Development of the mining complex of the Russian Far East

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Abstract. One of the competitive advantages of the Russian Far East is the presence of the largest reserves of natural resources in the Russian Federation: 81% of diamond reserves, 51% of forests, 37% of fresh water, 33% of aquatic biological resources, 44% of gold, 27% of gas and 17% of oil. It also occupies a unique economic and geographical position in the Russian Federation and in the Asia-Pacific region. Despite this, the region is characterized by an unsatisfactory state of economic development. The article discusses the mining complex of the Far East of the Russian Federation, the region is defined as a “resource-type problem region”. Specific real-time current problems and the corresponding imperatives (orders, imperatives) of effective activity are formulated. It is concluded that the successful overcoming of these problems is associated with the need to form a complex of high-tech industries based on the use of mineral resources of the Far East. It is required to implement inter-sectoral cooperation and apply a new (expedient) concept of organization and spatial distribution of the productive forces of the mining industry - processing industries for raw materials" - in contrast to the currently used inappropriate concept - "raw materials for processing industries".

1. Introduction
The Far East of the Russian Federation, having the richest mineral resources, is characterized by a discrepancy between the significant potential for their development and the current unsatisfactory state of the productive forces of the region's mining industry, as well as its transport and energy infrastructure. This is one of the rather significant factors in the significant lag of the Russian Far East in socio-economic development. The presence of large reserves of oil, coal, non-ferrous and rare earth metals, as well as the geographic proximity of the Russian Far East to the rapidly developing countries of the Asia-Pacific region, suggest that its further development will be associated with the strengthening and intensification of economic relations. The natural resources of the Russian Far East can become the main material, resource and financial base for the development of various branches of its industry while reorienting the region's economy to the industrial path of development. The full use of the mineral resource base in order to create industrial production with a higher added value is currently a fundamentally necessary and demanded condition.

2. Materials and methods
Within the framework of such a consideration, it is necessary to formulate specific problems and imperatives of effective activity and development of the mining industry of the Far East of the Russian Federation, taking into account the analysis and processing of publication materials [1-4].
3. Results and discussions

**Problem 1.** Significant distance of deposits of iron and non-ferrous metal ores of the region from metallurgical industries of the country. The main problem of the mineral and raw material base of the iron ore industry of the Russian Federation is the significant removal of deposits from metallurgical industries. In regions rich in iron ores, there are no large metallurgical production facilities, and areas where the main steel enterprises are located are significantly removed from the deposits and experience an acute shortage of iron ore raw materials. Therefore, during long-distance transportation of iron ore raw materials, the corresponding transport costs significantly exceed the cost of producing it. This situation is especially indicative for the tin industry of the Russian Far East. Almost all reserves of Russian tin are concentrated in the Far East of the Russian Federation, and in fact, the only processing enterprise in the country - the Novosibirsk Tin Plant - is located far beyond the boundaries of this region [5].

**Problem 2.** Lack of opportunities to obtain final products (metals). Until now, concentrates are produced in the Far East of the Russian Federation, but not finished products (metals). The exception is only a small lead plant in the Primorsky region. It is necessary to deepen the complexity of the extraction and processing of raw materials. The construction of a mining and metallurgical plant for the production of copper and tin concentrates in Solnechny District (Khabarovsk region) has been suspended. Since 2016, a mining and processing plant for the concentration and extraction of ores and the Solnechnaya concentrating plant (tin concentrate production) have been operating on the basis of the Festivalnoye, Solnechnoye, Pridorozhnoye, Perevalnoye deposits. The modernization and expansion of the capacities of the lead plant in the Primorsky region is also required. It is also necessary to build a zinc plant and a hydrometallurgical plant at the Yaroslavl mining and processing plant.

The construction of advanced plants would significantly improve the state of the mining industry of the Far East of the Russian Federation. All this negatively affected the prerequisites for the creation of ferrous and non-ferrous metallurgy in the Far East of the Russian Federation. In the region, for many decades, only primary processing (mining and processing) of raw materials were developed, and the main products were ores and their concentrates. The creation of metallurgical production in the region could meet its own needs (as well as the needs of the Russian state) in finished products and develop its export.

**Problem 3.** Lack of prerequisites for the integration of mining and metallurgical industries on a vertical technological basis. The analysis of world experience [6-7] has shown that in ferrous and non-ferrous metallurgy, integration is most effective according to the vertical technological principle. This allows you to combine the technological cycles of individual mining enterprises - from the extraction of raw materials and their processing into concentrate to the production of high value added products. At the same time, its competitiveness in world markets will increase.

