



2014 Minerals Yearbook

NORTH KOREA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF NORTH KOREA

By Susan Wacaster

According to estimates by the Bank of Korea, which is the central bank of the Republic of Korea, the rate of growth of North Korea's real gross domestic product (GDP) increased by 1.0% in 2014 compared with that of 2013. The Bank of Korea has estimated information about the economy of North Korea in terms of real and nominal GDP since 1991 by compiling production data supplied by unspecified relevant institutions and by using the international System of National Accounts to develop GDP estimates.¹ The year-on-year real GDP rate of growth was estimated to have increased by 3.8% in both 2001 and 2005, which were the years with the highest rates of growth since 1990; the average annual rate of growth for 1990 to 2014 was less than 1%. Real GDP in 2014² was estimated to be about \$30 billion compared with \$28 billion in 2013, and the nominal GDP was estimated to be about \$31 billion compared with \$32 billion in 2013. The nominal gross national income of North Korea was estimated to be about \$33 billion in 2014 compared with \$31 billion in 2013 (Bank of Korea, 2015, p. 1, 4).

Bilateral trade with China as well as foreign aid and direct investment from China have been critical for productivity in North Korea. From 2003 to 2009, China's investments in North Korea amounted to about \$98 million.³ Nonetheless, because of limitations on development resulting from international sanctions on North Korea, the country's outdated infrastructure, and the way that resources are allocated in the country, China's investments in North Korea accounted for just 3% of the total foreign investment that China directed to other countries of the region (including Burma, North Korea, the Republic of Korea, Mongolia, Thailand, and Vietnam) during the same period of time. Of the 138 China and North Korea joint-venture agreements established from 1997 to 2010, 41% were in extractives industries, 38% were in light industries, 13% were in services (unspecified), and 8% were in heavy industries (Thompson, 2011, p. 3, 4).

Minerals in the National Economy

The mining and manufacturing sectors combined were estimated to have accounted for 34.4% of the country's nominal GDP in 2014. The mining sector accounted for 13.1% of the nominal GDP in 2014 compared with 13.6% in 2013 and 14.0% in 2012. The value of mining output in 2014 based on real GDP estimates increased by 1.6% to about \$4 billion compared with that of 2013. The year-on-year rate of change in the value of heavy industrial and chemical manufacturing, which included

the fabrication of metal products, decreased by 5.6% in 2014 compared with that of 2013 (Bank of Korea, 2015, p. 3, 6).

Production

North Korea was known to have coal, copper, gold, graphite, iron ore, lead, limestone, magnesite, salt, tungsten, and zinc resources. Production of processed minerals in the past included cadmium, cement, coke, refined copper, ferroalloys, refined lead, nitrogen fertilizer materials, pig iron, crude steel, and refined zinc (table 1). Reported estimates of North Korea's total production capacity of nonferrous metals, which was given only for lead and zinc (unspecified as to product form), was about 400,000 metric tons (t) in 2013 (the most recent year for which data were available). Of that amount, 77% of nonferrous metal production capacity was accounted for by zinc, and the rest was accounted for by lead. Mine production rates in North Korea, however, were low compared with the estimated installed capacities. In 2006, the Musan iron ore mine was reported to be operating at about 30% of capacity and, as of 2007, the Daeheung magnesite mine was reported to be operating at 60% of capacity. As of 2011, it was thought that most mine facilities were operating at production rates of less than 30% of capacity owing in part to deteriorating infrastructure and a marginally operating electrical grid (Kyung-soo, 2011; Statistics Korea, 2014, p. 76).

Structure of the Mineral Industry

North Korea's mineral industry included a coal-mining sector, a ferrous and nonferrous metals sector, an industrial minerals sector, and petroleum refining capacity. Mining and mineral enterprises in North Korea were primarily owned and operated by the Central Government. Companies from China, the Republic of Korea, and other countries had participated in joint ventures with North Korea for the development and operation of mineral facilities. As of 2011, about 25 mining projects in North Korea were joint ventures with foreign investors. In 2012 (the most recent year for which data were available), the country had an estimated total of 696 mines, of which 240 were coal mines, 234 were metal mines, and 222 were nonmetal mines (table 2; Statistics Korea, 2014, p. 69).

