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2012 Minerals Yearbook

REPUBLIC OF KOREA

U.S. Department of the Interior
U.S. Geological Survey

February 2015

The Mineral Industry of the Republic of Korea

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The Republic of Korea's real gross domestic product (GDP) growth rate was 2.0% in 2012 compared with 3.7% (revised) in 2011. The country's exports continued to increase in the first half of the year, then slowed because of a decrease in external demand; domestic consumption and sales revenues also decreased. The inflation rate was 2.2% in 2012 compared with a rate of 4% in 2011. The mining and quarrying sector grew by 1.3% in 2012 compared with negative growth of 4.8% (revised) in 2011. The growth of the manufacturing sector was 2.2% in 2012 compared with 7.3% in 2011. The production of manufactured nonmetallic mineral products decreased by 8.4%, and the production of metals increased by 4.6% (Bank of Korea, 2013, p. 20–29).

Minerals in the National Economy

The Republic of Korea's mining and quarrying sector was not a significant contributor to the country's economic development in terms of monetary value; it accounted for only 0.2% of the GDP in 2012. Many of the country's mineral commodity requirements were met through imports (Bank of Korea, 2013, p. 20–29).

Government Policies and Programs

In 2012, the Bank of Korea, the Financial Services Commission, the Financial Supervisory Service, and the Ministry of Strategy and Finance worked together to enhance their policy cooperation and information sharing to help advance the country's financial stability. The Korea–U.S. Free Trade Agreement (KORUS FTA) entered into force. Also, the Republic of Korea hosted the 2012 Nuclear Security Summit (U.S. Department of State, 2012).

Production

In 2012, production of sand increased by about 80% compared with that of 2011; talc, by about 39%; cadmium, by about 30%; diatomite, by about 17%; and quartzite and silver, by about 16% each. Production of some mineral commodities decreased, including that of kaolin, which decreased by about 36%; mica, by about 18%; and salt, by 17% (table 1).

Structure of the Mineral Industry

The Ministry of Commerce, Industry, and Energy supervised the country's coal mining, natural gas, petrochemical, and petroleum refining companies, all of which were state owned. The rest of the mining, quarrying, and mineral processing companies were privately owned and operated (table 2).

Mineral Trade

According to the Bank of Korea, the country's exports of goods and services increased by 4.2% in 2012, led by exports of (in order of value) semiconductors, electrical equipment and devices, and automobiles. The country's imports of goods and services increased by 2.5% in 2012. There were significant flows of manufactured goods, services, and technology between the Republic of Korea and the United States. The Republic of Korea exported goods and services valued at $58.9 billion to the United States in 2012, which was an increase of about 4% from the $56.7 billion exported to the United States from the Republic of Korea in 2011. These exports included $10.6 billion in passenger cars, $3.7 billion in petroleum products (other than fuel oil), $1.6 billion in computer accessories, $1.5 billion in drilling and oilfield equipment and platforms, and $1.4 billion in semifinished iron and steel products. The Republic of Korea imported from the United States goods and services valued at $42.3 billion, which was a decrease of about 3% from the $43.4 billion imported from the United States in 2011. These imports included $4.1 billion in semiconductors, $1.2 billion in steelmaking materials, $1.1 billion in petroleum products (other than fuel oil), $609 million in nonferrous metals, $577 million in precious metals, $426 million in alumina and aluminum, and $311 million in copper (Bank of Korea, 2013, p. 20–29; U.S. Census Bureau, 2014a, b).