The objectives of various forms of integration on the part of mining enterprises are - obtaining a reliable market for their products, since the demand for it in the future is not determined, and from the side of metallurgical enterprises - acquisition or development of our own raw material base. The presence of mining and metallurgical industries within a single structure significantly reduces their dependence on third-party suppliers of ferrous and non-ferrous metal concentrates.

**Problem 4.** Unprofitable integration of the region's mining industries with large foreign and domestic holding corporations. Over the last ten years, processes such as concentration, integration and diversification have been taking place in the global non-ferrous and ferrous metallurgy. The active formation of holding structures continues, which control a significant part, in particular, non-ferrous metallurgy and are large producers and exporters of metals.

In addition to the previously identified characteristic pros and cons of this phenomenon, it also determined the undesirable dependence (for example, the lack of independence in choosing the paths of their development) of metallurgical enterprises in relation to global oligopolistic corporations (such as BHB Billiton, CVRD and Rio Tinto), which produce 35% of the world's iron ore, control the international resource market and, accordingly, have the tools to influence the global pricing policy.
This kind of oligopolistic integration is taking place in the nonferrous metallurgy of the Russian Federation. So, according to 2014-2015 data, more than 92% of the country's non-ferrous metallurgy industry revenue is generated by only four domestic corporations located far beyond the Russian Far East: Norilsk Nickel, Rusal, SUAL and UMMC. Therefore, the use of foreign and domestic experience of vertical integration here should be recognized as extremely disadvantageous for the functioning and modernization of the mining industry of the Far East of the Russian Federation and the effective development of its entire economy.

**Problem 5. Insufficient state budget investment in the creation of mining and metallurgical industries in the region**. To implement an investment project in the Russian Far East in the form of a vertically integrated mining and metallurgical complex, the region needs its own ferrous metallurgy. Table 1 presents the currently implemented investment projects in the region. The projects are related to the development of iron ore deposits and the creation of mining and metallurgical enterprises on their basis, as well as projects for the integrated development of tin ore deposits.

The creation of mining and metallurgical production of products of a high degree of redistribution is one of the most important components of the stability of the economy in the region. There is a real supply of iron ore base and tin resources, more than 95% of which are concentrated in the Far East of the Russian Federation. Currently, the state partially finances such projects as the development of the Garinsky iron ore deposit and the construction of a mining and processing plant, as well as the creation of a mining and metallurgical cluster in the Amur region in the Jewish Autonomous Region and the construction of a mining and metallurgical plant (iron ore concentrate) in the Kamchatkiy krai. But the table indicators indicate that the share of budget (federal) funds is extremely low and financing is provided mainly from investors (table 1).

**Table 1.** The ratio of budget and private investments in investment projects of the Russian Far East.

| Project, subject of the Far Eastern Federal District | Financial resources, RUB bln | Share of budgetary funds | Number of jobs | Investor |
|-----------------------------------------------------|-------------------------------|--------------------------|----------------|---------|
| Construction of MMC (iron ore concentrate), Kamchatkiy krai | 28 | 27.2 | 0.8 | 0.03* | 150 | Petropavlovsk-Kamchatka Processing Plant LLC |
| Development of the Garinskoye iron ore deposit and construction of the mining and processing plant, Amur Region | 48.5 | 21.3 | 27.2 | 0.56 | 1485 | Petropavlovsk Management Company, Garinsky MMC LLC, Petropavlovsk-Black Metallurgy LLC |
| Creation of a mining and metallurgical cluster, Jewish Autonomous Region, Amur Region | 25.4 | 24.9 | 0.5 | 0.02 | 1562 | Kimkano-Sutarsky GOK LLC |
| Development of alluvial tin deposit, Republic of Sakha (Yakutia) | 1.1 | 0 | 0 | 0* | 85 | Yanolovo OJSC, South Yakutia Development Corporation OJSC |
| Construction of a GOK Pravoumiyskoye tin ore deposit, Khabarovskiy krai | 4.5 | 0 | 0 | 0* | 400 | Rusolovo OJSC |

* – there is no budget financing or the company is looking for a partner investor

**Problem 6. Existing difficulties in implementing large investment projects related to mining.** Many large investment projects of the Far East of the Russian Federation related to mining are waiting for a long time for their implementation. There are certain general difficulties for their implementation [8-9]: underdevelopment of infrastructure facilities; population decline in the region; unbalanced
specialization of the raw material sectors of the regional economy; insufficient capacity of processing plants; poor industrial use of mined mineral resources; high physical and moral deterioration of the main assets of extractive and processing enterprises; lack of exploration, etc.

