



2019 Minerals Yearbook

RUSSIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF RUSSIA

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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 2019, Russia was the world's leading producer of asbestos (68% of world output), diamond (36%), and palladium (43%); the 2d-ranked producer of aluminum (5.8%), antimony (19%), cobalt (4.4%), gallium (2.3%), germanium (3.8%), magnesium compounds (5.5%), magnesium metal¹ (6.0%), nitrogen (11%), platinum (13%), silicon (7.3%), tellurium (10%), and vanadium (21%); the 3d-ranked producer of arsenic (4.6%), gold (9.2%), nickel (11%), potash (18%), sulfur (9.4%), titanium sponge (22%), and tungsten (2.6%); the 4th-ranked producer of lime (2.5%), pig iron (3.9%), phosphate rock (5.8%), and silver (7.5%); the 5th-ranked producer of alumina (2.1%), iron ore (4.2%), raw steel (3.9%), refined copper (4.2%), selenium (5.2%), and vermiculite (6.4%); the 6th-ranked producer of graphite (2.3%), lead (4.9%), and rare earths (2.3%); the 8th-ranked producer of cadmium (3.7%), cement (1.4%), gypsum (3.7%), indium (0.5%), mined copper (3.9%), and peat (2.8%); the 9th-ranked producer of bauxite (1.6%), molybdenum (1.0%), tantalum (1.4%), and zeolites (3.2%); and the 10th-ranked producer of barite (1.8%), diatomite (2.3%), salt (2.4%), and zinc (2.0%). It also was a significant world producer of boron, feldspar, and tin (Anderson, 2021a–d; Apodaca, 2021a–c; Bolen, 2021; Bray, 2021a–c; Briocche, 2021a–c; Callaghan, 2021a, b; Crangle, 2021a–c; Flanagan, 2021a, b; Gambogi, 2021a, b; George, 2021; Hatfield, 2021a, b; Jasinski, 2021a, b; Jaskula, 2021; Klochko, 2021a, b; McRae, 2021a, b; Merrill, 2021a, b; Olson, 2021a, b; Polyak, 2021a, b; Schnebele, 2021; Schulte, 2021; Sheaffer, 2021; Shedd, 2021a, b; Tolcin, 2021a, b; Tuck, 2021a, b).

Minerals in the National Economy

In 2019, the real gross domestic product (GDP) of Russia increased by 1.3% compared with a 2.5% increase in 2018; the nominal GDP increased to 110 trillion rubles (\$1.70 trillion²). In 2019, the total value of output from mining and quarrying accounted for 16.7% of the GDP and amounted to \$284 billion, which was a 0.7% increase compared with the value in 2018, although in real terms, the output value increased by 3.4%. Production of crude petroleum and natural gas accounted for \$200 billion of the GDP; mining and quarrying of coal and lignite, \$21.5 billion; and mining of metallic ores, \$18.6 billion. The total value of coke and refined petroleum production accounted for 9.3% of the GDP and amounted to \$159 billion,

¹For boron, cadmium, magnesium compounds, magnesium metal, selenium, and tellurium, the world rank and percentage of world output do not include U.S. production, which has been withheld to avoid disclosing company proprietary data.

²Where necessary, values have been converted from Russian rubles (RUB) to U.S. dollars (US\$) at an annual average exchange rate of RUB64.62=US\$1.00 for 2019; RUB62.845=US\$1.00 for 2018; and RUB60.692=US\$1.00 for 2017. All values are nominal, at current prices, unless otherwise stated.

which was a 1.4% decrease compared with the value in 2018 but an increase in real terms of 1.6%. Production of base metals was valued at \$110 billion, which was a 16.2% increase compared with the value in 2018 and an increase in real terms of 4.0%; the output of fabricated metal products was valued at \$42 billion, which was a 10.7% increase compared with the value in 2018 and an increase in real terms of 10.1%. The total value of output of chemical products was \$51 billion, which was a 0.4% increase compared with the value in 2018 and an increase in real terms of 3.4%; and the total value of other nonmetallic mineral products was \$27.1 billion, which was a 9.3% increase compared with the value in 2018 and an increase in real terms of 8.8% (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 265, 370–371).

In 2019, a total of about \$5.33 billion was spent on geologic exploration in Russia, of which 88.0% was financed from company funds, 3.5% was from domestic and foreign investment, and 6.9% was from the Federal budget. By category of expenditure, 76.0% of the total funds spent on exploration was directed to exploration for petroleum, gas and condensate; 9.1%, to exploration for precious metals; 1.4%, for nonferrous and rare metals; 0.7%, for nonmetallic minerals; 0.6%, for coal; 0.5%, for diamond; 0.3%, for ferrous metals; and the rest, on exploration for other minerals (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 86).

Government Policies and Programs

In September 2019, the Ministry of Natural Resources and Environment (Minprirody) announced that it had estimated the value of all mineral reserves in Russia as of yearend 2018. This was the second time the Ministry produced such an estimate; the previous estimate was done for yearend 2017. The total value of all mineral reserves was estimated to be about \$1.44 trillion whereas the 2017 estimate was about \$910 billion. The bulk of the value of Russia's reserves was embedded in petroleum, which was estimated to be about \$1.15 trillion. In the previous estimate, the total value of petroleum reserves was about \$650 billion, although the petroleum reserves by weight increased by only 8.7%, to 9.83 billion metric tons (Gt) from 9.04 Gt. The implied value of one barrel of petroleum was about \$15.5. The value of diamond reserves increased to \$8.7 billion from \$8.3 billion; iron ore, to \$19.7 billion from \$13.3 billion; gold, to \$9.8 billion from \$7.9 billion. At the same time, the value of coking coal reserves decreased to \$29.4 billion from \$32.6 billion. The value of copper reserves also decreased slightly. Minprirody included in its calculations only licensed deposits, and the methodology it used was the revenue approach; that is, the value was computed based on the discounted revenue stream that could be earned by the extraction of resources. The Ministry announced that it planned to continue updating the figures on an annual basis (Gazeta.ru, 2019; Minak, 2019; Tkachev and Fadeeva, 2019a, b).

In December 2018, the Government of the Russian Federation approved a new state development strategy for Russia's mineral resources through 2035. The strategy defines priorities, goals, and tasks for the exploration and mining sector and focuses on the exploration and production of raw materials to support the economy of the country. The strategy was to become the basis for formation and implementation of Government policy in the areas of geology, the replenishment of resources, and the production of mineral commodities both at the Federal and regional levels. In the strategy, all minerals are broken down into three groups—those for which reserves are sufficient for any development scenario through 2035, those for which reserves are insufficient for current production levels, and the those that are in deficit and for which current consumption is heavily reliant on imports or stockpiles. Specifically, reserves of apatite, coal, copper, iron ore, minerals for cement production, molybdenum, natural gas, nickel, platinum-group metals, potash, tin, and tungsten were deemed sufficient to satisfy the country's needs through 2035 and beyond. On the other hand, current production levels of crude petroleum, diamond, gold, high-purity quartz, lead, silver, and zinc could not be sustained with reserves available to date and would require additional exploration and involvement of nontraditional resources, such as nonconventional hydrocarbons and nontraditional (for Russia) sources of diamond and precious metals. The strategy defines replenishment levels for all groups of minerals and emphasizes the importance of regional geologic exploration (Ignatyeva, 2019).

In January, Minprirody developed a proposal to amend the Law on Subsoil as related to the cutoff figures for placement of gold ore deposits on the list of deposits of Federal significance. Specifically, Minprirody suggested increasing the cutoff amount to 200 metric tons (t) from 50 t; that is, only the deposits with reserves of 200 t or higher would be classified as deposits of Federal significance. Minprirody argued that the relatively low cutoff figure led to erroneous classification of average deposits as strategically significant. More importantly, the existing classification was likely to reduce investment in exploration for gold owing to investors' concerns that the Government would not issue a development license for the deposits they discover. It was expected that the amendment would promote investment in exploration for gold in the country (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2019a).

In February, the Parliament approved the bill on changes in the Tax Code of the Russian Federation. In November 2018, the Government proposed a bill to reduce the tax rate on mineral extraction, known as the *nalog na dobychu poleznyh iskopaemyh* (NDPI), for rare metals to 4.8% from 8.0%. The new tax rate would apply both to production of rare metals from ore deposits where rare metals are the primary components of ore and where rare metals are coproducts in complex polymetallic deposits. According to the bill, for tax purposes, "rare metals" would include beryllium, bismuth, cadmium, cesium, gallium, germanium, indium, the lanthanoids, lithium, niobium, rhenium, rubidium, scandium, selenium, strontium, tantalum, tellurium, thallium, vanadium, yttrium, and zirconium. Also, for new production projects of strategically important rare metals, an investment-period tax reduction was proposed. Specifically, during the first 10 years of production,

the NDPI would be reduced to 10% of the applicable rate. This NDPI reduction would be applied to production of beryllium, germanium, lithium, niobium, rare earth metals, rhenium, scandium, and tantalum. The measure was expected to increase the attractiveness of some mining projects, such as development of the Tomtorskoye rare earth deposit in the Sakha Republic (Yakutiya) (Metald.ru, 2018; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2019b).

