State of gold mining industry in the Republic of Sakha (Yakutia) in the period of sanctions and restrictions

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Abstract. The gold mining industry is one of the strategic sectors of the Russian Federation's economy. It plays an important role in the socio-economic development of Russia and its constituent entities. The Republic of Sakha (Yakutia) is one of the leading gold mining regions of Russia. Recent changes caused by political and economic events that occur in the global and domestic gold markets are of great interest to researchers. This article examines the consequences of the US and EU sanctions on Russian gold in 2022, reveals the level of impact of sanctions on the development of the gold mining industry of the Republic of Sakha (Yakutia) and the country as a whole. For this purpose, the analysis of the world gold market, the current state of the gold and foreign exchange reserves of the Russian Federation compared to other countries, the resource potential of gold mining companies in the region, and the prospects for its replenishment are evaluated.

It is revealed that the US and EU sanctions on Russian gold for gold mining companies can cause mainly temporary difficulties. Russia can reorient its sales market to friendly countries and countries in the Asia-Pacific region. In this direction, the Republic of Sakha (Yakutia) will have a favourable position in terms of geographical location and promising projects.

1 Introduction

The Russian Federation is one of the leading gold mining countries in the world. Russia ranks first in the world in terms of gold reserves, and according to various estimates, 10-12% of the world's gold reserves are located on its territory. In the rating of the world's countries in terms of gold production by the end of 2022, Russia (331.1 tonnes) ranks second after China (368.3 tonnes). It is followed by: Australia (327.8 tonnes), USA (190.2 tonnes) and the top 5 countries are closed by Canada (170.6 tonnes) [1].

Most of the gold reserves of the Russian Federation are concentrated in large ore deposits in Siberia and the Far East, including the territory of the Republic of Sakha (Yakutia).

The Republic of Sakha (Yakutia) is an old gold mining region - in 2024 will celebrate its 100th anniversary. Over the years it has undergone many changes, ups and downs. During
the years of planned economy, when gold mining was supported by the state, the Republic of Sakha (Yakutia) in the 1970s was a leader among the subjects of the USSR, producing more than 30 tonnes of gold per year. In those years, entire working settlements of gold miners were established in remote northern territories. Food and household goods were supplied directly from the centre, bypassing the centre of the region. Goods were delivered mainly by air transport.

With the transition to a market economy, when the industry switched to self-financing, in the 1990s, also under the influence of the world crises, the industry's performance began to decline sharply. Global demand for gold declined. The price of gold fell sharply. Gradually, gold mining and processing plants such as Indigirzoloto, Kularzoloto and others began to close down. Gold miners were left without work. The once established working settlements of gold miners were emptied, and most of the population moved to the central regions of the country.

At present, unlike mining under the planned economy, gold is extracted mainly by the less costly rotational method. Consequently, only production, household facilities and temporary housing are constructed. There is no need to build social infrastructure. The labour force is mainly recruited from the central regions. Local population participation is insignificant.

The gold mineral resource base of the Republic of Sakha (Yakutia) is one of the largest and most developed in Russia (20% of the Russian Federation reserves). Balance reserves of gold as of 01.01.2022 by categories A+B+C1 amount to 815.29 tonnes, including ore - 564.83 tonnes, placer - 250.47 tonnes [2].

According to the results of 2021 gold production Yakutia ranks third among gold-mining regions of Russia after Krasnoyarsk Krai and Magadan Oblast. In recent years, the region has seen a sharp increase in gold production (in 2021 compared to 2010 the volume of production increased by 2.3 times), due to the development of new gold ore deposits Gross and Tabornoye in the Olekminsky district (subsoil user "Neryungri Metallic" - a subsidiary of Nord Gold). Consequently, gold production from ore deposits also increased (2.6 times) (Fig. 2).

Fig. 1. Dynamics of gold production in the Republic of Sakha (Yakutia) for 2010-2021, kg [3]

Note: Data for 2021 - according to the Ministry of Industry and Geology of the Republic of Sakha (Yakutia).

