



2020–2021 Minerals Yearbook

REPUBLIC OF KOREA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF THE REPUBLIC OF KOREA

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

In the global mineral industry, the Republic of Korea continued to be a consumer rather than a producer of metallic ores and concentrates, particularly copper, iron, lead, and zinc. In 2020, the country was the third-ranked importer of metallic ores, slag, and ash, which together accounted for 6% of the country's global trade, by value, behind China (63%) and Japan (8%) (Zen Innovations AG, 2023).

In 2020, the Republic of Korea was the world's second-ranked producer of refined indium, accounting for 22% of global production; the second-ranked producer (excluding United States production) of refined cadmium (13% of global production); the second-ranked producer of smelted zinc (7%); the third-ranked producer of zeolites (8%); the fifth-ranked producer of talc and pyrophyllite (7%); and the sixth-ranked producer of raw steel (4%) and refined copper (3%). In 2019 (the latest year for which data were available), it was the world's fourth-ranked producer of refined lead, representing 7% of global production (Anderson, 2022; Bolen, 2022; Callaghan, 2022; Crangle, 2022; Flanagan, 2022; Klochko, 2022; Tolcin, 2022; Tuck, 2022).

Minerals in the National Economy

In 2020, the Republic of Korea's real gross domestic product (GDP) decreased by 1.0% compared with an increase of 2.2% (revised) in 2019; the decline was mainly due to the decreased consumption and exports driven by the coronavirus disease (COVID-19) pandemic. The country's nominal GDP was \$1.64 trillion, which ranked it as the world's 10th largest economy (Bank of Korea, 2021a, p. 17; World Bank, The, 2023).

In 2020, the value of manufacturing activities accounted for 25% of the GDP; construction, 5.4%; and mining and quarrying, 0.1%. Within the manufacturing sector, the output values of fabricated metal products and basic metals decreased by 7.3% and 4.2%, respectively. The output of the construction sector decreased by 0.9% owing to a slowdown in residential construction activity (Bank of Korea, 2021a, p. 19–20; 2021b, p. 122).

Mining and quarrying production was valued at \$1.21 billion¹ in 2020, of which limestone accounted for 70%, followed by anthracite (13%), iron ore (2.9%), and quartzite (2.5%). The mining sector employed 6,049 people in 2020 (a decrease from 6,088 in 2019), accounting for 0.02% of total employment (of about 26.904 million people) in the country (Bank of Korea, 2021b, p. 11; Korea Institute of Geoscience and Mineral Resources, 2021, p. 14, 34).

¹Where necessary, values have been converted from Republic of Korea won (KRW) to U.S. dollars (US\$) at the annual average exchange rates of KRW1,180=US\$1.00 for 2020 and KRW1,144=US\$1.00 for 2021.

Government Policies and Programs

The Ministry of Trade, Industry, and Energy (MOTIE) is responsible for implementing the country's mineral laws and policies. The Coal Industry Act (No. 14476 of 2016), the Petroleum and Alternative Fuel Business Act (No. 15179 of 2017), the Mining Industry (Amendment) Act (No. 16127 of 2018), and the Mining Damage Prevention and Restoration (Amendment) Act (No. 16936 of 2020) provide the basic guidelines for the extraction of the country's mineral resources (Korean Law Information Center, 2023).

Under the third master plan for overseas natural resources development in 2007, the Republic of Korea designated the following six minerals as strategic: bituminous coal, copper, iron, nickel, zinc, and uranium. The country defined strategic mineral commodities as those minerals for which imports accounted for more than 90% of the country's consumption, whose annual import value exceeded \$100 million, and that could be refined in the country. Rare-earth elements and lithium were added into the list of strategic minerals in 2010 (Ministry of Trade, Industry, and Energy, 2007, p. 30; 2010; 2020, p. 15).

To secure its mineral supply, Korea Resources Corp. (KORES) stockpiled the following 10 rare metals (antimony, chromium, gallium, molybdenum, niobium, rare earths, selenium, titanium, tungsten, and zirconium) in Gunsan. KORES maintained a 64.5-day supply of these metals, which were important to the country's manufacturing industry and were mostly from imports. For price stabilization, the Public Procurement Service stockpiled six nonferrous metals (aluminum, copper, lead, nickel, tin, and zinc) and other rare metals (bismuth, cobalt, indium, lithium, manganese, silicon, strontium, tantalum, and vanadium) at nine sites. As of 2018, Korea National Oil Corp. (KNOC) and private companies stockpiled nearly 200 million barrels (Mbbbl) of crude petroleum and refined petroleum products (Korea Resources Corp., 2020; Korea National Oil Corp., 2021).

Production

In 2020, notable increases in mineral production included that of graphite (crystalline, flake), which increased by about 10 times; kerosene, by 111%; iron ore, 68%; diatomite, 59%; mined molybdenum, 55%; fuel oil, 30%; kaolin, 24%; and silica sand, 12%. The increase in graphite, iron ore, and molybdenum output resulted from the rampup of operations at the Eunbok and the Daewoon graphite mines, the Sinyemi iron ore mine, and the Keumsung molybdenum mine, respectively.

Notable decreases in mineral production included that of bentonite, by 88%; fuller's earth, 61%; talc, 39%; crude

petroleum and zeolites, 34% each; marble, 33%; natural gas, 28%; calcite, 22%; salt and other petroleum products, 20% each; ferromanganese and refined gold, 18% each; gasoline, 15%; liquefied petroleum gas, 14%; mined lead and refined lead (secondary), 13% each; and mica, 10%. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2020, there were 310 active mines owned by private or state-owned companies (286 for industrial materials, 20 for metals, and 4 for anthracite) compared with 330 active mines (310 for industrial materials, 16 for metals, and 4 for anthracite) in 2019. The country's major smelting companies included Korea Zinc Co. Ltd., LS-Nikko Copper Inc., POSCO Ltd., and Young Poong Corp. (Korea Institute of Geoscience and Mineral Resources, 2021, p. 34). Table 2 is a list of major mineral industry facilities.

The Korea Institute of Geoscience and Mineral Resources (KIGAM) reports annual data on the country's mineral industry. Korea Coal Corp., Korea Gas Corp., KNOC, and KORES are state-owned under the MOTIE. KORES reports the country's mineral reserves biannually and supports the development of domestic, North Korean, and overseas mineral resources and industries. As of 2020, KORES had foreign investments in 17 projects across 12 countries to supply high-demand minerals to the Republic of Korea, such as coal from Australia, copper from South America, and nickel from Africa (Korea Resources Corp., 2022).

