



# Some System Problems of Russian Mining Enterprises of Ferrous Metallurgy

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## ABSTRACT

The results of the original scientific research directed on the estimation of prospects and restrictions of activity of Russian ferrous metallurgy mining enterprises under present-day conditions have been presented in the article. It has been shown that ferrous metallurgy branch is one of traditional indicators of economic development of the country. The place of ferrous metallurgy among other Russian industries has been identified. The place of Russian ferrous metallurgy enterprises in the world production structure has been shown. The estimation of iron ore reserves which are supervised by leading world companies of ferrous metallurgy has been given. Some objective and subjective branch problems of the mining enterprises of ferrous metallurgy have been revealed. Such system problems of Russian metallurgical complex as low power and ecological efficiency have been identified.

**Keywords:** Mining Enterprises, Ferrous Metallurgy, Metal Production

**JEL Classifications:** L61, L71, P13, P42

## 1. INTRODUCTION

Ferrous metallurgy branch organizationally and technologically unites enterprises for extraction and concentration of iron-bearing ore and non-metallic raw materials, iron and steel making, ferroalloys making, rolled steel making and products of the further conversion making. Ferrous metallurgy is one of the oldest branches of heavy industry in Russia and other countries. It forms a raw-material base of development of mechanical engineering, motor industry, building industry. Iron ore is a raw-material base of ferrous metallurgy. Economic security of Russian ferrous metallurgy enterprises is based on timely delivery of qualitative Russian raw materials. Thus, the success of Russian ferrous metallurgy in many respects depends on efficient activity of mining enterprises of the branch.

Foreign-economic activity in ferrous metallurgy have essentially extended for last two decades. Deep integration into world economic space became one of acquired features of the branch. Never before mining enterprises of ferrous metallurgy participated

in such sharp struggle for leadership in global competition. Never before technical and technological backlog of the industry was perceived so sharply, system problems of the environmental pollution and low power efficiency.

## 2. ANALYSIS OF RECENT STUDIES AND PUBLICATIONS

Ferrous metallurgy branch is one of the traditional indicators of economic development of the country. The estimation of volumes of iron ore output, the analysis of main domestic and foreign sale markets, the forecast of mining and other metallurgical enterprises development give the detailed picture of economic situation in which the state is. Production functions of mining enterprises of ferrous metallurgy form among others gross regional product of Russian Federation (Skufina et al., 2015).

Ferrous metallurgy always reacted to economic crises very strongly. Crisis of the financial markets give rise to crisis in industry and building. As a result the demand for ferrous metallurgy production

is sharply reduced. Mining enterprises have to make more active anti-recessionary programs. There is a necessity to regulate the amount of iron ore extraction by a partial stop of the equipment or by considerable reduction of productivity.

But the withdrawal of the national economy from a crisis and stabilization in the industry always involves the growth of demand for enterprises of ferrous metallurgy production. Accordingly, the demand for iron ore grows. Therefore many Russian and foreign economists addressed to the situation analysis in ferrous metallurgy as to the crisis indicator in the country. This question was considered in the papers of such Russian analysts as Antipin and Zinovieva (2009), Zinovieva and Ovchinnikov, (2010), Romenets and Ilyichev (2009).

Now the importance of ferrous metallurgy for prosperity of America, European and Asian countries is even more obvious than earlier. Ferrous metallurgy together with other industrial branches was, is and will be the basis of the economy and well-being of these countries population. Such analysts as Eder (2013), Harste and Ljungen (2011), etc. considered the problems of economic lifting and industry revival in ferrous metallurgy in their papers.

At present the processes of globalization and deepening of integration of the countries extracting iron ore in the system of world economic relations are on the rise. The World Trade Organization (WTO) role as regulator of trade relations between manufacturers and production consumers including iron ore amplifies in the international market. Such analysts as Kerkhoff (2014), etc. touched upon the issues of mining enterprises of ferrous metallurgy activity in the international market in their papers.

The equipment of mining enterprises of ferrous metallurgy needs constant updating because of specifics of production processes. Innovations in technologies underlie maintenance of Russian enterprises of ferrous metallurgy competitiveness in the world and internal markets. Baranov and Samarina's (2015) works, etc. are devoted to these problems.

Problems of ecological production efficiency and power-intensity decrease in ferrous metallurgy have been studied in Kerkhoff (2014), Samarina (2003; 2008) and Tkachenko's (2015) works. The researchers mention that the modern situation at mining metallurgical enterprises sets thinking of a policy in the sphere of energy and environment preservation.

### 3. KEY FINDINGS OF THE RESEARCH

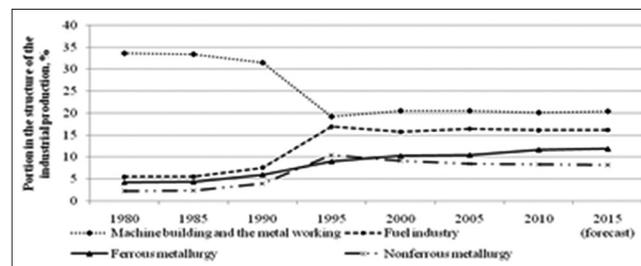
Let's examine the importance of ferrous metallurgy for the Russian Federation from the positions of foreign and domestic economy.