In August, the Government introduced a new proposal to allow companies that are engaged in development of hydrocarbon deposits and that hold appropriate licenses for hydrocarbon development to produce byproduct minerals from underground waters if their extraction is related to the deposit's development. This amendment to the Law on Subsoil would predominantly apply to byproduct production of boron, bromine, iodine, and lithium. Without the amendment, a subsoil user was not allowed to produce any minerals that were not explicitly specified in the production license. The Government expected the amendment to improve the efficiency of subsoil use in the country (Ria.ru, 2019).

Production

In 2019, Russia's production of mineral commodities did not show significant changes with the exception of a small number of commodities. Specifically, the estimated output of iridium increased by 50%. Production of mined tin increased by 48%; gallium, by an estimated 33%; ruthenium, by an estimated 30%; rhodium, by 26%; salt, by 22%; silicomanganese, by 19%; mined molybdenum, by an estimated 17%; ferrochromium, by 16%; refined lead, by an estimated 15%; iron ore (Fe content) and vermiculite, by 13% each; secondary gold, by 12%; ilmenite and leucoxene, and refined cobalt, by an estimated 11% each. At the same time, iodine production decreased by 63%; secondary silver, by 45%; native sulfur, by 31%; mined tantalum, by 28%; mined gypsum, by 23%; primary cadmium, by an estimated 22%; and mined zinc, by an estimated 15%. Production data for these and other mineral commodities are in table 1.

Structure of the Mineral Industry

At the end of 2019, Russia had 16,900 enterprises engaged in mining and quarrying, which was a 1.7% decrease compared with the number in 2018. Of these enterprises, 3,500 were engaged in mining of metallic ores; 1,300 in production of petroleum and natural gas; 800 in mining of coal; and the rest, in mining of other minerals. Of all mining and quarrying enterprises, 15,400 were owned by Russian citizens either in their private capacity or as owners of private businesses, about 100 were owned by the central and municipal governments, and about 100 were either owned by foreign companies or jointly owned by domestic and foreign entities. The ownership of the other 1,300 enterprises was not reported. In addition, Russia had 37,900 enterprises engaged in metal processing, 36,500 of which were owned by Russian citizens either in their private capacity or as owners of private businesses. Table 2 provides information on the structure of Russia's mineral industry (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 327–334).

Mineral Trade

In 2019, the total value of Russia's exports of goods was \$419.9 billion, which was a 5.4% decrease compared with the value in 2018. The value of Russia's imports increased in 2019 to \$254.6 billion, or by 2.3%. In 2019, Russia had a positive trade balance of \$165.3 billion (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 580).

The main export categories for Russia were chemicals, manufactured goods, metals, natural gas, petroleum and petroleum products, and wood and wood products. Mineral products made up 63.3% of the total value of Russia's exports, and crude petroleum alone contributed 29.1% to the total value of exports. In 2019, Russia exported 269 million metric tons (Mt; 1.96 billion barrels) of crude petroleum, including gas condensate. Petroleum refinery products accounted for 15.9% (amounting to 143 Mt, or 1.14 billion barrels); natural gas, 9.9% (221 billion cubic meters); and ferrous metals, 4.3%. Among ferrous metals, the leading categories were semifinished products made from carbon steel (33.5% of the total value of ferrous metals exports, amounting to 14.8 Mt) and flat-rolled iron and steel (24.2%, 7.6 Mt). Other mineral commodities that contributed to Russia's export revenue included bituminous coal (3.8% of the total value of exports, amounting to 205 Mt), aluminum (1.1%, 2.7 Mt), copper (1.0%, 703,000 t), complex mineral fertilizers (0.75%, 10.8 Mt), nitrogen fertilizers (0.69%, 14.4 Mt), potassium fertilizers (0.56%, 9.4 Mt), ferrous metals pipe (0.50%, 2.1 Mt), and nickel (0.43%, 134,000 t). Russia's major export partners in 2019 were China (which received 12.5% of Russia's exports), the Netherlands (10.6%), Germany (6.6%), Belarus (4.9%), Turkey (4.7%), Poland (3.7%), Italy and Kazakhstan (3.4% each), Japan and the United States (2.8% each), Finland (2.5%), and the United Kingdom (2.2%) (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 580–601).

In 2019, Russia imported \$6.5 billion worth of products made of ferrous metals (which constituted 2.6% of total imports) and \$5.1 billion worth of ferrous metals (2.0%). Russia's major import partners were China (which supplied 22.2% of Russia's imports), Germany (10.3%), the United States (5.4%), Belarus (5.3%), Italy (4.5%), Japan (3.7%), France (3.5%), Kazakhstan (2.3%), Poland (2.1%), and Turkey and Ukraine (2.0% each) (Federal'naya Sluzhba Gosudarstvennoy Statistiki, 2020, p. 583, 597).

Commodity Review

Metals

Gold.—In 2019, Russia produced 304,697 kilograms (kg) of mined gold, which was a 9.9% increase compared with production in 2018. More than 70% of mined gold was produced from gold mines, 12% from complex mines with gold as a byproduct, and about 18% from alluvial deposits. Russia's gold reserves (as defined by Russia's resources and reserves classification system) at the deposits that either were in production or in preparation for production, were estimated to be 6,800 t. Major gold-producing regions in Russia were the Far East and Siberia; the leading region in gold production in Russia was Krasnoyarskiy Kray, followed by Magadanskaya Oblast' and the Sakha Republic (Yakutiya). Other regions of

the Russian Far East producing at least 5,000 kg of gold were, in order of output, Khabarovskiy Kray and Zabaikal'skiy Kray, Chukotskiy Avtonomnyi Okrug, Amurskaya Oblast', Kamchatskiy Kray, and Buryatiya Republic (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 311–315).

Russia had more than 400 gold mining companies, although almost two-thirds of mined gold production in Russia was from the 10 leading gold producers. The leading company was PAO Polyus Gold, which produced 28% of the country's mined gold and held almost 35% of the gold reserves in the country. About 60% of Polyus's production came from the Blagodatnoye and the Olympiadninskoye Mines in Krasnoyarskiy Kray and the Natakinskoye deposit in Magadanskaya Oblast'. In 2019, the Natakinskoye Mine reached its design capacity, mined 11.2 Mt of ore, and produced about 13,000 kg of gold. The second-ranked gold producer was AO Polymetal UK of the United Kingdom, which was a subsidiary of Polymetal International plc. Polymetal UK produced 8% of Russia's mined gold output and owned 7% of its reserves. Polymetal was mining medium-size mines, such as the Albazinskoye Mine in Khabarovskiy Kray, the Mayskoye Mine in Chukotskiy Avtonomnyi Okrug, the Dukat Mine in Magadanskaya Oblast', and the Vorontsovskoye Mine in Sverdlovskaya Oblast'. The third-ranked producer was Petropavlovsk plc, which produced about 5.3% of Russia's mined gold output. In 2019, Petropavlovsk increased production by 23% from that of 2018. The company was mining medium-size deposits in Amurskaya Oblast'—the Albynskoye, the Malomyrskoye, the Pioneer, and the Pokrovskoye Mines. Kinross Gold Corp. of Canada produced about 5.0% of the mined gold output in Russia at its major assets—the Kupol Mine and the Dvoynoye Mine, both in Chukotskiy Autonomous Okrug. Nordgold S.E of the United Kingdom produced about 4% of Russia's output. Its major assets were the Gross Mine and the Tabornoye Mine, both of which are located in the Sakha Republic (Yakutiya) (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 315–316).

In 2019, Russia had nine gold refineries in operation and produced 343,500 kg of refined gold, which was a 9% increase compared with production in 2018. The leading refinery was OAO Gulidov Krasnoyarskiy Nonferrous Metals Plant (Krustsvetmet), which in 2019 produced 253 t of gold, or 74% of Russia's output of refined gold; its production increased by 8% from that of 2018. The second-ranked refinery was the AO Priokskiy Plant for Nonferrous Metals, which was located in Ryazanskaya Oblast' and produced about 15% of Russia's refined gold output. Other leading refineries included the AO Novosibirskiy Refinery (5%) and AO Uralektromed' in Sverdlovskaya Oblast' (4%) (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 318–319).

Nickel.—In 2019, Russia produced 278,700 t of nickel in sulfide ore concentrate and 166,300 t of refined nickel metal. As of yearend 2019, Russia had 8 Mt of proved and probable reserves of nickel. Russia's nickel reserves are found mainly in complex nickel-copper sulfide deposits, and this is the only type of deposit from which production was taking place. Nickel resources are also found in silicate deposits; production at these deposits had been conducted previously but had been stopped

since 2018 (table 1; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 169–170).