Mineral Trade

In 2020, the Republic of Korea's exports and imports totaled about \$512 billion and \$468 billion, respectively. Exports of "mineral products" as defined under chapters 25 through 27 of the Harmonized System (HS) were valued at \$26 billion (or 5% of total exports), including \$330 million for commodities defined under HS chapter 25 (salt; sulfur, earths and stone; plastering materials, lime, and cement); \$504 million for commodities defined under HS chapter 26 (ores, slag, and ash); and \$25 billion for commodities defined under HS chapter 27 (mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes). Exports of base metals and articles of base metal (defined under HS chapters 72 through 83) were valued at \$42 billion, including \$20 billion in exports of iron and steel (defined under HS chapter 72) (Bank of Korea, 2021a, p. 24–25; Zen Innovations AG, 2023).

Imports of "mineral products" were valued at \$103 billion (or 22% of total imports), including \$881 million for commodities defined under HS chapter 25, \$16 billion for commodities defined under HS chapter 26, and \$87 billion for commodities defined under HS chapter 27. The leading imported mineral commodity was crude petroleum (HS code 2709.00) (valued at \$44 billion, indicating a total imported quantity of 980 Mbbbl), followed by liquefied natural gas (LNG; HS code 2711.11) [valued at \$16 billion, indicating a total imported quantity of 40 million metric tons (Mt)]. Imports of base metals and articles of base metal were valued at \$32 billion, including \$11 billion in iron and steel.

The Republic of Korea's trade balance for base metals and articles of base metal was \$10 billion, whereas the trade balance for other mineral commodities was about –\$77 billion (Bank of Korea, 2021a, p. 24–25; Korea Energy Economics Institute, 2022, p. 46, 53; Zen Innovations AG, 2023).

Commodity Review

Metals

Gold.—Sun Cement Co. Ltd. operated the Republic of Korea's two major gold mines—the Eunsan and the Gasa-do Mines in South Jeolla Province. In 2020, Sun Cement's gold production decreased to 145 kilograms (kg) from 178 kg in 2019 owing to a lower gold grade at the Eunsan Mine and at the drilling program at the Gasa-do Mine. Despite the decreased production from Sun Cement, the country's gold production increased to 189 kg in 2020 from 181 kg in 2019 because gold production at smaller mines in other Provinces increased to 44 kg from 3 kg in 2019 in response to the 27% increase of the world gold price in 2020. The country's two leading gold-refining companies, LS-Nikko Copper Inc. and Korea Zinc Co. Ltd., produced refined gold mostly as a byproduct of the processing of imported copper and zinc concentrates. Refined gold output decreased by 18% to about 44,700 kg in 2020, likely owing to lower gold content in the imported copper and zinc concentrates (table 1; Kim and others, 2021, p. 31–34; Sheaffer, 2022).

Iron and Steel.—The Sinyemi Mine in Gangwon Province was the country's leading iron ore mine, accounting for 96% of the country's production in 2020. Sinyemi's iron ore production increased by 68% to about 550,000 metric tons (t) in 2020 owing to the completion of the second vertical shaft in May 2019 and the increased global price of iron ore. As of 2020, the mine had a production capacity of 1.5 million metric tons per year of iron ore. In 2020, iron ore imports decreased to 70.4 Mt from 74.7 Mt in 2019 owing to the COVID-19 pandemic (tables 1, 2; Kim and others, 2021, p. 121–123).

In 2020, the country produced 67.1 Mt of raw steel and 74.7 Mt of steel products. The country exported 28.1 Mt (valued at \$20.0 billion) of steel mill products² in 2020, of which China was the leading destination, by quantity received (5.1 Mt), followed by Japan (3.1 Mt), India (1.87 Mt), and the United States (1.86 Mt). The country imported 11.6 Mt (valued at \$8.5 billion) of steel mill products (down from 15.9 Mt in 2019), of which China was the leading supplier, by quantity supplied (5.6 Mt), followed by Japan (4.6 Mt) (table 1; Jung, 2021; Korea Iron & Steel Association, 2022; Zen Innovations AG, 2023).

Molybdenum.—Samyang Resource Corp. operated the country's sole molybdenum mine—the Keumsung (formerly the Moland) Mine in Chungbuk Province. The mine suspended production in August 2015 owing to the low global price of molybdenum and the slowed domestic and global steel industry. Samyang Resource resumed operations at the mine in March 2019. In 2020, the mine employed 67 workers compared with

²Includes semifinished steel products and finished steel products. For trade data purposes, steel mill products are defined in accordance with the Harmonized System (HS) codes, as shown in U.S. International Trade Administration (2016).

53 workers in 2019 and produced 411 t of molybdenum compared with 266 t in 2019 (Kim and others, 2021, p. 139–140).

Industrial Minerals

Cement and Limestone.—As of 2020, the Republic of Korea had an annual capacity of about 61.5 Mt of clinker. Clinker production and cement (hydraulic) production in 2020 totaled about 41.9 Mt and 47.5 Mt, respectively, and continued to follow the downward trend in recent years. The decrease resulted from reduced domestic consumption of cement in the depressed construction sector, especially for high-rise residential buildings; the domestic consumption of cement decreased to 45.5 Mt in 2020 from 56.7 Mt in 2017 (tables 1, 2; Jun, 2020; Korea Cement Association, 2021, p. 8).

The decreased cement consumption had negative effects on the country's limestone output, which was 79.0 Mt in 2020 compared with 92.3 Mt in 2017. The country's top 10 quarries of limestone, all of which were owned by cement companies, produced 57.6 Mt in 2020, accounting for 73% of the country's total output. In 2020, Ssangyong Cement Industrial Co. Ltd., which was the country's leading limestone producer, extracted nearly 5 Mt of limestone from the Donghae quarry (down from more than 10 Mt in 2019) and 7 Mt from the Singi limestone quarry (up from 3 Mt in 2019) (Kim and others, 2021, p. 152–153, 156).

Feldspar.—In 2020, feldspar production in the Republic of Korea increased by 5% to about 416,000 t, accounting for 2% of global production. The increase resulted from the rampup of production (an increase of 150% to more than 100,000 t) at the Gyeongsin Mine in Gyeongbuk Province, which was the country's second-ranked feldspar producer. The country's leading producer was the BMS Mine in Chungnam Province, which extracted about 200,000 t of feldspar in 2020 (table 1; Kim and others, 2021, p. 206, 210; Barry, 2022).

