



2020–2021 Minerals Yearbook

RUSSIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF RUSSIA

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Note: In this chapter, information for 2020 is followed by information for 2021.

The Russian Federation was one of world's leading producers of mineral commodities and produced a diverse range of metals, industrial minerals, and mineral fuels. In 2020, Russia was the world's leading producer of asbestos (65% of world output), diamond (31%), and palladium (43%); the 2d-ranked producer of aluminum (5.6%), antimony (23%), cobalt (6.3%), gallium (1.5%), germanium (3.6%), magnesium metal (4.8%, not including United States production), nitrogen (11%), platinum (14%), potash (18%), silicon (7.1%), tellurium (13%, not including United States production), and vanadium (19%); the 3d-ranked producer of gold (10%), nickel (11%), selenium (11%, not including United States production), sulfur (9.4%), titanium sponge (13%), and tungsten (3.1%); the 4th-ranked producer of graphite (2.6%), helium (3.1%), lime (2.7%), magnesium compounds (3.7%, not including United States production), pig iron (4.0%), phosphate rock (6.4%), and vermiculite (7.6%, tied with Zimbabwe); the 5th-ranked producer of alumina (2.1%), arsenic (0.2%), iron ore (4.6%), raw steel (4.0%), and refined copper (4.1%); the 6th-ranked producer of barite (4.2%), cadmium (4.2%, not including United States production), iodine (0.01%), lead (4.8%), and silver (5.6%); the 7th-ranked producer of tantalum (2.3%); the 8th-ranked producer of bauxite (1.4%), indium (0.5%), mined copper (3.9%), molybdenum (0.9%), rare earths (1.1%), and zinc (2.3%); the 9th-ranked producer of cement (1.3%), peat (3.5%), and salt (2.9%); and the 10th-ranked producer of diatomite (2.2%) and zeolites (3.7%). It also was a significant world producer of boron, feldspar, gypsum, and tin (Anderson, 2022a–d; Apodaca, 2022a–c; Barry, 2022; Bolen, 2022; Bray, 2022a–c; Briocche, 2022a, b; Callaghan, 2022; Cordier, 2022; Crangle, 2022a–c; Flanagan, 2022a, b; Friedline, 2022; Gambogi, 2022; George, 2022; Hatfield, 2022; Jasinski, 2022a, b; Jaskula, 2022; Klochko, 2022a, b; McRae, 2022a, b; Merrill, 2022a, b; Olson, 2022a, b; Peterson, 2022; Polyak, 2022a, b; Schnebele, 2022a, b; Schulte, 2022; Sheaffer, 2022; Shedd, 2022a, b; Simmons, 2022; Tolcin, 2022a, b; Tuck, 2021a, b).

In 2020, Russia was also one of the leading world producers of mineral fuels. According to BP's "Statistical Review of World Energy," the country accounted for 16.5% of the world's production of natural gas, 12.1% of crude petroleum, and 5.3% of coal. Russia was also the seventh-ranked world producer of uranium. More information can be found in 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> (BP p.l.c., 2022, p. 15, 29, 38; World Nuclear Association, 2022).

Minerals in the National Economy

In 2020, the real gross domestic product (GDP) of Russia decreased by 3.0% compared with a 2.0% increase in 2019; the nominal GDP was 107.0 trillion rubles (\$1.48 trillion).¹ In 2020, the total value of output from mining and quarrying in current prices was \$200 billion, which was a 20.9% decrease compared with the value in 2019, but real output decreased by 6.6%. The total value of coke and refined petroleum production was \$117 billion, which was a 17.3% decrease compared with the value in 2019 and a real output decrease of 5.0%. Production of base metals was valued at \$108 billion, which was a 10.3% increase compared with the 2019 production value; and real output decreased by 2.6%. The total value of output of chemical products was \$47.2 billion, which was a 3.8% increase compared with that in 2019 and a 7.1% increase in real output. The output of fabricated metal products was valued at \$39.0 billion, which was a 3.9% increase compared with that in 2019 and a real output increase of 4.5%. Mining and quarrying of coal (including lignite) accounted for \$15.2 billion, and production of crude petroleum and natural gas, for \$124 billion. The total value of other nonmetallic mineral products was 1.79 trillion rubles (\$24.7 billion), which was a 2.1% increase compared with that in 2019 and a 0.2% increase in real output (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 260, 358–359).

In 2020, a total of 355.1 billion rubles (about \$4.91 billion) was spent on geologic exploration, of which 87.5% was financed from company funds, 7.9% was funded from the Federal budget, 3.9% came from domestic and foreign investors, and 0.7% came from other sources. Of the total funds spent on exploration, 74.4% was spent on exploration for petroleum, natural gas, and condensate; 9.9%, for precious metals; 1.9%, nonferrous and rare metals; 0.8%, nonmetals; 0.4% each, coal and diamond; 0.3%, ferrous metals; and 11.9%, other minerals (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 86).

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, and 2016 in conjunction with related modifications of other relevant laws, such as the Tax Law (Konsortium Kodeks, 2023; Konsultant.ru, 2023).

¹Where necessary, values have been converted from Russian rubles (RUB) to U.S. dollars (US\$) at the annual average exchange rates of 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 December 2018, the Government approved a new state development strategy for the mineral resources of Russia through 2035. The strategy defines priorities, goals, and tasks for the exploration and mining sector and focuses on the production of raw materials in support of the country's economy. This strategy was intended to be the basis for the formation and implementation of Government policy in the areas of geology, replenishment of resources, and mineral production at the Federal and regional levels. In the strategy, all minerals are divided into three groups—those that have enough reserves for any development scenario through 2035, those that have insufficient reserves for current production levels, and those that are in deficit and the current consumption of which is heavily reliant on either imports or stockpiles. The strategy defines production levels for all groups of minerals and emphasizes the importance of regional geologic exploration (Finmarket.ru, 2018).

Production

In 2020, Russia's production of many mineral commodities decreased owing to disruptions related to the coronavirus disease 2019 (COVID-19) pandemic. Production of arsenic decreased by 78%; zirconium, by an estimated 62%; ferrophosphorus, by an estimated 50%; gallium, by 38%; fluor spar and titanium sponge, by 33% each; diamond, by 31%; magnesium metal, by 28%; graphite, salt, and rhodium, by 26% each; ferrosilichromium, by 24%; ruthenium, by an estimated 23%; native sulfur, by 21%; mica and secondary refined gold, by 18% each; ferrovanadium and estimated production of iridium, by 17% each; ferromolybdenum, by 15%; mined molybdenum, by 14%; ferromanganese, by 13%; antimony, by an estimated 12%; ferrochromium and steel pipe, by 11% each; and asbestos and estimated production of refined cobalt, by 10% each. Production of silicomanganese decreased from 51,774 metric tons (t) to zero. At the same time, mined tantalum production increased by 89%; iodine, by 33%; barite, by 26%; bentonite, by 25%; secondary silver, by 23%; copper ore, by 19%; peat, by 17%; copper in concentrate and refined tin, by 14% each; and potash, by 11%. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Ministry for Natural Resources and Environment (Minprirody) was responsible for development of laws and regulations related to the geologic exploration for, rational use of, and protection of subsoil resources. The Federal Agency for Subsoil Use (Rosnedra) was responsible for management of subsoil resources. Specifically, Rosnedra was in charge of the implementing subsoil-related laws and regulations in specific jurisdictions. At the end of 2020, Russia had about 16,700 enterprises engaged in mining and quarrying, which was a 1.2% decrease compared with the number in 2019. Of these enterprises, 3,800 were engaged in mining metal ores; 1,200, in the production of petroleum and natural gas; 700, in mining coal; and the rest, in mining other minerals. Of all mining and quarrying enterprises, 15,300 were privately owned, about 100 were owned by central and municipal governments, and about 100 had mixed private and government ownership. The ownership of the other 1,200 enterprises was not reported. In

addition, Russia had 3,400 enterprises engaged in metallurgical production, 3,100 of which were privately owned. Table 2 is a list of major mineral industry facilities (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 321–327).

Mineral Trade

In 2020, the total value of Russia's exports of goods was \$337.1 billion, which was a 20.5% decrease compared with the value of exports in 2019. The value of Russia's imports decreased to \$231.7 billion, or by 5.3%. Russia had a positive trade balance of \$105.4 billion (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 570).

The primary goods exported from Russia were chemicals, manufactured goods, metals, natural gas, petroleum and petroleum products, and wood and wood products. Mineral products made up 51.3% of the total value of Russia's exports; crude petroleum, 21.5%; petroleum refinery products, 13.4%; natural gas, 7.6%; and ferrous metals, 4.8%. The leading categories of exported ferrous metals were semifinished products made from carbon steel (30.3%) and flat-rolled iron and steel (26.2%). Other products that contributed to Russia's export revenue included bituminous coal (3.7% of the country's total export value), copper (1.4%), aluminum (1.3%), complex mineral fertilizers (0.8%), nitrogen fertilizers (0.7%), nickel (0.6%), and ferrous metal pipe and potassium fertilizers (0.5% each). The major recipients of Russia's exports in 2020 were China (which received 12.5% of Russia's exports), the Netherlands (7.4%), Germany (5.5%), Belarus and Turkey (4.7% each), Kazakhstan (4.2%), Poland (3.7%), Italy (3.0%), Japan and the United States (2.8% each), Finland (2.5%), and the United Kingdom (2.2%) (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 573, 580–581).

In 2020, Russia imported \$5.6 billion worth of ferrous metal products (which constituted 2.4% of total imports) and \$3.7 billion worth of manufactured ferrous metals (1.6%). The major origins of Russia's imports were China (which supplied 23.7% of Russia's total imports), Germany (10.1%), the United States (5.6%), Belarus (5.4%), Italy (4.4%), France (3.5%), and Japan (3.1%) (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2021, p. 573, 586–587).

Commodity Review

Metals

Cobalt.—In 2020, Russia produced 9,700 t of cobalt in copper-nickel concentrates, which was a 3.2% increase compared with production in 2019. During the past decade, gross production of cobalt from deposits of all types decreased by 27.3% and marketable production (where cobalt was recovered from marketable products) decreased by 8.8%. The decrease was due to a gradual decrease in production at silicate nickel deposits located in the Ural Mountains region (the Urals), a decrease in average cobalt content in the ore of producing mines, and planned modernization of existing production facilities. In 2020, 12 ore deposits and 1 technogenic deposit (that is, a waste pile) were in production; however, cobalt was recovered from ores of 8 copper-nickel sulfide deposits, where

12,500 t of cobalt was produced, and from 1 technogenic deposit, where 500 t of cobalt was produced. In other deposits, the primary mineral commodity was either copper or iron ore, and cobalt was not recovered (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 203–206).

PAO GMK Norilskiy Nickel (Nornickel) was responsible for the production of 99.3% of Russia's marketable cobalt. Cobalt was produced both in the Polar Division of Nornickel, which was located in Krasnoyarskiy Kray, and in the Kola Division, which was located in Murmanskaya Oblast'. The three deposits in the Norilsk ore province (Polar Division)—the Norilsk I (northern part), the Oktyabr'skoye, and the Talnakhskoye—produced 88.7% of the country's marketable cobalt. The AO Kol'skaya GMK (Kola Division) produced cobalt at its four deposits—the Kotsel'vara-Kammikivi, the Semiletka, the Zapolyarnoye, and the Zhdanovskoye deposits—and produced 10.5% of the country's marketable cobalt. Also, the Shanuch deposit in Kamchatskiy Kray that was mined by ZAO NPK Geotekhnologiya produced 0.8% of all marketable cobalt. The average cobalt content in ores was in the range of 0.027%–0.035% (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 205–209, 214).