#### 3.1. The Place of Ferrous Metallurgy among Branches of Industries in Russia

Ferrous metallurgy is one of the leading branches of industries in Russia (Figure 1).

The analysis shows that ferrous metallurgy for last 15 years has been stably taking the third place in the structure of industrial

**Figure 1:** The dynamics of the share of the key branches of the National Economy of Russia in Structure of the Industrial Production, % (Russian Statistics Committee, 2015)



production of the Russian Federation after mechanical engineering, metal working and fuel industry as well. Ferrous metallurgy share especially quickly grew from 1985 to 2000, and then was stabilized at the level of 8%. Positive dynamics of the growth of ferrous metallurgy share in industrial production structure is marked at that. Thus, ferrous metallurgy development is extremely important for the economic health of Russia.

#### 3.2. The Estimation of Iron Ore Reserves at the Leading World Ferrous Metallurgy Companies

The big development in metallurgy worldwide the practice of vertically integrated structures creation on the basis of property rights prevails. Such major companies (holdings, groups, etc.) quite often merge enterprises for iron ore and coal extraction and concentration of iron ore, steelmaking, production of rolled metal, enterprises of thermal and electric energy manufacture, transport structures, commercial and financial sectors (Harste and Ljungen, 2011).

The analysis shows that iron ore extraction and basic metal production manufacture are concentrated in several large transnational companies. Almost half of world industrial output depends on five largest raw iron-ore materials suppliers. Thus, ferrous metallurgy industry is characterized with high concentration level. Apparently, this concentration will become stronger with time. We will notice that Russian company metal-invest is part of a quintuple of world leaders of iron ore manufacture after Vale, Rio Tinto, BHP Billiton and Fortescue Metals Group with production volume about 40 million tons per year (Official Internet-portal the Company Metalloinvest, 2015).

The worldwide tendency is that the basic deposits of rich and accessible iron ore continue to become depleted. Such a situation strengthens positions of the largest company's leaders of raw iron-ore materials manufacture that have a right to the richest iron ore deposits development all over the world.

The analysis shows that the basic confirmed and probable ore reserves belong to these leading companies as well (Figure 2).

In accordance with the amount of explored iron ore reserves Russian Company Metalloinvest takes the second place after the Brazilian mining company Vale that have its branches worldwide.

On the whole Russia takes the first place in the world on total and confirmed iron ore reserves. According to the official data

mineral and raw materials base of ferrous metallurgy in Russia is 264 billion tons of iron ore (Official Internet-portal the Company Metalloinvest, 2015). Thus distinctive features of the Russian iron ore are:

- Basically low ore grade: Iron content is 16-32%, complex mineral composition, ruggedness;
- Need for concentration of ore;
- Considerable depth of occurrence;
- Adverse mining enterprises location concerning consumer plants:  $\frac{3}{4}$  commodity iron ore is manufactured in the European part of Russia whereas  $\frac{2}{3}$  metallurgical works are located in Ural and Western Siberia (Chernikova et al., 2015).

### 3.3. The Place of Russia among Basic World Iron Ore Manufacturers

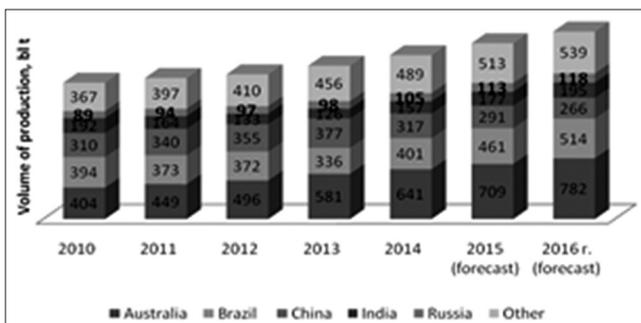
Russia is one of the largest world iron ore manufacturers. In accordance with this indicator the Russian Federation cedes top ranking only to China, Brazil, Australia and India (Figure 3).

Australia is the leading iron ore manufacturer (almost 30% of world extraction recently). Brazil actively extracts iron ore as well (18%). India accounts a little more than 6%. Chinese manufacture makes 18-19 % of the world iron ore extraction. Its extraction amount constantly grew: From 310 million tons in 2010 to 377 tons in 2013. However setback in production is predicted: In 2016 it will make up only 266 million tons. The decline of iron ore production 29% in 2016 in comparison with 2013 is expected. The role of other countries in iron ore manufacture is insignificant (Rating Agency "Expert RA", 2015).

**Figure 2:** The confirmed and probable ore reserves, billion tons (Official Internet-portal the Company Metalloinvest, 2015)



**Figure 3:** Basic world iron ore manufacturers (Rating Agency "Expert RA", 2015)



Russia accounts about 5% of world iron ore and its extraction amount constantly grew: From 89 million tons in 2010-105 tons in 2014. However growth rates of iron ore offers by Russian manufacturers is insignificant in the world market: Total volume in 2013 grew by 1% against 2012. Hereinafter, volumes of output will only grow. The forecast for 2016 is about 118 million tons. In accordance with such extraction amount Russia will keep 5% of world iron ore manufacture.