During the year, the country exported 27,700 t (valued at \$2.7 million) of feldspar; of which Japan received 88%, by quantity. The Republic of Korea imported 3,300 t (valued at \$590,000) of feldspar that was of higher quality than the domestic output; India and China were the leading suppliers, in terms of quantity, to the Republic of Korea, accounting for 64% and 31%, respectively (Zen Innovations AG, 2023).

Mineral Fuels and Other Sources of Energy

In December, the Government announced the long-term goal of reducing greenhouse gas emissions by cutting down the usage of coal for electricity generation and increasing the use of renewable energy. The plan aimed to change the share of coal in electricity generation to 30% in 2030 (from 34% in 2020); nuclear energy, to 25% (from 29% in 2020); LNG, to 23% (from 20% in 2020); and renewable energy, to 21% (from 6% in 2020). Since 2017, the Government had introduced a target to phase out nuclear power over several decades; the 2020 plan reaffirmed the target to close aging nuclear reactors and no longer construct new reactors (Ministry of Trade, Industry, and Energy, 2020, p. 11, 39, 41; Korea Energy Economics Institute, 2021, p. VI-4).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

In 2021, the Republic of Korea's real GDP increased by 4.0% owing to the increase in domestic consumption in response to the recovery from the COVID-19 pandemic. The country's nominal GDP was \$1.81 trillion. The mining sector employed 5,590 people, accounting for 0.02% of total employment (of about 27.273 million people) in the country. Mining and quarrying production was \$1.78 billion in 2021, of which limestone accounted for 78%, followed by anthracite (9.3%), iron ore (2.7%), and quartzite (1.9%) (Bank of Korea, 2022, p. 6; 2023; Korea Institute of Geoscience and Mineral Resources, 2022, p. 14, 34; World Bank, The, 2023).

The Republic of Korea's exports increased by 26% to \$644 billion in 2021, and imports increased by 32% to \$615 billion. Exports of mineral products were valued at \$42 billion (or 6.5% of total exports), those of base metals and articles of base metal, \$57 billion. Imports of mineral products were valued at \$163 billion (or 27% of total imports): those of base metals and articles of base metal, \$32 billion. The leading mineral commodity import was crude petroleum (\$67 billion, indicating a total imported quantity 961 Mbbl), followed by LNG (\$25.5 billion, indicating a total imported quantity of 46 Mt) (Bank of Korea, 2022, p. 14–15; Korea Energy Economic Institute, 2022, p. 46, 52; Zen Innovations AG, 2023).

Production

Notable increases in mineral production in 2021 included that of bentonite, which increased by about 6 times; graphite (crystalline, flake), 244%; feldspar, 137%; mined silver, 74%; ferromanganese, 57%; salt and talc, 31% each; quartzite (crushed), 29%; calcite, 22%; kerosene, 21%; gasoline, 16%; magnetite (titaniferous) and pyrophyllite, 12% each; and dolomite (crushed), 10%. The increases in bentonite and graphite output resulted from the resumption of operations at bentonite mines in Gyeongbuk Province (which had suspended operations in 2020 in response to decreased demand driven by the COVID-19 pandemic) and the resumption of operations at the Taesamjin graphite mine in Gyeonggi Province (which had been halted since 2007), respectively (table 1; Kim and others, 2022, p. 171; Korea Institute of Geoscience and Mineral Resources, 2022, p. 130).

Notable decreases in mineral production included that of natural gas, by 70%; crude petroleum, 65%; mica, 48%; fuller's earth, 27%; diatomite, 24%; pottery clay, 15%; mined gold, 14%; anthracite, 12%; and indium and kaolin, 10% each. Anthracite, natural gas, and crude petroleum production continued to decrease owing to the declining domestic coal consumption and the depleted reserves of natural gas and crude petroleum at the Donghae-1 oil and gas field (table 1).

Structure of the Mineral Industry

In September, the Government launched Korea Mine Rehabilitation and Mineral Resources Corp. (KOMIR) as an integration of two public agencies, Korea Mine Reclamation Corp. and KORES. KOMIR would not engage in foreign

direct investment (FDI) and would instead focus on KORES's other activities, such as the stockpiling of rare metals and strategic mineral resources and providing support services for private sector overseas resource development (Korea Mine Rehabilitation and Mineral Resources Corp., 2021).

Since 2018, KORES (now KOMIR) had aimed to sell all its shares in loss-making overseas mines. However, in 2021, KOMIR recorded a fiscal surplus owing to the increased global price of metals and the improved performance of its FDI assets. It made first net profits of \$211 million from the Ambatovy nickel-cobalt mine in Madagascar and \$75 million from the Panama copper mine in Cobre. KOMIR also continued to make a net profit—of \$132 million—from the Narrabri bituminous coal mine in Australia and lessened its net loss to \$117 million from the Boleo copper mine in Mexico (Yang, 2021; Korea Mine Rehabilitation and Mineral Resources Corp., 2022).

Commodity Review

Metals

Tungsten.—In May, Almonty Industries Inc. of Canada commenced reconstruction of the Sangdong Mine in Yeongwol, aiming to start operations in 2023. Almonty anticipated that the mine, when commissioned, would extract 2,300 metric tons per year (t/yr) of WO_3 , which is equal to 1.2 times of the country's yearly WO_3 imports. Proven and probable reserves at Sangdong were estimated to be 7.9 Mt grading 0.47% WO_3 (37,000 t of WO_3). The Sangdong Mine stopped operations in 1992 and had been closed since 1993 owing to low commodity prices (Gleeson, 2018; Almonty Industries Inc., 2021, p. 19; 2022, p. 17; Bae, 2021).

Zinc.—Young Poong Corp.'s zinc smelter production decreased by 10% to 308,600 t in 2021. The decrease was attributed in part to the 10-day suspension of operations at the Seokpo (or Sukpo) smelter in Gyeongbuk Province in November for a violation of Water Environment Conservation Act of 2018. In June 2021, following the order of the Provincial government in 2018, the company commenced operations of systems to stop contaminated flow into streams and planned to expand the groundwater treatment system (Young Poong Corp., 2021, p. 19; 2022, p. 17, 22).

Industrial Minerals

Cement and Limestone.—Ssangyong Cement Industrial Co. Ltd. was renamed SsangYong C&E Co. Ltd. in 2021. In the new name, "C&E" stands for cement and environment. The company had spent \$90 million yearly since 2016 in minimizing greenhouse gas emissions (Jo, 2021).