Mineral Trade

The reported value of North Korea's total trade (exports plus imports, excluding trade between North Korea and the Republic of Korea) increased by 3.6% in 2014 to \$7.6 billion compared with that of 2013. From 1995 through 2007, the total value of trade had fluctuated but increased overall, and included a low of \$1.4 billion in 1998 (when it decreased by 33.7% compared with that of 1997) and a high of \$3.8 billion in 2008; the overall increase during this period indicates that the economy of

¹Estimates by the Bank of Korea were based on prices and value-added ratios for the Republic of Korea. Where necessary, values have been converted from Republic of Korea won (KRW) to U.S. dollars (US\$) at an average rate of KRW\$1,052=US\$1.00 in 2014 and KRW\$1,094=US\$1.00 for 2013.

²When values for gross domestic product and gross national income are converted from KRW to US\$, the rate of growth between years becomes skewed. Values have been rounded to the nearest billion.

³All data for trade were reported in U.S. dollars.

North Korea benefited from increased global prices for mineral commodities in the mid-2000s. Thereafter, with the exception of a slight decrease in 2009 to \$3.4 billion (when total trade decreased by 10.5% compared with that of 2008), the total value of trade continued to increase through 2014. The decreases in North Korea's total trade value in 1998 and 2009 indicate that the country's economy was affected by the global recessions of 1998 and 2008 to 2009 (prior to 2009, the International Monetary Fund classified global annual GDP growth rate of 3.0% or less as a global recession) (Bank of Korea, 2015, p. 4; Statistics Korea, 2014, p. 78).

The value of North Korea's exports decreased by 1.7% to \$3.2 billion in 2014 compared with that of 2013 and exports of mineral origin decreased by 17.1%. The value of imports to North Korea in 2014 increased by 7.8% to \$4.5 billion, and imports of machinery increased by 27%. From 2009 through 2013 (the most recent years for which data were available), China accounted for about 80% to 90% of total trade with North Korea, excluding trade between North Korea and the Republic of Korea (Statistics Korea, 2014, p. 84, 93).

The value of bilateral trade between North Korea and the Republic of Korea increased by 106.2% in 2014 to \$2.3 billion. The value of trade between North Korea and Republic of Korea had generally trended upward since the mid-1990s until it decreased significantly in 2013, which may have resulted from diplomatic strains between the two countries. The increase in bilateral trade in 2014 was attributed to expanded trading of electronics and textiles (Bank of Korea, 2015, p. 4–5).

Commodity Review

Metals

Iron Ore.—The Musan iron ore mine, which had been operating intermittently owing to power shortages, ceased production completely at the end of 2014 for at least 2 months. About 40% of the mine's workforce, which reportedly earned less than \$4.00 per day, was expected to be laid off. North Korea reportedly rejected a request from China to lower the price of its iron ore shipments to \$50 per metric ton, resulting in reduced exports to China in 2014 (Min, 2015).

Lead and Zinc.—According to the United Nations Commodity Trade Statistics database, North Korea exported about 106,000 t of lead ore and concentrate valued at about \$56.4 million and about 19,000 t of zinc ore and concentrate valued at about \$7 million in 2014. All the exported lead and zinc was reported to have been received by China (United Nations Statistics Division, 2015).

Mineral Fuels and Related Materials

Coal.—Russia and North Korea had conducted negotiations over a production-sharing agreement that would result in exports of metallurgical coal from North Korea in return for a \$25 billion 20-year investment into the North Korea railway network. The railway renovation commenced in October 2014. The railway runs between coalfields in the South Pyongan Province and the country's west coast at Nampo. Mining would

reportedly take place simultaneously as improvements were made to the railway. From 1995 through 2013 (the most recent years for which data were available), coal had accounted for a steadily increasing share of North Korea's total primary energy production (49% in 2013 compared with 69% in 1995) (Yonho, 2014; Statistics Korea, 2014, p. 112).

