 190	30 820	34 636	54 135	156.3
	Imports	36 010	24 859	26 567	28 049	29 320	104.5
	Real internal consumption	68 388	59 049	57 387	62 685	83 455	133.1
Lead	Domestic production	27 787	29 787	28 807	26 588	20 907	78.6
	Imports	14 584	16 532	24 995	16 509	21 354	129.3
	Real internal consumption	42 371	46 319	53 802	43 097	42 261	98.1
Zinc	Domestic production	6 569	6473	6 243	7 503	7 166	95.5
	Imports	3 872	3487	5 257	4 768	4368	91.6
	Real internal consumption	10 441	9 960	11 500	12 271	11 534	94.0
Rolled/pressed metal of heavy non-ferrous metals	Domestic production	1 175	933	894	958	1165	121.6
	Imports	17 961	19 971	26 752	24 091	30 377	126.1
	Real internal consumption	19 136	20 904	27 646	25 049	31 542	125.9
Aluminum rolled/pressed metal	Domestic production	7112	17 887	16 343	4 214	13 217	313.6
	Imports	43 574	36 867	46 978	51 820	58 023	112.0
	Real internal consumption	50 686	54 754	63 321	56 034	71 240	127.1

Source: Customs statistic/National Revenue Agency (Imports), and Company data (Domestic sales)

Apparent consumption (AP) is an indicator, determined by the formula: $AP=P+I-E$, where **P** is metal production throughout the year in thousands of tons, **I** is imports of metal throughout the year in thousands of tons and **E** is exports of

metal throughout the year in thousands of tons. Table 3.19 shows the data for apparent consumption of non-ferrous metals and rolled/pressed products in 2022.

Table 3.19

Apparent consumption of non-ferrous metals and rolled/pressed products in 2022

Items	Domestic production (TNE)	Imports (TNE)	Exports (TNE)	Apparent consumption (TNE)
Electrolytic copper	229 070	29 320	183 195	75 195
Lead	103 426	21 354	98 135	26 645
Zinc	72 527	4368	63 518	13 377
Rolled/pressed metal of heavy non-ferrous metals	93 490	30 377	97 201	26 694
Aluminum rolled/pressed metal	98 470	58 023	85 819	70 674

Source: Customs statistics (Imports and Exports) and Company data for domestic production.

There is a general trend for consumption development, in spite of the differences in consumption values calculated by the two methods- RDC and AP. The quantities of utilized electrolytic copper are the largest and tend to increase. The difference between real domestic consumption and domestic consumption was the largest with electrolytic copper and was obtained from the toll processing raw materials. Electrolytic copper from toll processing was reported by the metallurgical enterprise as internal realization, and by Customs as export.

For the other metals, the differences were not substantial, rather close to the statistical error. These methods do not consider possible re-export or the impact of larger stockpiles.

The data on the production and sales of metals and metallurgical products make the main conclusion that Bulgaria has a high specialization in basic metallurgy. The high share of metallurgical production characterizes the general industrial structure of the country. The low consumption in the subsequent chains of processing and added value determines the export orientation of the industry. Therefore, the fundamental objective of metallurgy is to maintain its competitiveness on foreign markets and to continue its sustainable and efficient development through new investments.

In 2022, the investments in the major production of non-ferrous metallurgy for new equipment, technological and product development were 150 million BGN.

Bulgarian metals are important for our economy, but they are also important as strategic raw materials for the European economy, in order to reduce its raw material dependence on third countries. Strong growth in the consumption of ferrous and non-ferrous metals and products thereof is expected in the coming years, linked to the realization of the National Sustainability and Development Plan, as well as to the achievement of the envisaged digitalization and decarbonization of the EU economy. Bulgaria has opportunities to participate in the process and to be one of the countries that will contribute to providing critical raw materials and incorporating the production of products for zero emission technologies. The potential of this industry must be preserved and developed to meet the needs of the coming transition.

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• “Stomana Industry” JSC	“Alcomet” JSC
• “Sofia Med” JSC	“KCM” JSC
• “Etem Bulgaria” JSC	“Metalsnab Bulgaria” JSC
“Promet Steel” PJSC	“Gorubso–Karjali”JSC
“Evrometal” Ltd	“DZM 1” Ltd
• “BMB Metal” Ltd	“Kovintrade Bulgaria” PLtd
• „LKMK” PLtd	“Refran” Ltd
“EL BAT” JSC	“Ognjanovo K” JSC
“ZGP ” JSC	“EMC Distribution” Ltd
“Berg Montana Fittingi”JSC	“Monbat Recycling” PJSC
“IPO” Ltd	“Shamot EL PE 2007” Ltd
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Executive Director - Politimi Paunova

ADDRESS:

1309 Sofia

205, Aleksandar Stambolijski Blvd.

Tel./Fax: +359 2/ 920 37 39

+359 2/ 920 40 47

E-mail: bami@bami.bg

Website: www.bami.bg