The leading company involved in production of mined and refined nickel was PAO GMK Norilskiy Nickel (Nornickel), which produced 99.2% of the country's mined nickel output in 2019. Nickel production was primarily from the Norilsk ore province, where 86.7% of all Russia's mined nickel was produced from the Norilsk I, Oktyabr'skoye, and Talnakhskoye deposits. The Pechenegskaya group of deposits in Murmanskaya Oblast', which included the Kotselvaara-Kammikivi deposit, the Zapolyarnoye deposit, and the Zhdanovskoye deposit, was also an important source of nickel production, accounting for 12.5% of Russia's nickel output. Nickel production also took place in Kamchatskiy Kray, which accounted for 0.8% of the country's total output, and in Krasnoyarskiy Kray, where several technogenic deposits were in production (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 172–175).

The processing of ore into metal was conducted at Nornickel-owned facilities. The Norilskaya and the Talnakhskaya beneficiation plants produced concentrates containing between 4.3% and 4.8% nickel, and the concentrates produced by the Murmanskaya beneficiation plant had nickel content between 7% and 8%. Nickel smelting was conducted at the Nadezhdinskiy metallurgical plant and at the AO Kola GMK's smelters in Monchegorsk and Pechenga. Copper-nickel matte was then shipped for refining to either the Severonickel metallurgical plant in the city of Monchegorsk in Murmanskaya Oblast', or to the Norilsk Nickel Harjavalta plant in Finland. Cathode nickel of various grades was the main marketable nickel product. The Harjavalta plant also produced nickel sulfate that was used in accumulator production (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 172–175).

Another producer of copper-nickel sulfide ores was ZAO NPK Geotekhnologiya, which had been mining the Shanuch deposit in Kamchatskiy Kray using the underground mining method since 2017. The mine had not reached its design capacity as of 2019. The company planned to begin building a beneficiation plant in 2020. When the plant begins operating, the company expected to be able to conduct mining at design capacity and to produce between 7,500 and 9,000 metric tons per year (t/yr) of copper-nickel concentrate. The company planned to export all its output to China (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 175–176).

In 2019, 14 deposits (10 sulfide type and 4 silicate type) were at different stages of development. The largest, in terms of the planned production amount, were the Chernogorskoye, the Kingashskoye, the Verhnekingashskoye, the Maslovskoye, and the southern part of the Norilsk I deposit in Krasnoyarskiy Kray; the Kun-Manye deposit in Amurskaya Oblast'; and the Yelanskoye and the Yolkinskoye deposits in Voronezhskaya Oblast' (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 176–178).

ZAO Kun-Manye, which was a subsidiary of Amur Minerals Corp., planned to prepare a feasibility study for mining of the Kun-Manye deposit in 2020 and to begin production in 2024. ZAO Kun-Manye planned to produce separate nickel concentrate and copper concentrate and to export them to countries in the

Asia and the Pacific region (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 176–178).

OOO Russian Platinum was developing mines at the Chernogorskoye deposit and the southern part of the Norilsk I deposit and planned to build its own gravitation-flotation beneficiation plant and produce a bulk copper-nickel-platinum-palladium concentrate containing 2.28% nickel, with subsequent extraction of the following coproducts: cobalt, gold, iridium, osmium, rhodium, ruthenium, selenium, silver, and tellurium. The production was expected to begin in 2025, and the complex was projected to achieve full capacity of 11,100 t/yr of nickel by 2044 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 176–178).

OOO Mednogorskiy medno-sernyi kombinat, which was a subsidiary of OAO UGMK, planned a joint development of the Yelanskoye and the Yolkinskoye deposits in Voronezhskaya Oblast'. According to the feasibility study, underground mining would begin in 2027, and a beneficiation plant would be constructed at the Yelanskoye deposit. Expected full production capacities at the Yelanskoye and Yolkinskoye Mines were 20,000 and 7,300 t/yr of nickel, respectively. Copper-nickel concentrates containing 10.8% nickel from the Yelanskoye deposit and 9.6% nickel from the Yolkinskoye deposit would be processed at the Kirovgradskiy metallurgical plant in Sverdlovskaya Oblast'; the final product would be metals in ingots (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 176–178).

OOO Maslovskoye, a subsidiary of Nornickel, approved a feasibility study for the Maslovskoye Mine in 2018. The company planned to build its own beneficiation plant to produce a bulk concentrate containing 5.18% Ni and later a new metallurgical plant to produce nickel matte because existing Nornickel smelting facilities were operating at full capacity. The nickel matte would be refined at the existing Nornickel refineries to produce nickel cathodes; copper cathodes; cobalt cathodes; and platinum, palladium, and gold in concentrates. The mine was expected to begin operations in 2030 and to reach full capacity of 26,000 t/yr of nickel about 7 years later (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 176–178).

In 2019, Russia exported a total of 134,000 t of nickel, which was only a slight decrease compared with the amount exported in 2018. Russia's primary export partners for nickel were the Netherlands and Switzerland, which together received more than 99% of Russia's unwrought nickel exports. Exports of nickel concentrate were much smaller; notably, ZAO NPK Geotekhnologiya in the past 3 years exported between 30,000 t/yr and 135,000 t/yr of Ni concentrate to China. The apparent nickel consumption in Russia in 2019 was between 27,000 t and 30,000 t, and apparent consumption was expected to stay between 29,300 t/yr and 30,400 t/yr for the period through 2023 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 175–176).

Industrial Minerals

Diamond.—In 2019, Russia produced about 45.3 million carats of diamond, which was a 4.9% increase compared with production in 2018. The total value of 2019 production

was \$4.1 billion. The reserves of diamond in Russia were estimated to be 1.09 billion carats, or about 52% of the total world reserves. In 2019, Russia produced natural diamond from 25 deposits, 11 of which were alluvial-type deposits. About two-thirds of Russia's diamond output (64%) was produced using the open pit method from kimberlite-type deposits, 18% was produced from underground kimberlite mines, and 17% was produced from alluvial deposits. All diamond production was concentrated in two regions—the Sakha Republic (Yakutiya), which produced 79% of Russia's diamond output, and Arkhangel'skaya Oblast', which accounted for the rest of the production (table 1; Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 371–375).

The ALROSA Group, which produced 89.1% of all diamond output in Russia in 2019, was also the leading diamond producer in the world. The ALROSA Group included AK ALROSA (PAO) and its subsidiaries—PAO Severalmaz and AO Almazy Anabara. The third subsidiary, PAO ALROSA-Nurba entered the liquidation stage in November 2019, and all its assets were to be transferred to the parent company. ALROSA subsidiaries conducted production at all diamond deposits located in the Sakha Republic (Yakutiya) and at the Lomonosov deposit in Arkhangel'skaya Oblast'. In 2019, ALROSA owned six production units that produced and processed ores and sands—the Aykhal'skiy, the Mirninskiy, the Nyurbinskiy, and the Udachninskiy deposits; the Lomonosovskiy mining and beneficiation complex (GOK); and the AO Almazy Anabara processing complex. As of 2019, the only diamond-producing company that was not part of ALROSA was AO AGD Diamonds (formerly known as AO Arkhangel'sk-geoldobycha), which was mining the V.Grib volcanic pipe in Arkhangel'skaya Oblast' (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 373–375).

In 2019, the Nyurbinskiy GOK produced 11.3 million carats, or 27% of ALROSA's total diamond production. The company mined the Nyurbinskaya and the Botuobinskaya pipes by open pit method and the alluvial deposits with the same names. The company had two beneficiation plants with capacities to process 1.4 million metric tons per year (Mt/yr) and 0.5 Mt/yr of ore, respectively. The Aykhal'skiy GOK produced 10.1 million carats (26% of ALROSA's total production) and mined the Komsomol'skaya, the Yubileynaya, and the Zarya pipes using an open pit method and the Aykhal pipe using an underground method. The ores were processed at two beneficiation plants with capacities of 10 Mt/yr and 1.7 Mt/yr of ore, respectively. The Udachninskiy GOK produced 5.7 million carats, or 15% of ALROSA's production. The Aykhal'skiy GOK mined the Verkhne-Munskoye deposit and the Zarnitsa pipe (open pit) and the Udachnaya pipe (underground), which was approaching the design capacity of 4 Mt/yr of ore. The ores were processed at beneficiation plant #12, which was ALROSA's largest beneficiation plant and had a capacity to process 12 Mt/yr of ore. The Mirninskiy GOK produced 3 million carats, or 8% of ALROSA's production, predominantly from the Internatsionalnaya pipe. The beneficiation plant at the Mirninskiy GOK had the capacity to process 2.0 Mt/yr of ore at three dredges. Operations at the Mir pipe had been halted in August 2017 because of an accident at the site, and operations had

not been restarted as of yearend 2019 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 375).

The AO Almazy Anabara produced 5.2 million carats, which was 13% of ALROSA's total production. Almazy Anabara operated only at alluvial deposits; most of output was produced at the Bol'shaya Kuonamka River, the Ebelyakh River, the Gusinyi Spring, and the Morgogor Spring. Processing of diamond sands was done at seasonal sorting and beneficiation stations (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 375–376).

