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The Mineral Industry of Russia

By Elena Safirova

The Russian Federation was one of the world's leading producers of mineral commodities and produced a diverse range of metals, industrial minerals, and mineral fuels. In 2022, Russia was the world's leading producer of asbestos (56% of world output), natural gem-quality diamond (31%), natural industrial diamond (40%), and palladium (43%); the 2d-ranked producer of gallium (0.8%), nitrogen (9.7%), platinum (11%), potash (17%), silicon (11%), tellurium (12%, not including United States production), and vanadium (20%); the 3d-ranked producer of aluminum (5.4%), cobalt (4.7%), gold (10%), nickel (6.8%), selenium (10%, not including United States production), sulfur (9.2%), titanium sponge (7.4%), and tungsten (2.5%); the 4th-ranked producer of lime (2.7%), magnesium compounds (4.4%, not including United States production), niobium (0.5%), phosphate rock (6.1%), pig iron (4.0%), and silver (5.0%); the 5th-ranked producer of alumina (2.2%), antimony (5.2%), arsenic (0.8%), helium (3.2%), iron ore (3.6%), magnesium metal (2.0%, not including United States production), raw steel (3.8%), and refined copper (3.9%); the 6th-ranked producer of cadmium (4.4%, tied with Kazakhstan and not including United States production), kaolin (4.8%), and graphite (1.0%); the 7th-ranked producer of bauxite (1.4%), indium (0.5%), lead (4.7%), mined copper (4.3%), peat (5.9%), rare earths (0.9%), and vermiculite (5.6%); the 8th-ranked producer of barite (3.0%, tied with Turkey), cement (1.5%), tantalum (1.6%), and zeolites (3.9%); the 9th-ranked producer of molybdenum (0.7%, tied with Uzbekistan), and zinc (2.4%); and the 10th-ranked producer of diatomite (2.0%), salt (3.0%), and industrial sand and gravel (2.0%). Russia also was a significant global producer of boron, feldspar, germanium, iodine, and tin (Apodaca, 2024a–c; Bolen, 2024; Bray, 2024; Brioche, 2024a, b; Callaghan, 2024; Cordier, 2024; Crangle, 2024; Ewing, 2024; Flanagan, 2024a–d; Friedline, 2024a–c; Gambogi, 2024; George, 2024; Goodin, 2024a, b; Hartingh, 2024; Hatfield, 2024; Jasinski, 2024a, b; Jaskula, 2024; Klochko, 2024a, b; Londono, 2024; McRae, 2024a, b; Merrill, 2024a, b; Olson, 2024; Polyak, 2024a, b; Schnebele, 2024a, b; Schulte, 2024; Sheaffer, 2024; Shedd, 2024; Simmons, 2024a, b; Stewart, 2024a, b; Tolcin, 2024a, b; Tuck, 2024a, b; Williams, 2024).

In 2022, Russia was also one of the world's leading producers of mineral fuels. According to the Energy Institute's "Statistical Review of World Energy," the country was ranked second in the world in the production of natural gas, accounting for 15.3% of the world's production; third in the production of crude petroleum (including condensate), accounting for 13.1%; third in the production of refined petroleum, accounting for 6.8%; and sixth in the production of coal, accounting for 5.3%. Russia was also the sixth-ranked world producer of uranium, accounting for 5.1% of world production. For more information, see previous editions of the U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Europe and Central Eurasia at https://www.usgs.gov/centers/national-minerals-information-center/europe-and-central-eurasia (Energy Institute, 2023, p. 17, 30 39; World Nuclear Association, 2024).

On February 24, 2022, Russian forces invaded Ukraine. In response, the United States, the European Union, and other countries imposed wide-ranging economic sanctions and other types of sanctions on Russia, including restrictions regarding the Russian financial system, defense entities, and technology companies, as well as personal sanctions on Russian Government and business leaders. Although the effects of the sanctions varied across economic sectors, the sanctions made production and consumption of goods and services, including the production and consumption of mineral commodities, more costly. In response, the Government encouraged domestic companies to begin production of goods and services that used to be imported (Tass.ru, 2023c; Bagrova and Shevelyova, 2024; European Commission, 2024; U.S. Department of State, 2024).

Minerals in the National Economy

In 2022, the real gross domestic product (GDP) of Russia decreased by 2.1%; the nominal GDP was 153 trillion rubles ($2.20 trillion).[1] In 2022, the gross value added in mining and quarrying accounted for 12.7% of the GDP and totaled $279 billion, which was a 22% increase compared with the value in 2021, although in real terms, the output value increased by only 0.4%. Among the total goods and services output, mining and quarrying amounted to $391 billion, of which production of crude petroleum and natural gas accounted for $278 billion; mining and quarrying of coal, $40.1 billion; and mining of metallic ores, $24.5 billion. The total value of coke and refined petroleum production accounted for 21% of the value of manufacturing and totaled $197 billion, which was a 10.4% increase compared with the value in 2021 but a decrease in real terms of 0.4%. Production of base metals was valued at $151 billion, which was a 1.6% decrease compared with the value in 2021 and a decrease in real terms of 0.8%; the output of fabricated metal products was valued at $56.6 billion, which was a 14% increase compared with the value in 2021 and an increase in real terms of 15.3%. The output of chemical products was valued at $85.3 billion, which was a 13% increase compared with the value in 2021 but a decrease in real terms of 2.4%; and the total value of other nonmetallic mineral products was $37.0 billion, which was a 23% increase compared with the value in 2021 and an increase in real terms of 3.6% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2023, p. 270, 277, 281, 373–374).

[1]Where necessary, values have been converted from Russian rubles (RUB) to U.S. dollars (US$) at the annual average exchange rates of RUB69.8957=US$1.00 for 2022; RUB73.7032=US$1.00 for 2021; and RUB72.3197=US$1.00 for 2020. All values are nominal, at current prices, unless otherwise stated.

In 2022, a total of $5.23 billion was spent on geologic exploration in Russia, of which 89.7% was financed from company funds, 7.3% was from the Federal budget, and 1.6% was from domestic and foreign investment. By category of expenditure, 68.1% of the total funds spent on exploration was exploration for petroleum, natural gas, and condensate; 14.7%, for precious metals; 2.1%, for nonferrous and rare metals; 1.0%, for diamond; 0.8%, for nonmetallic minerals; 0.5%, for coal; 0.4%, for ferrous metals; and the rest, on exploration for other minerals (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2023, p. 86).

In 2022, the Federal budget funded exploration at 69 sites, including 11 sites studying the ocean floor in international waters and 1 site where the works were not completed in 2021. Exploration was completed at 14 sites, including at 2 ocean floor sites. A total of 62% of the work was focused on the Dal'nevostochnyi Federal Okrug (42%) and the Sibirskiy Federal Okrug (20%). An additional 18% of the total exploration done in 2022 was conducted in the Arctic zone of Russia (Zolteh.ru, 2023).

From the Federal budget funding, four significant new results were obtained. In Zabaikal'skiy [also referred to as Zabaykalsk or Transbaikal] Kray, two new mineralized zones—the Ekaterininskaya and the Sergeevskaya—were discovered, and the forecast resources were estimated to be 16,300 kilograms (kg) of gold, 806,000 kg of silver, 261,900 metric tons (t) of lead, and 81,000 t of zinc. In the Ylenskiy mineralization cluster in the Republic of Sakha (Yakutiya), nine gold occurrences were discovered, six of which had resources estimated to be 24,400 kg of gold. In Bashkortostan Republic, within the Mambetovsko-Karagayskaya area, a copper-zinc-chalcopyrite mineralization was discovered; resources were estimated to be 20,500 kg of gold;, 67,000 kg of silver, 361,200 t of copper, and 226,200 t of zinc. In Altay Kray, within the Zmeinogorskiy mineral region, six chalcopyrite-polymetallic mineralizations were found; resources were estimated to be 91,500 t of copper, 1,600 kg of gold, 251,900 t of lead, 101,400 kg of silver, and 580,100 t of zinc. Overall, at all nine newly discovered sites, new forecast resources were estimated to be 452,700 t of copper, 20,100 t of fluorite, 100,000 kg of gold, 514,000 t of lead, 974,000 kg of silver, 6,460 t of tungsten, and 887,400 t of zinc (Zolteh.ru, 2023).

Private companies conducted exploration of 131 deposits in 2022—103 were gold deposits (90 of which were alluvial), 19 were industrial mineral deposits, 5 were nonferrous metal deposits, 2 were coal deposits, 1 was a diamond deposit, and 1 was a platinum-group metal (PGM) deposit. The most prominent newly discovered deposits were the gold-copper Lugokan deposit in Zabaikal'skiy Kray (which had estimated resources of 603,700 t of copper, 124,100 kg of gold, and 1,340,400 kg of silver); the Roman gold deposit in the Republic of Sakha (Yakutiya) (49,400 kg of gold and 210,800 kg of silver); the Svetlovskoye gold deposit in Irkutsk Oblast (46,400 kg of gold and 10,600 kg of silver); the Talman polymetallic deposit in Zabaikal'skiy Kray (48,000 t of antimony, 2,000 t of cadmium, 7,200 kg of gold, 438,900 t of lead, 1,644,100 kg of silver, and 541,100 t of zinc); the Vostochnyi Dvoynoy deposit in Amur Oblast (34,900 kg of gold and 34,700 kg of silver); the Kuolisma precious-metal deposit in the Republic of Kareliya (9,500 kg of PGMs, 5,000 t of copper, 700 kg of gold, and 1,700 kg of silver); the Michurinskoye gold-polymetallic deposit in Chelyabinsk Oblast (1,400 t of cadmium, 17,200 t of copper, 14,700 kg of gold, 18,000 kg of indium, 103,000 kg of silver, and 309,600 t of zinc); the Shaburovskoye-Vostochnoye coal deposit in Altay Kray (151 million metric tons (Mt) of coal); and the Romanovskiy section of the Verkhnekamskoye deposit in Perm Kray (799 Mt of sylvinite) (Zolteh.ru, 2023).

Subsoil users reevaluated the resources and reserves of 370 deposits at their own expense in 2022. The most prominent increases in resource estimates were at the following deposits: the Mir kimberlite pipe in the Republic of Sakha (Yakutiya), 59.1 million carats of diamond; the Daldyn deposit in the Republic of Sakha (Yakutiya), 1.3 million carats of diamond; the Balagannakh deposit in Sakha Republic (Yakutiya), 1.3 million carats of diamond; the Sukhoy Log deposit in Irkutsk Oblast, 835,300 kg of gold; the Fyodorova Tundra deposit in Murmansk Oblast, 107,600 kg of PGMs, 63,000 t of copper, 4,500 kg of gold, and 25,200 t of nickel; the Kochkarskoye deposit in Chelyabinsk Oblast, 21,800 kg of gold and 19,600 kg of silver; the Saf'yanovskoye deposit in Sverdlovsk Oblast, 182.7 t of cadmium, 81,700 t of copper, 2,500 kg of gold, 9,800 kg of indium, 266.4 t of selenium, 103,500 kg of silver, 849,100 t of sulfide sulfur, 40.7 t of tellurium, and 34,500 t of zinc; the tailings of the Vostochno-Zavitinskoye deposit in Zabaikal'skiy Kray, 5,800 t of lithium; and the Vereteninskiy section of the Mikhaylovskoye deposit in Kursk Oblast, 6,600 Mt of iron ore (Zolteh.ru, 2023).

