



# 2011 Minerals Yearbook

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## MONGOLIA

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# THE MINERAL INDUSTRY OF MONGOLIA

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In 2011, Mongolia was estimated to be the world's third ranked producer of fluorspar after China and Mexico, producing both acid and metallurgical grades. Mongolia is a landlocked country situated between Russia to the north and China to the south. The country's mineral deposits remained of relatively limited global interest until about the past decade when global economic growth trends shifted towards Asia (Miller, 2012).

Mongolia has large proven reserves of coal, copper, fluorspar, and gold. As major mining companies began to take notice of such world class deposits as the Oyu Tolgoi porphyry deposit and the Tavan Tolgoi coking coal deposit and as China's demand for minerals increased, Mongolia expanded its domestic exploration and development projects through joint ventures with both junior and major international mining companies (Gotovsuren and others, 2012).

Mineralized systems with copper, gold, molybdenum, tin, and tungsten are common in Mongolia. As of 2008, it was estimated that about 30% of all the near-surface territory of Mongolia hosted granitoids, most of which have greisens and vein mineralization associated with calc-alkaline magmas. The central region of Mongolia is characterized by complex folded structures and basins where mineralized zones are frequently encountered. The South Gobi desert has extensive coal deposits, and petroleum is produced in the eastern part of the country. The entire country has been mapped geologically at a scale of 1:200,000, and about 25% has been mapped at a scale of 1:50,000 and explored for mineral occurrences (Gotovsuren and others, 2012).

Currently, Mongolia has one of the fastest growing economies in Asia, mainly as a result of significant foreign investment in its mining industry. By 2020, the value derived from Oyu Tolgoi alone was expected to account for one-third of Mongolia's gross domestic product (GDP). The country, however, was experiencing inflationary pressure because of the rapid economic growth that was taking place on a relatively short time scale; that is, since the economic reforms were begun in 1991 to transform the country into a market economy from a communist state. Mongolia was facing significant development challenges as the social and economic benefits associated with the mining boom were not being distributed evenly among the population. Access to water and sanitation and the quality of education remained problematic. Poverty was high at about 35% of the population, and extreme weather events and mining were placing increasing stress on Mongolia's fragile natural environment (Commonwealth of Australia, 2011, p. 93–94).

## Minerals in the National Economy

According to the National Statistical Office of Mongolia, preliminary estimates of the 2011 GDP (at current prices) indicated a year-on-year increase of 27.8% compared with that of 2010. In real terms, that growth was attributed to a 42.5% increase in the output value of wholesale and retail trade,

a 16.0% increase in the output value of the manufacturing sector, a 14.3% increase in the output value of the construction sector, and an 8.7% increase in the output value of mining and quarrying compared with those of 2010 (National Statistical Office of Mongolia, 2011, p. 12–13).

Mongolia's mining sector accounted for as much as 80% of the country's exports and generated nearly 50% of Government revenue. Transportation, power, and water, as well as other infrastructure development, however, would be needed to increase the production and commercialization of the country's minerals as well as generate jobs and related industry services. In May 2011, the World Bank approved an investment credit of \$25 million for the Mining Infrastructure Investment Support Project (MINIS). The MINIS would reportedly direct resources towards such projects as infrastructure feasibility studies and water resources management and it was to be implemented between June 2011 and May 2016 (World Bank, The, 2011, p. 7).

Government spending increased by 56% in 2011 mainly because of pre-election year capital expenditures and cash handouts to citizens, and was planned to increase to 32% in 2012, driven by sharply rising resource revenues. Growth in wholesale and retail trade reflected increased consumption fueled by increased Government spending (World Bank, The, 2012).

Mongolia's trade deficit increased significantly in 2011 to \$1.7 billion compared with \$370 million in 2010. The current account deficit increased to 35% of the GDP in 2011 compared with 14% in 2010, but was covered by record levels of foreign direct investment (FDI) inflows, which increased to \$5.3 billion in 2011 from \$1.1 billion in 2010. The amount of FDI directed to the mining sector in 2011 was unavailable (World Bank, The, 2012, p. 17).

In 2011, the total value of Mongolia's gross industrial output at current prices was \$4.01 billion compared with \$3.26 billion in 2010. Of that amount, mining and quarrying accounted for about 70% in both years. The value derived by the mining of coal and peat was about \$995 million in 2011, which was an increase of about 46% compared with that of 2010. Crude petroleum output contributed about \$255 million to the total compared with about \$176 million in 2010, which was an increase of about 45%. The value derived from the mining of metal ores was about \$1.5 billion in 2011 compared with \$1.3 billion in 2010, and the value of other mining and quarrying production was \$47.3 million compared with \$55.4 million in 2010 (National Statistical Office of Mongolia, 2011, p. 110).

## Government Policies and Programs

Mineral resources in Mongolia are the property of the state. The Minerals Law of Mongolia regulates the prospecting and exploration for and the mining of minerals within the country's territory. Numerous laws, guidelines, and procedures govern the prospecting, exploration, and mining of minerals, and include

the Constitution of Mongolia, the Environmental Protection Law, the Land Law, the National Security Law, the Subsoil Law, and the Water and Forest Law, among others (Mineral Resources Authority of Mongolia, 2011).

In 2011, Mongolia implemented the Fiscal Stability Law, which establishes fiscal policies designed to shield the economy from mining sector-related booms and busts. In December 2011, the country also passed the Integrated Budget Law, which defines the country's entire budget process and contains measures to support fiscal sustainability, and, in particular, the successful implementation of the Fiscal Stability Law (World Bank, The, 2012, p. 25).

## Production

In 2011, coal production increased to about 30.9 million metric tons (Mt), or by 23% compared with that of 2010. The gross weight of iron ore production increased by 77% in 2011 compared with that of 2010, and the iron content contained in iron ore increased by about 76% to 3.6 Mt. Production of acid-grade fluorspar decreased by 17% (table 1; National Statistical Office of Mongolia, 2011, p. 112–113).

## Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities. Most of the producing mining companies in Mongolia have mixed ownership between private international companies and the Mongolian Government or are primarily state owned, but there are also some that are wholly owned by foreign investors. In 2011, there were 383 active and 130 inactive mining and (or) quarrying establishments registered by the county's 2011 establishment census. Forty-one of the inactive establishments were reported not to have started activities, 74 had temporarily stopped activities, and 3 had permanently stopped activities; the status of the remaining 12 inactive establishments was reported as unknown. Of the 383 active establishments, about 52% was reported to have 1 to 9 employees, 18% had 10 to 19 employees, 16% had 20 to 49 employees, and about 14% had 50 or more employees (National Statistical Office of Mongolia, 2011, p. 88).

## Mineral Trade

In 2011, the value of exports from Mongolia increased by 64% to \$4.8 billion, and that of imports to Mongolia increased by 103% to about \$6.5 billion (the imports were mostly mining transport equipment, fuel, and machinery). China was the leading recipient of Mongolian exports in terms of value, and it accounted for about \$4.4 billion (compared with \$2.5 billion in 2010), or 92% of the total. It was followed by Russia and Canada, which accounted for \$96 million and \$91 million, respectively or, combined, about 4% of the total. The value of exported (unspecified) mineral products increased by 79% to \$4.3 billion compared with \$2.4 billion in 2010 (National Statistical Office of Mongolia, 2011, p. 76–84).

The volume of Mongolian copper exports changed little in 2011, but their value increased by greater than 50% to \$964 million as 573,000 t of copper concentrate was exported compared with 569,000 t valued at \$771 million in 2010.

In 2011, 2,400 t of refined copper and copper alloys valued at \$21 million was exported from Mongolia compared with 2,800 t valued at \$20.4 million in 2010. Also, 404,000 t of fluorspar valued at \$94.9 million was exported from Mongolia compared with 406,000 t valued at \$68.8 million in 2010 (National Statistical Office of Mongolia, 2011, p. 76–84).

## Commodity Review

### Metals

**Copper and Gold.**—In 2011, Centerra Gold Ltd. of Canada produced about 1,842 kilograms (kg) (reported as 59,224 troy ounces) of gold at Boroo. Boroo began commercial production in March 2004 primarily from disseminated sulfide veins. By November 2010, mining had ceased at Boroo, but the operation continued to mill stockpiled ore (Centerra Gold, Inc., 2012, p. 4).

The Oyu Tolgoi copper and gold project is located in the Southern Gobi region and was being developed by Oyu Tolgoi LLC (OT LLC), which was formerly called Ivanhoe Mines Mongolia Inc. The project consists of a series of porphyry deposits containing copper, gold, silver, and molybdenum, which stretch for 26 kilometers (km) from the Hugo North deposit in the north through the adjacent Hugo South deposit, down to the Southern Oyu deposit, and further to the Heruga deposit in the south. The first phase of construction was advancing in 2011, and by early 2012, it included a concentrator, the open pit of Southern Oyu, and supporting infrastructure. Phase 2 would include production from Hugo North, expansion of the concentrator and infrastructure, and construction of a power station (Ivanhoe Mines Ltd., 2012, p. 1).