Currently, there are about 60 gold mining companies operating in the Republic of Sakha (Yakutia), which conduct year-round and seasonal mining (depending on weather conditions, the season usually lasts from April to October). Since 2005, major gold mining holdings of the country have been investing in the gold mining industry of the republic: Polyus PJSC,
Polymetal JSC, Nord Gold, Vysochaishy PJSC (GV Gold) and others [4]. Currently, these companies are successfully operating in many deposits of the Republic (Table 1).

**Table 1.** Main subsoil users of gold deposits in the Republic of Sakha (Yakutia) [5]

<table>
<thead>
<tr>
<th>no.</th>
<th>Subsoil user enterprises</th>
<th>Deposits</th>
<th>Category A+B+C, reserves, kg</th>
<th>Production in 2021, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>JSC Polyus Aldan (PJSC Polyus)</td>
<td>Kuranakh group of deposits</td>
<td>78768</td>
<td>7373</td>
</tr>
<tr>
<td>2</td>
<td>JSC Yuzhno-Verkhoyanskaya (PJSC Polymetal)</td>
<td>Nezhdaninskoye</td>
<td>26900</td>
<td>2600</td>
</tr>
<tr>
<td>3</td>
<td>Neryungri Metallic LLC (Nord Gold)</td>
<td>Gross, Tabornoye</td>
<td>43841</td>
<td>12026</td>
</tr>
<tr>
<td>4</td>
<td>TZRK JSC (PJSC Vysochaishy (GV Gold))</td>
<td>Drazhnoye</td>
<td>5551</td>
<td>4348</td>
</tr>
<tr>
<td>5</td>
<td>JSC &quot;Sakha Gold Mining&quot; (PJSC Vysochaishy (GV Gold))</td>
<td>buried placer of the Bolshoi Kuranakh River</td>
<td>57300</td>
<td>556</td>
</tr>
<tr>
<td>6</td>
<td>JSC GRK Zapadnaya</td>
<td>Bazovskoye ore deposit, Bazovskoye alluvial deposit</td>
<td>2100</td>
<td>945</td>
</tr>
<tr>
<td>7</td>
<td>JSC Zoloto Seligdara</td>
<td>Nizhneyakokitskoye ore field</td>
<td>12700</td>
<td>4441</td>
</tr>
<tr>
<td>8</td>
<td>Ryabinovoye LLC</td>
<td>Ryabinovoye</td>
<td>4705</td>
<td>9006</td>
</tr>
<tr>
<td>9</td>
<td>Poisk Zoloto LLC</td>
<td>16 alluvial deposits</td>
<td>18027</td>
<td>1788</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>491042</td>
<td>41136</td>
</tr>
</tbody>
</table>

It is known that in 2022 the US and EU countries imposed a number of restrictions and sanctions on Russian gold, and the Russian Central Bank also imposed its own restrictions on gold purchases: [6]

- The London Bullion Market Association (LBMA) has suspended Good Delivery status for Russian refineries, including the Novosibirsk Refinery and Prioksky Non-Ferrous Metals Plant, where Yakut gold is refined;

- The US, Canada, Japan and EU countries imposed embargoes on Russian gold, which also affected the Russian gold market;

- In July 2021, the Bank of Russia resumed gold purchases to replenish gold reserves (after suspension in April 2020); net gold purchases (purchases minus sales) totalled 3.1 tonnes. In March 2022, in order to balance supply and demand in the domestic market of precious metals, the Bank of Russia announced the purchase of gold from credit institutions at a fixed price set by it (for the period from 28 March to 30 June 2022 it was set at RUB 5 thousand/g).