**Problem 7.** The negative impact of poor development of the regional economy and especially its transport infrastructure on the investment activities of mining enterprises. There are certain restrictions on the competitiveness of the sectors of the regional economy, which are associated with underdevelopment and the lack of transport infrastructure [10]. First of all, this applies to rail and road networks. These factors negatively affect the potential inflow of investment resources into the regional economy. As a result, the process of reproduction of fixed capital does not occur, which is a prerequisite for accelerated development. The "transit / export raw materials specialization" of the respective region is preserved. This means that the Far East of the Russian Federation remains a region of resource and raw materials orientation either with insufficient development of processing industries, or with the absence of such at all (Chukotka Autonomous Okrug).

**Problem 8.** Unstable financial condition of a number of mining enterprises in the region. In the last decade, many mining enterprises of the Far East of the Russian Federation have remained less competitive than foreign companies operating in the same market segments. As a result, domestic enterprises often lost in the competition. The formation of favorable conditions for the development of integration processes in the mining industry business, on the one hand, requires the improvement of regulatory, tax, financial, credit and other regulators of the external environment, in which there are integrated enterprises that produce products of a high degree of processing, on the other hand, it involves the development of forms and methods of internal management, the fundamental improvement of the activities of the integrated business structures themselves, and especially their financial condition.

**Problem 9.** The application in the mining industry of the region of the impractical concept of its organization is "raw materials for processing industries". The creation and development of metallurgy in the Far East of the Russian Federation involves the strengthening of the greening of its mining industry - the use of production processes in which more effective measures are taken to prevent negative impacts on the environment. Reducing the amount of waste to a minimum (waste-free technology) cannot be carried out within the framework of not only one mining, but also the metallurgical industries of the region, this also requires intersectoral cooperation and the application of a new concept of organizing and spatial placement of the productive forces of the mining industry – "Processing industries for raw materials" – in contrast to the outdated and therefore impractical concept - "raw materials for processing industries", which is currently used in the Russian Far East.

After the introduction of new raw material processing technologies, enterprises can get an almost unlimited regional raw material base and turn into highly profitable environmentally sound production. This will be a production with a technologically closed cycle, in which the waste of some processing will serve as raw material for others.

**Problem 10.** Imperfection of the system of tax payments for extractive mining enterprises. There are a number of deficiencies in determining the tax base: regular payment rates are set depending only on the amount of mineral reserves, but not on the quality of raw materials; double taxation; the tax burden is as much higher for enterprises that extract poorer ore (the poorer the ore, the more waste remains after its enrichment); the more waste, the more the tax burden increases per 1 ton of the extracted component; the poorer the ore, the more extensive the beneficiation and waste management, that is, the larger the property and, accordingly, the greater the tax on it; as a result, a larger land allotment is required and then the land tax increases; in some cases, value added tax is not charged, which means that costs are not compensated, etc.

**Problem 11.** Forced risk orientation of already risky mining enterprises in the region to the world market with unstable prices for mineral raw materials. The economic activity of mining enterprises has a number of the following significant risks: inevitable depletion of natural reserves of mineral raw materials; removal from economic circulation of unprofitable deposits of mineral raw materials; technological losses of mineral raw materials during its extraction; danger of the destructive impact of
mining on the environment; the need to process most types of mined mineral raw materials to obtain products both suitable for use and intermediate products (concentrates), which are further subject to further enrichment, purification from impurities, etc.; the obligatory acquisition of expensive fixed assets and the formation of significant working capital; implementation of continuous investment of large capital investments in the construction of mines, mines and open pits; performance of a city-forming function by some mining enterprises and, in the event of their respective insolvency, provision of the necessary state financial support; especially difficult and dangerous working conditions of production personnel in the implementation of underground mining.

4. Conclusion
The existence of the above-listed serious problems of rational nature management allows us to designate it as a “problem region of the resource type”. Sustainable development of the Russian Far East and ensuring the competitiveness of its economy is associated with the achievement of the following imperatives in the region: development of proven resources by overcoming their inaccessibility; the need for an optimal balance of openness and "closedness" of the regional economy; double taxation; avoiding the risks of effective participation of the Russian Federation in an external trade organization; improvement of interbudgetary relations of the Russian Federation; rational allocation of budget funds to ensure the environmental safety of the country; setting the priority of northern (depressed) territories in obtaining rent from natural resources; development of a concept for the development of natural resources or a nature management program in the Russian Far East; elimination of contradictions in federal programs for the development of the region; improving the distribution of rent from environmental management; optimization of the share of exports to countries and its structure. It also requires the implementation of intersectoral cooperation and the application of a new concept of organization and spatial distribution of the productive forces of the mining industry.

- "processing industries for raw materials" - in contrast to the currently used - "raw materials for processing industries".

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