The Lomonosovskiy GOK, which was operated by PAO Severalmaz at the Arkhangel'skaya pipe and the Karpinskogo pipe, produced 4.7 million carats, or 11.5% of ALROSA's production. The ore processing was done at the beneficiation plants with 1 Mt/yr and 3 Mt/yr capacity, respectively (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 375–376).

In 2019, AO AGD Diamonds produced 5 million carats of diamond from its only deposit, the V. Grib pipe. The ore was processed at the mine's beneficiation plant, which had a capacity of 4.5 Mt/yr of ore. In 2019, AGD Diamonds produced 11 exclusive diamonds, each exceeding 50 carats. The largest diamond in the history of the Grib GOK was produced in May and weighed about 222 carats (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 375–377).

In 2019, Russia exported 39.2 million carats of raw diamond valued at about \$3.5 billion, which was a 25% decrease from the amount exported in 2018. The average price decreased to \$89 per carat in 2019 from \$105 per carat in 2018 owing to the price volatility of the world diamond market. Russia's major diamond export partners were Belgium, India, Israel, and the United Arab Emirates (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 377–378).

Mineral Fuels and Related Materials

Natural Gas.—In 2019, Russia produced about 738 billion cubic meters of natural gas, which was a 1.7% increase compared with production (revised) in 2018. Russia's reserves of natural gas were estimated to be 49.1 trillion cubic meters, or 24.7% of the world's total reserves. In Russia, most production of natural gas was conducted at gas-only deposits and at the gas-and-gas-condensate deposits, which together accounted for 85.3% of total production. Production at complex deposits where gas is located either separately or in a gas cap contributed another 7.0%, and the remaining 7.7% was produced at petroleum deposits where natural gas was dissolved in petroleum. In 2019, natural gas was produced at 1,308 deposits, including 1,158 deposits for dissolved gas (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 41–44).

In 2019, 259 enterprises conducted production of natural gas; 15 of them were subsidiaries of PAO Gazprom, 9 were subsidiaries of PAO Novatek, and 82 were subsidiaries of vertically integrated petroleum holdings. About 150 other enterprises were independent hydrocarbon-producing companies. Gazprom was the leading producer of natural gas, holding about two-thirds of the country's gas producing assets and having produced 68% of Russia's natural gas output. In 2019, Gazprom produced gas from 144 deposits; the production

was predominantly nonassociated gas. Gazprom's major natural gas facilities were located in the Nadym-Pur-Tazovskiy region in Yamalo-Nenetskiy Autonomous Okrug. The three largest deposits—the Zapolyarnoye, the Urengoykoye, and the Yamburgskoye—together produced 285.5 billion cubic meters of natural gas, or about 39% of Russia's total production. Over time, however, the share of Yamalo-Nenetskiy Autonomous Okrug in Russia's gas production was decreasing as new gas-producing regions, such as Eastern Siberia, the Yamal Peninsula, and sea-shelf zones, increased production. Other leading producers of natural gas in Russia were, in the order of decreasing capacity, NOVATEK, PAO NK Rosneft', Arktikgaz, PAO LUKOIL, PAO Gazpromneft', and PAO Surgutneftegaz (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 46–48).

In 2019, 59% of all produced gas was transported to consumers for energy use without any processing; this was primarily dry gas containing no or little additives. The rest of the produced gas required processing at places of production and then further processing at gas-processing, helium, and petrochemical plants. In 2019, only 81.3 billion cubic meters of natural gas (about 11% of total production) was further processed at special facilities. Overall, in 2019, Russia produced 63.4 billion cubic meters of dry gas, 7.2 Mt of light hydrocarbons, 3.7 Mt of compressed hydrocarbon gases, 695,100 t of ethane, 895,500 t of stable gasoline, and 4.7 million cubic meters of helium. PAO Gazprom produced 96% of Russia's total processed natural gas at its Astrakhanskiy, Orenburgskiy, Sosnogorskiy, and Yuzhno-Priobskiy gas-processing plants, and two petrochemical plants—OOO Gazprom Neftechim Salavat and the Orenburg helium plant. In 2019, Russia had three active plants for compression of natural gas: Sakhalin-2, which is located in Sakhalinskaya Oblast' and was operated by the Sakhalin Energy Investment Co. Ltd. consortium; Yamal SPG, which is located in the Yamalo-Nenetskiy Autonomous Okrug; and Kriogaz-Vysotsk, which is located in Leningradskaya Oblast' and was commissioned in 2019 and operated by Novatek. Total production of compressed natural gas (CNG) in Russia in 2019 amounted to 29.5 billion cubic meters compared with 26.5 billion cubic meters in 2018 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 47–49).

In 2019, several natural-gas-processing projects were under construction in Russia. The largest facility to be built since the beginning of the 1990s was Gazprom's Amurskiy gas-processing plant (Amurskiy GPZ), which was to have the capacity to process 42 billion cubic meters per year of gas and to produce 60 million cubic meters per year of helium. Additionally, the plant was to produce butane, ethane, propane, and penthane-hexane fraction. Construction of the Amurskiy GPZ began in 2015, and opening of the first production line was planned for 2021; the plant was expected to reach full capacity in 2025. Gazprom was building two plants for the production of CNG. The first one was located in the town of Ust-Luga in Leningradskaya Oblast' and would have the capacity to process 45 billion cubic meters per year of ethane-containing natural gas and produce 13 Mt/yr of CNG. Construction was planned to start in 2020; the first line of the plant was expected to be completed

in 2023, and the second, in 2024. The second plant was the Portovaya CNG complex with a capacity of 1.5 Mt/yr of CNG, also located in Leningradskaya Oblast'. The plant was expected to be commissioned in 2020 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 48–49).

In 2019, Novatek was in the process of building its Arctic-SPG 2 plant on Gydanskiy Peninsula in the Yamalo-Nenetskiy Autonomous Okrug. The plant would have the capacity to produce 19.8 Mt/yr of CNG. In addition to Novatek, which had a 50% interest in the project, China National Offshore Oil Corp. (CNOOC), China National Petroleum Corp. (CNPC), Total SE of France, and Mitsui & Co. and Japan Oil, Gas, and Metal National Corp (JOGMEG) of Japan each had a 10% interest in the project. The first line of the plant was expected to open in 2022 or 2023. In addition, the company also planned to build two more plants—Arctic SPG 1 and Arctic SPG 3—and the blueprints of both plants were in the works (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 48–49).

At the end of 2019, Gazprom commissioned the first stage of its Sila Sibiri trunk gas pipeline for transporting natural gas from the Chayandinskoye gas deposit in the Sakha Republic (Yakutiya) to customers in the Russian Far East and China. Another branch of the pipeline that connects the trunk with the Kovyktinskoye deposit was scheduled to be completed in 2022. The pipeline was to reach its full capacity of 38 billion cubic meters per year by 2025. An additional 2,200 kilometers (km) of gas pipeline was planned to be constructed by then (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 48–49).

In 2019, Russia was the world's leading gas exporter and transported 260.4 billion cubic meters of natural gas, of which 219.9 billion cubic meters was transported by pipeline and 40.5 billion cubic meters was transported in the form of CNG. The leading export partners of Russia were Germany (which received 25.9% of Russia's gas exports), Italy (10.1%), Belarus (9.2%), Turkey (7.1%), France (6.4%), Poland (4.4%), and Slovakia (3.3%). In 2019, domestic consumption of natural gas in Russia was 481 billion cubic meters, which was a 2.5% decrease compared with consumption in 2018 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 50–51).

Petroleum.—In 2019, Russia produced about 3.7 billion barrels of crude petroleum, which was a 1.1% increase compared with production in 2018. The major type of Russia's petroleum was Urals, and 83% of Russia's petroleum exports was of the Urals type. The characteristics of Urals-type petroleum are high density, which is similar to the Dubai type, and an average sulfur content. Other types of Russia's petroleum included Arctic Oil (ARCO), Siberian Light, Sokol, and Vityaz. Russia produced crude petroleum at 2,093 deposits. In 2019, the leading oil-producing region was the Ural'skiy Federal Okrug, which produced 54.3% of Russia's total crude petroleum output. Within the Ural'skiy Federal Okrug, the most productive petroleum deposits were the four deposits located in the Hanty-Mansiyskiy Autonomous Okrug—the Krasnoleninskoye, the Priobskoye, the Prirazlomnoe, and the Samotlorskoye, which accounted for 13.4% of Russia's crude petroleum output, although the extraction of petroleum from these deposits had been taking place for a long time. The second-ranked oil-producing region in Russia was the Privolzhskiy Federal Okrug, which in

2019 produced 22.6% of Russia's crude petroleum output. Most petroleum deposits in the Privolzhskiy Federal Okrug are old and their productivity had been reduced. However, owing to new technologies, the Privolzhskiy Federal Okrug was able to extract petroleum that previously was considered unprofitable to produce and thus stabilize petroleum production in the region (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 13–18).