Salt.—Total production of sea salt in the Republic of Korea was about 454,000 t in 2021; of which solar salt from solar evaporation of seawater accounted for 62% of this amount, and refined salt from electro-dialytic concentration of seawater accounted for the remaining 38%. Refined salt production had been and continued to be stable at about 170,000 t/yr. In recent years, solar salt production had significantly decreased, to 176,000 t in 2020 from 309,000 t in 2017 and 262,000 t in 2019 owing to heavy rains and, in part, to the ongoing replacement

of some sea salt farms with solar energy farms to generate electricity. In 2021, however, the production rebounded to 281,000 t (table 2; Lim, 2021).

In 2021, based on the production and export data for domestic salt, the country's apparent salt consumption (regardless of use, such as for chemicals, deicing, or food processing) was about 5.1 Mt; of this amount, imports accounted for 92%. The Republic of Korea imported 4.7 Mt (valued at \$216 million) of salt in 2021, of which solar salt accounted for 93%, by quantity. India was the leading source of salt imports, supplying about 2.0 Mt (43% of total), followed by Australia (35%) (Zen Innovations AG, 2023).

Mineral Fuels

Natural Gas and Petroleum.—In December, KNOC ceased operations at the Donghae-1 oil and gas field in the Ulleung Basin owing to depleted reserves. Since 2004, the country had extracted a total of more than 5 billion cubic meters of natural gas and 3 Mbbbl of crude petroleum from the field. After its depletion, the field would be used for carbon capture and storage in the future (Ki and others, 2022).

Outlook

The Republic of Korea is expected to continue to rely on imports of metallic ores and concentrates, such as copper, iron, and lead-zinc, molybdenum, and nickel, and to remain a leading importer of those commodities in the world. In the short term, production of crude petroleum and natural gas would cease because KNOC closed operations at the Donghae-1 permanently. In the medium and long terms, the Sangdong tungsten mine may commence its operations, and mine output of iron ore is likely to increase as the Sinyemi iron mine ramps up to full capacity. Owing to the increased construction investment in mid-2020, construction activity is expected to recover slightly and the output of cement, limestone, and pyrophyllite is expected to increase.

References Cited

- Almonty Industries Inc., 2021, Investor presentation: Toronto, Ontario, Canada, Almonty Industries Inc., August, 41 p. (Accessed June 10, 2022, at https://mcusercontent.com/28aac3f492656437daa6699c9/files/2a585c43-2526-7ded-a88f-af44fd89b208/Almonty_Industries_Inc_Presentation_August_2021.pdf.)
- Almonty Industries Inc., 2022, Investor presentation: Toronto, Ontario, Canada, Almonty Industries Inc., March, 28 p. (Accessed June 10, 2022, at https://almonty.com/wp-content/uploads/2022/05/24.03.22_Almonty_InvestorDeck_vf_compressed-1.pdf.)
- Anderson, C.S., 2022, Indium: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 80–81.
- Bae, Yeonho, 2021, Almonti Daehan Tungsten started construction; Yonhap News [Seoul, Republic of Korea], May 28. (Accessed June 9, 2022, at <https://www.yna.co.kr/view/AKR20210528120200062>.)
- Bank of Korea, 2021a, Annual report 2020: Seoul, Republic of Korea, Bank of Korea, March, 157 p. (Accessed January 4, 2022, at https://www.bok.or.kr/ucms/cmnn/file/fileDownload.do?menuNo=400221&atchFileId=FILE_00000000025220&fileSn=1.)
- Bank of Korea, 2021b, Economic statistics yearbook 2021: Seoul, Republic of Korea, Bank of Korea, July, 322 p. (Accessed January 4, 2022, at https://www.bok.or.kr/portal/cmnn/file/fileDownload.do?menuNo=200641&atchFileId=FILE_00000000025592&fileSn=1.)

- Bank of Korea, 2022, Annual report 2021: Seoul, Republic of Korea, Bank of Korea, March, 150 p. (Accessed January 3, 2023, at https://www.bok.or.kr/ucms/cmnmn/file/fileDown.do?menuNo=400221&atchFileId=FILE_00000000032311&fileSn=1.)
- Bank of Korea, 2023, Economic statistics system—8.6.2. Summary of economically active pop.: Seoul, Republic of Korea, Bank of Korea. (Accessed January 3, 2023, at <https://ecos.bok.or.kr/#/SearchStat.>)
- Barry, J.J., 2022, Feldspar and nepheline syenite: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 60–61.
- Bolen, W.P., 2022, Talc and pyrophyllite: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 164–165.
- Callaghan, R.M., 2022, Cadmium: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 42–43.
- Crangle, R.D., Jr., 2022, Zeolites (natural): U.S. Geological Survey Mineral Commodity Summaries 2022, p. 190–191.
- Flanagan, D.M., 2022, Copper: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 54–55.
- Gleeson, Daniel, 2018, Almonty starts drift development at Sangdong tungsten mine in Korea: Hertfordshire, United Kingdom, International Mining, November 28. (Accessed January 12, 2022, at <https://im-mining.com/2018/11/28/almonty-starts-drift-development-sangdong-tungsten-mine/>.)
- Jo, He-rim, 2021, Ssangyong Cement to change name to Ssangyong C&E: The Korea Herald [Seoul], February 24. (Accessed January 6, 2023, at <https://www.koreaherald.com/view.php?ud=20210224000779#:~:text=Ssangyong%20Cement%2C%20a%20South%20Korean,E%2C%20the%20company%20said%20Wednesday.>)
- Jun, Geehyoun, 2020, 60-year Korea cement industry meets new famine: Economic Review [Seoul, Republic of Korea], November 7. (Accessed January 12, 2022, at <http://www.econovill.com/news/articleView.html?idxno=503565.>) [In Korean]
- Jung, Hayoung, 2021, Korea demands steel scrap of 29 million tons this year, needing stable supply and demand: FerroTimes [Seoul, Republic of Korea], September 15. (January 6, 2022, at <http://www.ferrotimes.com/news/articleView.html?idxno=14427.>) [In Korean]
- Ki, S., and others, 2022, Donghae-1 gas field development and its application to CCS: Journal of the Korean Society of Mineral and Energy Resources Engineers, v. 59, no. 5, p. 498–517. (Accessed January 6, 2023, at <https://www.jksmer.or.kr/articles/xml/e0a1/>.) [In Korean, English abstract]
- Kim, Y., Lee, H., Lee H., and Yu, O., 2021, Mineral commodity supply and demand 2020/2021: Daejeon, Republic of Korea, Korea Institute of Geoscience and Mineral Resources, October, 261 p. (Accessed January 6, 2022, at https://www.kigam.re.kr/galleryDownload.es?bid=0025&list_no=3060&seq=1.) [In Korean]
- Kim, Y., Lee, H., Lee H., and Yu, O., 2022, Mineral commodity supply and demand 2021/2022: Daejeon, Republic of Korea, Korea Institute of Geoscience and Mineral Resources, November, 249 p. (Accessed December 30, 2022, at https://www.kigam.re.kr/galleryDownload.es?bid=0025&list_no=3255&seq=1.) [In Korean]
- Klochko, Kateryna, 2022, Lead statistics and information—2019 tables-only release: U.S. Geological Survey. (Accessed June 22, 2023, at https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/media/files/myb1-2019-lead-advrel_0.xlsx.)
- Korea Cement Association, 2021, Cement industry statistics of Korea 2020: Seoul, Republic of Korea, July, 196 p. (Accessed January 12, 2022, at http://www.cement.or.kr/mater_down/2020%20%ED%95%9C%EA%B5%AD%EC%9D%98%20%EC%8B%9C%EB%A9%98%ED%8A%B8%EC%82%B0%EC%97%85%20%ED%86%B5%EA%B3%84-1.pdf.) [In Korean]
- Korea Energy Economics Institute, 2021, Yearbook of energy statistics—Data up to 2020: Ulsan, Republic of Korea, Korea Energy Economics Institute, December. (Accessed January 13, 2022, at http://www.kesis.net/FileDownloadAction.do?file=/admin/admin_RegList.jsp/20220110/662491641804540261_01.xlsx&oldFile=%EC%97%90%EB%84%88%EC%A7%80%ED%86%B5%EA%B3%84%EC%97%B0%EB%B3%B4_2021.xlsx.)
- Korea Energy Economics Institute, 2022, Monthly energy statistics—2022/12: Ulsan, Republic of Korea, Korea Energy Economics Institute, December, 133 p. (Accessed January 5, 2023, at [http://www.kesis.net/FileDownloadAction.do?file=/admin/admin_RegList.jsp/20221223/272721671776572574_01.pdf&oldFile=%EC%97%90%EB%84%88%EC%A7%80%ED%86%B5%EA%B3%84%EC%9B%94%EB%B3%B4\(2022.12\).pdf.](http://www.kesis.net/FileDownloadAction.do?file=/admin/admin_RegList.jsp/20221223/272721671776572574_01.pdf&oldFile=%EC%97%90%EB%84%88%EC%A7%80%ED%86%B5%EA%B3%84%EC%9B%94%EB%B3%B4(2022.12).pdf.))
- Korea Institute of Geoscience and Mineral Resources, 2021, Yearbook of minerals statistics 2020: Daejeon, Republic of Korea, Korea Institute of Geoscience and Mineral Resources, May, 214 p. (Accessed January 4, 2022, at https://www.kigam.re.kr/gallery.es?mid=a3020300000&bid=0026&list_no=3034.) [In Korean]
- Korea Institute of Geoscience and Mineral Resources, 2022, Yearbook of minerals statistics 2021: Daejeon, Republic of Korea, Korea Institute of Geoscience and Mineral Resources, May, 200 p. (Accessed December 30, 2022, at https://www.kigam.re.kr/galleryDownload.es?bid=0026&list_no=3142&seq=1.) [In Korean]
- Korea Iron & Steel Association, 2022, Steel statistics—Steel products production: Seoul, Republic of Korea, Korea Iron & Steel Association. (Accessed January 7, 2022, via <https://www.kosa.or.kr/eng/>.)
- Korea Mine Rehabilitation and Mineral Resources Corp., 2021, CEO greeting: Wonju, Gangwon, Korea Mine Rehabilitation and Mineral Resources Corp. (Accessed June 13, 2022, at <https://www.komir.or.kr/eng/contents/174.>)
- Korea Mine Rehabilitation and Mineral Resources Corp., 2022, Press release—KOMIR, net profit in the 1st year of establishment: Wonju, Gangwon, Korea Mine Rehabilitation and Mineral Resources Corp., April 6. (Accessed June 13, 2022, at <https://www.komir.or.kr/download/viewer/1653436324946/index.html.>)
- Korea National Oil Corp., 2021, FAQ—Petroleum stockpile: Ulsan, Republic of Korea, Korea National Oil Corp., September 30. (Accessed January 5, 2022, at https://www.knoc.co.kr/sub05/sub05_9_3.jsp?grp=BICHUK.)
- Korean Law Information Center, 2023, National law information: Sejong, Republic of Korea, National Law Information Center website. (Accessed June 6, 2023, via <https://www.law.go.kr/LSW/eng/Main.do.>)
- Korea Resources Corp., 2020, Business overview—Stockpile: Wonju, Republic of Korea, Korea Resources Corp., May 11. (Accessed January 5, 2022, at <https://www.kores.or.kr/views/cms/hkor/bi/bi04/bi0401.jsp.>)
- Korea Resources Corp., 2022, Business overview: Wonju, Republic of Korea, Korea Resources Corp. (Accessed January 5, 2022, at <https://www.kores.or.kr/views/cms/eng/bu/bu01.jsp.>)
- Lim, Hyeseon, 2021, Solar salt disappears...Price tripled in a year: The Asia Business Daily [Seoul, Republic of Korea], September 3. (Accessed June 8, 2022, at <https://www.asiae.co.kr/article/2021083014441662926.>)
- Ministry of Trade, Industry, and Energy, 2007, The 3rd master plan for overseas natural resource development: Seoul, Republic of Korea, Ministry of Trade, Industry, and Energy (formerly Ministry of Commerce, Industry, and Energy), August 14, 81 p. (Accessed January 12, 2022, via http://www.motie.go.kr/motie/in/ay/policynotify/announce/bbs/bbsView.do?bbs_seq_n=22392&bbs_cd_n=6.)
- Ministry of Trade, Industry, and Energy, 2010, The 4th master plan for overseas natural resource development: Seoul, Republic of Korea, Ministry of Trade, Industry, and Energy (formerly Ministry of Knowledge Economy), December 22. (Accessed January 14, 2022, at http://www.motie.go.kr/motie/ne/rt/press/bbs/bbsView.do?bbs_seq_n=65573&bbs_cd_n=16.)
- Ministry of Trade, Industry, and Energy, 2020, 9th plan of electricity supply and demand (2020–2034): Sejong, Republic of Korea, Ministry of Trade, Industry, and Energy, December 28, 106 p. (Accessed January 13, 2022, at http://www.motie.go.kr/common/download.do?fid=bbs&bbs_cd_n=72&bbs_seq_n=210325&file_seq_n=1.) [In Korean]
- Sheaffer, K.N., 2022, Gold: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 72–73.
- Tolcin, A.C., 2022, Zinc [advance data release of the 2020 annual tables]: U.S. Geological Survey, 12 tables. (Accessed December 29, 2022, at <https://www.usgs.gov/centers/national-minerals-information-center/zinc-statistics-and-information.>)
- Tuck, C.C., 2022, Iron and steel: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 88–89.
- International Trade Administration, 2016, Steel mill product category definitions: Washington, DC, International Trade Administration, 4 p. (Accessed January 12, 2022, at <https://legacy.trade.gov/steel/pdfs/product-definitions.pdf.>)
- World Bank, The, 2023, GDP (current US\$)—Korea, Rep.: Washington, DC, The World Bank. (Accessed January 3, 2023, via https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2021&locations=KR&most_recent_value_desc=true&start=1960.)

