The mineral resources of North Korea

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Contents

1. North Korea mineral resources

Mineral resources in N.Korea are widespread and various, are found in abundance in almost all parts of the country, especially Hamkyung Do and Jakang Do.

The most important mineral resources that N.Korea possesses include magnesite, zinc, iron, tungsten, graphite, anthracite, gold, barite, apatite, molybden.

The magnesite is mostly rich in N.Korea. Total resources of magnesite are 6 billion tons in 2009. N.Korea has the second highest magnesite reserves in world, after China. It is used to manufacture refractories.

1. North Korea mineral resources

Mineral	Grade	Unit	Resources
Gold	Metal content	ton	**2,000**
Copper	Metal content	Thousand ton	**2,900**
Zinc	Metal content	Thousand ton	**21,100**
Iron	Fe 50%	Million ton	**5,000**
Tungsten	WO_3 65%	Thousand ton	**246**
Molybden	MoS_2 90%	Thousand ton	**54**
Nickel	Metal content	Thousand ton	**36**
Manganese	Mn 40%	Thousand ton	**300**

<Sources : USGS, KORES>

1. North Korea mineral resources

Mineral	Grade	Unit	Resources
Graphite	FC 100%	Thousand ton	**2,000**
Limestone	Ore content	Billion ton	**100**
Barite	Ore content	Thousand ton	**2,100**
Apatite	Ore content	Billion ton	**0.15**
Magnesite	MgO 45%	Billion ton	**6**
Anthracite	Coal content	Billion ton	**4.5**

<Sources : USGS, KORES>

2. North Korea mine production

N.Korea mines and mineral industries were owned and operated by the government.

Until 1990, Mine production were increased, but were decreased from 1990 to 2000 periods because of energy supply reduction, flood damage, and deterioration of mine machines, etc.

2. North Korea mine production

Since 2000, Iron and anthracite production were slightly increased.

In 1985, N.Korea mine production of anthracite totalled 37,500 kt. but, in 2009 decrease of 32% to 25,500 kt.

The iron ore were produced 9,800 kt in 1985, 49% less than in 2009(4,955 kt)

2. North Korea mine production

Mineral	Unit	‘04	‘05	‘06	‘07	‘08
Anthracite	Thousand ton	22,800	23,500	23,000	24,100	25,060
Iron	Thousand ton	4,580	5,000	5,040	5,130	5,316
Magnesite	ton	60,000	40,000	60,000	55,000	150,000
Copper	ton	12,000	12,000	12,000	12,000	12,000
Zinc	ton	62,000	67,000	67,000	70,000	70,000
Gold	Kg	`2,000	2,000	2,000	2,000	2,000

<Sources : USGS, KORES>

2. North Korea mine production

Mineral	Unit	‘04	‘05	‘06	‘07	‘08
Silver	ton	20	20	20	20	20
Tungsten	ton	280	650	900	250	350
Lead	ton	13,000	13,000	13,000	13,000	13,000
Fluorspar	ton	12,000	12,500	12,500	12,500	12,500
Graphite	ton	30,000	30,000	30,000	30,000	30,000
Apatite	ton	300,000	300,000	300,000	300,000	300,000