In 2019, a total of 292 companies were engaged in petroleum production. Among them, 105 organizations were subsidiaries of 11 vertically integrated companies (VInC) that dominated the petroleum sector, and other 187 companies operated independently, either alone or with production-sharing agreements with other companies. In 2019, five leading petroleum VInCs in Russia—PAO NK Rosneft', PAO Lukoil, PAO Gazprom Neft', PAO Surgutneftegaz, and PAO Tatneft'—produced 79.7% of Russia's crude petroleum output, and Rosneft' alone produced more than 35%. In 2019, 42% of Rosneft's crude petroleum output was produced at only six deposits—the Malobalyksoye, the Priobskoye, the Prorazlomnoye, the Samotlorskoye (all located in Hanty-Mansiyskiy Autonomous Okrug -Yugra), the Vankorskoye (in Krasnoyarskiy Krai), and the Verkhechonskoye (in Irkutskaya Oblast'). Also, three projects with participation of foreign companies—Sakhalin-1, Sakhalin-2, and Khar'yaginskoye SRP—were in operation in 2019. All three of these projects functioned based on production-sharing agreements. The largest project, Sakhalin-1, included development of three petroleum deposits in the Okhotsk Sea—the Arktun-Dagi, the Chaivo, and the Odoptu deposits. The shareholders of Sakhalin-1 were Exxon Neftegas Ltd. (a subsidiary of Exxon Mobil Corp. of the United States), 30%; SODECO consortium of Japan, 30%; PAO NK Rosneft', 20%; and ONGC Videsh Ltd. [an international arm of Oil and Natural Gas Corporation Ltd. (ONGC) of India], 20%. In 2019, Sakhalin-1 produced 12.3 Mt (89.8 million barrels) of petroleum, which was an 8.9% increase compared with the amount produced in 2018 (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 19–21).

More than 50% of crude petroleum produced in Russia was processed in the country. In 2019, throughput at the petroleum refineries in the country was 285.1 Mt (2.08 billion barrels), a 0.7% reduction compared with that in 2018. As of yearend 2019, Russia had 38 large-scale petroleum refineries and 20 mini-refineries. The bulk of refining capacity was owned by five leading VInCs: PAO NK Rosneft', PAO Gazprom, PAO Lukoil, PAO Surgutneftegaz, and PAO Novatek (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 22–23).

In 2019, the network of petroleum pipelines in Russia, which was managed by PAO Transneft', was expanded and upgraded with the commissioning of 325 km of new trunk pipelines and the modernization of 1,001 km of operating pipelines. In 2019, the most important from the point of view of the PAO Transneft' pipeline project was the project to increase the capacity of the Eastern Siberia-Pacific Ocean (VSTO) pipeline to design level. Specifically, VSTO-1 increased capacity to 80 Mt/yr from 58 Mt/yr, and VSTO-2, to 50 Mt/yr from 30 Mt/yr (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 22–23).

Russia's exports of crude petroleum increased by about 16% from 2010 to 2019, and exports of refined petroleum products decreased by 17% from 2015 to 2019. In 2019, Russia exported 269.2 Mt of crude petroleum (1.97 billion barrels), which was a 3.3% increase compared with the amount exported in 2018. China was the leading importer of Russia's crude petroleum, having received 69.6 Mt, followed by the Netherlands (46.2 Mt), Germany (18.9 Mt), Belarus (18.0 Mt), the Republic of Korea (15.0 Mt), Italy (14.6 Mt), Poland (13.0 Mt), and Finland (10.0 Mt). About one-third of refined products was consumed domestically, including 38.2 Mt of diesel fuel, 34.8 Mt of gasoline, 10.9 Mt of jet fuel, and 12.0 Mt of oil fuel. In the past decade, domestic consumption of refined petroleum products increased by almost 20% (Ministerstvo Prirodnih Resursov i Ekologii Rossiyskoy Federatsii, 2020, p. 23–24).

Outlook

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

In the short to medium term, Russia is likely to deal with potentially negative effects of reduced petroleum prices, the decreased value of the ruble against other currencies, and economic sanctions. It is likely that some of the major mineral projects (such as the development of the Chernogorskoye, the Maslovskoye, the Yelanskoye, and the Yolkinskoye nickel deposits, and the development of the Tomtorskoye rare earth deposit) will be either canceled or delayed until domestic and, more importantly, international economic conditions become more favorable for mineral production and export. Some projects that are deemed to be related to national security, such as lithium and rare earths, will likely become more prominent over time. It remains to be seen, however, how this new economic reality will affect the development of Russia's mineral industry, which is highly dependent on the global market and thus very sensitive to the macroeconomic situation in the world.

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TABLE 1
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019	
METALS						
Aluminum:						
Bauxite	thousand metric tons	5,900	5,431	5,523	5,651	5,574
Nepheline ores	do.	31,407	31,900	33,300	35,600	36,000 ^e
Alumina	do.	2,593	2,682	2,822	2,763	2,755
Metal, primary	do.	3,529	3,561	3,583	3,627	3,637
Antimony, mine, recoverable, Sb content		6,300	11,900	14,400	30,000 ^e	30,000 ^e
Bismuth, mine, Bi content		NA	324	300 ^e	300 ^e	300 ^e
Cadmium, refinery, primary ^c		1,200	1,200	1,200	1,150 ^r	900
Chromium, mine, chromite, concentrates, marketable		503,000	465,000	488,000	507,000	510,000 ^e
Cobalt:						
Mine, recoverable, Co content ^e		6,200	5,500	5,900	6,100	6,300
Refinery, metal		2,040	3,092	2,077	1,800	2,000 ^e
Copper:						
Mine, Cu content:						
Ore		870,100	848,100	847,000	884,100	900,000 ^e
Concentrates		710,000	701,000	761,000	784,000	800,000 ^e
Solvent extraction ³		1,400	1,300	1,300	1,300	1,300 ^e
Smelter, blister:						
Primary		661,000	665,000	730,000	789,000 ^r	790,500
Secondary		218,900	202,000	216,000 ^r	230,000 ^r	220,000
Total		880,000	867,000	946,000 ^r	1,020,000 ^r	1,010,000
Refinery:						
Primary:						
Electrowon, leaching		1,400	1,300	1,300	1,300	1,300 ^e
Other		655,700	662,300	730,700 ^r	799,000	800,000 ^e
Total		657,000	664,000	732,000 ^r	800,000	801,000 ^e
Secondary		218,600	197,800	218,300 ^r	240,000	246,000 ^e
Grand total, primary and secondary		876,000	862,000	950,000 ^r	1,040,000	1,050,000 ^e
Ferroalloys:						
Ferrochromium		363,286	268,439	434,452	332,261	384,089
Ferromanganese		155,700	124,200	253,000	281,000	273,000
Ferroniobium ^c		255	125	100	100	100
Ferrophosphorus		1,500 ^e	1,500 ^e	1,538	1,500 ^e	1,500 ^e
Ferrosilicochromium ^c		102,000	75,000	75,000	75,000	75,000
Ferrosilicon		1,057,909	935,912	840,352 ^r	928,797 ^r	846,579
Ferrotitanium		9,961	10,741	10,200	9,000	9,000 ^e
Ferrovandium		12,277	12,392	12,593	11,383	10,894
Silicomanganese		188,895	203,216	44,917	43,334	51,774
Other, unspecified, electric furnace ^e		8,000	9,000	10,000	10,000	10,000
Gallium ^c	kilograms	1,000	9,000	7,000	6,000	8,000
Germanium, Ge content ^c		6	5	5	5	5
Gold:						
Mine, Au content	kilograms	248,945	253,579	270,300	277,139 ^r	304,697
Refinery, secondary	do.	38,474	35,014	36,600	34,477 ^r	38,487
Indium, refinery, primary, In content ^c	do.	5,000	5,000	5,000	5,000	5,000
Iron ore, mine, concentrate:						
Gross weight		101,049,000	101,097,000	95,042,000	96,063,000	97,531,000
Fe content, 55% to 63% Fe		59,619,000	59,647,000	56,074,000	56,700,000	64,287,000
Iron and steel:						
Direct-reduced iron		5,436,000	5,820,000	6,990,000	7,900,000	8,030,000
Pig iron ⁴		52,411,000	51,874,000	52,127,000	51,797,000	51,184,000

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019	
METALS—Continued						
Iron and steel:—Continued						
Steel:						
Raw steel	thousand metric tons	69,422	70,808	71,300	71,682	71,570
Products:						
Pipe	do.	11,402	10,518	11,833	12,151	12,394
Rolled	do.	60,420	60,472	60,483	61,650	61,639
Lead:						
Mine, recoverable, Pb content		171,200	204,300	210,800	220,000	230,000 ^e
Refinery, primary and secondary		106,000	130,000	156,000 ^{r,e}	157,000 ^{r,e}	180,000 ^e
Magnesium, primary, metal ⁵		60,000	58,900 ^r	65,000	67,000 ^r	67,000
Manganese, mine, concentrate, marketable:						
Gross weight		9,000	--	1,000	57,000	57,000 ^e
Mn content		2,000	--	250	14,000	14,000 ^e
Molybdenum, mine, concentrate, Mo content		3,254	3,359	3,227	2,400	2,800 ^e
Nickel:						
Mine, marketable, Ni content:						
Laterite ore		7,400	7,000 ^e	1,800 ^e	--	--
Sulfide ore, concentrate		269,310	251,840	265,500	272,300	278,700
Smelter, matte		812	16,862	42,690	43,918	44,000 ^e
Products, chemicals		2,900	2,400 ^e	--	--	--
Metal		231,200	188,700	157,396	158,005	166,300
Platinum-group metals:						
Mine, elemental content:						
Iridium ^c	kilograms	200	200	300	200	300
Palladium ^c	do.	85,000	83,000	88,000	90,000	98,000
Platinum ^c	do.	23,000	22,000	22,000	22,000	24,000
Rhodium	do.	2,613	2,644	2,115	1,928 ^r	2,426
Ruthenium ^c	do.	1,000	1,000	1,000	1,000	1,300
Refinery:						
Palladium	do.	81,000	78,400	85,160	83,000	89,200
Platinum	do.	19,300	19,300	20,500	20,000	21,500
Rare earths, mineral concentrate, rare-earth oxide equivalent		2,500 ^e	2,700	2,700	2,700	2,700 ^e
Selenium, Se content	kilograms	135,000	150,000	150,000 ^e	303,000 ^r	331,000
Silicon, metal		60,000 ^e	59,300	59,300 ^e	59,300 ^e	59,300 ^e
Silver:						
Mine, Ag content	kilograms	2,297,000	2,261,000	2,030,000	2,040,000	2,000,000 ^e
Refinery:						
Primary	do.	1,039,000	886,000	798,000	809,100	826,580
Secondary	do.	207,520	203,000	246,300	310,840 ^r	169,590
Tantalum, mine, loparite concentrates, Ta content	do.	25,879	39,966	36,444	36,200 ^r	25,900
Tellurium, refinery	do.	35,000 ^e	42,900	44,000	70,000	71,400
Tin, mine, recoverable, Sn content		578	627	1,011	1,530	2,264
Titanium:						
Mineral concentrates, ilmenite and leucoxene		193,236	18,900	3,300	3,600	4,000 ^e
Sponge		41,000	38,900	42,000	44,200	45,900
Tungsten, mine, concentrate, W content		3,262	2,707	2,144	2,234	2,200 ^e
Vanadium, metallurgical, V content		18,074 ^r	16,886	18,636	17,052	18,380
Zinc:						
Mine, Zn content		246,100	245,800	255,200	260,000	220,000 ^e
Smelter, primary and secondary		229,602	247,300	256,700	254,600	250,000 ^e
Zirconium, baddeleyite concentrate, averaging 98% ZrO ₂		8,180	7,704	7,200	7,400	7,400 ^e
INDUSTRIAL MINERALS						
Arsenic trioxide, white		1,500 ^e	1,500 ^e	1,500 ^e	-- ^r	2,226
Asbestos		650,375	691,712	714,105	752,917	790,000
Barite		361,000	434,000	178,000	163,000	163,000

See footnotes at end of table

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019
INDUSTRIAL MINERALS—Continued					
Boron	80,000	78,800	75,100	80,000 ^e	80,000 ^e
Cement, hydraulic thousand metric tons	62,104	54,935	54,721	53,678	57,679
Clay:					
Bentonite	497,900	603,000	91,000	50,100	50,000 ^e
Kaolin, including kaolinitic clays	786,000	1,064,800	1,226,000	1,593,000	1,530,000
Diamond, natural: ^e					
Gem thousand carats	23,500	22,600	23,900	24,200	25,400
Industrial do.	18,400	17,700	18,800	19,000	19,900
Diatomite	66,200	47,300	52,000	50,600	51,000 ^e
Feldspar	232,995	278,142	281,326	294,411	290,000 ^e
Fluorspar, 55% to 96.4% CaF ₂	3,000	3,000	2,700	6,000	6,000 ^e
Graphite:					
All forms	15,900	19,400	25,200	17,800	16,600
Crystalline ^e	7,900	9,900	13,200	13,200	13,100
Gypsum, mine ⁶ thousand metric tons	4,223	3,996	3,975	5,487	4,200
Iodine	14	3	8	8	3
Lime, industrial and construction	11,221,000	11,549,000	11,179,000	11,305,000	11,400,000
Magnesite thousand metric tons	1,493	1,342	1,500 ^e	1,500 ^e	1,500 ^e
Mica	4,823	3,701	5,219	4,465	4,500 ^e
Nitrogen, ammonia, N content thousand metric tons	12,455	13,300	14,056	14,859	15,000 ^e
Phosphate rock, P ₂ O ₅ content	4,475,000 ^e	5,409,000	5,690,000	5,777,000	5,360,000 ^e
Potash, marketable, K ₂ O content thousand metric tons	6,954	6,588	7,320	7,168	7,340
Salt, all types do.	5,600	6,887	7,073	6,710	8,160
Soda ash, synthetic do.	3,078	3,234	3,376	3,416	3,383
Sodium, compounds, caustic soda do.	1,115	1,151	1,239	1,279	1,289
Stone, crushed, limestone	60,000,000	59,800,000	64,430,000	67,251,000	71,300,000
Sulfur:					
Byproduct, S content:					
Metallurgy	200,000 ^e	200,000	200,000 ^e	200,000 ^e	200,000 ^e
Natural gas	5,961,000	6,098,000	6,321,000	6,597,000	6,600,000 ^e
Petroleum	500,000	500,000	500,000	500,000	500,000
Native, S content	110,155	94,418	96,316	83,707	57,427
Pyrites, S content ^e	180,000	180,000	180,000	180,000	180,000
Compounds, sulfuric acid thousand metric tons	10,381	11,739	12,388	13,026	13,400
Vermiculite	8,282	12,363	9,262	25,904	29,266
Zeolites	15,000	37,000	35,000 ^e	35,000 ^e	35,000 ^e
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite thousand metric tons	13,497	13,386	19,237	21,989	22,027
Bituminous ⁷ do.	201,600	229,200 ^r	249,600 ^r	267,400 ^r	261,000
Lignite do.	73,361	73,485	74,886	80,478	82,171
Metallurgical do.	82,900	83,800	85,400 ^r	91,600 ^r	97,000
Coke, metallurgical, 6% moisture content do.	26,027	26,326	27,998	26,977	26,870
Natural gas, marketable million cubic meters	633,551	640,784	691,488	726,008 ^r	738,381
Peat, horticultural and fuel uses	899,700	959,700	732,900	1,124,200	1,066,400
Petroleum:					
Crude ⁸ thousand 32-gallon barrels	3,720,000	3,610,000 ^r	3,610,000 ^r	3,660,000 ^r	3,700,000
Refinery ⁹ do.	2,308,000	2,281,000	2,270,000 ^r	2,340,000 ^r	2,320,000
Uranium, mine, U content	3,055	3,005	2,917	2,904	2,911

See footnotes at end of table.

TABLE 1—Continued
RUSSIA: PRODUCTION OF MINERAL COMMODITIES¹

⁶Estimated. ⁷Revised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through January 25, 2021. 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, ferronickel, lithium, niobium, oil shale, scandium, and talc may have been produced, but available information was inadequate to make reliable estimates of output.

³The copper content of solvent extraction output at the mine level is the same as electrowon refinery output; however, copper produced in the solvent extraction and electrowinning process is typically reported only at the refinery level.

⁴Includes spiegeleisen.

⁵Includes metal used in titanium sponge production.

⁶Excludes gypsum used in cement production.

⁷Excludes metallurgical coal.

⁸Production has been reported in thousand metric tons as follows: 2015—534,081; 2016—515,000; 2017—515,000; 2018—523,000; 2019—528,000; includes gas condensate.

⁹Production has been reported in thousand metric tons as follows: 2015—287,200; 2016—285,158; 2017—284,000; 2018—292,000; and 2019—290,000.