Commodity Review

Metals

Copper.—The Republic of Korea did not produce copper ore or copper concentrate in 2012, although the refineries produced about 0.6 million metric tons (Mt) of primary and secondary copper metal. The country relied on imports to meet the raw material requirements for its copper smelters, which are located in Changhang and Onsan. LS-Nikko Copper Inc., which was a Korean and Japanese joint venture based in Seoul, held a 50.1% share of the company's stock and was engaged in the import of copper ore and in metal recycling, smelting, and refining. LS-Nikko Copper's copper refinery had a 60% market share in electrolytic cathode copper. The company also owned the Danyang factory at the Maepo Agricultural and Industrial Complex in Choongchungbuk-do through its affiliate GRM Inc. The Danyang factory had the capacity to produce 73,300 metric tons (t) of recycled metals, including 17,600 t of copper (LS-Nikko Copper Inc., 2011, 2014).

Gold.—The Republic of Korea produced 47,992 kilograms of refined gold in 2012. The country held about 700 Mt of gold ore. The Korea Exchange Inc. established a trading system and planned to begin gold trading in 2014 to allow investors easy

access to the market and to provide a new financial opportunity for the Government to generate revenue. About 100 t of gold was traded domestically each year, and small local smelters could recycle about $4 billion worth of gold scrap and jewelry into bars each year (Hur, 2013; Korea Institute of Geoscience and Mineral Resources, 2013, p. 7).

Iron and Steel.—In 2012, the Republic of Korea relied heavily on imports to meet its iron ore requirements, and the domestic iron ore production was about 0.6 Mt. The country produced about 69 Mt of crude steel, which was an increase of 1% from that of 2011. Domestic steel consumption was about 52 Mt, which was a decrease of about 5% from that of 2011. According to the Korea Iron and Steel Association, the country exported about 30 Mt of steel in 2012, which was a decrease of about 4% from the previous year. The Republic of Korea's steel exports had decreased to about 20.5 Mt in 2009 from 20.8 Mt in 2008 owing to the international financial crisis; steel exports increased from 2010 to 2012, however, and totaled 24.9 Mt, 29.1 Mt, and 30 Mt, respectively (BusinessKorea Co. Ltd., 2013; Korea Institute of Geoscience and Mineral Resources, 2013, p. 7).

Lead, Nickel, Tin, and Zinc.—Tin and nickel were used for making alloys to produce electronic goods and kitchenware, Korea Zinc was the Republic of Korea's leading lead and zinc producer, and zinc was used for making steel for automobiles and construction materials. Korea Zinc also produced copper, gold, and silver. Korea Zinc had subsidiaries and affiliates in Australia, Canada, and Thailand. Zinc production accounted for about 40% of Korea Zinc's sales revenue, and silver and lead each accounted for about 20% of the company's revenue (Pohang Iron and Steel Co. Ltd., 2012; Korea Zinc Co. Ltd., 2014).

Tungsten.—The Sangdong tungsten-molybdenum project is located on the east coast, 187 kilometers from Seoul, and the mine and plant together were expected to become the world's leading tungsten production site and to account for 7% to 10% of global tungsten output. Woulfe Mining Corp. of Canada signed a memorandum of understanding with the Shinhan Bank in July to fund its Sangdong tungsten/molybdenum project. The Shinhan Bank, which was the Republic of Korea's largest bank, provided about $104 million in loans for the development of the project at less than 6% annual interest, which had a significant positive effect on the project. Woulfe reported that the Sangdong project's net present value was about $400 million in 2012 and that the internal rate of return was 46% (Lazenby, 2012; Woulfe Mining Corp., 2012).

Industrial Minerals

Rare Earths.—The Republic of Korea relied on imports to meet its requirement for rare-earth elements. In 2012, the country announced the discovery of a major deposit of rare-earth elements that was estimated to be adequate to supply the country's domestic demand for rare earths for about 50 years. The Korea Institute of Geoscience and Mineral Resources analyzed the soil samples collected from 11 locations around the country and reported that there were resources totaling 23 Mt containing 147,000 t of rare-earth elements in deposits spanning areas of Chungju, North Chungcheong Province, and Hongcheon, Gangwon Province. The rare-earth minerals are hosted in iron ore. According to the China Daily, China exported 72 t of rare-earth material to the Republic of Korea in September. The price of rare earths decreased by 8.6% in October, and the Republic of Korea increased its rare-earth imports from China by about 19% beginning in October (KBS World, 2011; China Daily, 2012).