The prospects for increased cobalt production in Russia depended on development of other complex copper-nickel sulfide deposits. As of 2020, the deposits in preparation for development were the Chernogorskoye, the Kingashskoye, the Maslovskoye, the Norilsk I (southern part), and the Verkhnekingashskoye deposits (all in Krasnoyarskiy Kray); the deposits in Yelanskoye and Yolkinskoye (both in Voronezhskaya Oblast') and in Kun-Manye (in Amurskaya Oblast'). The Chernogorskoye and the Norilsk I (south) deposits were being developed by OOO Russian Platinum as an integrated project; the Chernogorskoye deposit would be mined by an open pit method, and the Norilsk I (south), by an underground method. Mining at the Chernogorskoye deposit was expected to begin in 2024 and to result in the production of 7 million metric tons per year (Mt/yr) of ore [750 metric tons per year (t/yr) of cobalt]. Mining at the Norilsk I (south) deposit was expected to commence in 2027, and the mine was expected to have a production capacity of 14 Mt/yr of ore (1,700 t/yr of cobalt). PAO GMK Nornickel was developing the Maslovskoye deposit, where the capacity of the underground mine was expected to be 9 Mt/yr of ore (900 t/yr of cobalt). The company planned to commission the mine in 2030 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 210–211).

The Onexim Group planned to begin open pit mining at the Kingashskoye and Verkhnekingashskoye deposits in 2022 and to reach a combined production capacity of 23.6 Mt/yr of ore in 2026. In Voronezhskaya Oblast', OAO Ural Mining and Metallurgical Co. (UGMK) was preparing for underground production at the Yolkinskoye and Yelanskoye deposits. According to the plans, the mine at Yelanskoye was expected to be commissioned in 2027, and the mine at Yolkinskoye, in 2028. The combined capacity at the two mines was projected to be 3 Mt/yr of ore (900 t/yr of cobalt). In 2020, Amur Minerals Corp. completed its exploration at the Kun-Manye deposit and was planning to begin production in 2024. The mine would have a production capacity of 6 Mt/yr of ore (700 t/yr of cobalt) (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 210–212).

Copper.—In 2020, Russia increased its copper ore production by 18.8% to 1,134,600 t; copper in concentrate production, by 13.8% to 923,000 t; and refined copper production, by 2.9% to 1,060,000 t. Copper production by solvent extraction decreased by 8.3% to 1,100 t. In 2020, copper in Russia was produced from 48 ore deposits, of which 40 were predominantly copper deposits and 8 were complex copper-containing deposits; also, 3 technogenic deposits were mined. In addition, copper was mined at 14 other deposits where copper was not recovered. The share of copper mined but not recovered did not exceed 0.9% of all copper production. The primary copper-producing regions in Russia were, in order of decreasing production, Krasnoyarskiy Kray (where the Norilsk ore province is located), the Central and Southern Urals (Chelyabinskaya, Orenburgskaya, and Sverdlovskaya Oblast's and the Republic of Bashkortostan), Zabaykal'skiy Kray, and Murmanskaya Oblast'. Also, production of copper and copper-containing ores was carried out in the North Caucasus and in southern Siberia (in Altayskiy Kray and the Republics of Khakassiya and Tyva). Three vertically integrated holding companies—Nornickel, UGMK, and AO Russian Copper Co. (RMK)—produced the majority of the country's copper output. Of all mined copper produced in Russia, Nornickel accounted for 569,900 t; RMK, 286,500 t; and UGMK, 254,800 t; the remaining 23,400 t was produced by other companies. Of all refined copper produced, UGMK accounted for 432,600 t; Nornickel, 422,000 t; and RMK, 200,500 t (table 1; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 165–170).

Nornickel produced mined copper from copper-nickel sulfide deposits in the Norilsk ore province in Krasnoyarskiy Kray and from the Pechenga area in Murmanskaya Oblast'. Overall, the company had sufficient mineral resources to continue mining copper-nickel ores for at least 70 years. In addition, Nornickel was a majority owner (50.01% share) of the Bystrinskiy GOK in Zabaykal'skiy Kray, which began industrial-scale copper production in 2019, producing 9.7 million metric tons (Mt) of ore in that year. During the 2020–22 timeframe, the company planned to produce, on average, 15.1 Mt/yr of ore and, after that, 11.6 Mt/yr. Nornickel estimated the life of the mine at the Bystrinskiy GOK to be 31 years. Marketable products of the Bystrinskiy GOK were three types of concentrates—gold-containing copper (26% Cu), gold-containing gravity concentrate, and magnetite. Gold-containing copper and magnetite concentrates were exported to China, and the gold-containing gravity concentrate was processed at Nornickel facilities (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 168–175).

UGMK was developing copper and polymetallic deposits in the Altay Mountains region, the Central and Southern Urals, and the Northern Caucasus. The Gayskiy deposit, which is located in Orenburgskaya Oblast', and the Yubileyniy deposit, which is located in the Republic of Bashkortostan, produced 38.4% of all UGMK-mined copper in 2020. Several smaller deposits (the Novo-Shemurskoye and Safyanovskoye deposits in Sverdlovskaya Oblast'; the Osennee deposit in Orenburgskaya Oblast'; and the Uzel'ginskoye deposit in Chelyabinskaya Oblast') together produced another 35%. UGMK had a total of 11 processing plants that produced copper concentrates

containing between 18% and 23% copper. The metallurgical processing of all these concentrates was carried out at metallurgical plants owned by UGMK (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 173).

RMK produced copper in the Urals region, including from the Mikheevskoye and the Tominskoye copper porphyry deposits in Chelyabinskaya Oblast' and the Chebachye, Dzhusinskoye, and Vesenne-Aralchiskoye copper pyrite deposits in Chelyabinskaya and Orenburgskaya Oblast's. Additionally, RMK was the only company in Russia that produced copper at the Gumeshevskoye deposit in Sverdlovskaya Oblast' using the in situ leaching method. The company had sufficient resources to continue copper mining for 22 years. RMK conducted copper beneficiation and metallurgical processing of its mined copper ore at company-owned facilities in Russia (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 173).

Apparent copper consumption in Russia in 2020 was 318,000 t, and the copper was used mostly to produce long and rolled products; many of these products were then used in construction, machine building, and the production of electrical and electronic products. Copper was also used to produce blue vitriol for use in agriculture, construction, and the textile industry. In 2020, Russia exported 298,300 t of copper concentrates owing primarily to the opening of the Bystrinskiy GOK, which exported some produced concentrates to China. Copper concentrates from Kazakhstan were imported by TOO Akt'yubinskaya Mednaya Kompaniya, which was a subsidiary of RMK, and by KAZ Minerals from its Bozshakol Mine for use in processing facilities owned by UGMK (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 173–175).

In 2020, Russia, which was one of the world's leading exporters of refined copper, increased its exports to 742,900 t, or by 10% compared with the amount exported in 2019. In 2020, Russia's shipments of refined copper to China, Egypt, and Turkey increased, whereas shipments to Germany and the Netherlands decreased. Russia also imported a small amount (5,700 t) of refined copper in 2020 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 173–175).

As of 2020, Russia was looking to double mined copper production in the near future. Specifically, 29 ore deposits, of which 24 were predominantly copper and 5 were complex copper-containing deposits, as well as 2 technogenic deposits were in preparation for production. The largest projects were at seven deposits—the Ak-Sugskoye, the Malmyzhskoye, the Novo-Uchalinskoye, the Peschanka, the Podol'skoye, the Tominskoye, and the Udokanskoye. In addition, projects directed at increasing production at existing mines—the Gayskoye, the Norilsk I (north), and the Yubileynoye Mines—were also in development (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–176).

The ONEKSIM Group was preparing the Ak-Sugskoye deposit, which is located in the Republic of Tyva, for production. Production was expected to commence in 2022 and to reach design capacity of 24 Mt/yr of ore and 151,000 t/yr of copper in concentrate by 2027 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–185).

RMK was preparing for production at the Tominskoye deposit in Chelyabinskaya Oblast' and the Malmyzhskoye deposit in Khabarovskiy Kray. Industrial-scale production at the Tominskoye deposit was expected to begin in 2020, but no information was available about whether production had begun. At capacity, the mine would produce 36 Mt/yr of ore and up to 156,400 t/yr of copper in concentrate (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–178).

Production at the Malmyzhskoye deposit was expected to commence in 2023, and the mine would have the capacity to produce 5 Mt/yr in ore. By 2025, annual ore production was planned to be increased to 80 Mt/yr of ore and 320,000 t/yr of copper in concentrate (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–178).

Production at the Novo-Uchalinskoye deposit was expected to begin in 2024, and the mine would have the capacity to produce 1.6 Mt/yr of ore and 16,000 t/yr of copper in concentrate. The mine's capacity would be increased to 2.8 Mt/yr of ore and 28,000 t/yr of copper in concentrate by 2027 and continue until the projected end of mine life in 2051 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–185).

OOO GDK Bayimskaya (which was a subsidiary of KAZ Minerals plc of Kazakhstan) was preparing a copper porphyry Peschanka deposit in Chukotskiy Avtonomnyi Okrug for production, where mining was expected to begin in 2027. At capacity, production would reach 70 Mt/yr of ore and 320,000 t/yr of copper in concentrate. Power lines and roads were being constructed at the Peschanka deposit (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–185).

UGMK was preparing its two deposits for underground mining. The Podol'skoye deposit was expected to begin production in 2027 and to produce 500,000 t/yr of ore and 14,500 t/yr of copper in concentrate during the mine's first phase. By 2032, the mine's production capacity was expected to be increased to 3.5 Mt/yr of ore and 69,000 t/yr of copper in concentrate (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–185).

OOO Baykal'skaya Mining Co. was preparing the Udokanskoye deposit in Zabaykal'skiy Kray for production. The mining complex was expected to be completed in 2022, and the design capacity of the first phase of mining was expected to be 12 Mt/yr of ore and 136,100 t/yr of copper in concentrate to be reached in 2023. The first phase would continue through 2033, and production would be carried out using the open pit method. Later, the production capacity of the mine would be increased to 48 Mt/yr of ore (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 175–178).

Industrial Minerals

Graphite.—In 2020, Russia produced 12,900 t of graphite, which was a 26% decrease compared with production in 2019. Two graphite mines were under development in Russia. The Tayginskoye deposit, which is located in Chelyabinskaya Oblast', contained flake-type graphite. Ore was produced by OOO Kar'yer, and the beneficiation and processing were done at the OOO Tayginskiy GOK. In 2020, OOO Kar'yer produced 447,000 t of graphite ore. OOO Tayginskiy produced 19 grades of graphite that varied by minimal graphite content and the size

of the flakes. The output of the flake graphite was exported and used domestically. Among domestic consumers of flake graphite were producers of refractory materials, companies working in the production of hydrocarbons, and machine-building companies (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 433–438).

Another company, AO Krasnoyarskgraphit, occasionally produced graphite from the Kureyskoye deposit located in the northern part of Krasnoyarskiy Kray. The deposit contained an amorphous type of graphite; however, complicated logistics, the low accessibility of the deposit, and unstable demand determined the occasional nature of production. In the past decade, production took place only in 2011, 2013, 2014, and 2017. The ore produced at the Kureyskoye deposit was transported by barge to the processing plant, which was located in the city of Krasnoyarsk and had the capacity to produce between 15 and 20 t/yr of graphite. Depending on demand, the plant operated at between 30% and 50% of its capacity. The plant produced cryptocrystalline graphite, carburizers, and other products. The output was mostly sold domestically, primarily to metallurgical and machine-building plants (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 437–438).