Refinery Products.—North Korea was known to have two oil refineries. The country had reportedly been operating only one of the refineries, which was located at the Ponghwa chemical factory, since the Sungni chemical plant in Sonbong was shut down in 1995. The Ponghwa site is also the location of the Chongchong-gang thermoelectric powerplant, which was constructed in the mid-1970s with assistance from China, the Friendship Oil Pipeline that linked the refinery to petroleum products storage facilities in China's Dandong region, and a petrochemical research institution. The former Soviet Union built the Sungni plant in the early 1970s and supplied the country with crude petroleum until North Korea could not make market value cash payments; the Sungni chemical plant ultimately closed in 1995 (Bermudez, 2015).

Outlook

The mining sector in North Korea is not directly subject to international economic sanctions and is, therefore, the only legal, lucrative source of investment trade available to the country. Improvements to the country's mineral sector in the near- to mid-term seem more likely than in the recent past, but international sanctions, political tensions, lack of infrastructure, lack of investment, and a high level of sovereign risk still limit the options that are available to North Korea and any potential foreign investors. The degree to which China will remain a leading source of foreign currency for North Korea may decline as China implements environmental regulations that could decrease its demand for certain grades of coal.

References Cited

- Bank of Korea, 2015, Gross domestic product estimates for North Korea for 2014: Bank of Korea, July 17, 7 p. (Accessed November 17, 2015, at <http://www.bok.or.kr/contents/total/eng/boardView.action?menuNavId=634&boardBean.brdId=16312&boardBean.menuId=634>.)
- Bermudez, J.S., 2015, North Korea's Ponghwa chemical factory: 38 North. (Accessed November 25, 2015, at <http://38north.org/2015/07/jbermudez071015>.)
- Kyung-soo, Choi, 2011, The mining industry of North Korea: Nautilus Institute for Security and Sustainability, August 5. (Accessed November 25, 2015, at <http://nautilus.org/napsnet/napsnet-special-reports/the-mining-industry-of-north-korea>.)
- Min, C.S., 2015, Musan Mine to lay off 10,000 workers: DailyNK, January 20. (Accessed November 25, 2015, at <http://www.dailynk.com/english/read.php?num=12820&CataId=nk01500>.)
- Statistics Korea, 2014, 2014 Major statistics indicators of North Korea: Seoul, Republic of Korea, Statistics Korea, December, 217 p.
- Thompson, Drew, 2011, Silent partners—Chinese joint ventures in North Korea: Washington, DC, United States—Korea Institute at the School of Advanced International Studies, February, 86 p.
- United Nations Statistics Division, 2015, United Nations commodity trade statistics database (UN Comtrade): United Nations Statistics Division database. (Accessed January 3, 2015, via <http://comtrade.un.org/db>.)
- Yonho, Kim, 2014, Russia—North Korea strike deal—Improved railway for mineral resources: Voice of America News. (Accessed November 25, 2015, at <http://www.voanews.com/content/russia-to-overhaul-north-koreas-railway-in-return-for-mineral-resources/2513493.html>.)