<Sources : USGS, KORES>

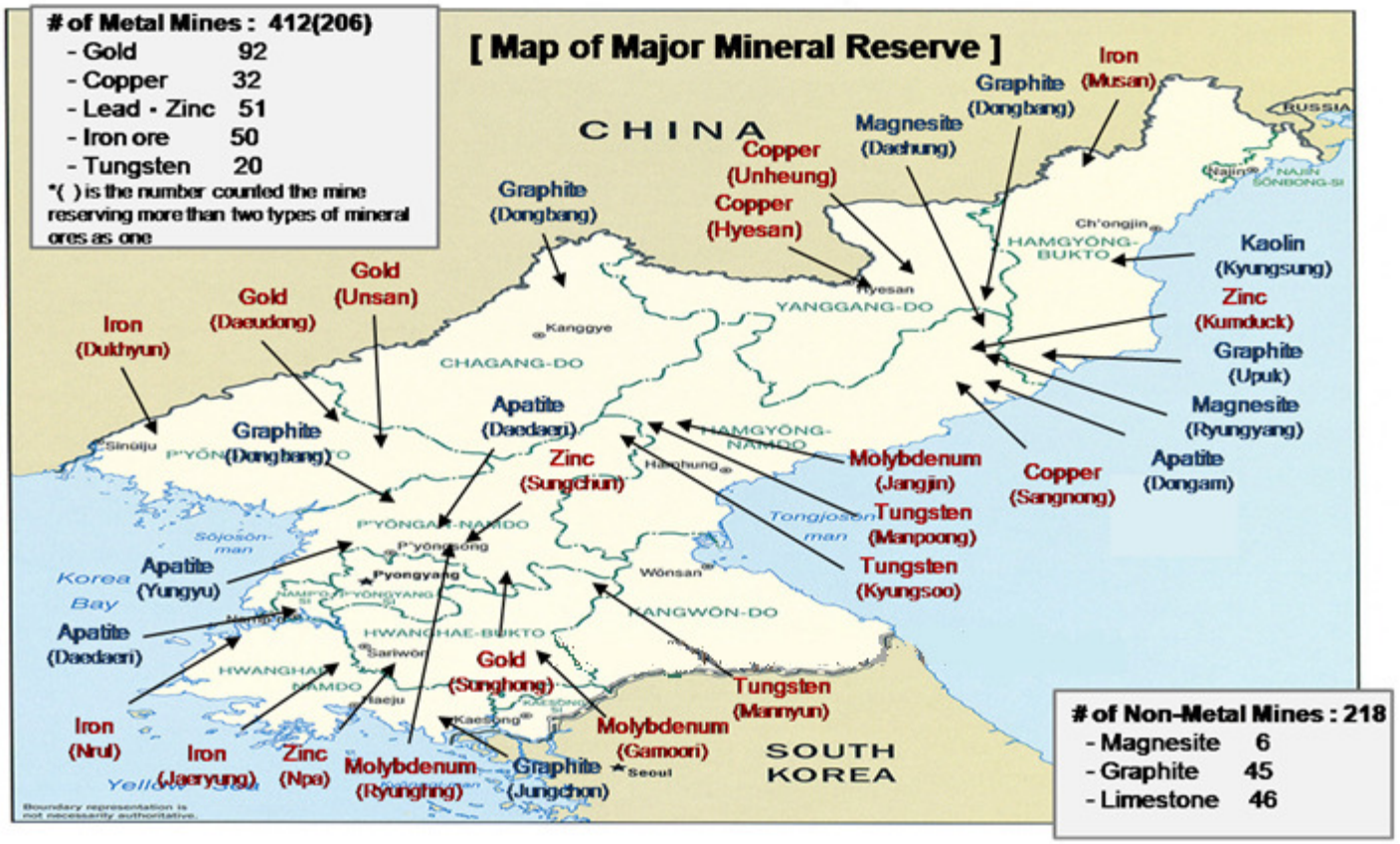
2. North Korea mine production

N.Korea mineral export to China and S.Korea

<ton>

Minerals	China				S.Korea
	Magnesite	iron	Lead	Anthracite	Anthracite
2007	26,299	1,348,717	42,006	3,741,267	235,976
2008	79,531	1,882,756	41,269	2,537,274	251,253
2009	58,251	897,418	32,108	2,972,187	467,962

3. The mines in North Korea



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3. The mines in North Korea

3-1 Dae-Hyeung Magnesite mine

Location : Hamkyungnam-do, Dancheon, DaeHyeung-dong

History : Redevelopment in 1982

Reserves : 820 million tons

Ore Grade : MgO 46.77%, SiO_2 0.73%, CaO 0.79%, R_2O_3 0.67%

3. The mines in North Korea

Development profile

Mining method : Open pit and underground(in winter season)

Mine production(capacity) : 600,000 t/a
90% open pit, 10% underground.

Mineral processing : Crushing and screening
Throughput(capacity) : 600,000 t/a

3. The mines in North Korea

Production(In 2006)

