The Mineral Industry of North Korea

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The year 1977 marked the end of the fourth economic development plan (1971-77). It was generally believed that the Government's goals were overly ambitious, and the various sectors of the economy did not fulfill their goals;[2] hence, the plan, originally covering the period 1971-76, was extended another year. During this period, which was North Korea's first 7-year plan period, North Korea's development was hampered by recession and its inability to meet payments on the country's outstanding foreign debt. In 1973, the Government initiated new policies to achieve economic parity with its counterpart in the south, the Republic of Korea. In this plan, the Government began to import modern industrial equipment from market economy countries as well as from its allies. During 1974, purchases from market economy countries totaled $786 million, of which $253 million was for machinery. In 1975, these purchases were $560 million and in 1976 were reduced to $300 million. Beginning in 1975, however, the Government was unable to meet payment of part of its outstanding debt, which was then estimated at $1.3 billion and has escalated as a result of purchases in 1976-77. Reportedly, the People's Republic of China and the U.S.S.R. began reducing economic aid to North Korea. Also, the Government began to negotiate a repayment formula for its financial obligations to European and Japanese banks. While it was believed that agreement was reached on rescheduling payment on overdue debts, no official announcements were made. North Korea, however, was believed to have successfully negotiated terms of 2 to 5 years on repayment of overdue notes at an annual interest rate of 7.3% to 8%.

The fifth economic plan, which was the second 7-year plan (1978-84), calls for doubling and even tripling some output targets. While the present plan was "designed to further the strength of the country both in terms of economic independence and in strengthening the scientific-technical levels," the new economic plan "proposed high goals without precedent" and "is a grand economic program which anticipates rapid development."

The Government characterized the basic tasks of the second 7-year plan as follows: "During the new long-term plan period, we must further step up Chuche in the people's economy to permanently establish a strong source of fuel, motive power, and raw material bases in the nation. We must further strengthen the self-sufficient system of our economy by creating new industrial sectors, and by developing the economy with more diversity and comprehensiveness."[3]

During the new plan period, "industry will gallop at a highly accelerated rate, on the average of 12.1% annually." The proposed production goals of the fifth economic plan as well as the targets of the third and fourth plans were as follows, in million tons unless otherwise specified:

Sector	1970	1977	1984
Iron ore	7.2	NA	16.0
Pig iron	2.3	3.5-3.8	6.4-7.0
Steel:			
Crude	2.2	3.8-4.0	7.4-8.0
Rolled	1.7	r2.8-3.8	5.6-6.0
Nonferrous metals	.16	.45	1
Cement	4.0-4.5	7.5-8.0	12-13
Chemical fertilizers	1.5	2.8-3.0	5
Magnesium clinker	NA	1.6	NA
Coal	27.5	50-53	100
Electricity billion kilowatt-hours	16.5	28-30	56.60

rRevised. NA Not available.

While the second 7-year plan projects slower growth, it has been conjectured that targets in key areas appear unrealistic.[4] Since 1975, North Korea has been cut off from additional credit from market economy countries, and no major import contracts have been signed. The goals for electric power, steel, and cement will probably not be met owing to the country's inability to import the required machinery and equipment.

PRODUCTION[5]

North Korea produces a variety of mineral commodities. Important minerals extracted are anthracite and bituminous coal, graphite, lead-zinc, magnesite, magnetite, and tungsten. In fact, North Korea is believed to be the world's second largest producer of magnesite, anthracite, and graphite; it is a medium-size producer of lead and zinc and a significant steel producer, following only Japan, China, and India in the Orient. Apatite, barite, copper, gold, and talc also are produced. The country has large reserves of coal, but petroleum and natural gas have not been discovered.

All of the country's mineral industries are State-owned. Moreover, the Government of North Korea does not publish mineral production data for dissemination. The production data given in table 1 denote a relative order of magnitude of North Korea's output of minerals and fuels. Output by the mineral sector comprises about 20% of the country's gross national product (GNP).