Government Policies and Programs

The legislative framework for exploration, mining, and other extractive activities related to the production of solid minerals, hydrocarbons, and groundwater in Russia is described by the "Subsoil Law" that was adopted on February 21, 1992. Major amendments to this law were made in 1995, 1999, 2014, 2016, and 2022 in conjunction with related modifications of other relevant laws, such as the Tax Law (Konsortsium Kodeks, 2024; Konsultant.ru, 2024).

Owing to the geopolitical situation and the sanctions imposed on the country, the Federal Agency for Mineral Resources of the Russian Federation (Rosnedra) developed a list of primary tasks aimed at reducing the domestic industry's import reliance on strategic mineral resources. The tasks included reorientation of exploration toward strategic import-dependent mineral resources. Government Order No. 2473-r of August 30, 2022, approved an extended list of import-dependent resources, and the Federally funded exploration projects were reoriented towards these resources. Other tasks included reevaluation of state reserves that were discovered many years ago, some as long as 50 years before; expedited issuance of mining licenses for strategic and import-reliant resources; creation of a Geotechnical Center that would be involved in the development and implementation of modern technologies for the beneficiation and processing of strategic and import-reliant minerals; and improvements in the procedures for the extraction of useful elements from tailings, slags, and other waste materials (Zolteh.ru, 2023).

In 2022, Rosnedra conducted 138 auctions for exploration and production rights to mineral resources, 58 (42%) of which were certified to be valid. In 31 of the 138 auctions (22%), only

one applicant expressed interest, and the applicant received a license in each of those cases. The total amount of one-time payments for all the licenses amounted to about $105 million. Overall, licenses for subsoil use were issued for 2,268 sites that contained solid minerals; of this number, 1,990 were licenses for prospecting, preliminary exploration, and evaluation, and another 278 were licenses for exploration and production. In 2023, Rosnedra planned to increase the issuance of licenses for such strategic minerals as beryllium, manganese, rare earths, titanium, and tungsten (Zolteh.ru, 2023).

In August, the Government approved an extended list of strategic minerals that included 61 minerals compared with the 29 minerals on the 1996 strategic minerals list. The new list included, in the following order of strategic importance, petroleum, natural gas, helium, uranium, manganese, chromium, titanium, bauxite, copper, lead, antimony, tin, zinc, nickel, molybdenum, tungsten, cobalt, rare metals (lithium, rubidium, beryllium, scandium), rare earths (yttrium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutecium), indium, gallium, germanium, zirconium, hafnium, vanadium, niobium, tantalum, rhenium, gold, silver, PGMs (ruthenium, rhodium, palladium, osmium, iridium, and platinum), diamond, graphite, phosphates, potash, fluorite, and pure quartz. The list was expected to be reconsidered and potentially revised at least once every 3 years (Interfax.ru, 2022b).

In December, the Government approved a strategy for development of the metallurgical industry in Russia through 2030. The strategy was aimed at quick adaptation of the metallurgical industry to new economic conditions and to return to growth no later than in 2024. Specifically, the strategy was directed at increasing domestic demand for metals and reorientation of exports to alternative international markets. The strategy included three major directions: (1) expansion of product lines to include a wide range of high-value-added products, (2) increases in domestic demand for metallurgical products, and (3) development of new export opportunities to China, Turkey, and countries of Africa, Latin America, the Middle East, and Southeast Asia. The strategy's base scenario assumed an increase in rolled-steel production by 33% and an increase in nonferrous metallurgy output by 28% by 2030; the domestic market was to serve as the major growth driver (Russian Union of Industrialists and Entrepreneurs, 2022; Smirnov, 2023).

In November, the President signed a law that would increase the taxes placed on Russia's hydrocarbon industry for a period of 3 years—from 2023 through 2025. According to the law, the tax on mineral extraction (NDPI) for PAO Gazprom (Gazprom) would increase by 50 billion rubles (about $715 million) per month for the 36-month period. As a result, Gazprom payments would increase by 1.8 trillion rubles (about $25.8 billion). The previous extraction of super profits from Gazprom took place during September through November 2022, when Gazprom paid an additional 416 billion rubles (about $5.95 billion per month), or a total of 1,248 billion rubles (about $17.9 billion). Also, the tax rate on profits for exporters of liquefied natural gas (LNG) for the next 3 years would increase to 34% from 20%. Of the total tax collected on LNG profits, 50% would be sent to the Federal Government budget, and the other 50%, to regional government budgets. In 2023, the additional revenue from LNG profits would total 200 billion rubles (about $2.86 billion). In addition, a planned tax increase on petroleum-producing companies for 2023 through 2025 would increase Government revenue by 629 billion rubles (about $9 billion). A planned increase of NDPI on coal for the period of January 1 through March 31, 2023, was expected to increase the Government revenue by about 30 billion rubles (about $429 million) (Neftegaz.ru, 2022).

Production

In 2022, Russia's production of many mineral commodities decreased, although a small number of commodities showed production increases. Specifically, the estimated output of ferrotitanium decreased by 91%. Production of other ferroalloys decreased by an estimated 75%; ferrosilicochromium, by an estimated 50%; arsenic trioxide, by an estimated 38%; mined ruthenium and refined cobalt, by an estimated 33% each; potash, by 32%; ferrophosphorus, by an estimated 25%; peat, by an estimated 24%; secondary smelted copper and tantalum content of loparite concentrates, by an estimated 21% each; refined lead, by 20%; Fe content of iron ore, by 16%; secondary refined copper, by an estimated 15%; nitrogen, N content of ammonia, by an estimated 14%; mined iridium, by an estimated 13%; natural gas, by 12%; and copper solvent extraction, by an estimated 10%. At the same time, titanium sponge production increased by 33%; lignite, by 20%; and mined tin, by an estimated 20%; steel pipe, by 18%; antimony, by an estimated 16%; mined cobalt, by an estimated 15%; nickel metal, by 13%; and construction sand and silicomanganese, by 12% each. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Ministry for Natural Resources and Environment (Minprirody) was responsible for the development of laws and regulations related to geologic exploration and the rational use and protection of subsoil resources. Rosnedra was responsible for the management of the Government's subsoil resources. Specifically, Rosnedra was responsible for implementation and execution of subsoil-related laws and regulations in specific jurisdictions.

At the end of 2022, Russia had 17,000 enterprises engaged in mining and quarrying, which was a 0.6% increase compared with that in 2021. Of these enterprises, 4,400 were engaged in the mining of metallic ores; 1,100 in the production of petroleum and natural gas; 600 in the mining of coal; and the rest, in the mining of other minerals. Of all mining and quarrying enterprises, 15,900 were owned by Russian citizens either in their private capacity or as owners of private businesses, about 100 were owned by central and municipal Governments, and about 100 were owned either by foreign companies or were jointly owned by domestic and foreign entities. The ownership of the other 900 enterprises was not reported. In addition, Russia had 36,400 enterprises engaged in metal processing, 35,400 of which were owned by Russian citizens either in their private capacity or as owners of private businesses

(Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2023, p. 331–334). Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2022, Russia's Federal Service of State Statistics suspended publication of statistics on foreign trade in goods and services and, as a result, data for 2022 were not published. Also, starting in January 2022, the Federal Customs Service of Russia stopped publishing data on customs statistics because of the Special Military Operation in Ukraine (Interfax.ru, 2022a).

Commodity Review

Metals

Titanium.—In 2022, Russia produced 36,000 t of titanium sponge, which was a 33.3% increase compared with 2021 production. Of the total production, 34,500 t was produced by OAO Corp. VSMPO-Avisma (VSMPO-Avisma) and 1,500 t was produced by the Solikamskiy Magnesium Plant (SMZ), both of which were located in Perm Kray. VSMPO-Avisma had the capacity to produce 44,000 metric tons per year (t/yr) of titanium sponge, and SMZ had the capacity to produce 2,500 t/yr. For production of titanium slab, VSMPO-Avisma had a capacity of 72,000 t/yr; the Chepetskiy Mechanical Plant (ChMZ), 5,000 t/yr; and Stupinskaya Metallurgical Co. (SMK) and AO Ruspolymet, 2,000 t/yr each. In 2021 (the latest year for which data were available), Russia produced 53,900 t of titanium slab, which was a 22.5% increase compared with production in 2020 (tables 1, 2; Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 325; Metalinfo.ru, 2023).

Prior to 2021, Russia imported about 200,000 t/yr of titanium concentrates (predominantly ilmenite). In 2021 (the latest year for which data were available), imports of titanium concentrates increased by 6% to 219,100 t; the major import partners were Ukraine (which supplied 46% of the total), Mozambique and Vietnam (22% each), and Kazakhstan (9%). Ukraine supplied ilmenite concentrates to Russia with TiO_2 content ranging between 55% and 66% and rutile concentrate with TiO_2 content of 94% to 95%. Starting in the second half of 2021, concentrate shipments from Ukraine were significantly reduced, and they were stopped completely in March 2022 (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 325).

Prior to 2021, VSMPO-Avisma exported about 70% of its titanium products; major recipients of these products were leading aircraft and engine manufacturing companies such as Airbus SE of the Netherlands, Boeing Co. of the United States, Collins Aerospace Systems of the United States, Embraer S.A. of Brazil, Rolls-Royce plc of the United Kingdom, and SAFRAN S.A. of France. Prior to 2021, VSMPO-Avisma provided titanium to satisfy 35% of Boeing's demand, 65% of Airbus Group's demand, and 100% of Embraer's demand. AO United Engine Corp. (ODK) and PAO United Aircraft Corp. (OAK), both of which were subsidiaries of state-owned Rostech Corp., also were leading buyers of titanium products (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 324, 325; RBC.ru, 2022a).

In March 2022, Boeing announced that it had suspended purchasing titanium from Russia. In December 2022, Airbus announced that it intended to stop using titanium from Russia in its production. Airbus noted that the process of replacing Russian titanium would take several months owing to a complicated process involving certification and other procedures. As of December 2022, Airbus continued to receive titanium products from Russia for use in building civil aircraft. It was expected that Airbus would replace Russia's titanium products with products from China and, to a lesser extent, Japan. In July, it was reported that the EU had decided not to impose sanctions on VSMPO-Avisma (RBC.ru, 2022a; Sintsova and Sidorkova, 2022).

VSMPO-Avisma, in its turn, was expected to redirect exports of its titanium products to China, which was planning to begin producing medium- and long-range aircraft, and to the domestic Russian aircraft building industry. In June, the Government approved a program to develop the aviation industry until 2030 that stipulated an increase in the share of Russian-built aircraft in the fleet of domestic airlines to 81% from 33%. To implement the program, civil aviation would need to add 1,036 domestically built planes for civil aviation. In addition, there was a plan to build an additional 760 helicopters and more than 5,000 engines for aircraft. Moreover, the increased needs of Russia's military would provide an additional market for VSMPO-Avisma output (Sintsova and Sidorkova, 2022; Sintsova, 2023).