### 3.4. Branch Problems of Mining Enterprises of Ferrous Metallurgy

At present moment Russian ferrous metallurgy tries to solve a new large problem, namely securing of effective functioning of the mining enterprises of metallurgical complex in the WTO system. Dynamical changes in the world economy, intra Russian institutional conditions, antirecessionary, investment and foreign-economic policies will figure in this situation, as well as practice of work of metallurgical enterprises of the European Union countries in the WTO system.

Mining enterprises of ferrous metallurgy are attached to iron ore reserves. Regardless of the country they are located; all of them have some branch problems, such as:

- Reserve depletion of qualitative iron ore;
- Deterioration of deposits operational characteristics;
- Difficult availability and adverse environmental conditions (desert, mountain desert, north zone) in the territory of new deposits;
- Considerable material capacity and energy intensity of manufactures.

First three problems have an objective nature. Enterprises cannot change them, but can only get adjusted and take them into account by designing development programs. Considerable material capacity and energy intensity of manufactures is caused by nature of manufacturing processes at mining enterprises of ferrous metallurgy. However, these problems have subjective nature. Enterprises can and should work on their solution.

### 3.5. Some System Problems of Russian Metallurgical Complex

In this connection, in our opinion, it is appropriate to pay attention to some system problems of the Russian enterprises of the metallurgical complex which will inevitably be aggravated in an existing situation.

First, in accordance with the level of pollutant emissions into atmosphere and reservoirs, pollution of soils and formation of solid waste, metallurgy wins the first place among all raw-materials branches of the industry. It creates high ecological danger of its manufacture and the raised social intensity in fetches of metallurgical plants.

According to requirements of the WTO, Russia should pay special attention to systems of standardization, certification and licensing of home industry, provide quality of product control of Russian commodity producers according to world standards. In

industrial democracies the ecological efficiency requirements, in particular environmental safety and ecological purity of production requirements become more and more tough. At modern metallurgical enterprises up to 15-20% of general capital investments have to be turned to guarantee of ecological purity of metallurgical enterprise functioning. For going into the world market in the WTO system Russian metallurgical enterprises should receive (and annually confirm) all necessary certificates of production quality. Including the certification of conformity of manufacture and production to international standards of ecological efficiency.

Secondly, ferrous metallurgy is one of the most power-intensive industries. The share of costs for fuel and energy resources in the general manufacturing costs for metal products manufacture is more than 30%. Energy intensity of Russian rolled metal on 30-50% exceeds a similar performance for metal products in developed countries.

High power intensity of metallurgical manufacture regards problems of economy of energy supply at a constant rise of prices for fuel and energy resources as of paramount importance. Russian metallurgists made certain efforts in the scope of increasing of power efficiency. Many metallurgical enterprises have achieved saving of consumption of fuel and energy resources. But basically it has been achieved at the expense of institutional arrangements and home working balances. At present moment they have exhausted their potential. Practically all reserves of such economy in ferrous metallurgy of Russia have been used. The further increase of power efficiency of enterprises of ferrous metallurgy is connected with qualitative modernization and technical re-equipment of production of manufactures.

At the same time, the power savings potential in the branch reaches 30%. At present power savings questions for metal works are not only one of the basic directions for cost reduction and competitive recovery of metal production in the European Union markets, but a survival condition as well.

#### 4. CONCLUDING REMARKS

In conclusion we would like to notice that the expansion of foreign-economic activity connected with Russia's joining the WTO, has brought to a competition aggravation in the European market. The tendency is also supported with such fact as entry of the European economy into the stage of setback in production and, thereafter, reduction of metal products prices.

For problem-solving of competitiveness control of metal products in the European Union markets it is necessary to have strategy of development of the branch that is inseparably linked with the basic directions of ecological efficiency and economy of energy supply. If Russia wants to remain at the European market at least as the supplier of resources and metal half-finished products, it should essentially reconsider its ecological and energy policies. Rather low level of expenditure of energy and resources and high ecological efficiency became the condition of competitiveness of Russian metal production in the European markets. The

price level related to high specific consumption of energy carriers and ecologically dirty manufacture will either make Russian production non-competitive or at least reduce profit of metallurgical companies.

Ferrous metallurgy at present moment is in great need in concrete programs of increasing of both ecological and power production efficiency. And the principal direction here is the commissioning of progressive and energy-saving technologies and equipment that provide rational nature management. In addition, the task of creation of institutional conditions of technical re-equipment of production support in ferrous metallurgy at the cost of tax concessions and incentive rates, subventions and some other preferences is assigned to the state.

The increase of power and ecological efficiencies is an uncontested way for Russian ferrous metallurgy. Otherwise, Russian metal production will not be competitive. All further added cost, new workplaces, inflow of investment of capital and finances will be created in the European Union countries. And Russian ferrous metallurgy will be used as a raw materials' source for the European market of metal production.

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