Government ministries and agencies which provide guidance and assistance to North Korea's mineral industries include the Ministry of Building Materials Industry (cement and construction), the Mining Industry Committee (coal and general mining), the General Bureau of Coal Industry, the General Bureau of Geology (surveying), the Ministry of Metallurgical Industry, and the Ministry of Chemical Industry.

Table 1.—North Korea: Estimated production of mineral commodities

(Metric tons unless otherwise specified)

Commodity[1]	1975	1976	1977[p]
METALS			
Aluminum, ingot, primary	10,000	10,000	10,000
Cadmium, smelter	110	120	130
Copper:			
Mine output, metal content	13,000	[r]15,000	15,000
Metal, primary and secondary:			
Smelter	18,000	20,000	20,000
Refined	18,000	25,000	25,000
Gold, mine output, metal content, troy ounces	160,000	160,000	160,000
Iron and steel:			
Ore and concentrate, thousand tons	9,400	9,500	9,700
Metal:			
Pig iron[2], do	2,900	3,000	3,500
Ferroalloys, do	100	100	120
Steel, crude, do	2,900	3,000	3,500
Semimanufactures, do	2,700	2,800	3,300
Lead:			
Mine output, metal content	120,000	[r]110,000	110,000
Metal, primary and secondary	80,000	[r]70,000	70,000
Silver, mine output, metal content, thousand troy ounces	1,600	1,600	1,600
Tungsten, mine output, metal content	2,150	2,150	2,150
Zinc:			
Mine output, metal content	160,000	[r]150,000	150,000
Metal, primary	140,000	[r]135,000	135,000
NONMETALS			
Barite	120,000	120,000	120,000
Cement, hydraulic, thousand tons	6,000	[r]7,000	7,000
Fertilizer materials, crude: Natural phosphate	450,000	450,000	450,000
Fluorspar	30,000	30,000	40,000
Graphite	75,000	75,000	75,000
Magnesite:			
Crude, thousand tons	1,500	1,500	1,500
Calcined, do	500	500	500
Pyrite and pyrrhotite (including cupreous), gross weight	[r]640,000	[r]600,000	610,000

See footnotes at end of table.

Table 1.—North Korea: Estimated production of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity[1]		1975	1976	1977[p]
NONMETALS —Continued				
Salt, all types		540,000	540,000	550,000
Sulfur:				
From pyrite	thousand tons	260	245	250
Byproduct of metallurgy	do	16	20	12
Total	do	276	265	262
Talc, soapstone, pyrophyllite		130,000	130,000	130,000
MINERAL FUELS AND RELATED MATERIALS				
Coal:				
Anthracite	thousand tons	32,000	33,000	34,500
Bituminous and lignite	do	8,000	8,000	8,500
Total	do	40,000	41,000	43,000
Coke	do	2,200	2,500	3,000

[p]Preliminary. [r]Revised.

[1]In addition to the commodities listed, a variety of other mineral commodities may be produced, but available information is inadequate to make reliable estimates of output levels. These include (but are not limited to) antimony, arsenic (in arsenopyrite), asbestos, beryl, bismuth, boracite, kaolin (china clay), chromium, cobalt, columbite, germanium, indium, lithium minerals (lepidolite), manganese ore, mica (phlogopite), molybdenite, monazite, nickel and/or ferronickel, selenium, tellurium, titanium minerals (ilmenite and rutile), zircon, and a variety of crude construction materials including miscellaneous clays, glass sand, building sand, stone (crushed and dimension), and gravel.

[2]Includes granulated iron.

TRADE

Although all trade transactions are conducted by the Government, it does not publish official foreign trade data for dissemination. Trade data, given in tables 2 and 3, are derived from published import-export information of selected trading partner countries.