In 2021, AO Tuganskiy GOK began production at an alluvial titanium-zirconium mine in Tomsk Oblast. Starting in 2022, the company planned to produce 11,400 t/yr of ilmenite concentrates and 800 t/yr of leucoxene concentrates. However, the company expected that by 2026 it would be able to increase production by three to four times, and then again to triple production by 2029. The resources of the Tuganskoye deposit were estimated to be 250 Mt of titanium-zirconium sands, and the company planned to mine about 2.3 million metric tons per year of sands by 2026. At this production rate, the deposit would have enough resources for 100 years of mining (Kuchumova, 2022; Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 327, 328).

In July 2022, VSMPO-Avisma expressed interest in mining titanium in Russia. One potential investment opportunity under consideration was the Tsentral'noye deposit in Tambov Oblast. The deposit had an area of 12,500 hectares and estimated resources of 1,600 Mt of titanium-zirconium sands; however, the deposit required additional exploration and was not ready for production. The development of two other deposits, the Ariadnenskoye deposit in Primorskiy Kray and the Big Seyim deposit in Amur Oblast, were closer to completion. The Ariadnenskoye project was being developed by OOO Iter and was at the stage of mine construction. The expected production of ilmenite concentrates was expected to range between 20,000 and 62,000 t/yr. The area had good infrastructure and production would be conducted by an open pit method. The Big Seyim deposit was being developed by OOO Uralmining of Hong Kong and was expected to produce 168,000 t/yr of ilmenite concentrates and 130,000 t/yr of titanium-magnetite concentrate by open pit method. The Big Seyim project was at the blueprint stage (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 328, 329; RBC.ru, 2022c).

Helium.—In 2022, helium production in Russia remained unchanged at an estimated 5 million cubic meters. The major producer of helium in 2022 was the Orenburgskiy helium plant (OHZ), which was a subsidiary of Gazprom. The design capacity of the plant was 8.8 million cubic meters per year of helium. The plant received raw materials from the Orenburgskoye petroleum and gas condensate field and the Karachaganakskoye gas condensate field. Over the years, gas production at the Orenburgskoye helium-containing field had been decreasing and gas production at the nonhelium-containing Karachaganakskoye Field had been increasing and, as a result, helium production peaked at 5.1 million cubic meters in 2017 and had been slowly decreasing ever since. It was expected that production at the OHZ would gradually decrease and eventually stabilize at between 3.0 and 3.3 million cubic meters per year. Based on the reserves of the reservoirs, it was expected that OHZ had enough gas reserves to continue operations for another 35 to 40 years (Budris, 2022; Ogrel', 2023).

In June 2021, the Amurskiy gas-processing plant (Amurskiy GPZ), which was located in Amur Oblast and was a subsidiary of Gazprom, inaugurated its first production line, and in September, its second production line. These two production lines were integrated with the first unit for separation, liquefaction, and packaging of helium and had a total (combined) capacity of 20 million cubic meters per year. Two accidents had taken place at the Amurskiy GPZ—a fire in October 2021 and an explosion in January 2022—and the plant was in the process of making repairs and conducting restoration and therefore was able to produce only 0.5 million cubic meters of helium in 2022. According to the company plans, the plant would open two more helium units and achieve full capacity of 60 million cubic meters per year of helium by 2026 (Budris, 2022; Iyevlev, 2023).

The technological scheme at the Amurskiy GPZ was as follows. First, the gas produced at the Kovyktinskoye Field would be transported through the "Siberia Force" pipeline to the Chayandinskoye Field located in the Republic of Sakha (Yakutiya). There, at the helium membrane extraction unit, concentrate would be produced and stored in the Chayandinskoye reservoir. This technical solution would allow variable helium production, depending on market conditions. Then a mix of natural gas from the Chayandinskoye and the Kovyktinskoye fields with a specified amount of helium would be transported to the Amurskiy GPZ, which was designed to produce super-pure helium containing 99.9995% He (Global Energy, 2022).

Another helium project was being developed by the Irkutskaya Petroleum Co. The first unit was planned to begin operations in 2022 but was delayed until May 2023. The company would produce helium at the Yaraktinskoye petroleum and gas condensate field and would have an annual capacity of 7.5 million cubic meters of helium (Iyevlev, 2023).

In 2022, domestic helium consumption decreased by 22% to 3.58 million cubic meters compared with that in 2021; of the total, 48% was used for advertisement (blimps and neon signs) and 24% was used in industrial production and scientific research. In the past decade, the highest consumption level of helium was in 2018, when Russia consumed 4.77 million cubic meters of helium (Ogrel', 2023; Tass.ru, 2023b).

Lithium.—Russia did not produce lithium in 2022. In 2021 (the latest year for which data were available), the country imported 10,700 t of lithium carbonate equivalent (LCE), which was a fourfold increase compared with that in 2012 and a 16.6% increase compared with that in 2020. Of the total, about 85% of these imports were lithium carbonates of technical grade and the rest of the imports were lithium chlorides, hydroxides, and oxides. Traditionally, the suppliers of lithium carbonates were Argentina and Chile, and in 2021, hydroxides and oxides of lithium came from Belgium, Chile, and countries of Southeast Asia, and lithium chlorides came from Argentina. The major recipients of imported lithium were PAO Chemical and Metallurgical Plant (PAO ChMZ), which was located in Krasnoyarsk; OOO DT Khalmek (Khalmek), which was located in Tula Oblast; and PAO Novosibirsk Plant of Chemical Concentrates (PAO NZKhK), which was a subsidiary of AO TVEL and was located in Novosibirsk. The three plants used imported lithium to produce lithium hydroxide and lithium metals, and they exported most of their production. In 2021, the three plants exported 86% of their output, which totaled 9,200 t of LCE (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 363, 364).

Since 2020, data on lithium resources, production, and processing in Russia were removed from the Government list of secret information and made public, which likely increased interest in developing domestic lithium deposits. In April 2022, GK State Atomic Energy Corp. (Rosatom) and PAO GMK Nornickel signed an agreement to participate in a joint project called Polar Lithium; the agreement was to develop the Kolmozerskoye deposit in Murmansk Oblast to mine the lithium raw materials and further process them at existing facilities of Nornickel and Rosatom. The Kolmozerskoye deposit was considered the largest lithium deposit in Russia and had resources of 75 Mt, which accounted for 18.9% of Russia's lithium resources. In addition to lithium resources, the Kolmozerskoye deposit had resources of niobium and tantalum. At full capacity, which the company was planning to reach by 2030, the project would produce 45 t/yr of lithium carbonate and hydroxide (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 365; Interfax.ru, 2023).

Another project was a joint venture between Khalmek and PAO NZKhK to develop the Polmostundrovskoye lithium deposit in Murmansk Oblast. The partners planned to begin experimental lithium production of about 1,000 t of LCE and to gradually increase production to 20,000 t of LCE by 2026 (Interfax.ru, 2023).

Another lithium carbonate project was the Zavitinskiy lithium field, which is located 250 kilometers (km) from the city of Chita in Zabaikal'skiy Kray, close to the Trans-Siberian railway that links Russia with China and other Asian countries. In 2022, Rosatom indicated that it planned to begin developing the lithium field, although the company did not have a mining license for the Zavitinskiy Field yet. The overall resources of the field were estimated to be 19 Mt of lithium oxide. In 2017, Stans Energy Co. of Canada had developed a feasibility study at the Zavitinskiy Field, but the project ultimatelywas not developed. Originally, a lithium mine at the Zavitinskiy Field had been developed and operated between 1949 and 1991.

During the active mining period, the mine produced more than 100,000 t of lithium concentrate that was supplied primarily to the Soviet Union's defense industry. After 1991, operations at the mine were suspended. The mine also had a stockpile of tailings containing approximately 19 Mt of mineralized material (spodumene pegmatite) grading at or below 0.3% lithium oxide (Junior Mining Network, 2016; Life.ru, 2016; Mil'kin, 2023; Vz.ru, 2023).

In the spring of 2022, Gazprom, the Ministry of Industry and Trade of Russia, and OOO Irkutskaya Petroleum Co. signed a document aimed at project implementation for the extraction and processing of formation brines (mineralized groundwater) at the Kovyktinskoye gas condensate field to obtain lithium compounds and other valuable components. The parties agreed on cooperation in conducting research and development (R&D) to create domestic technologies, equipment, and materials necessary for the implementation of the project, and on the preparation of proposals for obtaining Government support for scientific and industrial enterprises (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 366).

The Kovyktinskoye gas condensate field was located in Irkutsk Oblast and was the largest gasfield in eastern Russia. The field had recoverable gas reserves of 1.8 trillion cubic meters, and it contained significant reserves of highly mineralized formation waters (brine), from which it was possible to obtain hydromineral raw materials for subsequent extraction of such components as bromine, calcium, lithium, magnesium, and so forth. Previously, there had been no extraction of hydromineral raw materials from brines. In these brines, Ca content was 153.9 grams per liter (g/l); lithium, 0.5 g/l; and magnesium, 28.3 g/l. Well production was about 960 cubic meters per day of gas condensate (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 366).

Another brine project, located in Irkutsk Oblast, was developed by OOO Irkutskaya Petroleum Co., which had its own processing technologies for lithium-containing brines associated with petroleum and gas condensate. This company planned to start commercial lithium production in 2024 at the rate of 1,000 t/yr of lithium compounds from lithium-containing associated brines of the Yaraktinskoye petroleum and gas condensate field. At the Yaraktinskoye Field during the 25-year project development period, total production of associated brines was expected to be 68 Mt, with the brines of this field averaging 49 milligrams per liter lithium. As a result, a total of 3,400 t of Li (on average, 134 t/yr) would be extracted (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 366).

According to experts, the cost of LCE production at domestic ore deposits in Russia was expected to be between $5,000 and $8,000 per metric ton. Production of lithium from already drilled holes was estimated to be between $4,000 and $5,000 per metric ton of LCE. Consequently, even if the market price for lithium was between $20,000 and $30,000 per metric ton, production at both ore deposits and brine formations would likely remain profitable (Mil'kin, 2023; Smertina, Dyatel, and Kozlov, 2023; Vz.ru, 2023; Zadera and Tikhonov, 2023).

Mineral Fuels

Natural Gas.—In 2022, Russia produced 674 billion cubic meters of natural gas, which was an 11.6% decrease compared with production in 2021. Of this amount, production of associated petroleum gas decreased by 2% to 99 billion cubic meters. In 2022, total exports of natural gas decreased by 30.7% to 170.6 billion cubic meters. Russia's reserves of natural gas were estimated to be 46.1 trillion cubic meters, or 22.3% of the world's total reserves, and were sufficient for about 68 years of production at the 2022 production rate. Production of LNG in 2022 increased by 8.1% to 32.5 Mt. Gazprom, which was the leading producer of natural gas in Russia, produced 412.6 billion cubic meters of natural gas, which was a 20% decrease compared with 2021 production. Gazprom exported about 101 billion cubic meters of natural gas to non-Commonwealth of Independent States countries, which was a 45.5% decrease compared with that in 2021 (Ministerstvo Prirodnyh Resursov i Ekologii Rossiyskoy Federatsii, 2022, p. 43–66; Larina, 2023; Novak, 2023; Tass.ru, 2023a).