Yang, Chulmin, 2021, Nickel and copper mines are waiting for sales: The Seoul [Republic of Korea] Economic Daily, April 6. (Accessed June 13, 2022, at <https://www.sedaily.com/NewsView/22KZB0EP0Y>.)

Young Poong Corp., 2021, Business report: Seoul, Republic of Korea, Young Poong Corp., March 16, 271 p. (Accessed January 6, 2023, at <http://sukpo.ypzinc.co.kr/kor/ir/filedown.php?y=2020&nf=business1>.)

Young Poong Corp., 2022, Business report: Seoul, Republic of Korea, Young Poong Corp., March 15, 294 p. (Accessed January 6, 2023, at <http://sukpo.ypzinc.co.kr/kor/ir/filedown.php?y=2021&nf=business1>.)

Zen Innovations AG, 2023, Global trade tracker: Bern-Kehrsatz, Switzerland, Zen Innovations AG database. (Accessed January 3, 2023, via <https://www.globaltradetracker.com>.)

TABLE 1
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021
METALS					
Bismuth, refinery, Bi content ³	900	880	930 ^e	970 ^e	1,000 ^e
Cadmium, refinery, primary	4,960	4,905	4,400 ^e	4,000 ^e	4,000 ^e
Copper:					
Mine, concentrate, Cu content	7	--	--	--	--
Smelter:					
Primary	510,000	530,000	520,000	513,900	520,000
Secondary	125,000	140,000	160,000	166,000	170,000
Total	635,000	670,000	680,000	680,000	690,000
Refinery:					
Primary	501,300	500,500	473,600	489,500	476,300
Secondary	163,000	174,000	189,400	181,800	171,100
Total	664,000	675,000	663,000	671,000	647,000
Ferroalloys:					
Ferromanganese	360,000	374,000	317,478 ^r	258,787	407,516
Ferronickel:					
Gross weight	237,000	228,000	230,000	230,000 ^e	230,000 ^e
Ni content	47,400	45,631	46,000	46,000 ^e	46,000 ^e
Ferrosilicon ^e	30,000	30,000	30,000	29,000	30,000
Silicomanganese	117,000	164,000	137,852 ^r	149,196	146,289
Gallium ^e kilograms	3,000	3,000	2,000	2,000	2,000
Gold:					
Mine, Au content do.	361	238	181	189	162
Refinery, bullion do.	52,768	48,626	54,340 ^r	44,665	47,000
Indium, refinery, primary, In content ^e do.	225,000	235,000	225,000	210,000	190,000
Iron ore, mine:					
Gross weight thousand metric tons	311	383	342	575	539
Fe content do.	174	214	192	322	302
Iron and steel:					
Pig iron do.	47,071	47,124	47,521 ^r	45,360	46,441
Steel:					
Raw steel do.	71,030	72,463	71,411 ^r	67,098	70,556
Products, rolled do.	69,557	69,785	68,273 ^r	65,752	68,000 ^e
Lead:					
Mine, Pb content	3,762	2,341	1,933	1,681	1,528
Refinery:					
Primary	423,320	410,295	404,000	435,040	426,415
Secondary	380,000	390,000	390,000	340,000	349,000
Total	803,000	800,000	794,000	775,000	775,000
Molybdenum, mine, Mo content	--	--	266	411	408
Rhenium, refinery, NH ₄ ReO ₄ , Re content kilograms	2,600	2,700	2,800	2,800 ^e	2,800 ^e
Silver:					
Mine, Ag content do.	8,788	7,090	5,245	5,739	10,001
Refinery, primary, metal do.	2,642,007	2,653,486	2,692,154	2,851,739	2,785,000
Titanium, titaniferous magnetite	223,039	213,184	295,987	287,895	322,581
Zinc:					
Mine, Zn content	3,321	3,656	4,106	4,300	4,371
Smelter, primary	970,455	988,695	986,291	987,201	948,973

See footnotes at the end of table.

TABLE 1—Continued
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
INDUSTRIAL MINERALS						
Cement:						
Clinker	thousand metric tons	48,657	45,351	45,932 ^r	41,894	43,430
Hydraulic	do.	57,400	52,093	50,635 ^r	47,518	49,864
Calcite	do.	2,431	2,462	1,939	1,516	1,842
Clay:						
Bentonite		47,306	31,824	43,886 ^r	5,314	34,243
Fuller's earth		115,568	118,177	185,718 ^r	71,855	52,192
Kaolin		416,648	369,274	317,626	393,236	352,003
Pottery		307,546	237,242	186,918 ^r	182,619	155,746
Unspecified		1,013,026	533,661	502,619 ^r	504,291	508,168
Diatomite, diatomaceous earth		133,741	25,902	40,910 ^r	65,240	49,616
Feldspar		717,177	617,166	396,896 ^r	416,025	987,309
Graphite, crystalline flake		--	670	302	3,052	10,485
Lime ^c	thousand metric tons	5,200	5,200	5,200	5,100	5,200
Mica, all grades		14,567	16,559	23,433	20,983	10,984
Salt, sea salt		483,698 ^r	459,542 ^r	433,054 ^r	345,437	453,776
Sand and gravel, industrial, silica:						
Quartzite	thousand metric tons	2,200 ^r	1,500 ^r	810 ^r	870	1,000
Sand	do.	190 ^r	230 ^r	210 ^r	270	82
Total	do.	2,390	1,730	1,020	1,140	1,080
Stone, sand, and gravel, construction:						
Sand and gravel ^c	do.	270,000	220,000	230,000	210,000	220,000
Stone:						
Crushed:						
Dolomite	do.	3,021	3,374	3,645 ^r	3,407	3,746
Limestone	do.	92,276	86,255	83,769	78,985	82,850
Marble	do.	5	2	3	2	2
Quartzite	do.	2,082	2,239	2,024	1,931	2,496
Talc and related minerals:						
Pyrophyllite		431,458	346,761	327,624	314,346	353,013
Talc		2,834	1,887	2,626	1,600	2,091
Zeolites		127,685	144,330	199,777	130,958	128,173
MINERAL FUELS AND RELATED MATERIALS						
Coal, anthracite	thousand metric tons	1,486	1,202	1,084	1,019	898
Coke, metallurgical	do.	16,020	16,894 ^r	16,176 ^r	15,345	15,494
Natural gas, marketable	million cubic meters	355	318	269	193	57
Petroleum:						
Crude	thousand 42-gallon barrels	217	189	155	103	36
Refinery:						
Diesel	do.	344,882	358,780	366,864	350,121	336,183
Fuel oil	do.	67,961	68,623 ^r	57,787	75,266	75,686
Gasoline	do.	157,908	167,195	168,229	143,049	166,557
Kerosene	do.	19,896	21,125	20,717	43,669	52,853
Liquefied petroleum gas	do.	31,612	33,900	32,889	28,279	29,117
Naphtha	do.	307,635	313,839	312,445	286,738	285,598
Other ⁴	do.	297,822	296,545	291,284	231,938	217,920
Total	do.	1,230,000	1,260,000	1,250,000	1,160,000	1,160,000

^cEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through December 20, 2022. 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, antimony, carbon black, graphite (amorphous), ferromolybdenum, ferrovanadium, lithium compounds, molybdenum (refined), nephrite, nickel chemicals and metal, palladium-platinum (refined), phosphate rock, secondary iron, sulfur (byproduct of metallurgy, natural gas, and petroleum), thorium, and titanium dioxide may have been produced, but available information was inadequate to make reliable estimates of output.

³Refined bismuth was produced as a byproduct of zinc production.

⁴Includes bitumens, fuel oil byproducts, jet fuel, lubricants, paraffin waxes, petroleum coke, refinery gas, and solvents.

TABLE 2
REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Antimony, metal		Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	NA
Bismuth, metal	metric tons	do.	do.	950
Clay		Various owners	Small-scale mines in various locations	NA
Cadmium	metric tons	Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	5,100
Do.	do.	Young Poong Corp.	Seokpo refinery, ¹ Gyeongbuk Province	1,750
Cement:				
Clinker and portland, each		Asia Cement Co. Ltd.	Plants in Jecheon	4,100
Do.		Halla Cement Corp.	Plants in Gwangyang and Okkye	8,200
Do.		Hanil Cement Manufacturing Co.	Plants in Danyang, Chungbuk Province	7,100
Do.		Hanil Hyundai Cement Co. Ltd.	Plants in Danyang and Yeongwol	6,900
Do.		Korea Cement Co. Ltd.	Plant in Jangsung, Jeonnam Province	660
Do.		Sampyo (formerly Tong Yang) Cement	Plants in Samcheok	10,000
Do.		SsangYong C&E Co. Ltd.	Plants in Donghae and Yeongwol, Gangwon Province	14,800
Do.		SungShin Cement Manufacturing Co. Ltd.	Plant in Danyang, Chungbuk Province	9,700
Portland		Daehan Cement Co. Ltd. (SsangYong C&E Co. Ltd., 100%)	2 grinding plants in Gwangyang	1,600
Do.		Hankook C&T Co. Ltd.	Grinding plant in Pohang	4,700
Coal		Korea Coal Corp. (Government, 100%)	Mines at Dogye, Hwasoon, and Jangsung	1,100
Do.		Kyungdong Co. Ltd.	Sangduck Mine, Dogye, Samcheok	800
Do.		Taebaek Mining Corp.	Mine ² in Taebaek	132
Copper, metal, primary		Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	25
Do.		LS-Nikko Copper Inc. (LS Holdings, 50.1%, and Japan Korea Joint Smelting Co. Ltd., 49.9%)	Plant at Onsan, Ulsan	680
Do.		Young Poong Corp.	Seokpo refinery, Gyeongbuk Province	5
Diatomaceous earth		Private owners	Gyerim Mine, Gangwon Province, and Jangseong Mine, Gyeongbuk Province	150
Gallium	kilograms	Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	10,000
Gemstone, nephrite		Various owners	4 mines in Gangwon and Gyeongbuk Provinces	3
Gold:				
Concentrate, Au content	kilograms	Sun Cement Co. Ltd. (formerly GoldenSun Co. Ltd.)	Eunsan and Gasa-do Mines, Haenam, Jeonnam Province	500 ^e
Refined	do.	Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	50,000
Do.	do.	LS-Nikko Copper Inc. (LS Holdings, 50.1%, and Japan Korea Joint Smelting Co. Ltd., 49.9%)	Plant at Onsan, Ulsan	60,000
Graphite:				
Mine		Taesamjin Corp.	Eunbok Mine and Taesamjin Mine, Gyeonggi Province	10
Do.		Private owner	Daewoon Mine, Chungbuk Province	NA
Anode		POSCO Chemical Co. Ltd.	Sejong-1 and Sejong-2 plants, Sejong	61
Feldspar		Buyeo Materials Sales (BMS) Co. Ltd.	BMS Mine, Chungnam Province	200
Do.		Yeongbin Development	Gyeongsin Mine, Gyeongbuk Province	100
Do.		Private companies	18 mines in various locations	500
Ferroalloys:				
Ferromanganese and silicomanganese		DB Metal Co. Ltd.	Donghae plant, Donghae, Gangwon Province	NA
Do.		Dongil Industries Co. Ltd.	Plant in Pohang	NA
Do.		SIMPAC Inc.	Plants in Dangjin and Pohang	NA
Do.		Taekyung Industry	Yemi factory, Jeongseon, Gangwon Province	NA
Ferromolybdenum and ferrovandium		SeAH M&S Corp.	Plant in Yeosu, Jeonnam Province	NA
Ferronickel, Ni content		SNNC Co. Ltd. (SMSP S.A., 51%, and POSCO Ltd., 49%)	Gwangyang ferronickel plant, Gwangyang	54
Ferrosilicon		SIMPAC Inc.	Plant in Pohang	35

See footnotes at end of table.