North Korea's total trade value in 1977 was probably around $1.0 billion to $1.5 billion. The country's chief exports are manufactured light industry goods, some raw materials, and foodstuffs. The leading mineral exports include iron ore, pig iron, steel semimanufactures, lead and zinc, tungsten, cement, magnesite, and talc. The country imports machinery and transportation equipment, mineral fuels, foodstuffs, and selected raw materials such as coal, coke, and chromium and manganese ores. North Korea's main trading partners were China, Japan, and the U.S.S.R., not necessarily in that order. Other trading partners have included Australia, Canada, Israel, New Zealand, European countries, and member countries of the Council for Mutual Economic Assistance.

The principal Government corporations that handle North Korea's trade in science and technology transfers, minerals, and value-added mineral products include Korea Complex Equipment Export Corp., Korea JEIL Equipment Import Corp., Korea Industrial and Technical Corp., Korea Technical Corp., Korea Machinery Export Corp., Korea Machinery Import Corp., Korea Minerals Export and Import Corp., Korea Ferrous Metals Export and Import Corp., Korea Nonferrous Metals Export and Import Corp., Korea Chemicals Export and Import Corp., Korea Building Materials Export and Import Corp., Korea Ponghwa Trading Corp., Korea Kwangmyong Export and Import Corp., Korea Daesong Trading Corp., Korea P'yongyang Trading Co., Ltd., and Korea Okryu Trading Corp.

Table 2.—North Korea: Apparent exports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1975	1976	Principal destinations, 1976
METALS			
Copper metal including alloys:			
Scrap	795	596	All to West Germany.
Unwrought	2,708	2,951	West Germany 2,298; Belgium-Luxembourg 453.
Iron and steel metal:			
Pig iron	141,384	187,020	Japan 119,712; U.S.S.R. 34,307.
Ferroalloys	2,886	3,477	U.S.S.R. 3,380.
Steel, primary forms	5,147	7,097	All to Yugoslavia.
Semimanufactures	125,642	55,768	U.S.S.R. 55,754.
Lead metal including alloys, unwrought	62,620	[2]39,781	West Germany 18,714; Japan 11,627.
Silver, unworked and partly worked, value, thousands	$20,940	$12,913	West Germany $9,240; France $1,971; Japan $1,701.
Tungsten:			
Ore and concentrate	--	5	All to United Kingdom.
Metal	3	5	All to West Germany.
Zinc:			
Ore and concentrate	52,299	47,024	Yugoslavia 25,207; Japan 21,817.
Metal including alloys, unwrought	56,169	[2]38,812	Japan 27,277; France 3,973.
Other:			
Metal-bearing metallurgical residues	2,808	3,912	All to Japan.
Base metals including alloys, all forms, n.e.s	119	233	West Germany 181.
Nonferrous metals including alloys:			
Unwrought	--	[2]3,348	All to U.S.S.R.
Semimanufactures	--	[2]9,517	Do.
NONMETALS			
Clays, not further identified	9,096	11,535	Japan 11,280.
Cement, hydraulic, thousand tons	500	275	All to U.S.S.R.
Fertilizer materials: Ammonium nitrate	15,426	15,077	Do.
Fluorspar	4,350	2,434	All to Poland.
Graphite	20,356	7,063	All to Japan.
Magnesite, including powder	629,946	621,408	U.S.S.R. 342,835; Poland 116,877; Japan 92,840.
Stone, sand and gravel:			
Dimension stone, crude and partly worked	10,376	8,408	All to Japan.
Gravel and crushed rock	--	2,271	Do.
Quartz and quartzite	9,900	4,004	Do.
Talc, soapstone, steatite	119,349	47,465	Japan 38,892; Poland 8,573.
Other:			
Oxides of magnesium, strontium, barium	--	484	All to Finland.
Ground minerals	2,058	1,292	All to Hungary.
MINERAL FUELS AND RELATED MATERIALS			
Coal, anthracite and bituminous	36,938	70,036	All to Japan.

