



AZERBAIJAN METALLURGICAL INDUSTRY: CURRENT SITUATION AND NEW GOALS

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Abstract: The article analyzes the current situation and upcoming tasks of the Azerbaijan metallurgical industry. The activities of enterprises producing metal products in the country are assessed. It is noted that for the dynamic development of the metallurgical industry, a deep study of the mineral resource base existing in the territory of the Republic of Azerbaijan is required and it should be put into operation. In the near future, for the accelerated development of the metallurgical industry of the country, there is a mineral resource base, energy reserves, material and technical base, engineering and scientific and pedagogical potential. The tasks arising from the orders of the President of the country, stimulating the development of the metallurgical industry are shown and promising directions in this area are presented. The need to use local resources for the accelerated development of the metallurgical industry is noted. The industrial capacities of operating companies and plants are assessed, new goals are presented for them. At the same time, the article notes the acceleration of gold mining in the country and shows the ways of using their locations, liberated from the occupation of the Karabakh region. In recent years, in contact with the development of the non-oil sector, the order of the President of the country on the establishment of a steel production complex in Azerbaijan will determine the concept of sustainable development of the metallurgical industry. The article also provides information showing the dynamics of growth in the production of steel pipes, construction reinforcement and other products of ferrous metallurgy. A diagram is presented in the aspect of the prospective development of the ferrous metallurgy industry in Azerbaijan. The indicators of import and export in the Republic of Azerbaijan for ferrous metallurgy in 2002-2022 are given. It is noted that the metallurgical industry of the country will experience a new stage of development and in order to achieve new successes in this area, the development and implementation of innovative technologies are of great importance.

Keywords: metallurgy, steel, ferroalloy, mineral resource deposits, new intentions.

Introduction.

The state and development prospects of the metallurgical industry of Azerbaijan are always in the center of attention of specialists and the scientific and technical community of this industry. This, of course, is due to the important role of the metallurgical industry in the country's economy.

For example, in article [1], the metallurgical industry is characterized as one of the most profitable, dynamically developing sectors of the Azerbaijani economy.

The article analyzes the activities of the flagship enterprises of the metallurgical industry of Azerbaijan - Baku Steel Company LLC (BSC), Dashkasan Dashkesan ore enrichment OJSC, and also notes the great potential of industrial potential in Ganja and Sumgait. The capabilities of the Sumgait

Technological and Chemical Industrial Parks for the production of metal products are assessed. It is noted that at present, the main attention is paid to increasing the quantitative and qualitative indicators of the production of metallurgical products.

The article assesses the mineral resource base of the country, including the reserves of the territories liberated from occupation. It is noted that in the first half of 2023, Azerbaijan exported more than 90 thousand tons of ferrous metals and products made of them, and imported more than 600 thousand tons. The cost of imported metal products is 700 million US dollars. more than dollars. This indicator confirms that the development of high-quality steel and ferroalloy production by the country's metallurgical industry is a pressing scientific and technical task and can bring great technical, economic and social benefits.

In the article "Metallurgy is a priority direction of the Azerbaijani industry" [2] attention was paid to the issues of training metallurgical personnel in the country. It is shown that the metallurgical faculty has been operating at AzTU since the 60s of the last century. The article characterizes with irrefutable facts the fact that metallurgical production in Azerbaijan has an ancient history.

The authors associate the development of the metallurgical industry in Azerbaijan with the efforts of the national leader H. Aliyev. Within the framework of the comprehensive program for the development of the metallurgical industry of Azerbaijan, large production areas have been created in Sumgait, Ganja, Dashkasan and Gadabay. Thanks to the initiative of H. Aliyev, the huge plant "Baku Steel Company" began operating in 2001; this plant is the largest industrial enterprise in the Transcaucasus.

It is shown that the President of the country Ilham Aliyev pays great attention to the development of the metallurgical industry in the country. In recent years, the Sumgait Technopark, Chemical-Technological Park, Industrial Parks and microdistricts have begun to operate in the regions, turning the production of metal products into the leading direction of the non-oil sector. The article notes that the country has all the necessary factors for the rapid development of the metallurgical industry: mineral resource base, energy resources, material and technical base, engineering and scientific-pedagogical personnel potential.

Current status and goals of the metallurgical industry of Azerbaijan.

The metallurgical complex, which is planned to be built in the Ganja region, envisages the processing of 5 million tons of ore and the production of 1 million tons of high-quality steel based on Dashkasan iron ore. It is expected that 2500 people will work at this enterprise, and this will be a great contribution to the development of the regions.

At the same time, the Azerbaijan Technical University and the Metallurgical Faculty face important tasks to ensure the sustainable development of the metallurgical industry.

In the article entitled [3] - Metallurgical industry of Azerbaijan: achievements, problems and future development paths, it is noted that at present there are good opportunities for the development of the metallurgical industry of Azerbaijan. The author emphasizes that the metallurgical industry of Azerbaijan has a rich history, and in support of his opinion, he mentions the exceptional role of Azerbaijani Chingiz Yildirim in the construction of the Magnitogorsk Iron and Steel Works in Russia.

The author notes that the development of the metallurgical industry in Azerbaijan in modern times is closely connected with the company "BSC", Founded by the National Leader G. Aliyev. It should be noted that at present this enterprise produces up to 800 thousand tons of metal products and meets almost all the needs of the country's construction sector.

Currently, the author points to the decree of the president of the country on the establishment

of the "Azerbaijan Steel Production Complex" as a factor that will give a great impetus to the development of the metallurgical industry of the country [4]. According to this decree, the development of metallurgy is associated with the launch of the Dashkesan Oil Refinery OJSC, the start of operations of AzerGold CJSC, as well as the planning of the design and construction of a steel production facility with a capacity of 1 million tons in Ganja.

Aluminum plants in Ganja and Sumgait, the Sumgait Technological Park, the Chemical-Technological Park and other enterprises producing metal structures confirm that the country's metallurgy has great potential and development prospects.

In his work [3] he identifies 10 areas that will ensure the future development of the metallurgical industry:

- create production of non-metallic products and special alloys;
- create production of hard alloys and superhard materials to meet the republic's needs for various tools;
- create production of lightweight and durable composite and ceramic materials using SPS and injection molding technologies;
- reconstruct foundries and workshops in the republic using special casting methods to improve productivity and quality;
- create technological processes that improve the quality of alunite ore to meet the needs of the aluminum plants in Ganja and Sumgait;
- create a special independent organization engaged in the research and application of nanotechnology and functional coatings;
- build a new plant for the production of abrasive materials and products made from them to meet the needs of the republic;
- create a special scientific and technical center dealing with the problems of the metallurgical industry;
- in connection with the rapid development of the gold mining industry, to accept students in the specialty "Jewelry" at AzTU;
- develop a technology for the synthesis of nanosized aluminides, borides and hard alloys using the IPS method.

According to the author, the solution of the above-mentioned problems will allow achieving real technical and economic efficiency and developing innovative metallurgical technologies and materials science in our country.

Article [5] is devoted to the metallurgical industry of Azerbaijan and its development prospects.

The article states that the country has enough raw materials, equipment and engineering potential for the development of the metallurgical industry. Iron ore in Dashkesan, non-ferrous metals in Filizchay, Katekh, Kashdag, Mehmanly and Nakhchivan - deposits of aluminum, cobalt, copper, zinc, lead, as well as bentonite clay deposits in Dashsalahly are striking proof of this.

Then, article [5] examines the historical past of metallurgical industrial enterprises of Azerbaijan and assesses the potential opportunities of today. It is noted that Baku Steel Company (BSC), which produced 100000 tons in 2001, 250000 tons in 2008, 400000 tons in 2010 and 800000 tons in 2020, is currently expanding its production capacity. It is planned to increase it to 1. million tons. It is shown that at the time of the launch of BSC in 2001, it employed 400 people, and today MMK employs up to 3000 people.

The article notes that President Ilham Aliyev pays great attention to the non-oil sector,

especially the rapid development of the metallurgical industry as a priority. In one of his speeches, the President stated: **"... the creation of a powerful metallurgical industry is on our agenda, and we will do it."**

The article estimates the reserves of Dashkasan ore deposits at 350 million tons, and the reconstruction of the Dashkasan Mining and Processing Plant and direct recovery of iron from ore are assessed as priority tasks. By the way, the non-ferrous metals and ferroalloys plant, commissioned in 2014, creates broad opportunities for the sustainable development of the country's metallurgy.

Sources [6,7,8] explain some information about the activities of AzerGold CJSC, established according to Decree No. 1047 of the country's President Ilham

Aliyev dated February 11. 2015.

It is shown that AzerGold JSC began gold mining in 2009 at the Gadabay deposit, in 2013 it was mined at Gosh, in 2015 at Kadyr, in 2017 at the Ugur deposit. In 2016, gold mining began at the Chovdar deposit. In 2017, the company produced 6390.8 kg of gold, worth \$77340 million. In the first half of 2018, gold production was 2081.7 kg, up 20% from the previous year. In 2019, production was approximately \$20 million.

These sources indicate that since 2009, AzerGold has been increasing gold production by approximately 18-20% annually. Such growth rates confirm that the mineral resource base of the country's non-ferrous metallurgy has quite a strong potential. [6] The largest metallurgical enterprises of Azerbaijan are listed: Sumgait Aluminum Plant (SAP), DetAluminium LLC, Ganja Clay Plant, Baku Steel Casting JSC, Baku Steel Company LLC, Azerboru JSC, Global Construction JSC, Atahan Demir Industry JSC, Dashkasan Ore. Affinage OJSC, ElMetal OJSC, Non-Ferrous Metals and Ferroalloys Plant, etc.

The Internet resource [8] entitled "Metallurgy in Azerbaijan" (15.06.2010) notes that there are broad opportunities for the development of the metallurgical industry in the country:

1. Availability of an abundant and diverse base of raw materials and metal waste.
2. Local energy resources – availability of oil and natural gas.
3. Availability of industrial and construction sites with high metal capacity.
4. Availability of experienced personnel and labor resources.
5. Possibility of creating new production areas based on the existing material and technical base.

Thus, the issues of development of ferrous and non-ferrous metallurgy industry in Azerbaijan are constantly discussed in the country's press, periodical scientific and technical sources and Internet resources, which confirms the relevance and practical significance of the problem under study.

The information we received from Internet sources was briefly explained in articles [9-14]. Scientific article [15] ("Ferrous Metallurgy Industry in Azerbaijan: Development Stages and Prospects" (i.e. "Azerbaijan Tax Journal of Professor Hajizade E.M.", No. 2, 2014) is a study that requires special attention. Let us comment on its main points.

[15] confirms that the ferrous metallurgy industry occupies a leading position in the economy of all countries. Azerbaijan's ferrous metallurgy is also important in this sense and has a certain history, traditions and great potential.

In the context of the development of the non-oil sector in recent years, the article highly appreciates the Decree of the President of the country on the establishment of the Azerbaijan Steel Complex [16]. It is noted that the Dashkasan iron ore reserves with a reserve of 230 million tons are the basis of the concept of sustainable development of the metallurgical industry.

The article analyzes the historical aspects and production characteristics of the ferrous metallurgy industry for the first time. It is shown that out of more than 110 known chemical elements, up to 80 are metals. Iron is the 4th most common element on earth, iron ore reserves in the world are estimated at more than 200 billion tons. About 90% of all metal-based materials are iron alloys (steel and cast iron).

The article shows that in the 20th century, the ferrous metallurgy industry has undergone great technical progress and currently has successful development prospects. Then, the main trends in the development of the global ferrous metallurgy industry are examined. It was noted that according to statistics, 2 billion people currently live in the world. tons of steel are produced, and 1 billion tons of it. More than a ton comes from the People's Republic of China.

According to the author, a number of trends have formed in the development of the ferrous metallurgy industry in the world:

1. Transfer of metallurgical production to coastal areas - this is aimed at increasing the efficiency of transportation.
2. Transfer of steel production to developing countries - here cheap raw materials, human resources and environmental factors are taken into account.
3. Application of new methods of steel production - electrometallurgy and direct reduction of iron from ore - in order to increase the efficiency of production.
4. Creation of metallurgical enterprises of small production capacity (up to 1 million tons) - enterprises that mainly use recycled ferrous metal waste have more flexible technologies.
5. Increased demand for ferrous metal products.
6. Growing demand for special quality steels and alloys.

The article further analyzes the organization of the ferrous metallurgy industry of Azerbaijan and its modern development directions. The production activities and types of metal products of the Dashkesan Oil Refinery, Binagadi Steel Plant, Central Electrofoundry, Baku Metallurgical Company, Azertechnoline, non-ferrous metals and ferroalloys plants and other large metallurgical enterprises are studied. [17]-a graph is provided reflecting the dynamics of production of steel pipes and construction reinforcement in Azerbaijan in 2003-2022 (Figure 1).

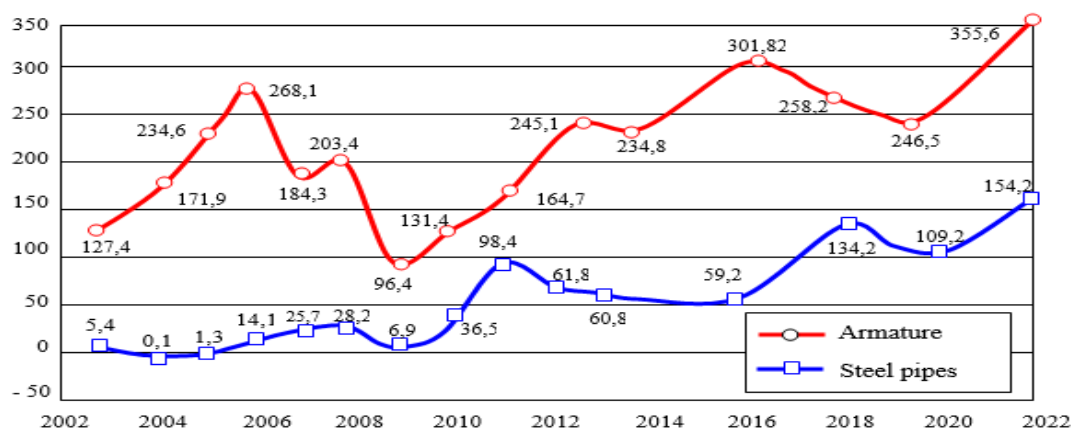


Figure 1. Production of steel pipes and construction fittings in 2003-2022 (thousand tons)

Table 1 below shows the production dynamics of other ferrous metallurgical products in Azerbaijan during that period.

Table 1. Production dynamics of other ferrous metallurgy products in Azerbaijan in 2012-2022.

Products	Unit of measure	2012	2014	2016	2018	2020	2022
Steel castings	thousand tons	256,4	286,1	306,5	379,1	444,2	552,4
Ferrous metal wire and coils	tons	483,6	499,8	501,7	598,8	523,2	584
Carbon steel cold-rolled profiles	tons	8891,7	10380,3	11875	11982	12839	21801,6
Various cold-worked stainless steel profiles	tons	0,0	0,0	9153,3	10732,1	17824,8	19034,3
Cast iron castings	tons	9631,7	11166,2	21836,5	23692	31631,2	41972,6

Taking into account the above, the author proposed the perspective development scheme of the ferrous metallurgy industry in Azerbaijan as follows (Figure 2).

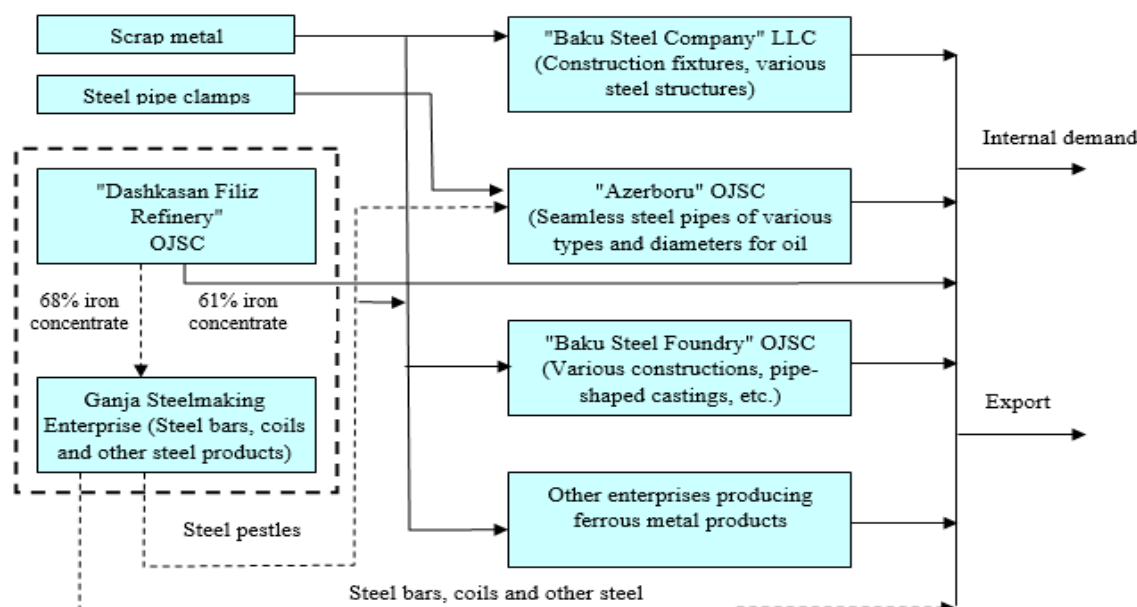


Figure 2. Prospective development scheme of ferrous metallurgy industry in Azerbaijan

3. The level of import and export of metal products of the country

It should be noted that the Baku Shipyard, which is currently working at full capacity, creates an important basis for the development of the production of steel sheets. Thus, the plant consumes about 25-30 thousand tons of steel sheets per year to fulfill shipbuilding orders, and this amount of steel products is imported only from abroad.

In general, referring to the website of the State Statistics Committee of the Republic of Azerbaijan, it can be shown that during the year, 200 names, the total value of which is 1 billion. ferrous metal products are imported over USD. Table 2 provides statistical data on import and export of ferrous metallurgy products in the Republic of Azerbaijan during 2012-2022 [18].

In conclusion, it can be noted that the ferrous metallurgy industry in our country is experiencing a new stage of development. Ferrous metallurgy, being a real production sector of the country's economy, has the opportunity to increase its potential many times in the near future.

Table 2. Import and export indicators of ferrous metallurgy in the Republic of Azerbaijan in 2012-2022, tons.

Years	Products	Import	Export
2012	Ferrous metals	580900	512
	Ferrous metal products	497644	6152
2014	Ferrous metals	688 971	54 785
	Ferrous metal products	415 838	55 253
2016	Ferrous metals	652 544	264 232
	Ferrous metal products	237 661	9894
2018	Ferrous metals	861 857	307 120
	Ferrous metal products	560 544	203 920
2020	Ferrous metals	827 580	21 081
	Ferrous metal products	564 650	62 583
2022	Ferrous metals	976 859	63 203
	Ferrous metal products	519 220	62 561

4. Conclusions

1. A number of positive trends were observed in the development of the country's ferrous metallurgy. In the context of the development of the non-oil sector, the important role of the Decree of the President of the country on the establishment of the Azerbaijan Steel Production Complex was noted. Based on the concept of sustainable development of the metallurgical industry, the importance of launching the Dashkasan Mining and Processing Plant, which has rich mineral resources, was substantiated.

2. The main directions of development of the metallurgical industry with low metal intensity in the country were determined: production of non-metallic and special alloys, hard alloys and superhard materials; made of light and durable composite and ceramic materials; widespread use of special casting methods; application of deep ore enrichment processes; application of nanotechnology and functional coatings; production of abrasive materials and products, synthesis of nanosized aluminides, borides and hard alloys, etc.

3. It was determined that the country has ample opportunities for sustainable development of the metallurgical industry. Various raw material base and metal waste, local energy resources, large metal-intensive industries and construction sites, experienced personnel and labor resources, the possibility of creating new industries based on the existing material and technical base were assessed.

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