Produces about 360,000 tons of concentrate at a grade of MgO 46.77%

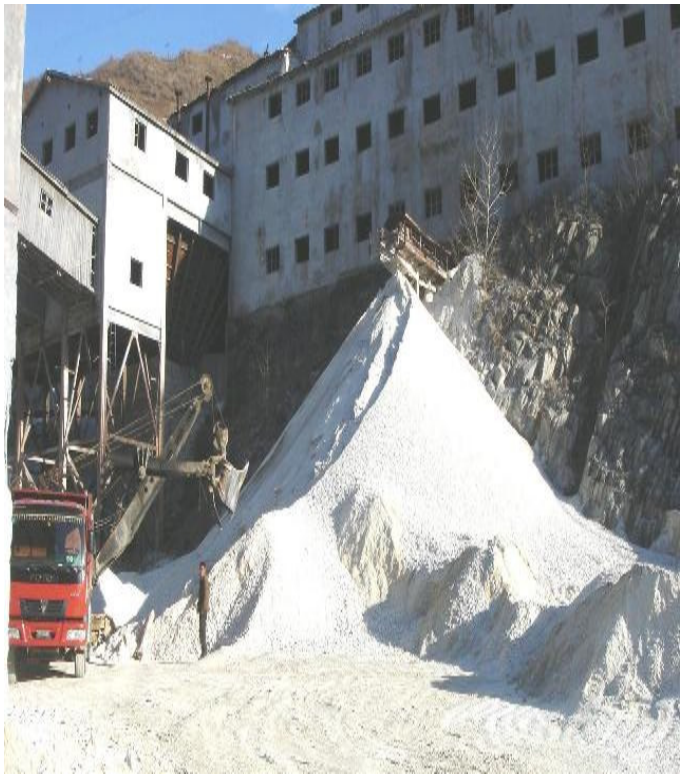
Infrastructure

Power station, 50MW, link to Hyeucheun hydroelectric power plant

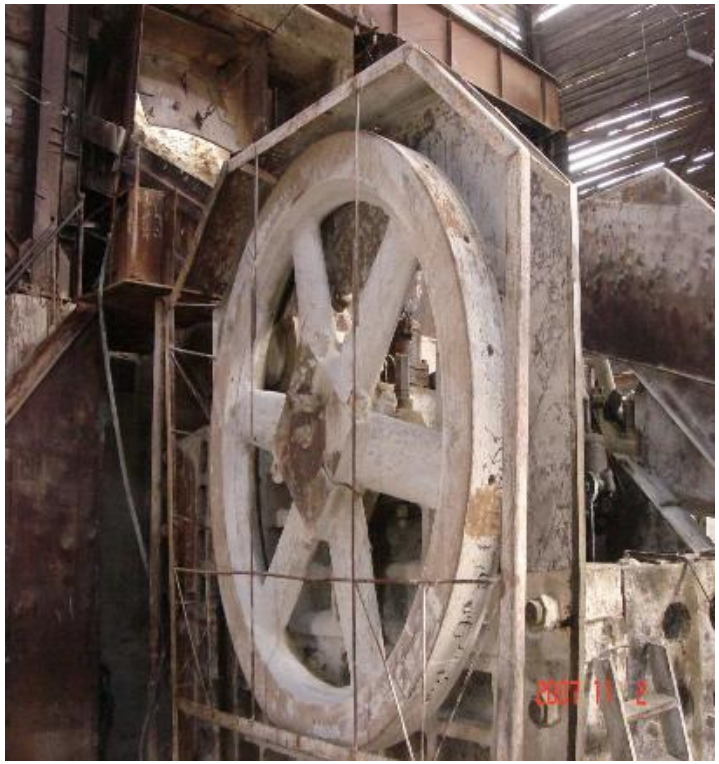
Railroad, 98km from mine site to Kimcheck port

Kimcheck port, loading capacity about 800,000 tons

3. The mines in North Korea



3. The mines in North Korea



3. The mines in North Korea

3-2 Kyumduck Zinc mine

Location : Hamkyungnam-do, Dancheon, Kyumgol-dong

History : Development in 1932

Reserves : 266 million tons

Ore Grade : Zn 4.21%, Pb 0.88%

Mineral : Sphalerite

3. The mines in North Korea

Development profile

Mining method : Underground

Mine production(capacity) : 10 Mt/a, 70% shrinkage,
30% sub-level stoping

Mineral processing : Flotation, Throughput(capacity) : 10 Mt/a

3. The mines in North Korea

Production(In 2006)