[1]Data are compiled from the 1976 edition of the United Nations Supplement to the World Trade Annual, v. 5, as well as official trade statistics of Hungary, Poland, and the U.S.S.R.
[2]1976 data exclude figures for the U.S.S.R., which are not broken down by individual metal but rather are reported as "Nonferrous metals including alloys: Unwrought and Semimanufactures."

Table 3.—North Korea: Apparent imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1975	1976	Principal sources, 1976
METALS			
Aluminum metal including alloys, all forms	1,923	[2]1,199	Yugoslavia 697; Hungary 254; Japan 222.
Chromium ore and concentrate	20,000	11,000	All from U.S.S.R.
Copper metal including alloys, all forms	79	71	All from Japan.
Iron and steel metal:			
Pig iron	[r]1,242	1,500	All from Australia.
Ferroalloys	7,148	8,379	U.S.S.R. 7,812; Japan 567.
Semimanufactures:			
Bars, rods, angles, shapes, sections	NA	906	All from Japan.

See footnotes at end of table.

Table 3.—North Korea: Apparent imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1975	1976	Principal sources, 1976
METALS —Continued			
Iron and steel metal —Continued			
Semimanufactures —Continued			
Plates and sheets	NA	11,565	Japan 4,842; Belgium-Luxembourg 4,827.
Hoop and strip	NA	87	All from Japan.
Rails and accessories	NA	400	Do.
Wire	NA	40	All from U.S.S.R.
Tubes and pipes	NA	3,273	Japan 1,728; U.S.S.R. 1,411.
Unspecified	--	3,197	All from U.S.S.R.
Total	37,670	19,468	
Lead ore and concentrate	--	3,728	All from Japan.
Manganese:			
Ore and concentrate	20,000	20,300	U.S.S.R. 20,000.
Oxide	--	2,700	All from Japan.
Nickel metal including alloys, all forms	255	50	Do.
Platinum-group metals including alloys value, thousands	--	$44	Japan $28.
Other:			
Oxides, hydroxides, peroxides of metals	--	10	All from Japan.
Nonferrous metals including alloys, unwrought	--	[2]192	All from U.S.S.R.
Metals including alloys, all forms, n.e.s	87	1	Do.
NONMETALS			
Abrasives: Grinding and polishing stones	--	4	Do.
Asbestos	3,341	[3]935	All from Australia.
Boron oxide and acid	--	60	All from Japan.
Clay products, refractory	10,681	3,044	Do.
Fertilizer materials, manufactured:			
Nitrogenous	15,000	2,200	Do.
Potassic	43,184	43,309	All from U.S.S.R.
Stone, dimension, worked	--	39	All from Japan.
MINERAL FUELS AND RELATED MATERIALS			
Coal, all grades thousand tons	189	167	All from U.S.S.R.
Coke do	204	222	U.S.S.R. [e]170; Poland 52.
Petroleum, crude, and refinery products do	1,110	1,061	All from U.S.S.R.
Mineral tar and other coal-, petroleum-, or gas-derived crude chemicals	--	51	NA.

[e]Estimate. [r]Revised. NA Not available.

[1]Data are compiled from the 1976 edition of the United Nations Supplement to the World Trade Annual, v. 5, as well as official trade statistics of Hungary, Poland, and the U.S.S.R.

[2]1976 data exclude figures for the U.S.S.R., which are not broken down by individual metal but rather are reported as "Nonferrous metals including alloys, unwrought."

[3]Excludes data for the U.S.S.R., which was not reported separately in the official trade statistics of the U.S.S.R.

COMMODITY REVIEW

METALS

Iron and Steel.—The current production capacity of iron ore and concentrate was around 11 million to 12 million tons. About 60% of the total production was from the Musan mine, which has an annual output capacity of 6.5 million tons. The Musan mine was reportedly undergoing expansion and modernization. The bulk of the remaining output was from the Chaeryong, Hasong, Kaech'on, Komdok, Songnam, Tokhyon, Unyul, and Yongwon mines, all of which were small- to medium-size mines. The iron ore deposits at Toksong and Sohaeri were still undergoing development.