TABLE 1
NORTH KOREA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ^{3,4}	2010	2011	2012	2013	2014
METALS					
Cadmium metal, smelter	200	200	200	200	200
Copper:					
Mine output, Cu content	4,600 ^r	7,000 ^r	6,700 ^r	6,200 ^r	14,400
Metal, primary and secondary:					
Smelter	15,000	15,000	15,000	15,000	15,000
Refinery	12,000	12,000	12,000	12,000	12,000
Gold, mine output, Au content	kilograms	2,000	2,000	2,000	2,000
Iron and steel:					
Iron ore and concentrate:					
Gross weight	thousand metric tons	5,000 ^r	5,000 ^r	5,000 ^r	6,000
Fe content	do.	2,500 ^r	2,500 ^r	2,500 ^r	2,800
Metal:					
Pig iron	do.	250	250	250	250
Ferroalloys, unspecified	do.	22	21	25	30
Steel, crude	do.	1,200 ^r	1,300 ^r	1,200 ^r	1,200
Lead:					
Mine output, Pb content	26,000	32,000	38,000	59,000	53,100
Metal, primary and secondary:					
Smelter	9,000	9,000	9,000	9,000	9,000
Refinery	4,000	3,000	3,000	3,000	3,000
Silver, mine output, Ag content	50	50	50	50	50
Tungsten, mine output, W content	110	110	100	65	70
Zinc:					
Mine output, Zn content	29,000 ^r	38,000 ^r	34,000 ^r	35,000 ^r	36,000
Metal, primary and secondary	26,000 ^r	36,000 ^r	30,000 ^r	31,000 ^r	32,000
INDUSTRIAL MINERALS					
Cement, hydraulic	thousand metric tons	6,100 ^r	6,300 ^r	6,400	6,600
Graphite		10,000	10,000	10,000	10,000
Magnesia		250,000	250,000	178,000	180,000
Nitrogen, N content of ammonia	thousand metric tons	200 ^r	200 ^r	200 ^r	200
Phosphorous content of fertilizer		90,000	90,000	90,000	95,000
MINERAL FUELS AND RELATED MATERIALS					
Coal	thousand metric tons	41,000	41,000	41,500 ^r	41,000
Coke	do.	2,000	2,000	2,000	2,000

^rRevised. do. Ditto.

¹Estimated data are rounded to no more than three significant digits.

²Table includes data available through November 25, 2015.

³In addition to the commodities listed, crude construction materials, such as salt, sand and gravel, sulfur, stone, and refined petroleum products are produced, but available information is inadequate to make reliable estimates of output.

⁴Because of the lack of official reported data, mineral commodity production numbers have been estimated.

TABLE 2
NORTH KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^e
Cement		Sunchon Cement Complex	Pyongnam Province	3,000
Do.		Samgwong Cement Complex	Kangwon Province	2,500
Do.		Gomusan Cement Factory	Hambuk Province	2,000
Do.		Cheonnaeri Cement Factory	Hamnam Province	1,000
Coal		Anju Coal Mining Complex and Sunchon Coal Mining Complex	Pyongbuk and Pyongnam Provinces	9,500
Do.		Saebjol Coal Mining Complex and Northern Coal Mine Enterprise	Hambuk Province	6,000
Copper, mine output, Cu content		Hyesan Youth Copper Mine (owned by Wanxiang Industrial Group, 51%, and Huizhong Mineral Industry, 49%)	Yanggang Province	15
Gold, mine output, Au content	kilograms	Kumsan Joint Venture Co.	Hambuk Province	530
Do.	do.	Daebong Mine	Yanggang Province	150
Graphite		Yeongchon Graphite Mine (joint venture of Korea Resources Corp. and the Government of North Korea)	Hwangnam Province	75
Iron ore, concentrate, gross weight		Ministry of Metal and Machinery, Department of Mines, Musan Iron Ore Mine Complex	Hambuk Province	10,000
Do.		Unryul Mine	Hwangnam Province	1,000
Lead:				
In concentrate		Korea Zinc Industrial Group	do.	60
Refined		do.	Kangwon Province	32
Magnesia clinker		Korea Magnesia Clinker Industry Group (KMCIG) and Quintermina AG	Hambuk and Hamnam Provinces	1,200
Magnesite, concentrate, gross weight		Korea Magnesia Clinker Industry Group (KMCIG)	do.	2,500
Steel, crude				
Do.		Kim Chaek Iron and Steel Complex (Ministry of Metal and Machinery)	Hambuk Province	2,400
Do.		Hwanghae (Hwanghai) Iron Works	Hambuk Province	1,500
Do.		Kangson Works	Hwanbuk Province	960
Do.		Chollima Steel Works	Pyongnam Province	760
Zinc:				
In concentrate		Korea Zinc Industrial Group	Hamnam and Hwangnam Provinces	80
Refined		do.	Hamnam and Kangwon Provinces	100

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto.