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Status and Trends of Development of the Metallurgical Industry of the Republic of Kazakhstan

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Abstract: This study reviews the metallurgical industry of Kazakhstan and the problems of reducing its cost-effectiveness. Analyzing the current situation in the industrial sector of Kazakhstan as well as based on international experience, the study examines the increasing economic efficiency of enterprises in the metallurgical industry through active innovation. The main conductor of the innovative development of the industry are the large enterprises have greater flexibility to market conditions and of high performance. In modern conditions given enterprises can become an alternative to enlargement of metallurgical production, increase its efficiency and to create conditions for the production of products with high added value. The study describes the advantages of these enterprises to the classic metal works given their technical and economic indicators, analyzes the global experience and the need for active development in Kazakhstan.

Key words: Economic stability, innovation, modernization, efficiency, consumption

INTRODUCTION

Metallurgy is the leading basic sector of Kazakhstan and the focus of its economic life. From the results of the operation of the industry depends not only an economic and social stability of our country. Iron and steel industry of Kazakhstan is closely integrated into the world market which in turn has a direct impact on its development (Tleugabulov, 2007). The current state of the steel industry is characterized by considerable technical and technological backwardness, high energy and resource consumption of production, a significant environmental load on the environment. The Concept of Transition of Kazakhstan to Sustainable Development for 2007-2024 year of Mining and Metallurgical Complex (MMC) is defined as one of the priority sectors which can provide entry of Kazakhstan in the number of countries with high levels of socio-economic development (Kaygorodtsev, 2013).

Major production facilities of leading enterprises in the metallurgical industry area were designed and built in the 70s and earlier and the further development of the production is carried out mainly by increasing the load on existing capacities. Thus, the increase in production was achieved without significant upgrading of industrial-production funds. The main problems of mining and smelting complex are:

- Low complexity of the raw materials used
- High degree of wear of fixed assets
- Technological backwardness and as a consequence of the high degree of environmental pollution
- Lack of integrated complexes with full production cycle from production to production with a high degree of readiness commodity
- Small capacity and dispersion of the internal market
- High energy, labor and material products (Yusfin and Pashkov, 2007)

Increased competition while a slowdown of growth in metal consumption led metallurgists dramatically overestimate their competitive position and future prospects. Partial modernization of the industry produced and its positive results was the introduction of innovations in the process of production of quartz fluorite. It is used for uranium enrichment. Sales volumes of the products immediately increased and the list of customers joined Russia, Belarus and Ukraine. Each year Karazhalskom field produces up to 76 tons of ore. The usual rock composed of the mineral. Such deposits in the world can be counted on the fingers. For example, Austria such as rock containing valuable mineral is extracted manually (Abishev, 2000).

However, the continued effective functioning of metallurgical industry in the global competition requires the introduction of innovative projects of reconstruction and modernization of metallurgical production. Investment projects MMC within the Industrialization Map in terms of investment takes the 3rd place after these kinds of sectors as transport infrastructure and telecommunications, oil refining and oil and gas infrastructure.

MATERIALS AND METHODS

In 2012, reconstruction of lead production company will modernize the entire process, thereby improving performance and reducing energy consumption. The project also allowed to conduct a large-scale processing of recyclable materials, improve production safety, improve working conditions for staff and environmental performance (www.stat.gov.kz).

In general, according to the LLP "Kazzinc", in 2013, the company produced 300,425 tones of zinc metal (in 2012 to 301 265 tons), 90,579 tons of refined lead (82,536 tones, respectively), 62,369 tons of copper in commodity products (52,649 tons, respectively), 579,144 troy ounces of gold from its own ore base (473,879 troy ounces, respectively) and 5,250,921 troy ounce of silver from own ore base (4,776,642 troy ounces respectively). For comparison, in the first year of implementation of sectoral programs in Kazakhstan production of zinc metal in the company amounted to 300,750 tons of refined lead 100,789 tones of copper in commodity products 50 862 tones of gold from its own ore base 317,968 troy ounces and silver 5,087,578 troy ounces. Recently the Ministry of Industry and New Technologies has announced plans to "Kazzinc" for 5 years (2014-2018 years) to invest in exploration work on the territory of Kazakhstan, at least T15 billion.

These commitments have been secured as a memorandum aimed at improving the efficiency of exploration programs and an increase in the mineral resource base within the East Kazakhstan within the framework of the project "Big Altai is unique ore province of Central Asia." However, the amount of investment in exploration activities may change depending on the timing of "Kazzinc" mineral rights to perform exploration. Currently a group of companies Altyntau, working as part of LLP "Kazzinc", aims at increasing the volume of gold production. In 2013, she produced over 516 thousand ounces. Or more than 16 tons of gold and silver in gold equivalent. In 2012, this production figure was 466.4 thousand. Ounces or 14.5 tonnes. In the past year compared to the previous gold equivalent production increased by 11%, while the planned figure was exceeded by 2%. Association in 2011, "golden" assets included in "Kazzinc", in the same group-Altyntau-allowed the most efficient use of production capacity and implement a complete production cycle from the extraction of gold ore to gold refining sample 9999 (Kozlov, 2005).

Today on the increase in gold production is set up and another company-Russian Polymetal International Plc, operating Kazakh gold-mine Varvarinskoe (Kostanay). In 2013, it increased gold production in Kazakhstan by 6% up to 106.8 thousand. Oz with 101 thousand, Oz respectively. But copper production last year compared with 2012 in the field has decreased by 26% up to 4,841 thousand. 6,567 thousand tones, respectively as a result of the planned reduction of content (www.minprom.ua/articles).

In 2016, in the east of the country is scheduled to launch into operation one investment project-a factory of titanium ingots and slabs LLP "POSUK Titanium". This project is a local Titanium Magnesium Plant implements together with Korean partners. The project cost is T7,384 billion which will fund POSUK Titanium, POSCO Co., Ltd, Kolur Holding AG and JSC "Ust-Kamenogorsk Titanium Magnesium Plant". The company will produce 4.1 thousand tons of titanium mill per year (60% of the domestic demand for titanium). Will create up to 80 permanent jobs. Today in the mining industry in Kazakhstan in order to increase production volumes emphasis is on exploration because it is believed that the Kazakh subsoil is not explored as it should and there are still great opportunities for growth stocks.

At present, inferred resources of copper are estimated at 100 million tons, of which 33.4% are resources categories P1 and P2 resources of lead and zinc to 135 million tons, of which resources P1 + P2 46.6% and 38.6 %, respectively and bauxite resources are estimated at 809 million tons. In addition, forward-looking gold reserves in the country are estimated at almost 10 thousand tons. According to MINT, proven reserves of gold in Kazakhstan for 2010-2013, increased by 325 tones. Growth in exploration work is expected with the use of advanced geological and geophysical methods. It is proposed to perform a revaluation of inventories and conduct geological and economic evaluation of undeveloped fields (Lipchenko and Agafonov, 2013). As they say in the Ministry of Industry and New Technologies, coping mechanisms replenish natural resources at the expense of the national budget is just acting sectoral program for the development of the mineral complex for 2010-2014. In addition, a development program for the resource base of the mineral complex of Kazakhstan for 2015-2019 years with a budget of T160 billion, of which T44 billion should be aimed at strengthening the resource base of the main types of metals copper, lead, zinc and gold.

The first step towards this goal was the February signing between JSC "Kazgeologiya" Nazarbayev University and a memorandum on the establishment of a modern center of geological research. According to the plan, it will form a world-class infrastructure in Kazakhstan including-modern research laboratories. This in turn will lead to a significant reduction in cost and time for processing of geological materials by conducting tests in the country. Start of construction of the geological center is planned for 2014.

RESULTS AND DISCUSSION

Analysis of investment projects conversions shows that 32 of the 83 projects implemented in the mining industry, including 13 in production, 19 in primary processing and enrichment. In the steel sector implemented 51 projects, 10 of which provides the primary metal, 16 obtaining alloys, 25 Issue and rolled metal products. As for the major investment projects in the steel industry in Kazakhstan, they are listed in Table 1. One such project is the creation of small steel plants, characterized by high production efficiency, quality and range of products, advanced production technology. In order to effectively address the problems of increasing productivity to the level of OECD countries enterprises of mining and metallurgical complex can benefit from state support under the state program “Performance 2020”, aimed at stimulating the increase of labor productivity in domestic enterprises.

One of the most effective tools to increase productivity is to introduce the principles of lean production which allows to eliminate all kinds of production losses. Losses occur when waiting, overproduction, unnecessary transportation, extra processing steps, redundant stocks, unnecessary movements, production of defective products. Implementation of the principles of lean manufacturing improves productivity, an average of 20-60%. With the implementation of these principles provides for the reimbursement of up to 15 m.

For the purpose of modernization and technical re-equipment of enterprises of MMC can replace outdated equipment with modern and high-tech, thus, helping to increase utilization of production capacity and improve productivity. Replace the equipment possible using a long-term lease financing on favorable terms at a rate of 5%. Following the acquisition of the company’s equipment can produce MMC design and after delivery of the equipment-installation and assembly work. For these purposes, provides for the reimbursement of costs up to 30 million tenges.

Another tool to ensure the effectiveness of labor and reduce the complexity of the production is the technical regulation of labor which provides a comprehensive approach to increase productivity through effective regulation of labor and wages in the industry. Provides for reimbursement of half the cost of the enterprise (Romenets and Yuzov, 2008). Top managers can improve their skills in the application and use of modern enterprise management tools that enhance productivity and efficiency without attracting investment, thereby increasing the profits of the enterprise.

The status and trends of the steel industry requires an analysis based on a study of best practices of global and domestic steel producers. The aim of the study is to examine the status and trends of development of metallurgical industry of the Republic of Kazakhstan. Overall MMC-export-oriented segment of the economy, almost all produced in Kazakhstan metals and metal products are exported. It should be noted that with all the diversity and large volumes of metal fabricated metal products characterized by small volumes and the scarcity of the product range. Such trends of development of metallurgical industry in Kazakhstan attracted to the fact that metallurgical enterprises exporting 80% of its production, i.e. for now developing the construction industry and the industry as a whole is not used for domestic steel products. The share of metallurgical complex in the total exports of the country is 35% (Mishin, 2006).

Mining industry: Mining industry is one of the most competitive and dynamic sectors of the industry in Kazakhstan. It employs nearly 164.5 thousand primary professions. In Kazakhstan, concentrated 30% of world reserves of chrome ore, 25%-of manganese ore, 10% - iron ore. Reserves of copper, lead and zinc are respectively 10 and 13% of the world. The total geological reserves and probable coal resources of the Republic of Kazakhstan are estimated at 150 billion. Tons of the 105 elements of the periodic table in the bowels of Kazakhstan holds 99, 70 explored, is involved in the production of more than 60 elements in Table 2.

In terms of total production of solid minerals Republic occupies the 13th place among the world’s 70 mining powers. In the coming years, the main task of development of the industry should be gradual establishment of new manufacturing industries in the metallurgical industry, production of products with high added value, ensuring the growth of high-tech products and expand its exports to foreign markets and meet the needs of the domestic market. In Kazakhstan, the volume of production from 2008-2013 in real terms grew by 6.2% to $632 billion tenge. At the same time, the structure of the manufacturing share of the steel industry decreased from 20% in 2008 to 10.7% in 2013(www.24.kz).

Mining and metals industry in Kazakhstan in recent years is one of the most dynamic sectors of the domestic industry. Was not an exception in 2013. Industrial output MMC compared with 2012 increased by 2.6% and

Table 1: (URL: www.stat.kz)

Major investment projects of mining and metallurgical industry Kazahstana4 implementation period estimated cost (mln.)	Term of realization	The estimated cost (mln.dollars)
Construction of the processing complex in Boschekul (100t.t. copper concentrate, Pavlodar) Kazakhmys 2010-2014 2000		
Kazakhmys	2010-2014	2000
Construction of the processing complex at Aktogay (100t.t copper concentrate V. Kazahstan) Kazakhmys 2010-2014 1500-2000		
Kazakhmys	2010-2014	1500-2000
Construction of the enterprise for the production of iron ore pellets with a sulfur content up to 92% (2.4 million tons per year), Kostanay. Sokolov-Sarbaiskoye GTO 2011-2014 1500		
Sokolov-Sarbaiskoye GAP	2011-2014	1500
Increasing high-carbon ferrochrome (4th smelting plant, 441 tonnes per year), Aktobe. Kazchrome 2009-2012 590		
Kazchrome	2009-2012	590
Construction of the field Jubilee processing plant gold ore (development of deep ores), Aktobe. Jubilee 2009-2013 280		
Jubileinoe	2009-2013	280
Increasing production of anode production, Pavlodar region ENRC 2009-2011 240		
ENRC	2009-2011	240
Increasing alumina production (300t.t per year), Pavlodar region ENRC 2009-2011 305		
ENRC	2009-2011	305
Increasing production of cobalt andENRC copper oxide (75 t. per year) ENRC 2011-2013 190		
ENRC	2011-2013	190

Table 2: The main mineral resources of Kazakhstan (www.24.kz)

Type of minerals	Balance reserves (tonne) in	Place in the world (reserves)	Place the world (the content in the ore)
Iron stone	18 600000 000	6	7
Manganese ore	635200 000	4	10
Chrome ore	382700 000	2	1
Bauxites	365400 000	12	н/д
Lead	17200 000	5	41
Zinc	39800 000	5	40
Copper	39300 000	12	63
Titanium	24100 000	10	15
Tungsten	2100 000	1	25
Gold	2232,6	15	2
Silver	53 204	4	31
Tin	69 300	10	23
Uranium	1600 000	2	-
Coal	150 000000 000	8	-

exceeded 3.6 trillion tenge which was 1/5 of the volume of the entire industry of Kazakhstan. The share of MMC in gross domestic product of Kazakhstan was 11.4%. Gross value added increased from 393.0 bn. In 2008-453.2 billion tenge in 2012. Number of people employed in the industry in the period from 2008-2013 decreased by 28 thousand. Man. Labor productivity in 2013 amounted to 89.9 thousand. Dollars. United States and for the period from 2008 to 2013 increased by 1.2 times. However, in 2012, the industry is still far behind the average of the Organization for Economic Cooperation and Development (OECD) (151.9 thousand. Dollars. USA) by 37%. In 2013, exports of steel products compared to 2008 decreased by 47.3% to $3.4 billion. Dollars. USA.

In the Republic of Kazakhstan on the development of primary sector influenced by external and internal factors. Complexity in international markets affected the export of products and production facilities of ferrous metallurgy such as a Joint Stock Company (hereinafter-JSC) "ArcelorMittal", a limited liability partnership (hereinafter-LP) "Casting", LLP "ALZ" and LLP «KSP Steel. Not implemented a program of modernization of "Arselor Mitall Temirtau" to increase steel production to 6 million tones per year (www.24.kz).

MMC is the basis of industrialization of Kazakhstan's economy. In this branch of industry in enterprises employing more than 190 thousand. Man on core activities effectively used export opportunities. Despite the global trend clotting investment programs in the industry are constantly being developed such projects (Mashekov *et al*., 2008). In 2013, was placed on the final stage of construction of ferroalloy plant in Aktobe on the basis of "Kazchrome". The plant meets all international standards of quality and innovation aims to achieve. In Stepnogorsk completed reconstruction sulfuric acid plant production capacity of 180 thousand. Tons per year, the aim of which is to provide uranium mining companies in the region of sulfuric acid, the need for which has been growing steadily. JSC "NGK" Tau-Ken Samruk "has completed construction of refinery in Astana which promises to be one of the most environmentally friendly mining companies in Kazakhstan.

The basis of the mineral resource base of the country comprise chromium, titanium, zinc, manganese, lead, silver, uranium, copper, iron ore, gold, aluminum, phosphorus, carbon, tungsten, tin. Kazakhstan-one of the world leaders in terms of total mining in the world. However, to use the full potential of the mineral resource base of some of the measures to be taken, as there are certain constraints: the low quality characteristics and complexity of the physical and mechanical properties of Kazakh ore, poor transport infrastructure, a low level of mechanization and automation of production. In the coming years before the MMC will be the task of addressing these issues.

Production volumes of the mining industry over the past few years, most of them show stable results. The volume of non-ferrous metals since 2007 has been

Table 3: Index of physical volume of production by economic activity (www.24.kz)

Type of economic activity	2006	2007	2008	2009	2010	2011	2012	2013
Mining and quarrying	107.3	103.6	105.9	107.2	107.2	101.3	100.2	103.1
Mining of coal and lignite	111.2	96.1	120.0	90.8	104.4	106.0	101.7	100.0
Iron ore mining	111.5	105.0	87.6	100.1	113.4	101.7	100.9	98.6
Mining of non-ferrous metals	109.0	106.2	108.4	107.3	105.7	99.9	106.1	108.8
manufacturing	107.2	108.6	97.5	97.1	113.9	106.2	100.7	101.6
ferrous metallurgy	101.5	113.0	86.6	101.6	109.4	105.6	88.0	89.6
Manufacture of basic precious and non-ferrous metals	107.2	99.6	104.5	92.0	115.7	107.2	106.9	98.8
Manufacture of fabricated metal products, except machinery and e1quipment	1432.0	134.7	93.3	102.4	98.2	112.2	97.8	108.5

growing steadily (with the exception of 2011, when production remained at the level shown in 2010). Volumes of manufactures show positive results in 2010 in Table 3. In 2013, the country produced 51,758.5 thousand. Tons of iron ore (-1.5% compared to 2012), 41,731.7 thousand tons of copper ore (+ 8.8%), 4909.9 thousand. tons of copper-zinc ore (+ 2.2%), 5192.8 thousand tons of aluminum ore (+ 0.4%), 2852.1 thousand tons of manganese ore (-3%), 5255 tons of chrome ore (+ 0.4%).