Annual pig iron production capacity was estimated at 3.5 million tons and that of steel semimanufactures at 2.8 million tons. Most of the production was locally consumed. Kim Ch'aek Iron Works in Ch'ongjin was the largest iron and steel complex in North Korea. Kim Ch'aek had two 800-ton blast furnaces, one 1,500-cubic-meter blast furnace, two 100-ton converter units, a hot-rolling mill from the U.S.S.R., and four coke ovens. A hot- and cold-rolling mill of 1-million-ton annual capacity was under construction with Soviet aid. Construction of a fifth coke oven and a storage area for raw materials is in the planning stage.

Hwanghae Iron Works at Songnim had three 250,000-ton blast furnaces, six open-hearth furnaces, and two coke ovens. Kang-

son Steel Works at Kangson's affiliate, April 13 Steel Works, had four rotary kilns for the production of granulated iron. The smaller steelworks in North Korea are the Kaech'on Rerolled Steel Plant at Kaech'on-gun, the Songjin Steel Works at Kimch'aek, the Puryong Alloy Plant at Ch'ongjin, and the P'yongyang Steel Plant at P'yongyang. Construction of a steelworks on the lower reaches of the Taedong River was planned. However, no information on the nature and status of this project is available.

Nonferrous Metals.—Lead and zinc continued to be the principal nonferrous metals produced in North Korea. The bulk of the domestic output of lead-zinc ore was from mines at Komdok and Songch'on. The country's lead-zinc smelters are located at Namp'o (zinc), Hamhung (55,000 tons of lead and 80,000 tons of zinc per year), and Munch'on-gun (the Munp'yong refinery, producing 70,000 tons of zinc per year). A lead-zinc refinery in the western district was planned, but construction had not been undertaken.

North Korea produces refined copper mostly from imported concentrate and from indigenous ore. The country's copper refineries are located at Hamhung (the Hungnam refinery, producing 30,000 tons of electrolytic copper per year), Haeju, and Namp'o. A copper refinery was reportedly under construction at Tanch'on-gun.

Small aluminum remelting facilities are located at Chinampo, Hungnam, and Tasado. Domestic requirements for aluminum are met by imports. However, a 20,000-ton-per-year aluminum smelter was planned for construction at Pukch'ang-gun.

North Korea annually provides about 5% of the world production of tungsten. The country also produces small quantities of antimony, cadmium, germanium, gold and silver, indium, lithium, manganese, molybdenum, nickel, and rare earths, but in most cases, information is inadequate to make reliable estimates of output levels.

NONMETALS

Cement.—The annual production capacity for cement using indigenous limestone was around 7 million to 8 million tons. About half of the total output was from the Sunch'on cement plant, the largest cement operation in the country. During the second 7-year plan, the Sunch'on plant was to be expanded to 5 million tons annual capacity. North Korea's cement facilities were as follows:

Plant	Location	Remarks
Ch'ongjin	Ch'ongjin (North Hamgyong).	
Ch'onnae-ri	Ch'onnae-ri (Kangwon)	5 rotary furnaces.
Haeju	Haeju (South Hwanghae)	4 rotary furnaces.
Kangson	Kangson.	
Komusan	Ch'ongjin (North Hamgyong)	2 rotary furnaces.
Kowon	Kowon-gun (South Hamgyong).	
Kujang	Kujang-gun (North P'yongan).	
Madong	Pongsan-gun (North Hwanghae).	
Pihyon	P'ihyon-gun (North P'yongan).	
Pukch'ang	Pukch'ang (South P'yongan).	
Purae-san	Kowon-gun (South Hamgyong)	2 rotary furnaces.
Pusan-ni	Pusan.	
Samhwasong	Munch'on-gun.	
Sinwon	Sinwon-gun (South Hwanghae).	
Sunch'on	Sunch'on-gun (South P'yongan)	3-million-ton-per-year capacity.
Sungho-ri	P'yongyang	4 rotary furnaces; 30,000-ton-per-year capacity.
Tokch'on	Tokch'on-gun (South P'yongan).	
Unsan	Unsan-gun (North P'yongan).	
Yongma	Paegam-gun (Yanggang).	

Fertilizer Materials.—Annual output of natural phosphate for fertilizers was around 450,000 tons. Small- to medium-scale phosphate fertilizer plants are located in almost all of the provinces. Based on Government estimations, North Korea's production level of chemical fertilizers currently ranges between 2.5 million and 3.0 million tons. Hungnam United Fertilizer was the largest producer of chemical fertilizers. Most of the remainder was from plants at Ch'ongsu and Sunch'on.

Plant	Location	Remarks
Aoji	Kyonghung-gun	Nitrogenous, phosphatic, ammonium bicarbonate.
Ch'ongjin	Ch'ongjin	Calcium cyanamide.
Ch'ongsu	Ch'ongsu-gun	Phosphatic, trace elements, calcium cyanamide.
Haeju Phosphate	Haeju	Phosphatic.
Haeju Smelting & Refinery	do	Do.
Huich'on	Huich'on	Calcium cyanamide.
Hungnam Smelting & Refinery	Hungnam	Phosphatic.
Hungnam United Fertilizer	Hamhung	Superphosphate, ammonium sulfate, calcium cyanamide, trace elements.
Hwanghae	Songnim	Phosphatic, ammonium sulfate.
Kaech'on	Kaech'on-gun	Calcium cyanamide.
Kanggye Bacterial	Kanggye.	
Kim Ch'aek	Ch'ongjin	Ammonium sulfate.
Munp'yong	Munch'on-gun	Phosphatic, trace elements.
Namp'o	Namp'o	Phosphatic.
Sinch'on	Sinch'on-gun	Calcium cyanamide.
Sinwon	Sinwon-gun	Slaked lime.
Sunch'on	Sunch'on-gun	200,000-ton-per-year capacity for calcium cyanamide.

MINERAL FUELS

Coal.—North Korea's major domestically produced fuel source is coal. Output in 1977 was about 43 million tons, compared with the target of 50 million to 53 million tons set in the fourth economic development plan ending in 1977. The total output was consumed locally for space heating and electricity generation. The remainder was bituminous coal, reportedly of good metallurgical grade. The Chollima Sinch'ang coal mine is the nation's largest producer. Additionally, there are large opencast workings at Yonghung. Additional coal production came from mines at Chik-tong, Ch'onsong, Huksong, Kaech'on, Kangdon, Kangso, Komdok, Kowon, Musan, Taedae-ri, Tokch'on, Toksong, Yongdae, and Yongmun. The mines at Kukdong and Yangjong were reportedly capable of producing up to 1 million tons of coking coal annually. Additionally, the mines at Aoji and Kogonwon were claimed to have produced large quantities of high-grade metallurgical coal.

Petroleum.—There are no known commercial occurrences of oil or natural gas in North Korea. Domestic demand for petroleum has been met through imports, principally from China and the U.S.S.R. A pipeline completed in late 1975 delivers Taching oil from China to North Korea. An oil refinery was built at Namhung to process Chinese crude oil and to provide naphtha feedstock for a petrochemical plant purchased from European concerns in 1971. The oil refinery on the eastern coast, which reportedly came onstream in 1974-75, presumably handles imports of crude oil from the U.S.S.R.

[1]Physical scientist, Branch of Foreign Data.
[2]Asia 1977 Yearbook (Hong Kong). Far Eastern Economic Review Limited. Dec. 21, 1976, pp. 255-259.
[3]Work cited in footnote 2.
[4]National Foreign Assessment Center. Washington, D.C. Korea: The Economic Race Between the North and the South. January 1978, 16 pp.
[5]Mining Journal, Mining Annual Review (London). June 1977, p. 398.