Natural graphite was exported from Russia either as powder or as flakes. Between 2011 and 2019, Russia's exports of graphite varied between 900 and 7,100 t/yr and were sold to Austria, Czechia, Germany, and Slovakia. In 2020, however, exports increased to 15,900 t owing to decreased inventories; 86% of all exports were shipped to Belarus. Domestic consumers of graphite also imported high-quality crystalline graphite (with a purity of 96% or higher) that was needed for some high-tech applications. Since 2016, Russia's imports of natural graphite varied between 2,500 and 3,800 t/yr. In 2020, the country imported 2,900 t of graphite mostly from, in order of decreasing tonnage, China, Belarus, Germany, and Madagascar. Between 2016 and 2020, apparent domestic consumption in Russia was 12,000 t/yr of graphite, on average, and the major consumers were metallurgical plants and producers of refractory materials (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 438–439).

Another graphite mine, the Topolikhinskiy section of the Soyuznoye deposit located in Evreyskaya Avtonomnaya Oblast', was under development. Production was expected to be by open pit, and the mine would have the capacity to produce 340,000 t/yr of ore and 40,000 t/yr of graphite. OOO Dal'nevostochnyi Grafit was the holder of the production license for the deposit. Construction of infrastructure for the mining complex, or GOK, began in 2017 and would include a powerplant, a heating plant, and water supply; the GOK would also have a beneficiation plant and a tailings storage area. Production was expected to begin in 2023, and the GOK would reach design capacity in 2024. The beneficiation would use a flotation method to produce graphite with 94.3% purity and separate various sizes of flake to produce multiple products. Also, the products could be chemically beneficiated at AO Irgiredmet. The graphite products were expected to be partially exported and partially used domestically (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 439–440).

As of yearend 2020, total identified graphite resources were 101 Mt and were concentrated in 12 deposits, of which 9 were of the crystalline type and 3 were of the amorphous type. The level of exploration of Russia's graphite resources remained low. The two deposits in development contained only 1.6% of the country's identified graphite resources, and another 12.9% of the resources were in the Soyuznoye deposit in preparation for production. Forecast resources of graphite (a probabilistic estimate of undiscovered resources made based on knowledge of already discovered resources in the area) in Russia are localized in Murmanskaya Oblast', Primorskiy Kray, and the Republic of Sakha (Yakutiya) (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 440–441).

Potash.—In 2020, Russia's production of potash increased by 10.5% to about 8.1 Mt in K_2O equivalent. In Russia, potash deposits were of the chloride type; 98% of the country's potash resources was contained in sylvinite and carnallite ores and the other 2% was in sulfate-chloride- and sulfate-type ores. Although the resources were practically equally distributed between sylvinite and carnallite, production was almost completely focused on sylvinite-type ores—only about 1% of all production was from carnallite deposits. The leading industrial-scale producing deposit of potash in Russia was the Verkhnekamskoye deposit in Permskiy Kray. In 2020, production and processing of potash were carried out by PAO Uralkali (Uralkali) and two divisions of MKhK EuroChem—the OOO EuroChem-Usol'skiy Potash Complex (EuroChem UKK) and the OOO EuroChem-VolgaKali site (table 1; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 462–464).

Uralkali was the leading producer of potash and potash fertilizers in Russia and one of the leading exporters of potassium chloride in the world. Uralkali had five mines producing potash at seven sections of the Verkhnekamskoye potash deposit as well as six potash plants and one carnallite plant, all of which were located in the cities of Berezniki and Solikamsk in Permskiy Kray. Production at the Verkhnekamskoye potash deposit was conducted using an underground chamber method, as a result of which ore losses were in the range of 55% to 75%, which was similar to analogous mines in the world. Uralkali planned to commission the first stage of the Polovodovskiy section and the central part of Novo-Solikamskiy section in 2021, which would increase the annual capacity to 14.8 Mt/yr of K_2O . The Ust'-Yayvinskiy section was expected to begin production in 2024. According to calculations, Uralkali had sufficient potash resources for long-term (more than 50 years of) production. The raw potash was processed at the plants to produce white potassium chloride in specifications of 95% and 98%, pink potassium chloride, and granulated potassium chloride, each of which could be used as ready-to-use fertilizers or for production of complex nitrogen (N), phosphorus (P), and potassium (K), or NPK, fertilizers (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 462–463).

OOO EuroChem was Russia's leading producer of mineral fertilizers—nitrates, phosphates, potash, and complex fertilizers. In 2020, EuroChem UKK conducted preparatory work at the Palasherskiy and the Balakhontsevskiy sections of the Verkhnekamskoye deposit and produced about 1.5 Mt of potash

in K₂O equivalent. EuroChem UKK was expected to increase production gradually and to reach design capacity of 12.6 Mt/yr of potassium chloride by 2025. The company's sylvinitic reserves would allow EuroChem UKK to continue operations until at least 2069. A beneficiation plant, which would have the capacity to produce 3 Mt/yr of potassium chloride, would use a flotation method that was expected to result in recovery of at least 86% of the contained potash. In 2020, EuroChem-VolgaKali produced 50 t of K₂O during mine construction at its Gremyachinskiy GOK in Volgogradskaya Oblast'. According to the project feasibility study, EuroChem-VolgaKali would reach full capacity of 7.3 Mt/yr of ore in 2027 and be able to operate at this capacity through 2034 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 463–466).

OOO K-Potash Service Co. was preparing the Nivenskoye sulfate-chloride deposit in Kaliningradskaya Oblast' for production. The Nivenskoye deposit had two sections that were expected to become the base of the Nivenskiy GOK, which was planned to produce chlor-less fertilizers. The GOK was expected to be commissioned in 2023. AO Verkhnekamskaya Potash Co. (a fully-owned subsidiary of PAO Akron) was preparing the Talitskiy section of the Verkhnekamskoye deposit for mining. According to the plan, which was updated in 2020, production would begin in 2025 and full capacity production of 7.45 Mt/yr of potassium chloride would be reached by 2028. Production using the underground chamber method was planned to be continued through 2039, with ore losses of about 70%. In 2020, construction of two vertical shafts was completed, and construction of the mine and GOK were continuing (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 466–467).

About 80% of the potash produced in Russia was exported to more than 70 countries. The white potassium chloride was predominantly shipped to China and European countries; pink, to India and Southeast Asia; and granulated, to Brazil, countries of Central America, and the United States. In 2020, apparent potash consumption in Russia amounted to 2.6 Mt. The primary use of potash was in the production of complex fertilizers (84%) and as a single-component fertilizer. Successful construction of new mines by OOO EuroChem, OOO K-Potash Service, and PAO Akron would likely bring about competition on the domestic market and double the production capacity of Russia's potash-producing facilities. A competitive advantage of the Gremyachinskiy GOK would be its location in the European part of the country in close proximity to agro-industrial regions in southern Russia (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 464–465).

Mineral Fuels and Related Materials

Coal.—In 2020, Russia produced 324 Mt of bituminous coal, about 73.9 Mt of lignite, and about 21 Mt of anthracite, which was a 9.5%, 9.7% and 5.3%, decrease, respectively, compared with production in 2019. The decrease in production was in response to the decreased demand for coal on the world market during the COVID-19 pandemic. In recent years, about 75% of all coal produced in Russia was bituminous, and only about one-third of bituminous coal was of metallurgical grade. The volume of metallurgical (coking) coal produced in Russia had

been stable for many years and amounted to between 85 and 94 Mt. Most of Russia's coal production was carried out by the inexpensive and relatively safe open pit method. During the period between 2011 and 2020, the share of coal produced in open pits increased to 79% from 68%. At the same time, about one-half of coking coal (42.3 Mt in 2020) was mined by underground methods, often in difficult mining conditions (table 1; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 72–73).

In 2020, Russia produced coal from 108 underground mines and 224 open pit mines. A significant number of the operating mines—53%—are located in the Kuznetsk coal basin, known as Kuzbass, in Kemerovskaya Oblast'. The share of production from other coal-producing regions was smaller: the Kansk-Achinskiy coal lignite basin accounted for about 10% of Russia's coal production, and six other coal-producing regions—Irkutskaya Oblast', Novosibirskaya Oblast', the Republics of Khakassiya and Sakha (Yakutiya), Sakhalinskaya Oblast', and Zabaykal'skiy Kray—each produced between 3% and 7% of the total (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 72–73).

Russia had more than 100 private coal-producing companies; however, the 6 largest ones were responsible for more than 50% of the country's total production. Sibantratsit Group and AO XK CDCUgol' were coal-mining companies, AO Siberian Coal and Energy Co. (AO SUEK) was a coal-mining and power generation company; and the other three—UGMK, PAO Mechel, and OOO Evraz—were metallurgical holding companies. In 2020, the leading producer of coal in Russia, AO SUEK, produced 101.2 Mt of coal, which was a 5% decrease compared with that in 2019. Of this total, 74.5 Mt was produced by the open pit method and the remaining 26.7 Mt was produced by an underground method. In 2020, AO SUEK beneficiated 44.2 Mt of coal to increase the energy content of the coal that it planned to export. The company mined coal in eight regions—the Republics of Buryatiya, Khakassiya, and Sakha (Yakutiya), Kemerovskaya Oblast', and Khabarovskiy, Krasnoyarskiy, Primorskiy, and Zabaykal'skiy Krays (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 73–74).

AO UK Kuzbassrazrezugol', which was a coal-producing division of UGMK, produced 40.1 Mt of coal at 16 mines located in Kuzbass. The company planned to increase its production to 60 Mt/yr of coal by 2035. OOO Evraz produced 20.7 Mt of coal at its mines in Kemerovskaya Oblast' and in the Republic of Tyva. The goal of Evraz was to produce enough coal to achieve self-sufficiency of its metallurgical operations; Evraz planned to increase annual production to 25 Mt/yr of coal in the near future (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 77–79).

AO KhKSDS-Ugol' produced 20.2 Mt of coal from two underground and three open pit mines in Kemerovskaya Oblast'. About 50% of the produced coal was beneficiated and about 75% was exported. Sibantratsit Group specialized in anthracite production that it mined in Novosibirskaya Oblast'; also, the company produced bituminous coal in Kemerovskaya Oblast'. Sibantratsit produced a total of 17.3 Mt of coal, which was a 25% decrease compared with that in 2019. Practically all output of the company was exported, and anthracite accounted for 72% of the company's coal exports. PAO Mechel produced 15.9 Mt

of coal, which was a 10% increase compared with that in 2019. Mechel's coal mines were located in Kemerovskaya Oblast' and in the Republic of Sakha (Yakutiya). Sales of pulverized coal amounted to 1.8 Mt; anthracite, 1.2 Mt; coking coal, 5.6 Mt, and thermal coal, 4.0 Mt. Mechel exported its products to China, Japan, and the Republic of Korea as well as to Belgium, France, Germany, and the Netherlands (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 77–79).

In 2020, domestic consumption of coal amounted to 180 Mt. Of that amount, 52% was sent to powerplants for power production; 20%, to chemical plants for metallurgical coke production; 12%, to residential customers and heating plants; and the rest, to other consumers. In 2020, Russia exported 211 Mt of coal, of which 89 Mt was shipped to customers in the West (Atlantic markets), and 122 Mt was shipped to customers in the East (Asian market). Exports sent in the eastern direction accounted for 99% of Russia's lignite exports, 68% of its anthracite exports, 64% of its coking bituminous coal exports, and 52% of its thermal coal exports. The leading importers of coal from Russia were China, followed by the Republic of Korea and Japan. Imports of coal to Russia were relatively small and amounted to 23.9 Mt. The imports were primarily limited to coal imported from Kazakhstan to powerplants located in the Urals (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 79).