In September, reduced pressure was detected at one of the two threads of the Nord Stream 2 pipeline and at both threads of the Nord Stream 1 pipeline. In November, investigators concluded that the loss of pressure was the result of explosions. Traces of explosive materials were found at the site where pipeline pressure was lost, and the explosions were declared to be the result of sabotage. For this and various other reasons, most pipelines that were used for transporting Russia's natural gas to European countries were either damaged or turned off during 2022. The only two pipelines still in operation were one pipeline through Ukraine and one thread of the TurkStream pipeline that connects Russia to Turkey (Adomaitis and Ahlander, 2024; Tass.ru, 2024).

In December, Gazprom commissioned production at the Kovyktinskoye natural gas and gas condensate field in Irkutsk Oblast, which was considered to be the largest such field in eastern Siberia. Its recoverable reserves were estimated to be 1.8 trillion cubic meters of natural gas and 65.7 Mt of gas condensate. The design production capacity was 27 billion cubic meters per year of gas. In order to transport gas from the Kovyktinskoye Field, a special 800-kilometer-long pipeline was built to connect to the Chayandinskoye Field in the Sakha Republic (Yakutiya). The Kovyktinskoye Field was discovered in 1987 and, in addition to methane, it was found to contain butane, helium, and propane. Gazprom acquired a production license for the Kovyktinskoye Field and production facilities in 2011 from the previous owner (RBC.ru, 2022b).

Petroleum.—In 2022, Russia produced about 3.9 billion barrels (bbl) of crude petroleum and gas condensate, which was a 2.2% increase compared with production in 2021. Excluding gas condensate, production amounted to 493 Mt (about 3.6 bbl) of crude petroleum. The Government announced that the Government revenues from the hydrocarbon industry increased in 2022 by 28%, or by 2.5 trillion rubles (about $35.8 billion). In September, Rosnedra announced that Russia had enough reserves of crude petroleum for profitable production for 33 years, and enough recoverable resources for 39 years (Neftegaz.ru, 2023; TAdviser.ru, 2024).

The EU and the United States imposed multiple sanctions targeting Russia's petroleum production and exports. In March, the United States banned imports of Russian petroleum and later imposed other sanctions limiting Russia's ability to produce and export petroleum, such as sanctions against individual companies and a ban on investment in the energy sector. The EU prohibited the import of seaborne crude petroleum and refined petroleum products from Russia and banned new investment in Russia's mining sector, including in petroleum extraction. The "Group of Seven" (G7) countries agreed on a price cap of $60 per barrel on Russia's petroleum. The price cap prevented operators from providing transport or insurance services for the transportation of petroleum from Russia unless the petroleum was purchased below the price cap. Some petroleum products, such a diesel, gasoline, and kerosene, had a cap established at $100 per barrel, and less valuable petroleum products, such as fuel oil and naphtha, at $45 per barrel. By the end of 2022, it was not clear how effective those measures were at limiting Russia's petroleum exports (European Commission, 2024; Sfera, 2024; U.S. Department of State, 2024).

Outlook

Russia has large reserves of a variety of mineral commodities and most likely will continue to be one of the world's leading mineral producers. Although the country's emphasis historically has been on mineral fuels, Russia has leading positions globally in the production of many metals and industrial minerals and significant resources to potentially increase production in the long term.

In the short-to-medium term, Russia is likely to have to continue to deal with the negative effects of sanctions imposed because of the Russia-Ukraine conflict, a need to find new export markets for many of its mineral products, the effects of reduced petroleum prices, and the decreased value of the ruble against other currencies. It is likely that some of the major mineral projects will be either canceled or delayed until domestic and, more importantly, international economic conditions become more favorable for mineral production and export. Some projects that are deemed to be related to national security, such as lithium and rare earths, will likely become more prominent. It remains to be seen, however, how this new economic reality will affect the development of Russia's mineral industry, which historically has been highly dependent on the global market and thus very sensitive to the macroeconomic situation in the world.

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TABLE 1
RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2018	2019	2020	2021	2022
METALS						
Aluminum:						
Bauxite	thousand metric tons	5,651	5,574	5,570	5,679	5,780
Nepheline ores	do.	35,600	36,800	37,300	38,900 r	39,000 e
Alumina	do.	2,763	2,755	2,873	3,054	3,080
Metal, primary	do.	3,627	3,637	3,639	3,640	3,715
Antimony, mine, recoverable, Sb content[e]		32,000	23,800	21,000	11,500	13,300
Bismuth, mine, Bi content[e]		300	300	300	400	400
Cadmium, refinery, primary[e]		1,150	1,000	1,000	1,000	1,000
Chromium, mine, chromite, concentrates, marketable		469,000	730,300 r	718,000 r	555,100 r	550,000 e
Cobalt, Co content:						
Mine, recoverable		8,700	9,400	9,700	8,000	9,200 e
Refinery, metal		1,800	2,000 e	1,800	1,500	1,000 e
Copper:						
Mine, Cu content:						
Ore		884,100	955,000	1,134,600	1,146,800 r	1,150,000 e
Concentrates		869,300	811,200	923,000	937,800 r	935,000 e
Solvent extraction		1,200	1,200	1,100	1,000 r	900 e
Smelter, blister:						
Primary		789,000	801,000	815,200	763,100 r	805,000 e
Secondary		230,000	240,000	235,000	227,900 r	180,000 e
Total		1,020,000	1,040,000	1,050,000	991,000 r	985,000
Refinery:						
Primary:						
Electrowon, leaching		1,200	1,200	1,100	1,000 r	900 e
Other		781,400	790,600	811,500	786,200 r	810,000 e
Total		783,000	792,000	813,000	787,000 r	811,000
Secondary		233,400	236,200	242,400	234,800 r	200,000 e
Total primary and secondary		1,020,000	1,030,000	1,060,000	1,020,000 r	1,010,000
Ferroalloys:						
Ferrochromium		332,261	384,089	342,622	289,000 r	307,219
Ferromanganese		281,000	273,000	238,000	209,000 r	203,000
Ferromolybdenum		3,066	4,652	2,500 r	2,400 r	2,400
Ferroniobium[e]		100	100	100	110	110
Ferrophosphorus[e]		1,500	1,500	750	400	300
Ferrosilicochromium		75,000 e	79,259	59,912	60,000 e	30,000 e
Ferrosilicon		928,797	846,579	880,401	880,000	880,000 e
Ferrotitanium		9,000	10,000 e	10,000 e	11,000 e	1,000 e
Ferrovanadium		11,383	10,894	9,084	9,000 e	9,000 e
Silicomanganese		43,334	51,774	--	406,000 r	455,000
Other, unspecified, electric furnace[e]		7,000	7,000	7,000	4,000	1,000
Gallium[e]	kilograms	6,000	8,000	5,000	5,000	5,000
Germanium, Ge content[e]		5	5	5	5	5
Gold:						
Mine, Au content	kilograms	277,139	304,697	308,560	313,830	310,000 e
Refinery, secondary	do.	34,477	38,487	31,610	32,590	32,500 e
Indium, refinery, primary, In content[e]	do.	5,000	5,000	5,000	5,000	5,000
Iron ore, mine, concentrates:						
Gross weight		96,063,000	97,531,000	100,015,000	100,600,000	95,100,000
Fe content, 55% to 63% Fe		56,700,000	64,287,000	69,500,000	66,700,000	55,783,000
Iron and steel:						
Direct-reduced iron		7,900,000	8,030,000	7,930,000	7,890,000 r	7,660,000
Pig iron[3]		51,797,000	51,184,000	52,003,000	53,785,000	51,586,000

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2018	2019	2020	2021	2022
METALS—Continued						
Iron and steel:—Continued						
Steel:						
Raw steel	thousand metric tons	71,682	71,729	71,621	75,585	71,746
Products:						
Pipe	do.	12,151	12,394	10,971	11,219 r	13,249
Finished, rolled	do.	61,650	61,639	61,768	65,865	61,414
Lead:						
Mine, recoverable, Pb content		206,100	207,900	200,700	212,300 r	210,000
Refinery, primary and secondary		140,000	141,000	142,000	152,800 r	121,600
Magnesium, metal, primary[4]		67,000	67,000	48,000	58,000 e	57,000 e
Molybdenum, mine, concentrates, Mo content		2,262	1,989	1,707	1,691 r	1,700 e
Nickel:						
Mine, marketable, sulfide ore, concentrates, Ni content		216,237	231,336	232,945	204,814	222,447
Smelter, matte[e]		43,918	53,500	48,400	30,400	30,000
Metal		158,005	166,265	172,357	145,817	164,250
Platinum-group metals:						
Mine, primary, elemental content:						
Iridium[e]	kilograms	300 r	300	250	230	200
Palladium[e]	do.	90,000	97,000 r	93,000	86,000	87,000
Platinum[e]	do.	22,000	24,000	23,000	21,000	20,000
Rhodium	do.	1,928	2,426	1,804	1,648	1,500 e
Ruthenium[e]	do.	700 r	600 r	400 r	900 r	600
Refinery:						
Palladium	do.	83,077	89,217	87,370	80,465	86,779
Platinum	do.	20,900	22,500	22,000	19,733 r	20,248
Rare earths, mineral concentrates, rare-earth oxide equivalent		2,700	2,700	2,600	2,500 r	2,500 e
Selenium, Se content	do.	303,000	331,000	338,000	330,000 e, r	340,000 e
Silicon, metal[e]		59,300	59,300	56,500	60,000	55,000
Silver:						
Mine, Ag content	kilograms	1,341,000 r	1,391,000 r	1,309,000 r	1,212,000 r	1,280,000
Refinery:						
Primary:	do.	809,100	826,580	757,400	717,380	750,000 e
Secondary	do.	310,840	169,590	208,330	228,320	220,000 e
Tantalum, mine, loparite concentrates, Ta content	do.	36,200	25,900	49,000	39,000 e	31,000 e
Tellurium, refinery, Te content	do.	70,000	70,600	70,200	68,000 r, e	70,000 e
Tin:						
Mine, recoverable, Sn content		1,531	2,471	2,559	3,088 r	3,700 e
Refinery, primary and secondary		1,100	1,650 r	1,650 r	2,400 r	2,400 e
Titanium:						
Ilmenite and leucoxene		3,000	3,600 r	3,300 r	2,900 r	2,900 e
Sponge		44,400	45,900	30,700	27,000 r	36,000
Tungsten, mine, concentrates, W content		2,234	2,433	2,274	2,143 r	2,000 e
Vanadium, metallurgical, V content		17,052	18,380	19,533	20,058	20,000 e
Zinc:						
Mine, Zn content		288,000	275,400	260,700	287,900 r	300,000 e
Smelter, primary and secondary		254,600	207,014	211,781	197,000 r	194,000 e
Zirconium, baddeleyite concentrates, averaging 98% ZrO_2		7,400	6,200 r	5,900 r	6,600 r	6,200 e
INDUSTRIAL MINERALS						
Arsenic trioxide, white		--	2,226	500	800 r, e	500 e
Asbestos		752,917	790,000	708,000	750,000	750,000 e
Barite		163,000	228,000	287,000	250,000 r, e	250,000 e
Boron		75,100	81,800	80,000 e	80,000 e	80,000 e
Cement, hydraulic	thousand metric tons	53,678	57,676	56,165	59,700	61,000