TABLE 2
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Alumina	Achinsk (United Company RUSAL)	Plant in Achinsk, East Siberia	900,000
Do.	Bogoslovsk (United Company RUSAL)	Plant in Krasnotur'insk	1,050,000
Do.	Boksitogorsk (United Company RUSAL)	Plant in Leningradskaya Oblast'	200,000
Do.	Pikalyovo (United Company RUSAL)	Plant in Pikalyovo	300,000
Do.	Uralsk (United Company RUSAL)	Plant in Kamensk-Uralskiy	700,000
Aluminum, primary smelters	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.	Uralskiy 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	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	Bazhenovskoye 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 Onega Mine (United Company RUSAL)	Northwest region	800,000
Do.	South-Urals mining company (United Company RUSAL)	Mine in South Urals	NA
Boron, boric acid	Bor Association	Mine and plant in Primorskiy Kray	140,000
Do.	Amur River complex	Mine and plant in Russian Far East	8,000
Do.	Alga River chemical complex	do.	12,000
Cement	thousand metric tons Eurocement Group	16 plants all over the country	40,000
Do.	do. OOO HeidelbergCement Russia	Plant in Central region, Bashkortostan	11,000
Do.	do. LafargeHolcim Russia	Plant in Central region	9,000
Do.	do. Gazmetallproekt	Plant in Krasnodarskiy Kray	8,200
Do.	do. AO Holding Company Sibirskiy Tsement	Plant in Kemerovskaya Oblast	5,600
Do.	do. OOO Dyckerhoff Korkino Cement	Plant in Chelyabinskaya Oblast'	NA
Do.	do. AO Sebyakovtsement	Plant in Volgogradskaya Oblast'	NA
Do.	do. Holding BaselTsement	Plant in Ryazanskaya Oblast'	NA
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 2019¹

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Coal:	thousand metric tons	OA0 SUEK	Mines in Siberia and Russian Far East	106,000
Do.	do.	OA0 UK Kuzbassrazrezugol'	Mines in Kuznetskiy Basin	45,000
Do.	do.	AO KhKSDS-Ugol'	Mines in Kemerovskaya Oblast'	29,000
Do.	do.	OA0 Mechel-Mining	Mines in Kuznetskiy Basin and Yakutiya	22,700
Do.	do.	Evrax Holding	Mines in Kuznetskiy Basin	22,300
Do.	do.	OA0 Russkiy Ugol'	Mines in Russian Far East	14,000
Do.	do.	Kompaniya Vostsibugol'	Mines in Eastern Siberia	13,200
Cobalt		PA0 GMK Norilskiy Nickel (Normickel)	Mines and plant in Norilsk, Kola Peninsula	4,000
Do.		Khovu-Aksynskoe (nickel-cobalt) deposit	Mine in Khovu-Aksy, Tyva Republic	NA
Copper:				
Cu in concentrate		PA0 GMK Norilskiy Nickel (Normickel)	Mines in Norilsk region, Kola Peninsula	500,000
Do.		OA0 Ural'skaya Gorno-Metallurgicheskaya Kompaniya (UGMK)	Mines in the Urals	230,000
Do.		ZAO Russkaya Mednaya Kompaniya (RMK)	do.	70,000
Do.		Metalloinvest Holding	Mines in Udokan, Zabaykal'skiy Kray	NA
Metal, refinery		OA0 Ural'skaya Gorno-Metallurgicheskaya Kompaniya (UGMK)		360,000
Do.		PA0 GMK Norilskiy 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	PA0 AK Alrosa (ALROSA Group, 100%): PA0 Severalmaz:	Sakha Republic (Yakutiya) mines:	
Do.	do.	Aikhal'skiy mining and beneficiation complex	Aikhal, Komsomol'skiy, Yubileyniy and Zarya	11,900 5,900
Do.	do.	Anabaraskiy mining and beneficiation complex	Alluvial mines	5,300
Do.	do.	Lomonosovskiy mining and beneficiation complex	Arkhangel'skaya Oblast'	4,800
Do.	do.	Mirinskiy 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
Ferovanadium		Vanadii-Tulachemet (Evrax Group)	Plants in Tula and North Caucasus	NA
Fluorspar		Abagaytuy deposit	Mine in Transbaikal	NA
Do.		Usugli Mine	do.	NA
Do.		Kyakhtinsky deposit	do.	NA
Do.		Kalanguy mining complex	Mines in Zabaykal'skiy Kray	NA
Do.		Yaroslavsky mining and beneficiation complex	Mines at Pogranichnoye and Vosnesenskoye deposits, Primorskiy Kray	NA
Gallium		Achinsk (United Company RUSAL)	Plant in Achinsk in Eastern Siberia	15
Do.		OOO Galiy	Plant in Moscow	NA
Do.		Pikalevo (United Company RUSAL)	Plant in Pikalevo	NA
Germanium, metal and products		Federal State Unitary Enterprise Germanium	Plant in Krasnoyarsk	7

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
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. IK Arlan (Pavlik ZRK)	Mine in Magadanskaya Oblast'	3,700
Do.	do. Highland Gold Mining Ltd. (HGM)	Mines in Khabarovskiy and Zabaykal'skiy Kray	6,900
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	Mines in Amurskaya Oblast'	1,500
Do.	do. OAO Susumanzoloto	Mines in Magadanskaya Oblast'	4,500
Do.	do. OAO Uralektromed'	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	Mines in Sakha Republic (Yakutiya)	1,500
Do.	do. OOO Nirungan	Mines in Sakha Republic (Yakutiya)	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. OAO Gudilov Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Kray	260,000
Do.	do. AO Priokskiy Plant for Nonferrous Metals	Refinery in Ryazanskaya Oblast'	51,000
Do.	do. AO Novosibirskiy Refinery	Novosibirsk	40,000
Do.	do. AO Uralektromed'	Refinery in Sverdlovskaya Oblast'	20,000
Do.	do. AO Ekaterinburgskiy Plant (EZOTsM)	Sverdlovskaya Oblast'	NA
Do.	do. AO Priobskiy plant (OJSC Gazprom Neft)	Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO)	NA
Do.	do. AO Shelkovskiy zavod	Refinery in Moskovskaya Oblast'	NA
Do.	do. AO Moskovskiy zavod for special alloys	Refinery in Moscow	NA
Do.	do. ZAO Kyshtymskiy zavod	Chelyabinskaya Oblast'	NA
Primary	do. Chelyabinsk zinc plant	Chelyabinskaya Oblast'	6
Secondary	do. Elektrozinik plant	Vladikavkaz, North Caucasus	6

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(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	OOO Fregat	Moskovskaya Oblast'	170,000
Do.	Elektrozink lead smelter [Ural Mining and Metallurgical Co. (UMMC)]	Vladikavkaz, North Caucasus	40,000
Do.	Dalpolymetal lead smelter	Rudnaya in Primorskiy Krai	20,000
Do.	AO Uralektromed' (UGMK)	Sverdlovskaya Oblast'	NA
Do.	OOO Ryaztsvetmet	Ryazan'	NA
Do.	ZAO Agropribor	Moskovskaya Oblast'	NA
<u>Lead-zinc, recoverable content of ore:</u>			
Lead, recoverable Pb content of ore	Altay mining-beneficiation complex	Mines in Altay Krai, southern Siberia	2,000
Do.	Dalpolymetal mining-beneficiation complex	Mines in Primorskiy Krai	20,000
Do.	Nerchinsk polymetallic complex	Mines in Zabaykal'skiy Krai	7,000
Do.	Novoangarskiy GOK	Mine in Krasnoyarskiy Krai	170,000
Do.	Sadon lead-zinc complex	Mines in North Ossetia	5,000
Do.	Salair mining-beneficiation complex	Mines in Kemerovskaya Oblast'	2,000
Zinc, recoverable Zn content of ore	Altay mining-beneficiation complex	Mines in Altay Krai, Southern Siberia	1,000
Do.	Dalpolymetal mining-beneficiation complex	Mines in Primorskiy Krai	25,000
Do.	Nerchinsk polymetallic complex	Mines in Zabaykal'skiy Krai	12,500
Do.	AO UGMK	Mines in Altay Krai, 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	Mazulsky Mine (United Company Rusal)	Goryachegorsk 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
Magnesium, metal	Avisma plant	Berezniki	35,000
Do.	Solikamsk plant (Uralkali)	Permskiy Krai	30,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c	
Mica	Emel'dzhak deposit	Mine at Aldan Shield, Sakha Republic (Yakutiya)	NA	
Do.	Lopatova Guba mica pit	Mine in Kareliya Republic	NA	
Do.	Kovdor phlogopite mine (Mica Mine; Slyuda Mine; Kovdorslyuda Shaft)	Kola Peninsula, Murmanskaya Oblast'	NA	
Do.	Irkutsk complex (JSC "Vostoksluda")	Mine at Mam deposit, Irkutskaya Oblast'	NA	
Molybdenum, mined	Dzhida tungsten-molybdenum mine	West Transbaikal	NA	
Do.	Sorsk molybdenum mining enterprise	Mine in Khakasiya Republic	NA	
Do.	Shakhtaminskoye molybdenum mining enterprise	Mines in Zabaykal'skiy Kray	NA	
Do.	Tyrnyauz 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	PAO Gazprom (Government, 50.23%, and private owners, 49.77%)	Deposits throughout Russia	405,000
Do.	do.	PAO Novatek	Deposits in Yamalo-Nenetskiy Avtonomnyi Okrug	50,100
Do.	do.	OAO NK Rosneft'	Deposits throughout Russia	46,700
Do.	do.	Arktikgaz	Deposits in Yamalo-Nenetskiy Avtonomnyi Okrug	25,800
Do.	do.	PAO Lukoil	Deposits in West Siberia, Volga region	18,400
Do.	do.	PAO Gazpromneft'	Deposits throughout Russia	13,500
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	NA NA NA NA	
		Petrochemical plants: OOO Gazprom Neftechim Salavat, Bashkortostan Republic Orenburg helium plant	NA NA NA	
Compressed natural gas production	Kriogaz-Vysotsk (OAO Novatek)	Plant in Leningradskaya Oblast'	NA	
Do.	Sakhalin Energy Investment Co. Ltd.	Plant Complex Sakhalin-2, Sakhalinslaya 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	PAO GMK Norilskiy Nickel (Normickel)	Mines in Murmanskaya Oblast' (Kotselvaara-Kammikivi, Zapolyarnoye, and Zhdanovskoye) and in Norilsk region	300,000	
Do.	OAO Ufaleynickel [Koks Company of Industrial Metallurgical Holding]	Mines in Chelyabinskaya Oblast', Urals	17,000	
Do.	ZAO NPK Geotekhnologiya	Mine at Shanuch deposit, Kamchatskiy Kray	NA	
Metal:				
Smelting	PAO GMK Norilskiy Nickel (Normickel)	Nadezhdinskiy plant in Sverdlovskaya Oblast'	NA	
Do.	do.	Plant in Pechenga	50,000	
Do.	do.	Plant in Monchegorsk	50,000	
Refining	do.	Severonickel plant in Monchegorsk	140,000	
Do.	do.	Nadezhdinskiy plant in Sverdlovskaya Oblast'	NA	
Products and Ni content of ferronickel	Enterprises: OAO Ufaleynickel (Koks Industrial Metallurgical Holding Co.) Yuzhuralnickel (Mechel OAO) ZAO Rezhnickel [Ural Mining and Metallurgical Co. (UMMC)]	Plant location: South Urals do. do.	65,000 ³	
Niobium (columbium)	Karnarsurt mining enterprise (AO Sevredmet)	Mines at Lovozerskoye deposit, Kola Peninsula	12,000	
Oil shale	Leningradslanets Association	Slantsy, Leningradskaya Oblast'	5,000,000	