Mineral Fuels and Related Materials

Natural Gas and Petroleum.—In 2012, the Russian state-owned natural gas company OAO Gazprom was discussing the railway junction, gas pipeline, and power line projects that were to run from Russia to the Republic of Korea by way of North Korea with the Governments of the Republic of Korea and North Korea. Gazprom was under a contract to supply at least 1.5 Mt of liquefied natural gas (LNG) to the Republic of Korea each year until 2025, and the volume was expected to increase greatly to meet the country's future energy needs. Gazprom sent gas to Japan directly through the Sakhalin-2 pipeline, but it had to send LNG to the Republic of Korea by ship. The Republic of Korea and Russia thought it was important for all three countries to have a gas pipeline that goes through North Korea from Russia to the Republic of Korea. The countries were negotiating a deal that would enable North Korea to earn $100 million per year from the trans-Korean pipeline when it opens in 2017 (Blank, 2012; UPI.com, 2013).

Uranium.—Stonehenge Metals Ltd. of Australia was engaged in exploration for uranium in the Republic of Korea and was focusing on its 100%-owned Daejon project in the areas of Chubu, Kolnami, and Yokwang. The company discovered a vanadium resource in the project area and expected to discover a vanadium deposit. Woulfe owned the Ogshon uranium project; the project is located within the Okcheon metamorphic belt, which extends through the middle of the country. Woulfe had been granted five registered mining rights (RMRs) and four mining applications (MAs) in the Daejeon-Geumsan area. Korea Resources Corp. conducted the U_3O_8 resource drilling program for Woulfe in Daejeon 29, Daejeon 39, and Daejeon 48. Woulfe had also been granted one RMR and two MAs in the Miwon area, and the company's sampling and testing programs were in process (Australia's Paydirt, 2012, p. 71; Woulfe Mining Corp., 2012).

Outlook

According to the Korea Iron and Steel Association, the Republic of Korea's steel production, domestic consumption, and exports are expected to increase by about 4%, 1%, and 4%, respectively, in 2014. The Republic of Korea's GDP is dependent mainly on exports. The Bank of Korea projects that the country's economy will grow in 2013 but at only a slow pace, and that the value of the country's exports will also increase only slowly because of geopolitical risks in certain regions of the world and because of global economic conditions. Domestic demand, however, is projected to remain relatively steady as real purchasing power increases owing to improved working conditions and stable oil prices (Bank of Korea, 2013, p. i–vi, 14–17).