### 2 Results and discussion

Gold as a strategic metal is of great importance in the country's economy. The geopolitical situation affects the volatility of the global gold market. During the conflict in Ukraine, the overall volatility of the global commodity market increased from 35% to 85%, which is higher than the level observed during the Covid-19 pandemic [6]. Sources of volatility are many minerals, including gold, silver, copper, platinum, aluminium become net sources of volatility.
The empirical findings indicate that there are positive and negative influences of Russia's geopolitical situation on the global gold market. The positive influences indicate that Russia's deteriorating geopolitical situation may stimulate the international gold market. However, the unfavourable influences of the geopolitical situation cannot support this view, mainly due to economic and non-Russian geopolitical factors. The negative impact contradicts the intertemporal fixed asset pricing model, on the contrary, the gold price has a positive impact on the geopolitical environment, showing that the gold market can be considered as a predictive indicator reflecting the geopolitical situation. With the intensifying conflict between Russia and Ukraine, these findings benefit society and related countries, reducing losses by optimising investments and adjusting gold reserves, and guaranteeing the health of inhabitants, national security and peaceful development through a more comprehensive analysis of geopolitical risks [7].

As shown by the dynamics of gold exchange prices after a sharp increase in 2012 there was a slight decline and lasted until 2020. Starting from 2020 there was a sharp jump (compared to the previous year increased by 1.3 times). At the end of the first 11 months of 2022, the price was $1,792/troy ounce (Fig.2).

Since 2020, there has been an increase in gold exports. The main importer of Russian gold was the UK. It should be noted that London is the centre of the global gold trade and an important global hub for the turnover and storage of precious metals. Thus, in 2019, 113.5 tonnes worth $5.33 billion were exported to the UK. Also importers of Russian gold are: Kazakhstan, Switzerland, India, Germany, Belarus and Turkey. In general, the maximum export of gold from Russia was recorded in 2020 (Fig.2).

![Fig. 2. Average annual exchange prices and volumes of gold exports for 2010-2021, 2022. [5]](image)

Note: in 2022 the assessment is based on the results of 11 months.
prices in the domestic market due to the global decline in gold prices and strengthening of the ruble; "Polymetal International" - the second largest producer of Russian gold will also not suffer much, as it already actively cooperates with Kazakhstan and has a well-diversified product portfolio, which in addition to gold contains a significant share of silver. The company concentrates about a third of its production in Kazakhstan and is going to move refining there as well. As a result, it will have sales opportunities in almost all global markets.

- The most difficult situation is that of Petropavlovsk. It is registered in the UK and, due to government sanctions, cannot fully operate in Russia. "Petropavlovsk, whose current market value is lower than its total debt, is likely to face difficult times that could lead to complete bankruptcy. This company has no assets in the Republic of Sakha (Yakutia)."

- Seligdar, a major gold mining company in Yakutia, will not suffer major losses either, as its main partners are located in Russia;

- Gold bars produced at Russian refineries can be sold without going through the London Metal Exchange, as they meet international standards and are listed on the Dubai Metals and Commodities Centre (DMCC) and Shanghai Gold Exchange (SGE).

One of the main indicators for the development of the gold mining industry is market demand. While the dynamics of global demand did not experience sharp changes until 2020, there was a sharp decline in 2020 due to the restrictive measures caused by Covid-19. In 2022, the demand for gold reached 4,742 tonnes. At the same time, about 40% of gold is consumed by the jewellery industry. The main consumers of gold are European and Middle Eastern countries and Turkey. There is also a sharp increase in banks' demand for gold (in 2022 compared to 2021 by 2.5 times) (Fig. 3).

![Fig. 3. World demand for gold and its consumption structure, tonnes](https://doi.org/10.1051/e3sconf/202343103002)

In Russia in 2021, visible gold consumption grew 2.2 times year-on-year to 45.2 tonnes, which was due to the recovery of the domestic jewellery market after the decline caused by the introduction of measures to combat the COVID-19 pandemic. At the end of 2021, gold consumption by the jewellery industry was 29.3 tonnes (+24.2%). The amount of gold used for technical purposes and to meet investment demand from the population is about 6-7 tonnes. Starting from 1 March 2022, following amendments to Part Two of the Tax Code of the Russian Federation, the value added tax on the purchase of gold bars was cancelled for individuals. The adopted changes are aimed at stimulating demand for gold on the part of the population [5].
The dynamics of changes in the gold stock of Russia after the rise from 2010 to 2020 (3.5 times), in recent years shows, we can say, stability (on 01.01.2023 compared to 2020 by only 2%). As for the currency part, insignificant changes are observed here - for the period under study the increase is 3.2% (Fig. 4). It should be noted that the share of gold in Russia's gold and foreign exchange reserves is only 21.5 %, which is 3.6 times less compared to the USA and Germany [11].

The pace of replenishment of gold and foreign exchange reserves depends significantly on the situation on export markets and import needs. Russia is currently facing very serious trade restrictions, although for many items buyers are unable to refuse Russian supplies. This situation is unlikely to persist for a long time, as the barriers to Russian exports are already having negative consequences for the economies of Europe and the entire world. Accordingly, compensation for frozen reserves is out of the question.

3 Conclusion

Thus, it can be stated that the gold mining industry of the Republic of Sakha (Yakutia) has not yet experienced any serious hardships from the US and European sanctions. Balance reserves and forecast gold resources c in the territory of the region ensure efficient development of the industry for many years to come. At the same time, promising gold ore projects of the Republic of Sakha (Yakutia) in the coming years are:

- Kyuchus (Beloe Zoloto LLC, a joint venture of Rostec State Corporation and Seligdar PJSC) - a gold ore deposit on the border of Verkhoyansk and Ust-Yansk districts, with balance reserves of 175 tonnes, inferred resources of 253 tonnes, and a planned production volume of 10 tonnes per year. The field will be powered by a small-capacity nuclear power plant of at least 35 MW. In January 2022, an agreement was signed with JSC Rusatom Overseas (Rosatom State Corporation) on the supply and consumption of energy from the nuclear plant for the development of the deposit. The energy supply period is 40 years, starting from 30 June 2028. [12]

- Khvoynoye (Seligdar PJSC) - gold ore deposit in the territory of Aldan district, balance reserves - 16.8 tonnes, inferred resources - 14.9 tonnes. It is planned to build a gold extraction plant with a capacity of 3 million tonnes of ore per year. A 110 kV overhead line has been
constructed to organise power supply to the production complex. The plant is expected to be commissioned in 2024 [12].

- Tokko (OOO Neryungri Metallic, Nordgold) includes two gold deposits Anomalaya and Roman, located in the territory of the Olekminsky district near the Gross and Tabornoye deposits. Mineral resources have been estimated at 3.6 million ounces of gold. Production of the first gold will begin in 2024 [13].

- The Bazovskoye ore field (exploration companies Zapadnaya, Zapadnaya Gold Mining Ltd.) is located in the territory of the Oymyakonsky district, 140 km north-west of the Ust-Nera settlement. The balance reserves of the 1st stage of the C2 category are 9.4 tonnes. C2 stage 1 balance reserves amount to 9.4 tonnes. Prospecting and exploration works continue according to the project, as a result of which further increase of reserves is expected. Pilot development of the approved reserves is expected to start in the near future [14].

Exploration work is also continuing at the Khangalasskoye gold deposit in the Oymyakonsky district. In 1968, the deposit was put into operation with 629 kg of balance reserves and 1,048 kg of off-balance gold reserves. The Khangalasskoye deposit (ore body No.1, Central zone) was partially mined in 1968-1973. A total of 1329 kg of gold was extracted, including about 700 kg obtained as a result of operational exploration [15].

Negative factors affecting the development of the gold mining industry is the continuing depletion of the mineral resource base of placer deposits, deterioration of mining and geological conditions, reduction of metal content in the sands.[16] In this regard, improvement and development of new effective geotechnologies, mining equipment, technological processes and operations are necessary. A rational combination of two or more technologies can create a synergistic effect leading to a significant improvement in the overall schemes of deposit development.

4 Findings

The analysis shows sufficient resource potential for the effective development of the gold mining industry in the region for many years to come and favourable global market conditions. Consequently, the impact of the US and EU sanctions on Russian gold for gold mining companies may result primarily in temporary difficulties, mainly related to the reorientation of supply directions from European to Asian markets. It should be noted that here the main problem may be a decrease in the exchange price of gold.

5 Acknowledgements

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