See footnotes at end of table.

TABLE 2—Continued
 RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Petroleum, crude	PAO NK Rosneft'	The Krasnoleninskoye, the Malobalykskoye, the Priobskoye, the Prirazlomnoye, and the Samotlorskoye deposits (all HMAO-Yugra), the Vankorskoye deposit (Krasnoyarskiy Krai), Verkhnechonskoye deposit (Irkutskaya Oblast') and deposits across Russia	240,000,000
Do.	PAO Lukoil	Komi Republic deposits: Kyrtael'skoye Pashshorskoye Perevoznoye Timen Pechora deposit: Yuzhnaya Khylichuya Urals deposits Volga region deposits (PFO) West Siberian deposits: Kechimovskoye Nivagalskoye	90,000,000 ³
Do.	PAO Surgutneftegaz	Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO) deposits	65,000,000
Do.	PAO Gazprom Neft'	Deposits throughout Russia	50,000,000
Do.	PAO Tatneft'	Deposits: Bavlinskoye Bondyuzskoye Novo-Elkkhovskoye Pervomayskoye Romashkinskoye Sabandchinskoye	35,000,000 ³
Do.	PAO NGK Slavneft'	Western Siberia and Krasnoyarskiy Krai deposits	20,000,000
Do.	PAO NK Russneft'	Central and western Siberia, Urals and Volga regions deposits	15,000,000
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)	14,000,000
Do.	PAO Novatek	Western Siberia deposits	5,000,000
Petroleum, refined	PAO NK Rosneft'	13 petroleum refineries	115,000,000
Do.	PAO Gazprom Neft'	Refineries Moskovskiy NPZ and Omskiy NPZ	70,000,000
Do.	PAO Lukoil	4 petroleum refineries	45,000,000
Do.	PAO Surgutneftegaz	Refinery Kirishskiy NPZ	20,000,000
Do.	PAO Novatek	Refinery Purovskiy ZPK	19,000,000
Do.	PAO Tatneft'	Refinery TANECO complex	11,000,000
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
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	PAO GMK Noril'skiy Nickel (Normickel)	Mines in Noril'sk region, Kola Peninsula	150
Do.	AO Koryakgeoldobycha, Amur Prospectors	Placer deposits (mostly platinum), Urals; Siberia; Russian Far East	10
Do.	OAO AS Amur (Russian Platinum Co.)	Placer deposits (mostly platinum), Urals; Siberia; Russian Far East	10
Do.	Lopatino and Yegorevsk deposits	Mines in Moskovskaya Oblast'	NA
Do.	Polpinskoye deposit	Mines in Bryanskaya Oblast'	NA
Do.	Verkhnekamsk deposit	Mines in Ural'skiye Gory	NA

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
Platinum-group metals:—Continued			
Metals, refined	Ekaterinburgskiy plant (EZOTsM)	Sverdlovskaya Oblast'	NA
Do.	Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Krai	NA
Do.	Priobskiy plant (OJSC Gazprom Neft)	Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO)	NA
Potash, K ₂ O equivalent	OAo Uralkali	Mines at Verkhnekamskoye deposit	8,000,000
Do.	OAo Akron	Mines in Novgorod	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 Priobskiy plant (OJSC Gazprom Neft)	Khanty-Mansiyskiy Avtonomnyi Okrug (HMAO)	NA
Do.	AO Priokskiy Zavod Tsvetnyh Metallov	Refinery in Ryazanskaya Oblast'	NA
Do.	AO Novosibirskiy refinery	Novosibirsk	NA
Do.	AO Uralektromed' refinery	Sverdlovskaya Oblast'	NA
Do.	AO Shelkovskiy refinery	Moskovskaya Oblast'	NA
Do.	AO Moskovskiy plant for special alloys	Moscow	NA
Do.	kilograms OAo Krasnoyarskiy Nonferrous Metals Plant (Krastsvetmet)	Krasnoyarskiy Krai	500,000
Do.	ZAO Kyshtymskiy plant	Chelyabinskaya Oblast'	NA
Soda ash	thousand metric tons Achinsk plant	Eastern Siberia	595
Do.	Berezniki plant	Ural'skiye Gory	1,080
Do.	Pikalyovo plant	Leningradskaya Oblast'	200
Do.	Sterlitamak plant	Bashkortostan Republic	2,140
Do.	Volkhov plant	Leningradskaya Oblast'	20
Steel, raw	AO Chusovskoy Metallurgical Plant	Permskiy Krai	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
Do.	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 (Moskovskiy Metallurgicheskiy Plant)	Moskovskaya Oblast'	70,000
Do.	OAo Severskiy Tube Plant	Polevskoy, Sverdlovskaya Oblast'	825,000
Do.	OAo Sibelectrostal Metallurgical Plant	Krasnoyarskiy Krai	110,000
Do.	OAo Taganrogskiy Metallurgical Plant (Tagmet)	Rostovskaya Oblast'	925,000
Do.	OAo Tulachermet	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 Krai	350,000

See footnotes at end of table.

TABLE 2—Continued
RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^c
Steel, raw—Continued	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: Zabaykalskiy mining and beneficiation complex NA	Mines in: Etykinskoye deposit Lovozerkoye deposit, Kola Peninsula	NA
Tellurium	PAO GMK Norilskiy Nickel (Nornickel)	Norilsk	5
Do.	Ural Mining and Metallurgical Co. (UMMC)	Urals	75
Tin:			
Ore, Sn content	OOO Pravourmiyskoye (PAO Soligdar)	Mine in Khabarovskiy Kray	NA
Do.	AO Tin Ore Co. (PAO Soligdar)	Solnechniy deposit, Khabarovskiy Kray	NA
Metal	Novosibirsk Processing Plant Ltd.	Novosibirskaya Oblast'	NA
Titanium:			
Ore	OAo Apatit	Mines at Kykivumchorrskoye 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	Moskovskiy 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 Magnium 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 Primteplenergo	Mine at Lermontovskoye deposit, Primorskiy Kray	NA
Do.	OAo Primorskiy GOK	Mine at Vostok-2 deposit	NA
Do.	Tyrnyauz tungsten-molybdenum mine [OAo Kabardino-Balkarskaya Tungsten-Molybdenum Co. (Government of Kabardino-Balkarskaya Republic)]	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

See footnotes at end of table.

TABLE 2—Continued
 RUSSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019¹

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity ^e
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	Kachkanar iron mining complex	Mines at Ural'skiye Gory	NA
Metal	Chusovoy and Nizhniy Tagil plants	Plants in the Urals	17,000
Pentoxide	Vanadii-Tulachermet	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 [Ural Mining and Metallurgical Co. (UMMC)]	Plant in Vladikavkaz, North Caucasus	90,000
Do.	Uralektromed' plant [Ural Mining and Metallurgical Co. (UMMC)]	Plant in Verkhnyaya Pyshma	17,000
Zirconium:			
Baddeleyite concentrate	Kovdor iron ore mining and beneficiation complex	Mine on Kola Peninsula	8,000
Metal	Chepetsky 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 2019.

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