TABLE 2—Continued
REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Indium, metal	kilograms	Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	200,000
Do.	do.	Young Poong Corp.	Seokpo refinery, Gyeongbuk Province	110,000 ^e
Iron ore, mine, gross weight		Handok Iron & Steel Co. Ltd. (SM Group)	Sinyemi Mine, Jeongseon, Gangwon Province	1,500
Do.		Daehan Mineral Co. Ltd.	Yangyang Mine, Yangyang, Gangwon Province	30
Iron and steel, raw steel		Dongkuk Steel Mill Co. Ltd.	Inchon Works, Incheon	2,200
Do.		do.	Pohang Works, Pohang	1,400
Do.		Hyundai Steel Co. Ltd.	Dangjin plant, Dangjin	23,000
Do.		do.	Inchon plant, Incheon	4,800
Do.		do.	Pohang plant, Pohang	3,200
Do.		Korea Iron and Steel Co. Ltd.	Changwon Works., Changwon	1,200
Do.		POSCO Ltd.	Gwangyang Works, Gwangyang	21,200
Do.		do.	Pohang Works, Pohang	17,400
Lead:				
Concentrates, gross weight		Shin DongYang Corp.	Guk-jeon Mine, Gyeongnam Province	1
Do.		SungAn-Jawon Corp.	Kumho Mine, Gyeongbuk Province	5
Refined		Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	430
Limestone		SsangYong C&E Co. Ltd.	Donghae Quarry, Gangwon Province	11,000
Do.		do.	Singi Limestone Quarry, Gangwon Province	7,000
Do.		Other private companies	96 quarries in various locations	85,000
Lithium, compound:				
Carbonate	metric tons	POSCO Ltd.	Gwangyang Works, Gwangyang	2,500
Hydroxide	do.	do.	do.	1,500
Mica		Various owners	10 mines in Gangwon and Chungbuk Provinces, and 6 mines in other provinces	25
Molybdenum:				
Mine, Mo content	metric tons	Samyang Resources Corp. (formerly Dongwon Resources Corp.)	Keumsung (formerly Moland) Mine, ³ Daejang-ri, Jecheon, Chungbuk Province	500
Refined	do.	SeAH M&S Corp.	Smelter in Yeosu, Jeonnam Province	6,000
Natural gas	thousand cubic meters per day	Korea National Oil Corp. (KNOC)	Donghae-1 gasfield ⁴ in Ulleung Basin	200
Nickel:				
Metal		Enertec Co. Ltd.	Refinery at Haman, Gyeongnam Province	6
Do.		Korea Nickel Corp. (Korea Zinc Co. Ltd., 34%; Vale Canada Ltd., 25%; POSCO Ltd., 14%)	Onsan nickel refinery at Onsan, Ulsan	30
Sulfate		Korea Energy Materials Co. (KEMCO) (Korea Zinc Co. Ltd., 55%; Young Poong Corp., 15%; LG Chem, 10%; others, 20%)	Onsan plant at Onsan, Ulsan	80
Palladium, refined	kilograms	LS-Nikko Copper Inc. (LS Holdings, 50.1%, and Japan Korea Joint Smelting Co. Ltd., 49.9%)	Plant at Onsan, Ulsan	1,300
Petroleum:				
Crude	42-gallon barrels per day	Korea National Oil Corp. (KNOC)	Donghae-1 oilfield ⁴ in Ulleung Basin	100
Refinery products	thousand 42-gallon barrels per day	GS Caltex Corp.	Refinery in Yeosu	785
Do.	do.	Hyundai Oil Refinery Co.	Daesan plant, Seosan	520
Do.	do.	SK Energy Corp.	Refinery in Ulsan	1,115
Do.	do.	S-Oil Corp.	Refinery at Onsan, Ulsan	669
Platinum, refined	kilograms	LS-Nikko Copper Inc. (LS Holdings, 50.1%, and Japan Korea Joint Smelting Co. Ltd., 49.9%)	Plant at Onsan, Ulsan	600
Pyrophyllite		Hankook Mineral Powder Co. Ltd.	Dae-do, Hwangsan, and Wan-do mines, Haenam, Jeonnam Province	400 ^e
Do.		HyunMoo Mining	HyunMoo Mine, ⁵ Danyang, Chungbuk Province	100
Do.		Jinhae Pyrophyllite	Jinhae Mine, Gyeongnam Province	50 ^e
Do.		Minkyoung Corp.	Nohwa-do Mine, Jeonnam Province	100

See footnotes at end of table.

TABLE 2—Continued
 REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Quartzite		Various companies (including Sampyo Cement)	23 quarries in various locations (including Sampyo Samcheok Quarry in Gangwon Province)	2,500
Rhenium, refined, Re content	kilograms	LS-Nikko Copper Inc. (LS Holdings, 50.1%, and Japan Korea Joint Smelting Co. Ltd., 49.9%)	Plant at Onsan, Ulsan	3,000
Salt, sea salt:				
Refined		Hanju Salt Corp.	Factory in Ulsan	190
Solar		Private owners	Salt pans along south and west coasts	230
Silver:				
Concentrate, Ag content	kilograms	Sun Cement Co. Ltd. (formerly GoldenSun Co. Ltd.)	Eunsan Mine and Gasa-do Mine, Haenam, Jeonnam Province	9,000 ^e
Refined	metric tons	Korea Zinc Co. Ltd.	Onsan refinery, Ulsan	2,500
Do.	do.	LS-Nikko Copper Inc.	Plant at Onsan, Ulsan	1,200
Talc		Ilshin Dongyang Stone Co.	Youngwoo Resource-2 Mine, Chungju	4 ^e
Do.		Private owner	Sangbo Mine, Cheongpung, Jecheon	1 ^e
Do.		do.	Pyongan Mine, Gongju	1 ^e
Titaniferous magnetite		Samyang Resources Corp.	Gwan-in Mine, Pocheon, Gyeonggi Province	250
Titanium dioxide		COSMO Chemical Co. Ltd.	Onsan plant, Ulsan	2
Zeolites		Dong-sin Co. Ltd.	Dong-sin Zeo Mine, Gyeongju	150
Do.		Private owner	Guryong Baekto Mine, Pohang	50
Zinc:				
Concentrates, gross weight		Shin DongYang Corp.	Guk-jeon Mine, Gyeongnam Province	1
Do.		SungAn MNP Korea Corp.	Kumho Mine, Gyeongbuk Province	8
Smelter, primary		Korea Zinc Co. Ltd.	Onsan smelter, Ulsan	700
Do.		Young Poong Corp.	Seokpo smelter, Gyeongbuk Province	400

^eEstimated. Do., do. Ditto. NA Not available.

¹Production of cadmium suspended since June 2019.

²Production suspended since September 2018.

³Production suspended in 2016 and resumed in 2019.

⁴Closed at the end of 2021.

⁵Production suspended since 2019.