In 2020, construction was being carried out at 144 coal mines, including 50 underground mines with a combined capacity of 60.6 Mt/yr and 94 open pit mines with a combined capacity of 77.6 Mt/yr. Of all coal mines, 2 underground mines with a combined capacity of 57.8 Mt/yr of coal and 61 open pit mines with combined capacity of 61.3 Mt/yr were located in Kuzbass. In the future, Russia's goal was to move the center of the coal industry to the Far East to be closer to the major customers of Russia's coal exports and to reduce the costs of transporting coal domestically (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2021, p. 79–80, 90).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

In 2021, the real GDP of Russia increased by 4.7% compared with a decrease of 2.7% (revised) in 2020; the nominal GDP was 131.0 trillion rubles (\$1.77 trillion). In 2021, the total value of output from mining and quarrying in current prices was 23.60 trillion rubles (\$320 billion), which was a 61.5% increase compared with the value in 2020; real output increased by 4.2%. Production of crude petroleum and natural gas accounted for 16.21 trillion rubles (\$220 billion). The total value of coke and refined petroleum production was 12.46 trillion rubles (\$169 billion), which was a 46.7% increase compared with the value in 2020 and a real output increase of 3.6%. Production of base metals was valued at 10.72 trillion rubles (\$145 billion), which was a 36.1% increase compared with the 2020 production value; and real output increased by 1.9%. The total value of output of chemical products was 5.26 trillion rubles (\$71 billion), which was a 48.9% increase compared with that in 2020 and a 6.8% increase in real output. The output of fabricated metal products was valued at 3.47 trillion rubles

(\$47 billion), which was a 10.6% increase compared with that in 2020 and a real increase of 9.4%. Mining of metallic ores accounted for 2.27 trillion rubles (\$30.8 billion) and mining and quarrying of coal and lignite, for 2.14 trillion rubles (\$29.1 billion). The total value of other nonmetallic mineral products was 2.10 trillion rubles (\$28.4 billion), which was a 9.9% increase compared with that in 2020 and a 9.2% increase in real output (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2022, p. 264; 371–372).

In February 2021, the Finance Ministry decided not to increase the tax rate on mineral extraction, known as the NDPI, for the companies developing tungsten deposits. Earlier, at the end of 2020, a decision had been made to increase the NDPI on tungsten by 3.5 times, to 28%, for the companies developing tungsten deposits. The increase would have generated revenue for the Government in the amount of 56 billion rubles (\$760 million); however, the tungsten mining companies would likely have become bankrupt (Biznes-gazeta.ru, 2021).

In 2018, the Government approved a bill that reduced the NDPI on rare metal production to 4.8% from 8.0%. The same tax rate was in effect in 2021 and would apply both to the production of rare metals from ore deposits where rare metals are the primary components of the ore and where rare metals are coproducts in complex polymetallic deposits. According to the bill, for tax purposes, "rare metals" includes beryllium, bismuth, cadmium, cesium, gallium, germanium, hafnium, indium, lanthanides, lithium, niobium, rhenium, rubidium, scandium, selenium, strontium, tantalum, tellurium, thallium, vanadium, and zirconium (Metaltd.ru, 2018).

In 2021, the total value of Russia's exports of goods was \$493.1 billion, which was a 46.2% increase from the value of exports in 2020. The value of Russia's imports increased in 2021 to \$293.5 billion, or by 26.4%. Mineral products made up 56.2% of the total value of Russia's exports. Crude petroleum accounted for 22.5% of total exports; petroleum refinery products, 14.2%; natural gas, 11.4%; and ferrous metals, 5.9% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2022, p. 584, 589, 593–594).

Production

In 2021, production of many mineral commodities recovered from reductions observed in 2020. Production of fluor spar increased by an estimated 614%; zirconium, by an estimated 117%; arsenic, by an estimated 100%; refined lead, by 62%; peat, by 39%; salt, by 37%; bismuth, by 33%; mined tin, by 31%; mica, by an estimated 29%; copper produced by solvent extraction, by 27%; industrial diamond, by 26%; gem diamond, by 25%; anthracite coal, by 21%, and magnesium metal, by an estimated 21%; sand, by 19%; mined zinc, by 17%; graphite, by an estimated 16%; refined tin, by an estimated 13%; potash, by 12%; bituminous coal, by 11%; magnesite, by an estimated 11%; ferroniobium and ferrotitanium, by an estimated 10% each; and metallurgical coal, by 10%. At the same time, ferrophosphorus production decreased by 47%; antimony by 45%; other ferroalloys, by an estimated 43%; barite, by an estimated 30%; iodine, by an estimated 25%; titanium sponge, by an estimated 22%; mined tantalum, by an estimated 20%; mined cobalt, by an estimated 18%; refined cobalt, by 17%; nickel metal, by 15%; nickel in concentrate, by 12%; and selenium, by an estimated 11% (table 1).

Commodity Review

Fluorspar.—In September 2021, Druza mining company, which was registered as a gold-mining company in Irkutskaya Oblast', began developing the Naranskoye fluorspar deposit in Buryatiya. The development of the Naranskoye deposit would require an investment of about 3.5 billion rubles (about \$47.5 million). Earlier, Druza mining company received licenses for fluorspar development at two other deposits—the Osenneye and the Egitinskoye deposits, both in Buryatiya. The Egitinskoye deposit was discovered in 1974 and had reserves of 1.6 Mt of fluorspar. The company planned to build a GOK for production and processing of 150,000 t/yr of fluorspar. The total investment in the Egitinskiy GOK was estimated to be 2 billion rubles (about \$27 million). In 2021, the Egitinskiy GOK began industrial-scale production and produced the first 49,000 t of concentrate. The Osenneye deposit, which was located 50 kilometers southwest of the Egitinskoye deposit, had resources of 1.7 of mineralized material and 442,000 t of fluorspar. The company planned to invest at least 18 billion rubles (\$244 million) in mineral deposits in Buryatiya (Voronov, 2018; ERuda.ru, 2019; Tass.ru, 2021a).

Tungsten.—In October 2021, implementation of a new investment project in the Republic of Kabardino-Balkarskaya was begun. The project involved construction of a new GOK at the Tyrnyauzskoye tungsten and molybdenum deposit. The mining and beneficiation of the ore would take place in Tyrnyauz, and the hydrometallurgical plant would be located in Nevinnomyssk in Stavropol'skiy Kray. In December 2017, Rosnedra announced a tender for restarting tungsten production at the Tyrnyauz deposit, and OOO Elbrusskiy GOK was the only contender. The Tyrnyauz deposit was discovered in 1934 and was in production until 2001 when the Tyrnyauz GOK filed for bankruptcy and stopped production. At that time, mining was conducted by open pit and underground methods and the beneficiation plant was located onsite (Sukharev, 2021; Tass.ru, 2021b).

The new GOK at Tyrnyauz would have the capacity to produce 1.5 Mt/yr of ore, 4,500 t of tungsten trioxide, and 300 t of molybdenum oxide. The total cost of the project was estimated to be 27 billion rubles (about \$366 million), and the project was expected to create 800 jobs. The project would use existing mines but alter the design to make a new GOK both cheaper to operate and more environmentally sound. The GOK was expected to begin production in 2023 and to reach full capacity in 2026 (Sukharev, 2021; Tass.ru, 2021b).

Zinc.—A new 100 billion ruble (about \$1.36 billion) GOK, an investment project by OOO Ozyornoye, was initiated at the Ozyornoye polymetallic deposit in the Republic of Buryatiya in December 2021. OOO Ozyornoye had obtained a license for development of the Ozyornoye deposit in December 2018. The GOK would have the capacity to process 8 Mt/yr of ore using an open pit method. The Fund for Development of the Far East and Arctic recognized the project as a priority and provided 9 billion rubles (about \$122 million) in the form of a loan. OOO Ozyornoye also obtained a 70 billion ruble (about \$950 million) loan from VTB Bank. When commissioned, the GOK was projected to produce 600,000 t/yr of zinc concentrate and 80,000 t/yr of lead concentrate and to create more than 2,000 jobs, mostly for the residents of Buryatiya. The project featured processing complicated ores. Because there was no

access to a railroad, an automobile road would be constructed specifically for this project. The infrastructure was expected to be completed in 2022, and the GOK was planned to be commissioned in 2023 (Rossaprimavera.ru, 2021).

In 2021, Polymet Engineering Co. continued working on construction of a new zinc plant in the town of Verkhniy Ufaley in Chelyabinskaya Oblast'. Ufaleynickel had produced nickel metal at this site between 1933 and 2017 that, at the height of production, accounted for up to 15% of nickel production in the country and up to 1% of world nickel production. The bankruptcy of Ufaleynickel in 2017 left 2,000 of its workers without jobs in a town with limited employment opportunities for skilled metallurgists. Construction of a new metallurgical plant in the town would reduce social tensions in Verkhniy Ufaley and create a new center of zinc production. The new zinc plant in New Ufaley would have the capacity to produce 120,000 t/yr of zinc and would be able to make use of the town's skilled labor force. The total cost of the project was estimated to be about \$350 million, of which the cost of equipment would be about \$50 million. As of mid-2021, the investments exceeded \$136 million. The plant was expected to be commissioned in 2024 (Dprom.online, 2021; Metalinfo.ru, 2022).

The reason for construction of the new zinc plant was a shortage of zinc in Russia. In 2021, the imports of zinc increased by 46%, to 23,800 t, of which 78% was imported from Kazakhstan and 20% was imported from Uzbekistan. At the end of 2021, owing to the shortage of zinc in the country, Russia began importing zinc from Iran and Poland, where lower quality was compensated for by lower prices. Before 2018, Russia had two zinc plants that produced about 290,000 t/yr of zinc, and zinc consumption in Russia in recent years was between 260,000 and 280,000 t/yr. In 2018, the Electrozink plant, which was located in Vladikavkaz, North Ossetiya, had a fire, and the decision was made not to rebuild the plant. As a result, the only zinc plant left in Russia was the Chelyabinskiy zinc plant, which had the capacity to produce between 190,000 and 195,000 t/yr of zinc (Metalinfo.ru, 2022).

Outlook

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

In the short to medium term, Russia is likely to deal with the effects of reduced petroleum prices, the decreased value of the ruble against other currencies, and economic sanctions. It is likely that some of the most ambitious mineral industry projects will be either canceled or delayed until better economic conditions prevail in the country. Other projects that are related to national security, such as lithium and rare earths, will become more prominent. It remains to be seen, however, how this new economic reality will affect the structure and resilience of Russia's mineral industry.