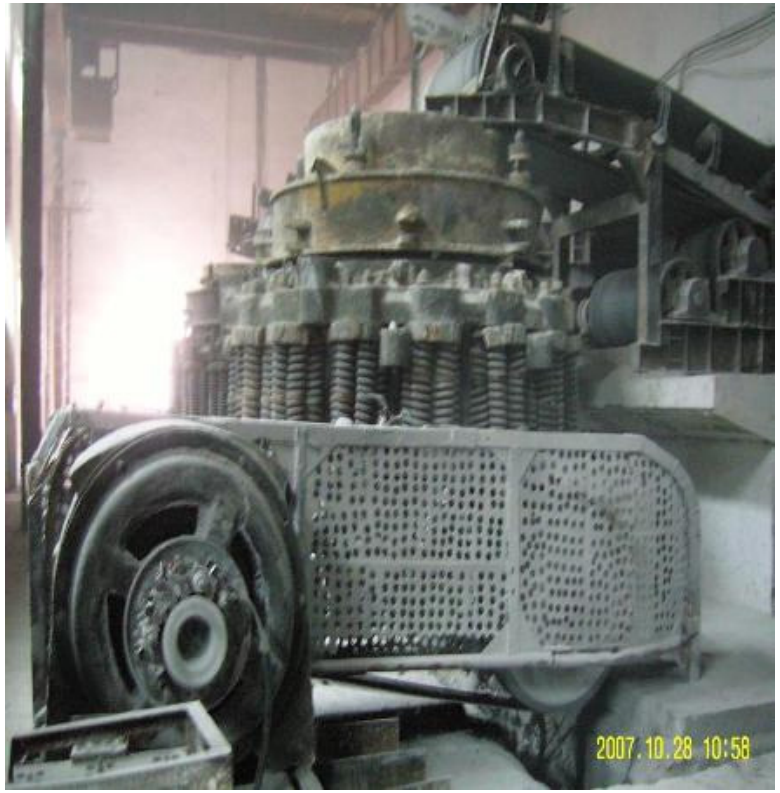
Ore : 3.5 Mt/a
Concentrate : Zn 196,000 t/a (Zn 53%), Recovery 52%
Pb 31,800 t/a (Pb 63%), Recovery 63%

Infrastructure

Power station, 50MW, link to Hyeuchen hydroelectric power plant
Water supply : Bukdaechen
Railroad, 78km from mine site to Kimcheck port
Kimcheck port, loading capacity about 800,000 tons

3. The mines in North Korea

3. The mines in North Korea



3. The mines in North Korea

3. The mines in North Korea

3-3 Musan Iron mine

Location : Hamkyungbuk-do, Musan-kun, chanrel district

History : Development in 1935

Reserves : 1.73 billion tons

Ore Grade : Fe 24%

Mineral : Magnetite

3. The mines in North Korea

Development profile

Mining method : Open pit

Mine production(capacity) : 10 Mt/a

Mineral processing : Magnetic separation(wet)
Throughput(capacity) : 7.5 Mt/a

3. The mines in North Korea

Production(In 2006)

Ore : 5 Mt/a
Concentrate : Fe 2 Mt/a (Fe 65%), Recovery 79.5%

Infrastructure

Link to Seodusu hydroelectric power plant(60,000V power line)
Water supply : Duman river
Railroad, 150km from mine site to Chengjin port

4. Inter-Korea mining cooperation project

4-1. Project summary

Mine : Jengchun graphite mne

Location : Hwanghaenam-do, Yenan-kun Jengchunri
38km east of the city of Haeju(port)

Stake sttructure
N.Korea : MyengJi company 50%
S.Korea : KORES 50%

4. Inter-Korea mining cooperation project

Mine management : MyengJi company

Mining Licences : J/V

Transaction

J/V was made, and raised U$10.2 million

MyengJi and KORES were invested U$5.1 million, respectively.

4. Inter-Korea mining cooperation project

History

In March 2002. MOU was signed between KORES and MyengJi company.

In May 2002. Mine survey was carried out.
J/V company was created in July 2003 under an agreement entered into between KORES and MyengJi company.

In April 2007 Mine construction was completed

4. Inter-Korea mining cooperation project

4-2 Mine Status

Reserves and Grade
Reserves : 6.25 million tons
Ore grade : FC 5.53%

The mining process are a conventional open pit operation**.**

Mine production(designed) capacity : 72,000 t/a

4. Inter-Korea mining cooperation project

Mineral processing method were conventional flotation and leaching process

Designed production was about 3,000t/a of concentrae at a grade of FC 98% graphite

4. Inter-Korea mining cooperation project

Production('09)

Ore : 36,000 t/a
Concentrate : FC 90%, 1,500 t/a, Recovery 80%

Infrastructure

Link to east Pyengyang thermal power generation plant
Installed 110KV power station(transformer) in mine
Water supply : Gyuamho
Road, 46km from mine site to Haeju port

4. Inter-Korea mining cooperation project

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Thank You