Mining and metallurgical complex in Kazakhstan today is mainly focused on the export of their own products. The main importers of the mining industry are Russia, China and the countries. The largest mining companies in Kazakhstan include: ENRC is one of the world's leading groups in the field of mining and processing of mineral resources, with integrated mining, processing, energy and logistics companies.

LLP "Corporation" Kazakhmys is a fully integrated company which covers all stages from mining to manufacturing of finished metal. The main business is the production and sale of copper. The copper division also produces significant volumes of other metals as by-products such as zinc, silver and gold. "Kazzinc" is a large integrated zinc producer with a high degree of concomitant copper, precious metals and lead. JSC "ArcelorMittal" is the largest mining and metallurgical sector of the Republic of Kazakhstan is an integrated mining and metallurgical complex with its own coal, iron ore and energy base.

JSC "NAC" Kazatomprom is the national operator of Kazakhstan for export of uranium and its compounds, rare metals, nuclear fuel for nuclear power plants, special equipment, technologies and dual-use materials. LLP "Bogatyr" is the largest in Kazakhstan, dynamically developing company on the open coal output. The Company accounts for 70% of the total volume extracted in Ekibastuz coal mine coal. There is also a large metallurgical enterprises of the Republic are Ust-Kamenogorsk Titanium Magnesium Plant" LLP "Temirtau Electro Works" LLP "Taraz Metallurgical Plant", LLP" KSPSteel" and others. Currently in the industry there are the following major players in the global market, included in the list of leading multinational companies in the world by the magazine Forbes-Global (Goncharov, 2000): Posco (South Korea), ArcelorMittal (Luxembourg), EvrazGroup (Russian) (www.24.kz).

0.054548888888888879999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999997++++++++++++++++++7(SSGPO), the largest enterprise on extraction and enrichment of iron ores in Kazakhstan, has spent more than T1 billion to repair one of the roasting machines factory production of pellets. Thanks to the complete replacement of all base units and equipment as well as repair of structural performance of the technological line in the formation of green pellets increased by more than 20%. After the commissioning of the largest CIS producer of zinc with a high degree of concomitant copper, precious metals and lead LLP "Kazzinc" in December 2010, the copper plant built in the framework of the innovative project "New metallurgy", metallurgists talking about opening a new page in the history of the industry Ust-Kamenogorsk. And it was the first batch of copper in the amount of 30 tons.

CONCLUSION

In the period from 2015-2019 the state policy in the development of metallurgical industry will focus on the implementation of the priorities in the steel industry. Firstly, the production of high quality raw materials to produce steel (iron nuggets and hot briquetted iron, increase and production of new types of ferroalloys), new types of steel (pipe and corrosion resistant, heat-resistant and heat-resistant, tool, ball bearing, rail and spring steel), the ship's steel and more. In non-ferrous metallurgy the expansion of production of base metals-copper, gold, titanium with the exception of aluminum and the increase in the production of products-wire rod, wire, rolled profiles and alloys, foil, jewelry, products for related industries (www.stat.gov.kz).

In the period from 2015-2019 the state policy in the development of non-ferrous metallurgy of the country will focus on the creation of new or expansion of existing capacity of enterprises for the production of priority commodities/commodity groups which will help to reduce imports and increase exports sector: copper tubes and pipes; copper wire, rods and profiles of copper; plates, sheets, strips or ribbons of copper; rods and profiles of aluminum; aluminum metal; casks, drums, cans, boxes and similar containers (Abisheva, 2000).

Therefore, it is hoped that the next "Five-Years Plan" demonstrate a more convincing results of the metallurgical industry, rather than the previous one. To do this, the global decline in production in the metallurgical complex which lasts more than two years and, according to leading analysts will last 3-4 years, it is necessary to develop comprehensive measures of state support that would give tangible results and economic benefits for the companies in the industry and would allow to maintain the competitiveness of products and jobs.

RECOMMENDATIONS

Given the most severe conditions of survival metallurgical industry of Kazakhstan, the main for its further development should be extremely innovative way, involving the construction of new high-tech industries which are based on the creation of products with high added value. At the same time, it is the innovative development of the metallurgical industry is impossible without the creation of small enterprises which thanks to a lot of innovation in the technological, structural and organizational processes have high investment attractiveness.

To date, the degree of involvement of small factories in the metallurgical industry of Kazakhstan is very low but the prospect of this sector is not in doubt. This new generation of enterprise - more environmentally friendly, energy efficient and technologically advanced with a high level of adaptation to market conditions and consumer needs. In this case, the further development of mini-mills in Kazakhstan may occur as independent subjects of the market economy and created on the basis of integrated steel mills while addressing the problem of obsolete technology of large steel giant and its own problems of quality raw materials.

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