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TABLE 1
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2008	2009	2010	2011	2012
METALS						
Bismuth, metal		210	300	498	480	437
Cadmium, smelter		3,090	2,500	4,166	3,005	3,904
Copper:						
Mine output, Cu content		4	14	9	NA [r]	NA [r]
Metal:						
Refined, primary and secondary		537,925	531,701	564,600	595,447	591,000
Gold:						
Mine output, Au content	kilograms	175	274	235	209	336
Metal, refined	do.	37,989	51,186	54,540	49,550	47,992
Iron and steel:						
Iron ore and concentrate:						
Gross weight	thousand metric tons	366	455	513	542	593
Fe content	do.	205	255 [r]	287 [r]	303 [r]	332
Metal:						
Pig iron	do.	31,043	27,405 [r]	31,228	42,213	NA [r]
Ferroalloys:						
Ferromanganese		251,125	216,400 [r]	286,259	355,047	364,800 [r]
Ferrosilicomanganese		76,184	151,100 [r]	120,779	195,650	184,700 [r]
Total		327,309	367,500	407,038	550,697	549,500
Steel, crude	thousand metric tons	53,493	48,752 [r]	58,914	68,519	69,073
Lead:						
Mine output, Pb content		449	2,064	1,168	2,577	3,879
Metal, smelter		244,137	216,918	197,900	256,851	280,000
Nickel:						
Ferronickel		2,506 [2]	21,609 [2]	20,512 [r]	19,011 [r]	20,858 [r]
Metal		28,653	NA	NA	NA	NA
Silver:						
Mine output, Ag content	kilograms	NA [r]	NA [r]	2,025	2,649	2,925
Metal	do.	1,461,886	1,740,078	1,735,535	2,197,409	2,547,315
Zinc:						
Mine output, Zn content		3,672	4,441 [r]	710	1,486	2,868
Metal, primary		406,542 [r]	751,179	717,100	828,735	875,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	51,653	50,127	47,420	48,300	NA [r]
Clays, kaolin	do.	955	659	764	799	515
Diatomaceous earth		2,540	2,440	2,200	5,150	6,000
Feldspar		344,257	622,700	496,511	384,221	360,413
Graphite, all types		73	48	34	NA [r]	NA [r]
Mica, all grades		49,474	27,078	36,486	31,260 [r]	25,594
Salt		384,304	382,270	222,509	372,230	308,847
Stone, sand and gravel:						
Limestone	thousand metric tons	87,282 [r]	81,612 [r]	83,628 [r]	86,945 [r]	86,912
Quartzite	do.	3,325	3,536	3,603	3,603	4,184
Sand, including glass sand	do.	1,757	455	535	394	709
Talc and related materials:						
Pyrophyllite		892,625	617,411	673,936	510,708	483,133
Talc		6,439 [r]	5,997 [r]	5,729	15,608	21,625
Zeolites		217,691	235,226	242,190	231,420	245,285

See footnotes at end of table.

TABLE 1—Continued
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2008	2009	2010	2011	2012
MINERAL FUELS AND RELATED MATERIALS						
Carbon black[e]		484,000	500,000	500,000	500,000	500,000
Coal, anthracite[e]	thousand metric tons	2,773 [2]	2,519 [2]	2,084 [r, 2]	2,084 [r, 2]	2,000 [e]
Fuel briquets, anthracite briquets[e]	do.	2,320	2,000	2,000	2,000	2,000
Petroleum, refinery products[e, 3]	thousand 42-gallon barrels	747,827 [2]	750,000	750,000	750,000	750,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto.
NA Not available.
[1]Table includes data available through January 16, 2014.
[2]Reported figure.
[3]Includes bunker oil C-type, diesel oil, gasoline, kerosene, liquefied petroleum gas, and naphtha.

Sources: Ministry of Commerce, Industry and Energy, Korea Institute of Geoscience and Mineral Resources; Mineral Commodity Summaries 2012; Korea Mineral Information; U.S. Geological Survey Minerals Questionnaires 2008–12. World Bureau of Metal Statistics, December 2011; The Bank of Korea Monthly Statistical Bulletin, table 41, Exports by principal commodity, and table 42, Imports by principal commodity, May 2011, p. 132–135.