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2018	2019	2020	2021	2022
INDUSTRIAL MINERALS—Continued						
Clay:						
Bentonite		50,100	29,200	36,400	36,000 e	36,000 e
Kaolin, including kaolinitic clays		1,593,000	2,424,000	2,478,000	2,500,000 e	2,500,000 e
Diamond, natural:[e]						
Gem	thousand carats	24,200	25,400	17,500	21,900	23,500
Industrial	do.	19,000	19,900	13,700	17,200	18,400
Diatomite		50,600	51,000 e	51,000 e	51,000 e	51,000 e
Feldspar		294,411	641,100 r	650,000 r, e	650,000 r, e	650,000 e
Fluorspar, unspecified, 55% to 96.4% CaF_2		6,000	4,200	4,480 r	42,850 r	43,000 e
Graphite, all forms		11,900	17,500	12,900	16,200 r	16,000 e
Gypsum, mine[5]	thousand metric tons	5,487	4,199	4,063	4,100 e	4,100 e
Helium[e]	million cubic meters	3	5	5	5	5
Iodine		8	3	4	3 e	3 e
Lime, industrial and construction	thousand metric tons	11,305	11,577	11,364	11,400 e	11,400 e
Magnesite	do.	1,571	935	900 e	1,000 e	960 e
Mica		4,465	5,689	4,654	6,000 e	6,000 e
Nitrogen, ammonia, N content	thousand metric tons	14,859	15,802	16,126	16,300 e	14,000 e
Phosphate rock:						
Gross weight	do.	13,600	13,800	13,800	14,100 r	14,000 e
P_2O_5 content	do.	5,777	5,881	6,129	6,327 r	6,300 e
Potash, marketable, K_2O content	do.	7,168	7,340	8,114	9,101	6,200
Salt, all types	do.	6,710	8,175	6,026	8,242	8,186
Sand and gravel, industrial, glass sand[6]	do.	6,165	7,409	7,321	7,300 e	7,300 e
Soda ash, synthetic	do.	3,416	3,402	3,348	3,464	3,509
Sodium, compounds, caustic soda	do.	1,279	1,291	1,272	1,267	1,253
Stone, sand and gravel, construction:						
Sand and gravel:						
Gravel	do.	509,000	534,000	528,000	557,000	609,000
Sand	do.	407,000	395,000	389,000	464,000	521,000
Stone, crushed, limestone	do.	67,251	71,318	71,179	78,400 r	81,200
Sulfur:						
Byproduct, S content:						
Metallurgy[e]		200,000	200,000	200,000	200,000	200,000
Natural gas		6,597,000	6,600,000 e	6,600,000 e	6,600,000 e	6,600,000 e
Petroleum[e]		500,000	500,000	500,000	500,000	500,000
Native		83,707	57,972	46,056	50,000 e	50,000 e
Pyrite[e]		180,000	180,000	180,000	180,000	180,000
Compounds, sulfuric acid	thousand metric tons	13,026	13,361	13,354	14,500	15,100
Vermiculite		25,904	29,900	28,510	29,000 e	29,000 e
Zeolites[e]		35,000	35,000	35,000	35,000	35,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand metric tons	21,989	22,114	20,953	25,300	24,400
Bituminous[7]	do.	359,000	358,000	324,000	361,000 r	345,000
Lignite	do.	80,478	81,886	73,908	74,700	89,700
Metallurgical	do.	91,600	97,000	90,500	100,000	107,000
Coke, metallurgical, 6% moisture content	do.	26,977	26,938	27,016	25,687	25,394
Natural gas, marketable	million cubic meters	726,008	739,424	694,485	762,300	673,800
Peat, horticultural and fuel uses		1,124,200	1,071,400	1,248,200	2,100,000 r	1,600,000 e
Petroleum:						
Crude[8]	thousand 42-gallon barrels	4,060,000	4,100,000	3,740,000	3,822,000	3,906,000
Refinery[9]	do.	2,340,000	2,340,000	2,250,000	2,280,000	2,216,000
Uranium, mine, U content		2,904	2,911	2,846	2,635 r	2,508

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES[1]

[e]Estimated. [r]Revised. do. Ditto. -- Zero.
[1]Table includes data available through January 24, 2024. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]In addition to the commodities listed, lithium, oil shale, scandium, tantalum, titanium ore, and vanadium ore may have been produced, but available information was inadequate to make reliable estimates of output.
[3]Includes spiegeleisen.
[4]Includes metal used in titanium sponge production.
[5]Excludes gypsum used in cement production.
[6]Glass sand production represents about one-third of the total industrial sand production.
[7]Includes anthracite and metallurgical coal.
[8]Production has been reported in thousand metric tons as follows: 2018—556,000; 2019—561,000; 2020—512,800; 2021—524,050; and 2022—535,000; includes gas condensate.
[9]Production has been reported in thousand metric tons as follows: 2018—292,000; 2019—292,100; 2020—280,700; 2021—285,000; and 2022—277,000.