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TABLE I
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
METALS						
Aluminum:						
Bauxite	thousand metric tons	5,523	5,651	5,574	5,570	5,679
Nepheline ores	do.	33,300	35,600	36,800 ^r	37,300	37,000 ^e
Alumina	do.	2,822	2,763	2,755	2,873	3,054
Metal, primary	do.	3,583	3,627	3,637	3,639	3,640
Antimony, mine, Sb content, recoverable		14,400	32,000 ^{r, e}	23,800 ^r	21,000 ^e	11,500 ^e
Bismuth, mine, Bi content ^e		300	300	300	300	400
Cadmium, refinery, primary ^e		1,200	1,150	1,000 ^r	1,000	1,000
Chromium, mine, chromite, concentrates, marketable		488,000	469,000 ^r	698,000 ^r	689,000	700,000
Cobalt:						
Mine, recoverable, Co content		8,900 ^r	8,700 ^r	9,400 ^r	9,700	8,000 ^e
Refinery, metal		2,077	1,800	2,000 ^e	1,800	1,500
Copper:						
Mine, Cu content:						
Ore		847,000	884,100	955,000 ^r	1,134,600	1,147,000
Concentrates		759,800 ^r	869,300 ^r	811,200 ^r	923,000	933,000
Solvent extraction		1,300	1,200 ^r	1,200 ^r	1,100	1,400
Smelter, blister:						
Primary		730,000	789,000	801,000 ^r	815,200	737,600
Secondary		216,000	230,000	240,000 ^r	235,000	222,600
Total		946,000	1,020,000	1,040,000 ^r	1,050,000	960,000
Refinery:						
Primary:						
Electrowon, leaching		1,300	1,200 ^r	1,200 ^r	1,100	1,400
Other		729,700 ^r	781,400 ^r	790,600 ^r	811,500	753,700
Total		731,000 ^r	783,000 ^r	792,000 ^r	813,000	755,000
Secondary		218,000 ^r	233,400 ^r	236,200 ^r	242,400	226,100
Total, primary and secondary		949,000 ^r	1,020,000 ^r	1,030,000 ^r	1,060,000	981,000
Ferroalloys:						
Ferromanganese		434,452	332,261	384,089	342,622	350,000 ^e
Ferromanganese		253,000	281,000	273,000	238,000	240,000 ^e
Ferromolybdenum		3,000 ^e	3,066	4,652	3,937	4,000 ^e
Ferroniobium ^e		100	100	100	100	110
Ferrophosphorus		1,538	1,500 ^e	1,500 ^e	750 ^e	400 ^e
Ferrosilicochromium		75,000 ^e	75,000 ^e	79,259 ^r	59,912	60,000 ^e
Ferrosilicon		840,352	928,797	846,579	880,401	880,000
Ferrotitanium		10,200	9,000	10,000 ^{r, e}	10,000 ^e	11,000 ^e
Ferrovandium		12,593	11,383	10,894	9,084	9,000 ^e
Silicomanganese		44,917	43,334	51,774	--	-- ^e
Other, unspecified, electric furnace ^e		7,000 ^r	7,000 ^r	7,000 ^r	7,000	4,000
Gallium ^e	kilograms	7,000	6,000	8,000	5,000	5,000
Germanium, Ge content ^e		5	5	5	5	5
Gold:						
Mine, Au content	kilograms	270,300	277,139	304,697	308,560	313,830
Refinery, secondary	do.	36,600	34,477	38,487	31,610	32,590
Indium, refinery, primary, In content ^e	do.	5,000	5,000	5,000	5,000	5,000
Iron ore, mine, concentrate:						
Gross weight	thousand metric tons	95,042	96,063	97,531	100,015	100,600
Fe content, 55% to 63% Fe	do.	56,074	56,700	64,287	69,500	66,700

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
METALS						
Iron and steel:						
Direct-reduced iron	thousand metric tons	6,990	7,900	8,030	7,930	7,766
Pig iron ³	do.	52,127	51,797	51,184	52,003	53,785
Steel:						
Raw steel	do.	71,300	71,682	71,729 ^r	71,621	75,585
Products:						
Pipe	do.	11,833	12,151	12,394	10,971	11,200
Rolled	do.	60,483	61,650	61,639	61,768	65,865
Lead:						
Mine, recoverable, Pb content		210,800	206,100 ^r	207,900 ^r	200,700	200,000 ^c
Refinery, primary and secondary		140,000 ^r	140,000 ^r	141,000 ^r	142,000	230,000
Magnesium, metal, primary ⁴		65,000	67,000	67,000	48,000	58,000 ^c
Manganese, mine, concentrate, marketable, Mn content		250	-- ^r	-- ^r	--	-- ^c
Molybdenum, mine, concentrate, Mo content		3,227	2,262 ^r	1,989 ^r	1,707	1,700 ^c
Nickel:						
Mine, marketable, Ni content:						
Laterite ore		1,800 ^c	--	--	--	--
Sulfide ore, concentrate		207,989 ^r	216,237 ^r	231,336 ^r	232,945	204,814
Smelter, matte		42,690	43,918	53,500 ^r	48,400	50,000
Metal		157,396	158,005	166,265 ^r	172,357	145,817
Platinum-group metals:						
Mine, primary, elemental content:						
Iridium ^c	kilograms	300	200	300	250	230
Palladium ^c	do.	88,000	90,000	98,000	93,000	86,000
Platinum ^c	do.	22,000	22,000	24,000	23,000	21,000
Rhodium	do.	2,115	1,928	2,426	1,804	1,648
Ruthenium ^c	do.	1,000	1,300 ^r	1,300	1,000	1,000
Refinery:						
Palladium	do.	85,161 ^r	83,077 ^r	89,217 ^r	87,370	80,465
Platinum	do.	22,000 ^r	20,900 ^r	22,500 ^r	22,000	20,000 ^c
Rare earths, mineral concentrate, rare-earth oxide equivalent		2,700	2,700	2,700	2,600	2,600 ^c
Selenium, Se content	kilograms	150,000 ^c	303,000	331,000	338,000	300,000 ^c
Silicon, metal ^c		59,300	59,300	59,300	56,500	60,000
Silver:						
Mine, Ag content	kilograms	1,373,000 ^r	1,400,000 ^r	1,407,000 ^r	1,380,000	1,320,000 ^c
Refinery:						
Primary	kilograms	798,000	809,100	826,580	757,400	717,380
Secondary	do.	246,300	310,840	169,590	208,330	228,320
Tantalum mine, loparite concentrates, Ta content	do.	36,444	36,200	25,900	49,000	39,000 ^c
Tellurium, refinery	do.	44,000	70,000	70,600 ^r	70,200	70,000 ^c
Tin:						
Mine, recoverable, Sn content		1,011	1,531 ^r	2,471 ^r	2,559	3,360
Refinery, primary and secondary		800	1,100	1,400	1,600	1,800 ^c
Titanium:						
Mineral concentrates, ilmenite and leucoxene		2,900 ^r	3,000 ^r	3,100 ^r	3,000	3,000 ^c
Sponge		42,600 ^r	44,400 ^r	45,900	30,700	24,000 ^c
Tungsten, mine, concentrate, W content		2,144	2,234	2,433 ^r	2,274	2,300 ^c
Vanadium, metallurgical, V content		18,636	17,052	18,380	19,533	20,058
Zinc:						
Mine, Zn content		255,200	288,000 ^r	275,400 ^r	260,700	306,000
Smelter, primary and secondary		256,700	254,600	207,014 ^r	211,781	198,000
Zirconium, baddeleyite concentrate, averaging 98% ZrO ₂		7,200	7,400	6,300 ^r	2,400 ^c	5,200 ^c

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
INDUSTRIAL MINERALS						
Arsenic trioxide, white	1,500 ^e	--	2,226	500	1,000 ^e	
Asbestos	714,105	752,917	790,000	708,000	750,000	
Barite	178,000	163,000	228,000 ^f	287,000	200,000 ^e	
Boron	78,800 ^f	75,100 ^f	81,800 ^f	80,000 ^e	80,000 ^e	
Cement, hydraulic	thousand metric tons	54,721	53,678	57,676 ^f	56,165	59,700
Clay:						
Bentonite	91,000	50,100	29,200 ^f	36,400	36,000 ^e	
Kaolin, including kaolinitic clays	1,226,000	1,593,000	2,424,000 ^f	2,478,000	2,500,000 ^e	
Diamond, natural: ⁵						
Gem	thousand carats	23,900	24,200	25,400	17,500	21,900
Industrial	do.	18,800	19,000	19,900	13,700	17,200
Diatomite	52,000	50,600	51,000 ^e	51,000 ^e	51,000 ^e	
Feldspar	281,326	294,411	298,376 ^f	300,000	300,000 ^e	
Fluorspar, 55% to 96.4% CaF ₂	2,700	6,000	4,200 ^f	2,800	20,000 ^e	
Graphite, all forms	19,500 ^f	11,900 ^f	17,500 ^f	12,900	15,000 ^e	
Gypsum, mine ⁵	thousand metric tons	3,975	5,487	4,199 ^f	4,063	4,100
Iodine	8	8	3	4	3 ^e	
Lime, industrial and construction	thousand metric tons	11,179	11,305	11,577 ^f	11,364	11,400 ^e
Magnesite	do.	1,397 ^f	1,571 ^f	935 ^f	900 ^e	1,000 ^e
Mica	5,219	4,465	5,689 ^f	4,654	6,000 ^e	
Nitrogen, ammonia, N content	thousand metric tons	14,056	14,859	15,802 ^f	16,126	16,300 ^e
Phosphate rock:						
Gross weight	13,200,000	13,600,000	13,800,000	13,800,000	14,000,000 ^e	
P ₂ O ₅ content	5,690,000	5,777,000	5,881,000 ^f	6,129,000	6,200,000 ^e	
Potash, marketable, K ₂ O content	thousand metric tons	7,320	7,168	7,340	8,114	9,101
Salt, all types	do.	7,073	6,710	8,175 ^f	6,026	8,242
Sand and gravel, industrial, glass sand ⁶	do.	6,023	6,165	7,409	7,321	7,300 ^e
Soda ash, synthetic	do.	3,376	3,416	3,402 ^f	3,348	3,464
Sodium, compounds, caustic soda	do.	1,239	1,279	1,291 ^f	1,272	1,267
Stone, sand, and gravel:						
Sand and gravel:						
Gravel	479,000	509,000	534,000	528,000	557,000	
Sand	385,000	407,000	395,000	389,000	464,000	
Stone, crushed, limestone	64,430	67,251	71,318 ^f	71,179	78,100	
Sulfur:						
Byproduct, S content:						
Metallurgy ^e	200,000	200,000	200,000	200,000	200,000	
Natural gas	6,321,000	6,597,000	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, S content	96,316	83,707	57,972 ^f	46,056	50,000 ^e	
Pyrites, S content ^e	180,000	180,000	180,000	180,000	180,000	
Compounds, sulfuric acid	thousand metric tons	12,388	13,026	13,361 ^f	13,354	14,500
Vermiculite	9,262	25,904	29,900 ^f	28,510	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	19,237	21,989	22,114 ^f	20,953	25,300
Bituminous ⁷	do.	335,000 ^f	359,000 ^f	358,000 ^f	324,000	360,000
Lignite	do.	74,886	80,478	81,886 ^f	73,908	74,700
Metallurgical	do.	85,400	91,600	97,000	90,500	100,000
Coke, metallurgical, 6% moisture content	do.	27,998	26,977	26,938 ^f	27,016	25,687
Natural gas, marketable	million cubic meters	691,488	726,008	739,424 ^f	694,485	762,300

See footnotes at end of table.

TABLE 1—Continued
 RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021
MINERAL FUELS AND RELATED MATERIALS—					
Continued					
Peat, horticultural and fuel uses	732,900	1,124,200	1,071,400 ^r	1,248,200	1,730,000 ^e
Petroleum:					
Crude ⁸ thousand 42-gallon barrels	3,990,000 ^r	4,060,000 ^r	4,100,000 ^r	3,740,000	3,822,000
Refinery ⁹ do.	2,270,000	2,340,000	2,340,000 ^r	2,250,000	2,280,000
Uranium, mine, U content	2,917	2,904	2,911	2,846	2,600

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through January 23, 2023. 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.

²In 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.

³Includes spiegeleisen.

⁴Includes metal used in titanium sponge production.

⁵Excludes gypsum used in cement production.

⁶Glass sand production represents about one-third of the total industrial sand production.

⁷Includes anthracite and metallurgical coal.

⁸Production has been reported in thousand metric tons as follows: 2017—547,000; 2018—556,000; 2019—561,000; 2020—512,800; and 2021—524,050; includes gas condensate.

⁹Production has been reported in thousand metric tons as follows: 2017—284,000; 2018—292,000; 2019—292,100; and 2020—280,700; and 2021—285,000.

TABLE 2
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e	
Alumina	Achinskiy (United Company RUSAL)	Plant in Achinsk, Eastern Siberia	900,000	
Do.	Bogoslovskiy (United Company RUSAL)	Plant in Krasnotur'insk	1,050,000	
Do.	Boksitogorskiy (United Company RUSAL)	Plant in Leningradskaya Oblast'	200,000	
Do.	Pikalyovskiy (United Company RUSAL)	Plant in Pikalyovo	300,000	
Do.	Ural'skiy (United Company RUSAL)	Plant in Kamensk-Uralskiy	700,000	
Aluminum, primary smelted	Bogoslovskiy AZ (United Company RUSAL)	Plant in Krasnotur'insk	175,000	
Do.	Bratskiy AZ (United Company RUSAL)	Plant in Bratsk	1,000,000	
Do.	Irkutskiy AZ (United Company RUSAL)	Plant in Irkutskaya Oblast'	420,000	
Do.	Kandalakskiy AZ (United Company RUSAL)	Plant in Kola Peninsula	75,000	
Do.	Khakasskiy AZ (United Company RUSAL)	Plant in Khakasiya	300,000	
Do.	Krasnoyarskiy AZ (United Company RUSAL)	Plant in Krasnoyarskiy Kray	1,000,000	
Do.	Nadvoitskiy AZ (United Company RUSAL)	Plant in Nadvoitsy, Kareliya Republic	75,000	
Do.	Novokuznetskiy AZ (United Company RUSAL)	Plant in Novokuznetsk	300,000	
Do.	Sayanogorskiy AZ (United Company RUSAL)	Plant in Sayanogorsk	550,000	
Do.	Ural'skiy AZ (United Company RUSAL)	Plant in Kamensk-Uralskiy	150,000	
Do.	Volgogradskiy AZ (United Company RUSAL)	Plant in Volgogradskaya Oblast'	175,000	
Do.	Volkhovskiy AZ (United Company 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	
Compounds and metals	OOO Ryazsvetmet plant	Ryazanskaya Oblast'	NA	
Do.	Zabaykal'skiy GOK (ZabGOK) (OOO NefteChimMash)	Plant in Zabaykal'skiy Kray	NA	
Apatite, concentrate	Khibiny apatite association (OAO Apatit)	Mine on Kola Peninsula	15,000,000	
Do.	Kovdor iron ore mining association	do.	700,000	
Asbestos	Bazenovskoye chrysotile deposit	Mine in Sverdlovskaya Oblast'	NA	
Do.	Molodeznoye deposit	Mine in Zabaykal'skiy Kray	NA	
Do.	"Orenburg Minerals" Co., Kiembraevskoye chrysotile deposit	Mine in Orenburgskaya 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	100,000	
Bauxite	Komi Aluminum (United Company RUSAL)	Mine in Sredne-Timanskiy	3,000,000	
Do.	OAO Sevuralboksitruuda (United Company RUSAL)	Mine in Severoural'sk region	NA	
Do.	Severnaya Omega Mine (United Company RUSAL)	Northwest region	800,000	
Do.	South-Urals mining company (United Company 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	Mine and plant in Russian Far East	8,000	
Do.	Bor Association	Mine and plant in Primorskiy Kray	140,000	
Cement	thousand metric tons	AO Holding Company Sibirskiy Tsement	Plant in Kemerovskaya Oblast	5,600
Do.	do.	AO Sebyakovtsement	Plant in Volgogradskaya Oblast'	NA
Do.	do.	Eurocement Group	16 plants all over the country	40,000
Do.	do.	Gazmetallproekt	Plant in Krasnodarskiy Kray	8,200
Do.	do.	Holding BaselTsement	Plant in Ryazanskaya Oblast'	NA
Do.	do.	LafargeHolcim Russia	Plant in Central region	9,000
Do.	do.	OOO Dyckerhoff Korkino Cement	Plant in Chelyabinskaya Oblast'	NA
Do.	do.	OOO HeidelbergCement Russia	Plant in Central region, Bashkortostan Republic	11,000
Do.	do.	OOO VostokTsement	Plant in Evreyskaya AO, Yakutiya	NA
Do.	do.	OOO Yuzhno-Ural'skaya mining and processing company	Plant in Orenburgskaya Oblast'	NA
Chromite		AO ChEMK	Tsentralnoye Mine, YaMAO	350,000
Do.		Saranovskiy complex	Mines and plant in Permskiy Kray	140,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c	
Coal:				
thousand metric tons	AO KhKSDS-Ugol'	Mines in Kemerovskaya Oblast'	29,000	
Do.	do.	AO Siberian Coal and Energy Co. (AO SUEK)	Mines in Siberia and Russian Far East	106,000
Do.	do.	OAO UK Kuzbassrazrezugol'	Mines in Kuznetskiy Basin	45,000
Do.	do.	Evrast Holding	Mines in Kuznetskiy Basin	22,300
Do.	do.	OAO Mechel-Mining	Mines in Kuznetskiy Basin and Yakutiya	22,700
Do.	do.	OAO Russkiy Ugol'	Mines in Russian Far East	14,000
Do.	do.	Sibantratsit Group	Mines in Siberia	25,000
Do.	do.	Vostsibugol' Co.	Mines in Eastern Siberia	13,200
Cobalt	PAO GMK Noril'skiy Nickel (Normickel)	Mines and plant on Kola Peninsula and in Norilsk	10,000	
Do.	ZAO NPK Geotekhnologiya	Shanuch Mine in Kamchatskiy Kray	100	
Copper:				
Cu in concentrate	Metalloinvest Holding	Mines in Udokan, Zabaykal'skiy Kray	NA	
Do.	OAO Urals Mining and Metallurgical Co. (UGMK)	Mines in the Urals	230,000	
Do.	PAO GMK Noril'skiy Nickel (Normickel)	Mines in Norilsk region, Kola Peninsula	500,000	
Do.	ZAO Russkaya Mednaya Kompaniya (RMK)	do.	70,000	
Do.				
Metal, refined	OAO Urals Mining and Metallurgical Co. (UGMK)	Plants in the Urals	360,000	
Do.	PAO GMK Noril'skiy Nickel (Normickel)	Plant 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%): PAO Severalmaz:	Sakha Republic (Yakutiya) mines:	
Do.	do.	Aikhal'skiy mining and beneficiation complex	Aikhal, Komsomol'skiy,	11,900
Do.	do.	do.	Yubileyniy and Zarya	5,900
Do.	do.	Anabar'skiy mining and beneficiation complex	Alluvial mines	5,300
Do.	do.	Lomonosov'skiy mining and beneficiation complex	Arkhangel'skaya Oblast'	4,800
Do.	do.	Mirninskiy mining and beneficiation complex	Mir and International	3,000
Do.	do.	Nyurbinskiy mining and beneficiation complex	Nyurbinskiy and Botuobinskiy	11,500
Do.	do.	Udachninskiy mining and beneficiation complex	Zarnitsa and Udachnyy	5,800
Do.	do.	AO Almazy Anabara Processing complex	Complex in Arkhangel'skaya Oblast'	6,000
Do.	do.	V. Grib mining and beneficiation complex (AO AGD Diamonds, 100%)	Mine in Arkhangel'skaya Oblast'	4,500
Feldspar		Kheto-Lanbino and Lupikko deposits	Mines in Kareliya Republic	NA
Ferroalloys		ChEMK Industrial Group enterprises: Chelyabinsk electrometallurgical plant	Plant locations: Chelyabinskaya Oblast'	450,000
Do.		Kuznetsk ferroalloys plant	Novokuznetsk	400,000
Do.		Chusovoy iron and steel plant	Permskiy Kray	NA
Do.		Klyuchevsk ferroalloy plant	Dvurechensk	160,000
Do.		Kosaya Gora iron works	Kosaya, Gora	200,000
Do.		Lipetsk iron and steel works	Lipetskaya Oblast'	NA
Do.		Serovskiy ferroalloy plant [a subsidiary of Eurasian Natural Resources PLC (ENRC)]	Sverdlovskaya Oblast'	NA
Ferrovandium		Vanadiy-Tulachermet (Evrast Group)	Plants in Tula and North Caucasus	NA
Fluorspar		Abagaytuy deposit	Mine in Transbaikal	NA
Do.		Egitskiy GOK (Druza Mining Co.)	Buryatiya Republic	100,000
Do.		Usugli Mine	do.	NA
Do.		Kyakhtinskiy deposit	do.	NA
Do.		Kalanguy mining complex	Mines in Zabaykal'skiy Kray	NA
Do.		Yaroslavskiy mining and beneficiation complex	Mines at Pogranichnoye and Vosnesenskoye deposits, Primorskiy Kray	NA
Gallium		Achinskiy (United Company RUSAL)	Plant in Achinsk in Eastern Siberia	15
Do.		OOO Galiy	Plant in Moscow	NA
Do.		Pikalyovskiy (United Company RUSAL)	Plant in Pikalevo	NA
Germanium, metal and products		Federal State Unitary Enterprise Germanium	Plant in Kranoyarsk	7
Graphite		OOO Kar'yer	Mine in Chelyabinskaya Oblast'	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Gold, mine output, Au content	kilograms	AO Polymetal UK (Polymetal International plc)	Mines in Amurskaya Oblast', Chukotskiy Avtonomnyi Okrug, Magadanskaya and Sverdlovskaya Oblast's, Khabarovskiy Kray	7,500
Do.	do.	Highland Gold Mining Ltd. (HGM)	Mines in Khabarovskiy and Zabaykal'skiy Krays	6,900
Do.	do.	IK Arlan (Pavlik ZRK)	Mine in Magadanskaya Oblast'	3,700
Do.	do.	Kinross Gold Corp.	Mines in Chukotskiy Avtonomnyi 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 Magadanskaya Oblast'	3,000
Do.	do.	OAO Omolonskaya ZRK	Mines in Magadanskaya Oblast'	5,000
Do.	do.	OAO Pokrovskiy Mine	Mines in Amurskaya Oblast'	6,000
Do.	do.	OAO Priisk Solov'yevskiy	do.	1,500
Do.	do.	OAO Susumanzoloto	Mines in Magadanskaya Oblast'	4,500
Do.	do.	OAO Uralelektromed'	Mines in Sverdlovskaya Oblast'	1,400
Do.	do.	OAO Zoloto Kamchatki	Mines in 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 Krasnoyarskiy Kray	1,200
Do.	do.	OOO Ros-DV	Mines in Khabarovskiy Kray	1,100
Do.	do.	OOO Russdragmet	Mines in Khabarovskiy Kray, Zabaykal'skiy Kray	6,000
Do.	do.	OOO Sovrudnik	Mines in Krasnoyarskiy Kray	3,900
Do.	do.	Oyna, a/s	Mines in Tyva Republic	1,500
Do.	do.	PAO Polyus Gold	Mines in Krasnoyarskiy Kray and Magadanskaya Oblast'	70,000
Do.	do.	PAO Seligdar	Mines in Sakha Republic (Yakutiya)	4,300
Do.	do.	Petropavlovsk plc	Mines in Petropavlovsk	23,000
Do.	do.	Polyarnaya, a/s	Mines in Chukotskiy Avtonomnyi Okrug	1,000
Do.	do.	PAO Vysochayshiy (GV Gold)	Mines in Irkutskaya Oblast' and Sakha Republic (Yakutiya)	5,500
Do.	do.	OOO Yuzhuralzoloto	Mines in Chelyabinskaya Oblast'	6,500
Do.	do.	Vitim, a/s	Mines in Irkutskaya Oblast'	2,900
Do.	do.	Vostok, a/s	Mines in Khabarovskiy Kray	1,100
Do.	do.	ZAO Amur a/s	Mines in Khabarovskiy Kray	5,500
Do.	do.	ZAO Chukotskaya Mining and Geological Co. (Chukotskaya GGK)	Mine in Chukotskiy Avtonomnyi Okrug	15,000
Do.	do.	ZAO LT-Resurs	Mines in Irkutskaya Oblast'	2,700
Do.	do.	ZAO Omsukchanskaya GGK	Mines in Magadanskaya Oblast'	3,000
Do.	do.	ZAO Zolotaya, ZDK	Mines in Khakasiya Republic	1,200
Do.	do.	Zapadnaya, a/s	Mines in Krasnoyarskiy Kray	1,900
Gold, refined	do.	AO Ekaterinburgskiy Plant (EZOTsM)	Plant in Sverdlovskaya 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-Mansiyskiy	NA
Do.	do.	AO Priokskiy Plant for Nonferrous Metals	Refinery in Ryazanskaya Oblast'	51,000
Do.	do.	AO Shyolkovskiy plant	Refinery in Moskovskaya Oblast'	NA
Do.	do.	AO Uralelektromed' refinery (UGMK)	Refinery in Sverdlovskaya Oblast'	20,000
Do.	do.	OAO Gudilov Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Kray	260,000
Do.	do.	ZAO Kyshtymskiy plant	Chelyabinskaya Oblast'	NA
Primary	do.	Chelyabinskii electrolytic zinc plant	do.	6
Secondary	do.	Elektrozink plant [OAO Urals Mining and Metallurgical Co. (UGMK)]	Vladikavkaz, North Caucasus	6

See footnotes at end of table.

TABLE 2—Continued
 RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Iron ore	Kursk Magnetic Anomaly (KMA) region, which contains the following enterprises: Lebedi and Stoilo Mikhaylovka	Mines in: Gubkin Zheleznogorsk	50,000,000 ³
Do.	Northwest region, which contains the following enterprises: Kostomuksha Kovdor Olenegorsk	Mines in : Kostomuksha Kola Peninsula Olenegorsk	22,000,000 ³
Do.	Siberia region, which contains the following enterprises: East: Korshunovo Rudnogorsk West: Abakan Sheregesh Tashtagol Teya	Mines in: Zheleznogorsk Rudnogorsk Abaza Sheregesh Tashtagol Vershina Tei	18,000,000 ³
Do	Urals region, which contains the following enterprises: Akkermanovka Bakal Goroblagodat Kachkanar Magnitogorsk Peshchanka	Mines in: Novotroitsk Bakal Kushva Kachkanar Magnitogorsk Rudnichnyy	22,000,000 ³
Lead, metal	AO Uralkhrommet' refinery (UGMK)	Refinery in Sverdlovskaya Oblast'	NA
Do.	Dal'polymetal lead smelter	Rudnaya in Primorskiy Kray	20,000
Do.	Elektrozink lead smelter [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucasus	40,000
Do.	OOO Fregat	Moskovskaya Oblast'	170,000
Do.	OOO Ryaztvetmet plant	Plant in Ryazanskaya Oblast'	NA
Do.	ZAO Agropribor	Moskovskaya 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 Zabaykal'skiy Kray	7,000
Do.	Novoangarskiy GOK	Mine in Krasnoyarskiy Kray	170,000
Do.	Sadon lead-zinc complex	Mines in North Ossetia	5,000
Do.	Salarinskiy mining and beneficiation complex	Mines in Kemerovskaya 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 Zabaykal'skiy Kray	12,500
Do.	OAO Urals Mining and Metallurgical Co. (UGMK)	Mines in Altay Kray, Caucasus, and the Urals	95,000
Do.	OOO Luncin (Zijin Mining Group, 100%)	Mine in Tyva Republic	50,000
Do.	Sadon lead-zinc complex	Mines in Severnaya Osetiya	14,000
Do.	Salair mining-beneficiation complex	Mines in Kemerovskaya Oblast'	10,500
Limestone	Mazul'skiy Mine (United Company Rusal)	Goryachegorskiy massif, Eastern Siberia	NA
Lithium	JSC Novosibirsk Chemical Plant (TVEL Corp.)	Novosibirsk	NA
Do.	JSC Chemical-Metallurgical Plant (TVEL Corp.)	Kransnoyarsk	NA
Magnesite	Karagayskiy open pit (Magnezit Group) and Magnezitovaya underground mine (Magnezit Group)	Sakha group of deposits in Chelyabinskaya Oblast'	3,800,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits		Location or deposit names	Annual capacity ^e
Magnesium, metal	Avisma plant		Berezniki	35,000
Do.	Solikamskiy Magnium Plant (SMZ)		Plant in Solikamsk, Permskiy Kray	30,000
Mica	Emel'dzhak deposit		Mine at Aldan Shield, Sakha Republic (Yakutiya)	NA
Do.	Kovdor phlogopite mine (Mica Mine; Slyuda Mine; Kovdorslyuda Shaft)		Kola Peninsula, Murmanskaya Oblast'	NA
Do.	Lopatova Guba mica pit		Mine in Kareliya Republic	NA
Do.	Irkutsk complex (JSC "Vostoksluda")		Mine at Mam deposit, Irkutskaya Oblast'	NA
Molybdenum, mined	Dzhida tungsten-molybdenum mine		West Transbaikal	NA
Do.	Shakhtaminskoye molybdenum mining enterprise		Mines in Zabaykal'skiy Kray	NA
Do.	Sorsk molybdenum mining enterprise		Mine in Khakasiya Republic	NA
Do.	Tyrnauz tungsten-molybdenum mine [OAO Kabardino-Balkarskaya Tungsten-Molybdenum Co. (Government of Kabardino-Balkarskaya Republic)]		Republic of Kabardino-Balkariya, North Caucasus	NA
Natural gas:				
Production	million cubic meters	Arktikgaz	Deposits in Yamalo-Nenetskiy Avtonomnyi Okrug	25,800
Do.	do.	OAO NK Rosneft'	Deposits throughout Russia	46,700
Do.	do.	PAO Gazprom (Government, 50.23%, and private owners, 49.77%)	Deposits throughout Russia	405,000
Do.	do.	PAO Gazpromneft'	Deposits throughout Russia	13,500
Do.	do.	PAO Lukoil	Deposits in West Siberia, Volga region	18,400
Do.	do.	PAO Novatek	Deposits in Yamalo-Nenetskiy Avtonomnyi Okrug	50,100
Do.	do.	PAO Surgutneftegaz	Deposits 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 Ornburskiy GPZ, Orenburg The Sosnogorskiy GPZ, Komi Republic The Yuzhno-Priobskiy GPZ, HMAO Petrochemical plants: OOO Gazprom Neftechim Salavat, Bashkortostan Republic Orenburg helium plant	NA
Compressed natural gas production	Kriogaz-Vysotsk (OAO Novatek)		Plant in Leningradskaya Oblast'	NA
Do.	Sakhakin Energy Consortium Ltd.		Plant Complex Sakhalin-2, Sakhalinskaya Oblast'	NA
Do.	Yamal SPG		Plant in YaNAO	NA
Nepheline syenite	Apatite complex		Mines on Kola Peninsula	1,500,000
Do.	Kiya-Shaltyr Mine (United Company RUSAL)		Goryachegorsk massif, Eastern Siberia	NA
Nickel:				
Ore, Ni content	OAO Ufaleynickel (Koks Co. of Industrial Metallurgical Holding)		Mines in Chelyabinskaya Oblast', Urals	17,000
Do.	PAO GMK Noril'skiy Nickel (Normickel)		Mines in Murmanskaya Oblast' (Kotselvaara-Kammikivi, Zapolyarnoye, and Zhdanovskoye) and in Noril'sk region	300,000
Do.	ZAO NPK Geotekhnologiya		Mine at Shanuch deposit, Kamchatskiy Kray	NA
Metal:				
Smelted	PAO GMK Noril'skiy Nickel (Normickel)		Nadezhdinskiy plant in Sverdlovskaya Oblast'	NA
Do.	do.		Plant in Pechenga	50,000
Do.	do.		Plant in Monchegorsk	50,000
Refined	do.		Severonickel plant in Monchegorsk	140,000
Do.	do.		Nadezhdinskiy plant in Sverdlovskaya Oblast'	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits		Location or deposit names	Annual capacity ^e
Nickel:—Continued					
Products and Ni content of ferronickel		Enterprises OAO Ufaleynickel (Koks Co. Industrial Metallurgical Holding) Yuzhuralnickel (Mechel OAO) ZAO Rezhnickel [Urals Mining and Metallurgical Co. (UGMK)]		Plant location: ² South Urals do. do.	65,000 ³
Niobium (columbium)		Karnasurt mining enterprise (AO Sevredmet)		Mines at Lovozerskoye deposit, Kola Peninsula	12,000
Oil shale		Leningradslanets Association		Slantsy, Leningradskaya Oblast'	5,000,000
Petroleum, crude	thousand 42-gallon barrels	PAO Gazpromneft'		Deposits throughout Russia	400,000
Do.	do.	PAO Lukoil		Komi Republic deposits: Kyrta'yelskoye Pashshorskoye Perevoznoye Timen Pechora deposit: Yuzhnaya Khylychuya Urals deposits Volga region deposits (PFO) West Siberian deposits: Kechimovskoye Nivagalskoye	720,000
Do.	do.	PAO NGK Slavneft'		Western Siberia and Krasnoyarskiy Kra'y deposits	160,000
Do.	do.	PAO NK Rosneft'		The Krasnoleninskoye, the Malobalykskoye, the Priobskoye, the Prirazlomnoye, and the Samotlorskoye deposits (all HMAO-Yugra), the Vankorskoye deposit (Krasnoyarskiy Kra'y), Verkhnechonskoye deposit (Irkutskaya Oblast') and deposits across Russia	2,000,000
Do.	do.	PAO NK Russneft'		Central and western Siberia, Urals and Volga regions deposits	120,000
Do.	do.	PAO Novatek		Western Siberia deposits	40,000
Do.	do.	PAO Surgutneftegaz		Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO) deposits	520,000
Do.	do.	PAO Tatneft'		Deposits: Bavlinskoye Bondyuzskoye Novo-Elkhovskoye Pervomayskoye Romashkinskoye Sabandchinskoye	280,000
Do.	do.	Sakhalin-1 (Exxon Neftegaz Ltd., 30%; SODECO, 30%; PAO NK Rosneft', 20%; and ONGC Videsh Ltd., 20%)		Deposits: Arktun-Dagi, Chaivo, and Odoptu (Sakhalin Island)	110,000
Petroleum, refined	thousand 42-gallon barrels	PAO Gazprom Neft'		Refineries Moskovskiy NPZ and Omskiy NPZ	630,000
Do.	do.	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		Kingisepp complex (OAO Fosforit)		Mines in Leningradskaya Oblast'	3,500,000
Do.		Lopatino and Yegorevsk deposits		Mines in Moskovskaya Oblast'	NA
Do.		Polpinskoye deposit		Mines in Bryanskaya Oblast'	NA
Do.		Verkhnekamsk deposit		Mines in the Urals	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Phosphate rock, apatite concentrate	OAO Apatit (Phosagro)	Mines in Kola Peninsula	12,000,000
Do.	Kovdorskiy GOK	do.	700,000
Platinum-group metals:			
Ore, platinum-group metal content	AO Koryakgeoldobycha, Amur Prospectors	Placer deposits (mostly platinum), Urals; Siberia; Russian Far East	10
Do.	Lopatino and Yegor'yevsk deposits	Mines in Moskovskaya Oblast'	NA
Do.	OAO AS Amur (Russian Platinum Co.)	Placer deposits (mostly platinum), Urals; Siberia; Russian Far East	10
	PAO GMK Noril'skiy Nickel (Nornickel)	Mines in Noril'sk region, Kola Peninsula	150
Do.	Polpinskoye deposit	Mines in Bryanskaya Oblast'	NA
Do.	Verkhnekamskiy deposit	Mines in the Urals	NA
Metals, refined	AO Priobskiy plant (PAO Gazpromneft')	Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO)	NA
Do.	Ekaterinburgskiy plant (EZOTsM)	Sverdlovskaya Oblast'	NA
Do.	Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Kray	NA
Potash, K ₂ O equivalent	PAO Uralkali	Mines at Verkhnekamskoye deposit	8,000,000
Do.	PAO Akron	Mines in Novgorod	NA
Do.	Usol'skiy Potash Complex (OOO EuroChem)	Permskiy Kray	NA
Do.	Volga-Kali (EuroChem UKK)	Volgograd region	NA
Rare earths	OAO Apatit	Mines at Lovozerskoye deposit, Kola Peninsula	2,700
Salt	AO Bassol'	Mines at Lake Baskunchak in Astrakhanskaya Oblast'	2,500,000
Do.	Dus-Dagskoe deposit	Mines at Dus-Dag Mountains	25,000
Silver, mine output, Ag content	Dukat Mine	Mines in Magadanskaya Oblast'	1,000
Do.	Kinross Gold Corp.	Mines in Chukotskiy Avtonomnyi Okrug	NA
Silver, refined	AO Ekaterinburgskiy plant (EZOTsM)	Sverdlovskaya Oblast'	NA
Do.	AO Moskovskiy plant for special alloys	Moscow	NA
Do.	AO Novosibirskiy refinery	Novosibirsk	NA
Do.	AO Priobskiy plant (PAO Gazpromneft')	Khanty-Mansiyskiy	NA
Do.	AO Priokskiy Zavod Tsvetnyh Metallov	Refinery in Ryazanskaya Oblast'	NA
Do.	AO Shelkovskiy refinery	Moskovskaya Oblast'	NA
Do.	AO Uralelektromed' refinery	Refinery in Sverdlovskaya Oblast'	NA
Do.	kilograms OAO Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Kray	500,000
Do.	ZAO Kyshtymskiy plant	Chelyabinskaya Oblast'	NA
Soda ash	thousand metric tons Achinskiy plant	Eastern Siberia	595
Do.	do. Bereznikovskiy plant	Plant in the Urals	1,080
Do.	do. Pikalyovskiy plant	Leningradskaya Oblast'	200
Do.	do. Sterlitamak plant	Bashkortostan Republic	2,140
Do.	do. Volkhovskiy plant	Leningradskaya Oblast'	20
Steel, raw	AO Chusovskoy Metallurgical Plant	Permskiy Kray	570,000
Do.	AO Electrostal Metallurgical Plant	Moscow	314,000
Do.	AO Nizhnetagil'skiy mining and metallurgical complex (NTMK) (Evraz Group)	Plant in Sverdlovskaya Oblast'	8,000,000
Do.	AO Novosibirskiy Metallurgical Plant	Novosibirskaya Oblast'	1,100,000
Do.	AO Omutninskiy Metallurgical Plant	Kirovskaya Oblast'	210,000
Do.	AO Volgogradskiy Metallurgical Plant (Red October)	Volgogradskaya Oblast'	2,000,000
Do.	AO Vyksunskiy Metallurgical Plant (OMK)	Nizhegorodskaya 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	Kemerovskaya Oblast'	160,000
Do.	OAO Magnitogorskiy mining and metallurgical complex (MMK)	Plant in Chelyabinskaya Oblast'	16,200,000
Do.	OAO Nizhneserginskiy Metallurgical Plant	Plant in Sverdlovskaya Oblast'	300,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Steel, raw—Continued	OAO Nosta (OAO Orsk-Kahlilovo Iron and Steel Works)	Plant in Novotroitsk, Orenburgskaya Oblast'	4,600,000
Do.	OAO Novokuznetskiy Metallurgical Complex	Novokuznetsk, Kemerovskaya Oblast'	4,700,000
Do.	OAO Oskol'skiy Electrometallurgical Complex (OEMK)	Staryi Oskol	2,500,000
Do.	OAO Petrovsk-Zabaykal'skiy Metallurgical Plant	Petrovsk-Zabaykal'skiy	426,000
Do.	OAO Serovskiy Metallurgical Plant (UGMK)	Sverdlovskaya Oblast'	1,000,000
Do.	OAO Serp i Molot (Moscovskiy Metallurgicheskiy Plant)	Moskovskaya Oblast'	70,000
Do.	OAO Severskiy Tube Plant	Polevskoy, Sverdlovskaya Oblast'	825,000
Do.	OAO Sibelektrostal Metallurgical Plant	Krasnoyarskiy Kray	110,000
Do.	OAO Taganrogskiy Metallurgical Plant (Tagmet)	Rostovskaya Oblast'	925,000
Do.	OAO Tulachemet	Plant in Tul'skaya Oblast'	18,400
Do.	OAO Zapadno-Sibirskiy mining and metallurgical complex (ZSMK) (Evraz Group)	Kemerovskaya Oblast'	6,900,000
Do.	OOO Gor'kovskiy Metallurgicheskiy Plant	Plant in Nizhegorodskaya Oblast'	78,000
Do.	OOO Lis'venskiy Metallurgical Plant	Permskiy Kray	350,000
Do.	OOO Nizhnesal'dinskiy Metallurgical Plant	Sverdlovskaya Oblast'	1,900
Do.	OOO VIZ-Stal (Verkh-Isetsk Steel Works) (NLMK)	do.	132,000
Do.	OOO Zlatoustovskiy Metallurgical Plant	Zlatoust, Chelyabinskaya Oblast'	1,200,000
Do.	PAO Ashinskiy Metallurgical Plant	Chelyabinskaya Oblast'	450,000
Do.	PAO Mechel (Mechel)	Plant in Chelyabinskaya Oblast'	7,000,000
Do.	PAO Novolipetskiy mining and metallurgical complex (NLMK)	Lipetskaya Oblast'	9,900,000
Do.	PAO Severstal	Plant in Vologodskaya Oblast'	14,000,000
Do.	ZAO Revdinskiy Metallurgical and Wire Production Plant	Sverdlovskaya Oblast'	281,000
Do.	ZAO Sulinskiy Metallurgical Plant	Rostovskaya Oblast'	280,000
Talc	Kirgiteysk deposit	Mine in Krasnoyarskiy Kray	NA
Do.	Miass deposit	Mine in Chelyabinskaya Oblast'	NA
Do.	Onotsk deposit	Mine in Irkutskaya Oblast'	NA
Do.	Shabrovsk deposit	Mine in Sverdlovskaya Oblast'	NA
Tantalum, ore	Facilities: Lovozerkiy GOK Zabaykalskiy mining and beneficiation complex	Mines in: Lovozerkoye deposit, Kola Peninsula Etykinskoye deposit	NA
Tellurium	PAO GMK Norilskiy Nickel (Normickel)	Norilsk	5
Do.	Ural Mining and Metallurgical Co. (UMMC)	Urals	75
Tin:			
Ore, Sn content	AO Tin Ore Co. (PAO Soligdar)	Solnechnyi deposit, Khabarovskiy Kray	NA
Do.	OOO Pravourmiyskoye (PAO Soligdar)	Mine in Khabarovskiy Kray	NA
Metal	Novosibirsk Processing Plant Ltd.	Novosibirskaya Oblast'	NA
Titanium:			
Ore	OAO Apatit	Mines at Kykisvumchorskoye and Yuksporskoye deposits	NA
Do.	OAO TGOK Ilmenit	Mines at Tyuganskoye deposit	NA
Do.	OOO Lovozerkiy GOK	Mines in Murmanskaya 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, Permskiy Kray	NA
Sponge	do.	do.	47,000
Do.	Solikamskiy Magnesium Plant (SMZ)	Plant in Solikamsk, Permskiy Kray	3,000
Tungsten:			
Concentrate, W content	AS Quartz	Mine at Bom-Gorkhom deposit, West Transbaikal, Zabaykal'skiy Kray	NA
Do.	KGUP Primteploenergo	Mine at Lermontovskoye deposit, Primorskiy Kray	NA
Do.	OAO Primorskiy GOK	Mine at Vostok-2 deposit	NA

See footnotes at end of table.

TABLE 2—Continued
 RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Tungsten:—Continued			
Concentrate, W content— Continued	Tyrnyauz tungsten-molybdenum mine [OAO Kabardino-Balkarskaya Tungsten-Molybdenum Co. (Government of Kabardino-Balkarskaya Republic)]	Mine in Republic of Kabardino-Balkariya, North Caucasus	NA
Do.	ZAO Novoorlovskiy GOK	Mine at Spokoyninskoye deposit, Zabaykal'skiy Kray	NA
Do.	ZAO Zakamensk	Mine at Ruchey Inkur deposit, Barun-Narynskoye deposit	NA
Metal	Gidrometallurg plant	do.	NA
Uranium, U content of ore	Uranium Holding OAO Atomredmetzoloto (ARMZ): OAO Khiagda mining enterprise Priargunskoye mining and chemical enterprise ZAO Dalur mining enterprise	Locations of mines: Buryatiya Republic Krasnokamensk, Zabaykal'skiy Kray Kurganskaya Oblast'	3,500 ³
Vanadium:			
Ore	Kachkanarskiy iron mining complex	Mines in the Urals	NA
Metal	Chusovoy and Nizhniy Tagil plants	Plants in the Urals	17,000
Pentoxide	Vanadiy-Tulachermet (Evraz Group)	Plant in Tul'skaya 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 Chelyabinskaya Oblast'	200,000
Do.	Elektrozink plant [Urals Mining and Metallurgical Co. (UGMK)]	Plant in Vladikavkaz, North Caucasus	90,000
Do.	Uralektromed' plant [Urals Mining and Metallurgical Co. (UGMK)]	Plant in Verkhnyaya Pyshma	17,000
Zirconium:			
Baddeleyite concentrate	Kovdor iron ore mining and beneficiation complex	Mine on Kola Peninsula	8,000
Metal	Chepetskiy metallurgical plant (TVEL Corp.)	Plant in Glazov, Udmurtiya Republic	NA

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Many 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.

²Not in operation as of 2021.

³Capacity estimates are totals for all enterprises that produce that commodity.

⁴Damaged owing to fire in 2018.