TABLE 2
REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Bismuth, metal	metric tons	Korea Zinc Co. Ltd.	Onsan refinery	500
Cadmium	do.	do.	do.	2,100
Do.	do.	Young Poong Corp.	Sukpo refinery	2,100
Cement		Ssangyong Cement Industrial Co. Ltd.	Plants at Tonghae, Kwang Yang, Munkyung, Pukpyong, and Yeongwol	15,040
Do.		Sung Shin Cement Manufacturing Co. Ltd.	Tanyang plant	13,700
Do.		Tong Yang Major Corp.	Plants at Pukpyong and Samchok	11,580
Do.		Lafarge Halla Cement Corp.	Plants at Kwang Yang and Okkye	9,500
Do.		Hyundai Cement Co. Ltd.	Plants at Tanyang and Yongwol	8,600
Do.		Hanil Cement Manufacturing Co.	Plants at Chungbuk and Tanyang	7,200
Do.		Asia Cement Manufacturing Co. Ltd.	Plants at Daegu and Jaechon	4,600
Coal		Korea Coal Corp.	Mines at Changsung, Dogae, and Hwasoon	2,000
Copper, metal, primary		Korea Zinc Co. Ltd.	Onsan	20
Do.		LS-Nikko Copper Inc.	Changhang	60
Do.		do.	Onsan	510
Gas, natural		Korea National Oil Corp.	Ulleung Basin	NA
Gold:				
In concentrate	kilograms	Hangum Co. Ltd.	Muguk Mine, Haenam, Jeonnam (South Cholla) Province	1,600
Refined	do.	Korea Zinc Co. Ltd.	Onsan	50,000
Do.	do.	LS-Nikko Copper Inc.	do.	60,000
Graphite		Kaerion Graphite Ltd.	Kangwon	NA
Do.		Wolmyong Mining Co.	do.	NA
Indium, metal	kilograms	Korea Zinc Co. Ltd.	do.	55,000
Iron ore		NA	Mines at Sinyemi, Gangwon Province	600
Lead, metal, primary		Korea Zinc Co. Ltd.	Kangwon	200

See footnotes at end of table.

TABLE 2—Continued
REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Magnesium[1]		Pohang Iron and Steel Co. Ltd.	Magnesium refinery plant, Gangneung City, Gangwon Province	10
Do.		do.	Magnesium metal sheet plant, Suncheon City, Jeonnam (South Jeolla) Province	3
Molybdenum[1]	metric tons	Korea Resources Corp. (KORES)	Mine at Uljin; Smelter at Yeosu, Jeonnam (South Jeolla) Province	6,000
Do.	do.	NMC Resource Corp.	Moland Mine, at Daejang-ri, Geumseongmyeon, Jecheon-si, Chungcheongbuk-do District	2,000
Nickel:				
Ferronickel		Pohang Iron and Steel Co. Ltd.	Gwangyang ferronickel plant	30
Metal		Korea Nickel Corp.	Onsan nickel refinery	48
Petroleum, refinery products	thousand 42-gallon barrels per day	SK Corp.	Ulsan	817
Do.	do.	LG-Caltex Corp.	Yocheon (Yosu)	650
Do.	do.	Hyundai Oil Refinery Co.	Daesan and Inchon	589
Do.	do.	S-Oil Corp.	Onsan	520
Pyrophyllite		NA	Wan-Do, Sungsan, Hwansan, Okmesan, Dae-Do, and Chin-Do Mines in Haenam	446
Do.		NA	Nilyang, Yangsan, Kimhae, Pusan, and Kyong-Nam Mines in Dong-Nae	446
Silver:				
In concentrate	kilograms	Hangum Co. Ltd.	Haenam, Jeonnam (South Cholla) Province	3,700
Refined	metric tons	Korea Zinc Co. Ltd.	Onsan	1,000
Do.	do.	LS-Nikko Copper Inc.	do.	370
Steel, crude		Pohang Iron and Steel Co. Ltd.	Kwangyang (Gwangyang) Works	15,000
Do.		do.	Pohang Works	13,000
Do.		Hyundai Steel Co. Ltd.	Inchon Plant	4,800
Do.		do.	Pohang Plant	3,200
Do.		Dongkuk Steel Mill Co. Ltd.	Inchon Works	1,450
Do.		do.	Pohang Works	3,600
Do.		Korea Iron and Steel Co. Ltd.	Masan and Changwon Works	1,200
Talc		IL Shin Industrial Co. Ltd.	Choong Ju, Chungbuk Province	160
Do.		Korea Zinc Co. Ltd.	Onsan	430
Do.		Young Poong Corp.	Sukpo	280
Zinc		Korea Zinc Co. Ltd.	Onsan refinery	445
Do.		Young Poong Corp.	Sukpo refinery	303

Do., do. Ditto. NA Not available.
[1]Production data are not available.