TABLE 2
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Alumina	Achinskiy (United Co. RUSAL)	Plant in Achinsk, eastern Siberia	900,000
Do.	Bogoslovskiy (United Co. RUSAL)	Plant in Krasnotur'insk	1,050,000
Do.	Boksitogorskiy (United Co. RUSAL)	Plant in Leningrad Oblast	200,000
Do.	Pikalyovskiy (United Co. RUSAL)	Plant in Pikalyovo	300,000
Do.	Ural'skiy AZ (United Co. RUSAL)	Plant in Kamensk-Uralskiy	700,000
Aluminum, primary metal	Bogoslovskiy AZ (United Co. RUSAL)	Plant in Krasnotur'insk	175,000
Do.	Bratskiy AZ (United Co. RUSAL)	Plant in Bratsk	1,000,000
Do.	Irkutskiy AZ (United Co. RUSAL)	Plant in Irkutsk Oblast	420,000
Do.	Kandalakskiy AZ (United Co. RUSAL)	Plant in Kola Peninsula	75,000
Do.	Khakasskiy AZ (United Co. RUSAL)	Plant in Khakasiya	300,000
Do.	Krasnoyarskiy AZ (United Co. RUSAL)	Plant in Krasnoyarsk Kray	1,000,000
Do.	Nadvoitskiy AZ (United Co. RUSAL)	Plant in Nadvoitsy, Kareliya Republic	75,000
Do.	Novokuznetskiy AZ (United Co. RUSAL)	Plant in Novokuznetsk	300,000
Do.	Sayanogorskiy AZ (United Co. RUSAL)	Plant in Sayanogorsk	550,000
Do.	Ural'skiy AZ (United Co. RUSAL)	Plant in Kamensk-Uralskiy	150,000
Do.	Volgogradskiy AZ (United Co. RUSAL)	Plant in Volgograd Oblast	175,000
Do.	Volkhovskiy AZ (United Co. RUSAL)[2]	Plant in Volkhov, east of St. Petersburg	20,000
Amber	Kaliningrad Amber Enterprise (Kaliningrad regional authorities and Alrosa Co. Ltd.)	Plant in Kaliningrad Oblast	250
Antimony:			
Sb content of concentrate	GeoProMining, Ltd. (GPM)	Mine at Sarylakh deposit, Ust'-Nera region, Sakha Republic (Yakutiya) and mine at Sentachan deposit, northeastern Sakha Republic (Yakutiya)	8,000
Do.	PAO Polyus Gold	Mines in Krasnoyarsk Kray	25,000
Compounds and metals	OOO Ryazsvetmet plant	Ryazan Oblast	NA
Do.	Zabaykal'skiy GOK[3] (ZabGOK) (OOO NefteChimMash)	Plant in Zabaikal'skiy Kray	NA
Asbestos	Bazhenovskoye chrysotile deposit	Mine in Sverdlovsk Oblast	NA
Do.	Molodeznoye deposit	Mine in Zabaikal'skiy Kray	NA
Do.	"Orenburg Minerals" Co., Kiembaevskoye chrysotile deposit	Mine in Orenburg Oblast	500,000
Do.	"Tuvaasbest" plant, Ak-Dovurakskoye chrysotile deposit	Tyva Republic	250,000
Do.	"Uralasbest" mining and treatment plant	Central Urals	1,100,000
Barite	Salarinskiy mining and beneficiation complex	Kvartsitovaya Sopka deposit	250,000
Bauxite	Komi Aluminum (United Co. RUSAL)	Mine in Sredne-Timanskiy	3,000,000
Do.	OAO Sevuralboksitruda (United Co. RUSAL)	Mine in Severoural'sk region	NA
Do.	Severnaya Onega Mine (United Co. RUSAL)	Northwest region	800,000
Do.	South-Urals mining company (United Co. RUSAL)	Mine in South Urals	NA
Boron, boric acid	Alga River chemical complex	Mine and plant in Russian Far East	12,000
Do.	Amur River complex	do.	8,000
Do.	Bor Association	Mine and plant in Primorskiy Kray	140,000
Cement thousand metric tons	AO Holding Co. Sibirskiy Tsement	Plant in Kemerovo Oblast	5,600
Do. do.	AO Sebryakovtsement	Plant in Volgograd Oblast	4,100
Do. do.	Eurocement Group	16 plants throughout the country	40,000
Do. do.	Gazmetallproekt	Plants in Krasnodar Kray	8,200
Do. do.	Holcim Russia	Plants in Central region	9,000
Do. do.	Holding SMiKom Group	Plants in Ryazan Oblast	NA
Do. do.	OOO SLK Cement	Plants in Chelyabinsk Oblast	NA
Do. do.	OOO HeidelbergCement Russia	Plant in Central region, Bashkortostan Republic	11,000
Do. do.	OOO VostokTsement	Plants in Yevreyskaya Autonomous Oblast and in Yakutiya	NA
Do. do.	OOO Yuzhno-Ural'skaya mining and processing company	Plant in Orenburg Oblast	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Chromite	AO ChEMK	Tsentralnoye Mine, Yamalo-Nenets Autonomous Okrug	350,000
Do.	Saranovskiy complex	Mines and plant in Perm Kray	140,000
Coal: thousand metric tons	AO A-Property Holding	Mines in Kemerovo Oblast	40,000
Do. do.	AO KhKSDS-Ugol'	do.	29,000
Do. do.	AO Siberian Coal and Energy Co. (AO SUEK)	Mines in Siberia and Russian Far East	106,000
Do. do.	OAO Russkiy Ugol'	Mines in Russian Far East	14,000
Do. do.	OAO UGMK	Mines in Kuznetskiy Basin	40,000
Do. do.	OAO UK Kuzbassrazrezugol'	do.	45,000
Do. do.	OOO Evraz Holding	do.	22,300
Do. do.	PAO Mechel-Mining	Mines in Kuznetskiy Basin and Yakutiya	22,700
Do. do.	Sibantratsit Group	Mines in Siberia	25,000
Do. do.	Vostsibugol' Co.	Mines in eastern Siberia	13,200
Cobalt	PAO GMK Norilskiy Nickel (Nornickel)	Mines and plant on Kola Peninsula and in Norilsk	10,000
Do.	ZAO NPK Geotechnologiya	Shanuch Mine in Kamchatka Kray	100
Copper:			
Cu in concentrate	Metalloinvest Holding	Mines in Udokan, Zabaikal'skiy Kray	NA
Do.	OAO Urals Mining and Metallurgical Co. (UGMK)	Mines in the Urals	230,000
Do.	PAO GMK Norilskiy Nickel (Nornickel)	Mines in Norilsk region, Kola Peninsula	500,000
Do.	ZAO Russkaya Mednaya Kompaniya (RMK)	Mines in the Urals	70,000
Do.			
Metal, refined	OAO Urals Mining and Metallurgical Co. (UGMK)	Plants in the Urals	360,000
Do.	PAO GMK Norilskiy Nickel (Nornickel)	Plants in Norilsk region, Kola Peninsula	450,000
Do.	ZAO Russkaya Mednaya Kompaniya (RMK)	Plants in the Urals	170,000
Diamond, gem and industrial thousand carats	PAO AK Alrosa (ALROSA Group, 100%):		
	AO Almazy Anabara Processing complex	Sakha Republic (Yakutiya)	6,000
	PAO Severalmaz:	Sakha Republic (Yakutiya) mines:	
Do. do.	Aikhal'skiy mining and beneficiation complex	Aikhal, Komsomol'skiy,	11,900
Do. do.	do.	Yubileynyi, and Zarya	5,900
Do. do.	Anabaraskiy mining and beneficiation complex	Alluvial mines	5,300
Do. do.	Lomonosovskiy mining and beneficiation complex	Arkhangelsk Oblast	4,800
Do. do.	Mirninskiy mining and beneficiation complex	International and Mir	3,000
Do. do.	Nyurbinskiy mining and beneficiation complex	Botuobinskiy and Nyurbinskiy	11,500
Do. do.	Udachninskiy mining and beneficiation complex	Udachnyy and Zarnitsa	5,800
Do. do.	V. Grib mining and beneficiation complex (AO AGD Diamonds, 100%)	Mine in Arkhangelsk Oblast	4,500
Feldspar	Kheto-Lanbino and Lupikko deposits	Mines in Kareliya Republic	NA
Ferroalloys	ChEMK Industrial Group enterprises:	Plant locations:	
	Chelyabinsk electrometallurgical plant	Chelyabinsk Oblast	450,000
Do.	Kuznetsk ferroalloys plant	Novokuznetsk	400,000
Do.	Chusovoy iron and steel plant	Perm Kray	NA
Do.	Klyuchevsk ferroalloy plant	Dvurechensk	160,000
Do.	PAO Kosogorskiy metallurgical plant	Kosaya Gora, Tula Oblast	200,000
Do.	PAO Novolipetskiy mining and metallurgical complex (NLMK)	Lipetsk Oblast	NA
Do.	Serovskiy ferroalloy plant [a subsidiary of Eurasian Natural Resources PLC (ENRC)]	Sverdlovsk Oblast	NA
Ferrovanadium	Tulachermet (Evraz Vanadiy Tula)	Plants in Tula and North Caucasus	NA
Fluorspar	Abagaytuy deposit	Mine in Transbaikal	NA
Do.	Egitinskiy GOK[3] (Druza Mining Co.)	Buryatiya Republic	100,000
Do.	Kalanguy mining complex	Mines in Zabaikal'skiy Kray	NA
Do.	Kyakhtinsky deposit	Buryatiya Republic	NA
Do.	Usugli Mine	do.	NA
Do.	Yaroslavskiy GOK[3]	Mines at Pogranichnoye and Voznesenskoye deposits, Primorskiy Kray	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Gallium	kilograms	Achinskiy (United Co. RUSAL)	Plant in Achinsk in Eastern Siberia	15,000
Do.		OOO Galiy	Plant in Moscow	NA
Do.		Pikalyovskiy (United Co. RUSAL)	Plant in Pikalevo	NA
Germanium, metal and products		AO Germaniy (Rostech)	Plant in Kranoyarsk	7
Graphite		OOO Kar'yer	Mine in Chelyabinsk Oblast	16,000
Gold:				
Mine output, Au content	kilograms	AO Polymetal UK (Polymetal International plc)	Mines in Amur Oblast, Chukotka Autonomous Okrug, Magadan and Sverdlovsk Oblasts, Khabarovsk Kray	7,500
Do.	do.	Highland Gold Mining Ltd. (HGM)	Mines in Khabarovsk and Zabaikal'skiy Krays	6,900
Do.	do.	IK Arlan (Pavlik ZRK)	Mine in Magadan Oblast	3,700
Do.	do.	Kinross Gold Corp.	Mines in Chukotka Autonomous Okrug	20,700
Do.	do.	Nordgold S.E.	Mines in Sakha Republic (Yakutiya)	10,200
Do.	do.	OAO Buryatzoloto	Mine in Buryatiya Republic	5,000
Do.	do.	OAO Omchak	Mines in Magadan Oblast	3,000
Do.	do.	OAO Omolonskaya ZRK	do.	5,000
Do.	do.	OAO Pokrovskiy Mine	Mines in Amur Oblast	6,000
Do.	do.	OAO Priisk Solov'yevskiy	do.	1,500
Do.	do.	OAO Susumanzoloto	Mines in Magadan Oblast	4,500
Do.	do.	OAO Uralelektromed'	Mines in Sverdlovsk Oblast	1,400
Do.	do.	OAO Zoloto Kamchatki	Mines on Kamchatka Peninsula	5,500
Do.	do.	OOO Mining and Geological Co. (GRK) Aldanzoloto	Mines in Sakha Republic (Yakutiya)	4,000
Do.	do.	OOO Neryungri-Metallik	do.	1,500
Do.	do.	OOO Nirungan	do.	1,100
Do.	do.	OOO Priisk Drazhnyy	Mine in Krasnoyarsk Kray	1,200
Do.	do.	OOO Ros-DV	Mines in Khabarovsk Kray	1,100
Do.	do.	OOO Russdragmet	Mines in Khabarovsk and Zabaikal'skiy Krays	6,000
Do.	do.	OOO Sovrudnik	Mines in Krasnoyarsk Kray	3,900
Do.	do.	OOO Yuzhuralzoloto	Mines in Chelyabinsk Oblast	6,500
Do.	do.	Oyna, a/s	Mines in Tyva Republic	1,500
Do.	do.	PAO Polyus Gold	Mines in Krasnoyarsk Kray and Magadan Oblast	70,000
Do.	do.	PAO Seligdar	Mines in Sakha Republic (Yakutiya)	4,300
Do.	do.	PAO Vysochayshiy (GV Gold)	Mines in Irkutsk Oblast and Sakha Republic (Yakutiya)	5,500
Do.	do.	Petropavlovsk plc	Mines in Petropavlovsk	23,000
Do.	do.	Polyarnaya, a/s	Mines in Chukotka Autonomous Okrug	1,000
Do.	do.	Vitim, a/s	Mines in Irkutsk Oblast	2,900
Do.	do.	Vostok, a/s	Mines in Khabarovsk Kray	1,100
Do.	do.	ZAO Amur a/s	do.	5,500
Do.	do.	ZAO Chukotskaya Mining and Geological Co. (Chukotskaya GGK)	Mine in Chukotka Autonomous Okrug	15,000
Do.	do.	ZAO LT-Resurs	Mines in Irkutsk Oblast	2,700
Do.	do.	ZAO Omsukchanskaya GGK	Mines in Magadan Oblast'	3,000
Do.	do.	ZAO Zolotaya Zvezda, ZDK	Mines in Khakasiya Republic	1,200
Do.	do.	Zapadnaya, a/s	Mines in Krasnoyarsk Kray	1,900
Refined	do.	AO Ekaterinburgskiy Plant (EZOTsM)	Plant in Sverdlovsk Oblast	NA
Do.	do.	AO Moskovskiy plant for special alloys	Refinery in Moscow	NA
Do.	do.	AO Novosibirskiy refinery	Novosibirsk	40,000
Do.	do.	AO Priobskiy plant (PAO Gazpromneft')	Khanty-Mansi-Yugra Autonomous Okrug	NA
Do.	do.	AO Priokskiy Plant for Nonferrous Metals	Refinery in Ryazan Oblast	51,000
Do.	do.	AO Shyolkovskiy plant	Refinery in Moscow Oblast	NA
Do.	do.	AO Uralelektromed' refinery (UGMK)	Refinery in Sverdlovsk Oblast	20,000
Do.	do.	OAO Gudilov Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarsk Kray	260,000
Do.	do.	ZAO Kyshtymskiy plant	Chelyabinsk Oblast	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Gold:—Continued			
Refined, primary kilograms	Chelyabinskiy electrolytic zinc plant	Chelyabinsk Oblast	6
Refined, secondary do.	Elektrozink plant [OAO Urals Mining and Metallurgical Co. (UGMK)][2]	Vladikavkaz, North Caucasus	6
Helium thousand cubic meters	PAO Gazprom (Government, 50.23%, and private owners, 49.77%)	Amurskiy Gas Processing plant	9,000
Do. do.	do.	Orenburgskiy helium plant, Orenburg	4,000
Iron ore	Kursk Magnetic Anomaly (KMA) region, which contains the following enterprises:	Mines in:	50,000,000 [5]
	Lebedi and Stoilo	Gubkin	
	Mikhaylovka	Zheleznogorsk	
Do.	Northwest region, which contains the following enterprises:	Mines in:	22,000,000 [5]
	Kostomuksha	Kostomuksha	
	Kovdor	Kola Peninsula	
	Olenegorsk	Olenegorsk	
Do.	Siberia region, which contains the following enterprises:	Mines in:	18,000,000 [5]
	East:		
	Korshunovo	Zheleznogorsk	
	Rudnogorsk	Rudnogorsk	
	West:		
	Abakan	Abaza	
	Sheregesh	Sheregesh	
	Tashtagol	Tashtagol	
	Teya	Vershina Tei	
Do.	Urals region, which contains the following enterprises:	Mines in:	22,000,000 [5]
	Akkermanovka	Novotroitsk	
	Bakal	Bakal	
	Goroblagodat	Kushva	
	Kachkanar	Kachkanar	
	Magnitogorsk	Magnitogorsk	
	Peshchanka	Rudnichnyy	
Lead, metal	AO Uralelektromed' refinery (UGMK)	Refinery in Sverdlovsk Oblast	NA
Do.	Dal'polymetal lead smelter	Rudnaya in Primorskiy Kray	20,000
Do.	Elektrozink lead smelter [Urals Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucasus	40,000
Do.	OOO Fregat	Moscow Oblast	170,000
Do.	OOO Ryaztsvetmet plant	Plant in Ryazan Oblast	NA
Do.	ZAO Agropribor	Moscow Oblast	NA
Lead-zinc, recoverable content of ore:			
Lead, recoverable Pb content of ore	Altay mining-beneficiation complex	Mines in Altay Kray, southern Siberia	2,000
Do.	Dalpolymetal mining-beneficiation complex	Mines in Primorskiy Kray	20,000
Do.	Nerchinsk polymetallic complex	Mines in Zabaikal'skiy Kray	7,000
Do.	Novoangarskiy GOK[3]	Mine in Krasnoyarsk Kray	170,000
Do.	Salarinskiy mining and beneficiation complex	Mines in Kemerovo Oblast	2,000
Zinc, recoverable Zn content of ore	Altay mining-beneficiation complex	Mines in Altay Kray, southern Siberia	1,000
Do.	Dalpolymetal mining-beneficiation complex	Mines in Primorskiy Kray	25,000
Do.	Nerchinsk polymetallic complex	Mines in Zabaikal'skiy Kray	12,500
Do.	OAO Urals Mining and Metallurgical Co. (UGMK)	Mines in Altay Kray, the Caucasus, and the Urals	95,000
Do.	OOO Luncin (Zijin Mining Group, 100%)	Mine in Tyva Republic	50,000
Do.	Salarinskiy mining and beneficiation complex	Mines in Kemerovo Oblast	10,500
Limestone	Mazulsky Mine (United Co. Rusal)	Goryachegorskiy massif, eastern Siberia	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Lithium, refined		PAO Chemical and Metallurgical Plant (TVEL Corp.)	Kransnoyarsk	NA
Do.		PAO Novosibirsk Plant of Chemical Concentrates (TVEL Corp.)	Novosibirsk	NA
Magnesite		Karagayskiy open pit (Magnezit Group) and Magnezitovaya underground mines (Magnezit Group)	Sakha group of deposits in Chelyabinsk Oblast and Krasnoyarsk Kray	1,600,000
Magnesium, metal		Avisma plant	Berezniki	35,000
Do.		Solikamskiy Magnesium Plant (SMZ)	Plant in Solikamsk, Perm Kray	30,000
Mica		Emel'dzhak deposit	Mine at Aldan Shield, Sakha Republic (Yakutiya)	NA
Do.		Kovdor phlogopite mine (Kovdorslyuda Shaft; Mica Mine; Slyuda Mine)	Kola Peninsula, Murmansk Oblast	NA
Do.		Lopatova Guba mica pit	Mine in Kareliya Republic	NA
Do.		Irkutsk complex (JSC "Vostoksluda")	Mine at Mam deposit, Irkutsk Oblast	NA
Molybdenum, mine, concentrate		Dzhida tungsten-molybdenum mine	West Transbaikal	NA
Do.		Shakhtaminskoye molybdenum mining enterprise	Mines in Zabaikal'skiy Kray	NA
Do.		Sorsk molybdenum mining enterprise	Mine in Khakasiya Republic	NA
Do.		Tyrnyauz tungsten-molybdenum mine [OAO Kabardino-Balkarskaya Tungsten-Molybdenum Co. (Government of Kabardino-Balkariya Republic)][2]	Republic of Kabardino-Balkariya, North Caucasus	NA
Natural gas:				
Production	million cubic meters	Arktikgaz	Fields in Yamalo-Nenets Autonomous Okrug	25,800
Do.	do.	OAO NK Rosneft'	Fields throughout Russia	46,700
Do.	do.	PAO Gazprom (Government, 50.23%, and private owners, 49.77%)	Fields throughout Russia	405,000
Do.	do.	PAO Gazpromneft'	Fields throughout Russia	13,500
Do.	do.	PAO Lukoil	Fields in West Siberia, Volga region	18,400
Do.	do.	PAO Novatek	Fields in Yamalo-Nenets Autonomous Okrug	80,000
Do.	do.	PAO Surgutneftegaz	Fields in eastern Siberia and western Siberia	9,800
Processing		PAO Gazprom (Government, 50.23%, and private owners, 49.77%)	Natural gas processing plants: The Astrakhanskiy GPZ, Astrakhan' The Orenburgskiy GPZ, Orenburg The Sosnogorskiy GPZ, Komi Republic The Yuzhno-Priobskiy GPZ, Khanty-Mansi Autonomous Okrug-Yugra	NA
Do.		do.	Petrochemical plants: OOO Gazprom Neftekhim Salavat, Bashkortostan Republic	NA
Compressed natural gas production		Kriogaz-Vysotsk (OAO Novatek)	Plant in Leningrad Oblast	NA
Do.		Sakhalin Energy Consortium Ltd.	Plant Complex Sakhalin-2, Sakhalin Oblast	NA
Do.		Yamal SPG	Plant in Yamalo-Nenets Autonomous Okrug	NA
Nepheline syenite		Apatite complex	Mines on Kola Peninsula	1,500,000
Do.		Kiya-Shaltyr Mine (United Co. RUSAL)	Goryachegorsk massif, eastern Siberia	500,000
Nickel:				
Ore, Ni content		OAO Ufaleynickel (Koks Co. of Industrial Metallurgical Holding)	Mines in Chelyabinsk Oblast, Urals	17,000
Do.		PAO GMK Norilskiy Nickel (Nornickel)	Mines in Murmansk Oblast (Kotselvaara-Kammikivi, Zapolyarnnoye, and Zhdanovskoye) and in Norilsk region	300,000
Do.		ZAO NPK Geotechnologiya	Mine at Shanuch deposit, Kamchatka Kray	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Nickel:—Continued				
Metal:				
Smelted		PAO GMK Norilskiy Nickel (Nornickel)	Nadezhdinskiy Plant in Sverdlovsk Oblast	NA
Do.		do.	Plant in Monchegorsk	50,000
Refined		do.	Severonickel plant in Monchegorsk	140,000
Do.		do.	Nadezhdinskiy Plant in Sverdlovsk Oblast	NA
Products and Ni content of ferronickel		Enterprises:	Plant locations:[2]	65,000 [5]
		OAO Ufaleynickel (Koks Co. of Industrial Metallurgical Holding)	South Urals	
		Yuzhuralnickel (Mechel OAO)	do.	
		ZAO Rezhnickel [Urals Mining and Metallurgical Co. (UGMK)]	do.	
Niobium (columbium)		Karnarsurt mining enterprise (AO Sevredmet)	Mines at Lovozerskoye deposit, Kola Peninsula	12,000
Oil shale		Leningradslanets Association	Slantsy, Leningrad Oblast	5,000,000
Petroleum:				
Crude	thousand 42-gallon barrels	PAO Gazpromneft'	Fields throughout Russia	400,000
Do.	do.	PAO Lukoil	Komi Republic fields:	720,000
			Kyrtayelskoye	
			Pashshorskoye	
			Perevoznoye	
			Timan Pechora field:	
			Yuzhnaya Khylchuya	
			Urals deposits	
			Volga region fields (Volga Federal Okrug)	
			West Siberian fields:	
			Kechimovskoye	
			Nivagalskoye	
Do.	do.	PAO NGK Slavneft'	Western Siberia and Krasnoyarskiy Kray fields	160,000
Do.	do.	PAO NK Rosneft'	The Krasnoleninskoye, the Malobalykskoye, the Priobskoye, the Prirazlomnoye, and the Samotlorskoye fields (all in Khanty-Mansi Autonomous Okrug-Yugra), the Vankorskoye field (Krasnoyarsk Kray), the Verkhnechonskoye field (Irkutsk Oblast) and fields throughout Russia	2,000,000
Do.	do.	do.	Central and western Siberia, Urals, and Volga region fields	120,000
Do.	do.	PAO Novatek	Western Siberia fields	40,000
Do.	do.	PAO Surgutneftegaz	Khanty-Mansi Autonomous Okrug-Yugra fields	520,000
Do.	do.	PAO Tatneft'	Fields:	280,000
			Bavlinskoye	
			Bondyuzskoye	
			Novo-Elkkhovskoye	
			Pervomayskoye	
			Romashkinskoye	
			Sabandchinskoye	
Do.	do.	Sakhalin-1 (Exxon Neftegaz Ltd., 30%; SODECO, 30%; PAO NK Rosneft', 20%; and ONGC Videsh Ltd., 20%)	Fields: Arktun-Dagi, Chaivo, and Odoptu (Sakhalin Island)	110,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Petroleum:—Continued			
Refined thousand 42-gallon	PAO Gazpromneft'	Refineries Moskovskiy NPZ and Omskiy NPZ	630,000
Do. barrels	PAO Lukoil	4 petroleum refineries	400,000
Do. do.	PAO NK Rosneft'	13 petroleum refineries	1,000,000
Do. do.	PAO Novatek	Refinery Purovskiy ZPK	170,000
Do. do.	PAO Surgutneftegaz	Refinery Kirishskiy NPZ	180,000
Do. do.	PAO Tatneft'	Refinery TANECO complex	100,000
Phosphate rock, ore	Kingisepp complex (OAO Fosforit)	Mines in Leningrad Oblast	3,500,000
Do.	Lopatino and Yegor'yevsk deposits	Mines in Moscow Oblast	NA
Do.	Polpinskoye deposit	Mines in Bryansk Oblast	NA
Do.	Verkhnekamskiy deposit	Mines in the Urals	NA
Phosphate rock, apatite concentrate	Khibiny apatite association (OAO Apatit)	Mine on Kola Peninsula	15,000,000
Do.	Kovdorskiy GOK	do.	700,000
Do.	OAO Apatit (Phosagro)	do.	12,000,000
Platinum-group metals:			
Ore, platinum-group metal content	AO Koryakgeoldobycha, Amur Prospectors	Placer deposits (mostly platinum) in the Urals; Siberia; Russian Far East	10
Do.	Lopatino and Yegor'yevsk deposits	Mines in Moscow Oblast	NA
Do.	OAO AS Amur (Russian Platinum Co.)	Placer deposits (mostly platinum) in the Urals; Siberia; Russian Far East	10
	PAO GMK Norilskiy Nickel (Nornickel)	Mines in Norilsk region and Kola Peninsula	150
Do.	Polpinskoye deposit	Mines in Bryansk Oblast	NA
Do.	Verkhnekamskiy deposit	Mines in the Urals	NA
Metals, refined	AO Priokskiy plant (PAO Gazpromneft')	Khanty-Mansi Autonomous Okrug-Yugra	NA
Do.	Ekaterinburgskiy plant (EZOTsM)	Sverdlovsk Oblast	NA
Do.	Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarsk Kray	NA
Potash, K_2O equivalent	PAO Akron	Mines in Novgorod	NA
Do.	PAO Uralkali	Mines at Verkhnekamskoye deposit	8,000,000
Do.	Usol'skiy Potash Complex (OOO EuroChem)	Perm Kray	NA
Do.	Volga-Kali (EuroChem UKK)	Volgograd region	NA
Rare earths	OAO Apatit	Mines at Lovozerskoye deposit, Kola Peninsula	2,700
Salt	Dus-Dagskoe deposit	Mines at Dus-Dag Mountains	25,000
Do.	OAO Bassol' (Russalt Group)	Mines at Lake Baskunchak in Astrakhan Oblast	1,700,000
Silver:			
Mine output, Ag content	Dukat Mine	Magadan Oblast	1,000
Do.	Kinross Gold Corp.	Mines in Chukotka Autonomous Okrug	NA
Refined	AO Ekaterinburgskiy plant (EZOTsM)	Sverdlovsk Oblast	NA
Do.	AO Moskovskiy plant for special alloys	Moscow	NA
Do.	AO Novosibirskiy refinery	Novosibirsk	NA
Do.	AO Priobskiy plant (PAO Gazpromneft')	Khanty-Mansi Autonomous Okrug-Yugra	NA
Do.	AO Priokskiy Zavod Tsvetnyh Metallov	Refinery in Ryazan Oblast	NA
Do.	AO Shelkovskiy refinery	Moscow Oblast	NA
Do.	AO Uralelektromed' refinery (UGMK)	Refinery in Sverdlovsk Oblast	NA
Do. kilograms	OAO Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarsk Kray	500,000
Do.	ZAO Kyshtymskiy plant	Chelyabinsk Oblast	NA
Soda ash thousand metric tons	Achinskiy plant (United Co. RUSAL)	Eastern Siberia	595
Do. do.	Bereznikovskiy plant	Plant in the Urals	1,080
Do. do.	Pikalyovskiy plant (United Co. RUSAL)	Leningrad Oblast	200
Do. do.	Sterlitamak plant (AO Bashkirskaya Sodovaya Co.)	Bashkortostan Republic	2,140
Do. do.	Volkhovskiy plant (United Co. RUSAL)	Leningrad Oblast	20

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Steel, raw, and products	AO Chusovskoy Metallrgical Plant	Perm Kray	570,000
Do.	AO Electrostal Metallurgical Plant	Moscow	314,000
Do.	AO Nizhnetagil'skiy mining and metallurgical complex (NTMK) (Evraz Group)	Plant in Sverdlovsk Oblast	8,000,000
Do.	AO Novosibirskiy Metallurgical Plant	Novosibirsk Oblast	1,100,000
Do.	AO Omutninskiy Metallurgical Plant	Kirov Oblast	210,000
Do.	AO Volgogradskiy Metallurgical Plant (Red October)	Volgograd Oblast	2,000,000
Do.	AO Vyksunskiy Metallurgical Plant (OMK)	Nizhniy Novgorod Oblast	540,000
Do.	OAO Amurmetal	Plant in Komsomol'sk-na-Amure	1,600,000
Do.	OAO Beloretskiy Metallurgical Complex	Bashkortostan Republic	380,000
Do.	OAO Gur'yevsk Steel Works	Kemerovo Oblast	160,000
Do.	OAO Magnitogorskiy mining and metallurgical complex (MMK)	Plant in Chelyabinsk Oblast	16,200,000
Do.	OAO Nizhneserginskiy Metallurgical Plant	Plant in Sverdlovsk Oblast	300,000
Do.	OAO Nosta (OAO Orsk-Kahlilovo Iron and Steel Works)	Plant in Novotroitsk, Orenburg Oblast	4,600,000
Do.	OAO Novokuznetskiy Metallurgical Complex	Novokuznetsk, Kemerovo Oblast	4,700,000
Do.	OAO Oskol'skiy Electrometallurgical Complex (OEMK)	Staryi Oskol	2,500,000
Do.	OAO Serovskiy Metallurgical Plant (UGMK)	Sverdlovsk Oblast	1,000,000
Do.	OAO Serp i Molot (Moscovskiy Metallurgical Plant)	Moscow Oblast	70,000
Do.	OAO Severskiy Tube Plant	Polevskoy, Sverdlovsk Oblast	825,000
Do.	OAO Sibelektrostal Metallurgical Plant	Krasnoyarsk Kray	110,000
Do.	OAO Taganrogskiy Metallurgical Plant (Tagmet)	Rostov Oblast	925,000
Do.	OAO Tulachermet	Plant in Tula Oblast	18,400
Do.	OAO Zapadno-Sibirskiy mining and metallurgical complex (ZSMK) (Evraz Group)	Kemerovo Oblast	6,900,000
Do.	OOO Gor'kovskiy Metallurgichesky Plant	Plant in Nizhniy Novgorod Oblast	78,000
Do.	OOO Lis'venskiy Metallurgical Plant	Perm Kray	350,000
Do.	OOO Nizhnesal'dinskiy Metallurgical Plant	Sverdlovsk Oblast	1,900
Do.	OOO VIZ-Stal (Verkh-Isetsk Steel Works) (NLMK)	do.	132,000
Do.	OOO Zlatoustovskiy Metallurgical Plant	Zlatoust, Chelyabinsk Oblast	1,200,000
Do.	PAO Ashinskiy Metallurgical Plant	Chelyabinsk Oblast	450,000
Do.	PAO Mechel (Mechel)	Plant in Chelyabinsk Oblast	7,000,000
Do.	PAO Novolipetskiy mining and metallurgical complex (NLMK)	Lipetsk Oblast	9,900,000
Do.	PAO Severstal	Plant in Vologoda Oblast	14,000,000
Do.	ZAO Revdinskiy Metallurgical and Wire Production Plant	Sverdlovsk Oblast	281,000
Do.	ZAO Sulinskiy Metallurgical Plant	Rostov Oblast	280,000
Talc	Kirgiteysk deposit	Mine in Krasnoyarsk Kray	NA
Do.	Miass deposit	Mine in Chelyabinsk Oblast	NA
Do.	Onotsk deposit	Mine in Irkutsk Oblast	NA
Do.	Shabrovsk deposit	Mine in Sverdlovsk Oblast	NA
Tantalum, ore	Facilities: Lovozerskiy GOK Zabaykalskiy mining and beneficiation complex	Mines located in: Lovozerskoye deposit, Kola Peninsula Etykinskoye deposit	NA
Tellurium	PAO GMK Norilskiy Nickel (Nornickel)	Norilsk	5
Do.	Urals Mining and Metallurgical Co. (UGMK)	Urals	75
Tin:			
Ore, Sn content	AO Tin Ore Co. (PAO Soligdar)	Solnechnyi deposit, Khabarovsk Kray	NA
Do.	OOO Pravourmiyskoye (PAO Soligdar)	Mine in Khabarovsk Kray	NA
Metal	Novosibirsk Processing Plant Ltd.	Novosibirsk Oblast	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2022[1]

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity[e]
Titanium:			
Ore	OAO Apatit (Phosagro)	Mines at Kykisvumchorrskoye and Yuksporskoye deposits	NA
Do.	AO Tuganskiy GOK	Mines at Tuganskoye deposit	NA
Do.	OOO Lovozerskiy GOK	Mines in Murmansk Oblast	NA
Do.	OOO Olekminskiy Rudnik	Mines at Kuranakhskoye deposit	NA
Metal	Moscovskiy plant	Moscow	NA
Do.	Podol'skiy plant	Podol'sk	NA
Do.	OAO Corp. VSMPO-Avisma	Bereznikovskiy Complex, Perm Kray	NA
Sponge	do.	do.	44,000
Do.	Solikamskiy Magnesium Plant (SMZ)	Plant in Solikamsk, Perm Kray	2,500
Tungsten:			
Concentrate, W content	AS Quartz	Mine at Bom-Gorkhom deposit, West Transbaikal, Zabaikal'skiy Kray	NA
Do.	KGUP Primteploenergo	Mine at Lermontovskoye deposit, Primorskiy Kray	NA
Do.	OAO Primorskiy GOK	Mine at Vostok-2 deposit	NA
Do.	Tyrnyauz tungsten-molybdenum mine [OAO Kabardino-Balkarskaya Tungsten-Molybdenum Co. (Government of Kabardino-Balkarskaya Republic)][2]	Mine in Republic of Kabardino-Balkariya, North Caucasus	NA
Do.	ZAO Novoorlovskiy GOK	Mine at Spokoyninskoye deposit, Zabaikal'skiy Kray	NA
Do.	ZAO Zakamensk	Mine at Ruchey Inkur deposit, Barun-Narynskoye deposit	NA
Metal	Gidrometallurg plant	do.	NA
Uranium, mine, U content	Uranium Holding OAO Atomredmetzoloto (ARMZ): OAO Khiagda mining enterprise Priargunskoye mining and chemical enterprise ZAO Dalur mining enterprise	Locations of mines: Buryatiya Republic Krasnokamensk, Zabaikal'skiy Kray Kurgan Oblast	3,500 [5]
Vanadium:			
Ore	Kachkanarskiy iron mining complex	Mines in the Urals	NA
Metal	Chusovoy and Nizhniy Tagil plants	Plants in the Urals	17,000
Pentoxide	Tulachermet (Evraz Vanadiy Tula)	Plant in Tula Oblast, North Caucasus	NA
Zinc:			
Copper-zinc ore, Zn content	Bashkirskiy copper-zinc complex	Mine in Sibay, southern Urals	5,000
Do.	Buribai copper-zinc mining complex	Mine in Buribai, southern Urals	1,500
Do.	Gaiskiy copper-zinc mining and beneficiation complex	Mine in Gai, southern Urals	25,000
Do.	Kirovgrad copper enterprise	Mine in Kirovgrad, central Urals	1,200
Do.	Sredneuralskiy copper complex	Mine in Revda, central Urals	5,000
Do.	Uchalinskiy copper-zinc mining and beneficiation complex	Mine in Uchalinskiy Rayon, southern Urals	90,000
Metal	Chelyabinskiy electrolytic zinc plant	Plant in Chelyabinsk Oblast	200,000
Do.	Elektrozink plant [Urals Mining and Metallurgical Co. (UGMK)][6]	Plant in Vladikavkaz, North Caucasus	90,000
Do.	Uralelektromed' plant [Urals Mining and Metallurgical Co. (UGMK)]	Plant in Verkhnaya Pyshma	17,000
Zirconium:			
Baddeleyite concentrate	Kovdorskiy iron ore GOK	Mine on Kola Peninsula	8,000
Metal	Chepetskiy metallurgical plant (TVEL Corp.)	Plant in Glazov, Udmurtiya Republic	NA

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and that of locations.

[2]Not in operation as of 2022.

[3]GOK stands for mining and beneficiation complex

[4] GPZ stands for gas processing plant

[5]Capacity estimates are totals for all enterprises that produced that commodity.

[6]Damaged by fire in 2018.