In 2009, the Mongolian Parliament authorized the Government of Mongolia to conclude the Oyu Tolgoi investment agreement (IA) with Ivanhoe Mines Ltd. of Canada and Rio Tinto plc of the United Kingdom. The companies had been negotiating the terms with the Government since 2005. During the intervening years, the companies had advanced the planning for the project's development, including capital estimations, procurement, the underground shaft, and other construction activities, and increased the project's mineral resource base (Ivanhoe Mines Ltd., 2012, p. 2).

Under that agreement the Government would become a partner in the development of the project and acquire a 34% interest in the Ivanhoe Mines subsidiary OT LLC, which held the Oyu Tolgoi mining licenses. The country's interest was to be held through the state-owned sovereign wealth resources company Erdenes MGL LLC, and Ivanhoe Mines would own a 66% indirect interest in OT LLC (Ivanhoe Mines Ltd., 2012, p. 2).

Ivanhoe Mines and the Government agreed that because of the extent of the mineral discoveries and the potential for additional discoveries, the approved IA should conform with the provision of Mongolia's Minerals Law, which specifies that certain deposits of strategic importance qualify for 30 years of stabilized tax rates and regulatory provisions, with an option of extending the term of the IA for an additional 20 years. Major taxes and rates stabilized for the life of the agreement were to include the corporate income tax, customs duty, excise tax, exploration and mining licenses, and immovable property and (or) real estate tax, royalties, and value-added tax. As of

December 2010, a revised agreement was signed by Rio Tinto and Ivanhoe Mines, which established that Rio Tinto would manage the core operations and that Ivanhoe Mines would manage the exploration activities in certain areas (Ivanhoe Mines Ltd., 2012, p. 2, 4).

In June 2011, the Government passed Resolution 175 to authorize the designation of certain land areas for special state needs within certain defined areas near Oyu Tolgoi. Those areas were to be used for infrastructure facilities necessary to implement the development and construction of major mineral projects, including OT LLC. Most of that designated land was already subject to existing mineral exploration and mining licenses issued to third parties, and in some cases, a mineral resource had already been declared and registered. OT LLC entered into certain arrangements with some of the affected third parties; however, those arrangements had not been completed by March 2012 (Ivanhoe Mines Ltd., 2012, p. 10).

If OT LLC was not successful in reaching a consensual arrangement with an affected third party and the third party's rights to use and access the land is adversely affected by application of Resolution 175, the Government was to be responsible for compensating the third party in accordance with the mandate of the Resolution. As of March 2012, it was unclear whether the Government would expect some of the compensation to be borne by OT LLC (Ivanhoe Mines Ltd., 2012, p. 11).

Measured and indicated mineral resources at Oyu Tolgoi included almost 19 Mt (reported as 41 billion pounds) of contained copper and more than 650,000 kg (reported as 21 million troy ounces) of contained gold and another 19 Mt (reported as 41 billion pounds) of contained copper and almost 780,000 kg (reported as 25 million troy ounces) of contained gold in the inferred category. The operation was expected to start up in 2013 (Ivanhoe Mines Ltd., 2012, p. 13).

### **Mineral Fuels**

**Coal.**—The coal industry in Mongolia dates back to 1922, and coal accounts for 90% of the fuel used for electric power and heat generation in the country. There are about 300 coal deposits and occurrences in 15 basins, about 60% of which are located in the Eastern and Gobi regions. Mongolia's total coal resources include 9.8 billion tons of proven reserves and 162.3 billion tons of inferred resources (Coal Mongolia, 2012, p. 21–23).

Mongolia's still unexploited Tavan Tolgoi coal deposit contains a reported 6.5 billion metric tons (Gt) of coking coal. In the spring of 2011, reports were released stating that the initial public offering (IPO) for Tavan Tolgoi would take place by the end of 2011 or in early 2012. In 2011, the state-owned Erdenes Tavan Tolgoi Co. reportedly planned to retain ownership of 50% of the project and would distribute 10% of the shares to Mongolian citizens, 10% to Mongolian companies, and 30% to the IPO (Chinese Stock Information, 2010).

The \$3 billion IPO was reportedly delayed because of the lack of a legal framework that Hong Kong requires for listing on its stock exchange. Hong Kong recognized more than 20 jurisdictions in which companies could be incorporated, but Mongolia was not among them. The delay increased the amount of money to \$600 million from \$400 million that Erdenes would have to raise in the months before the offering for funding the initial infrastructure developments, including the coal handling and processing plants, transport facilities, and water supply (Chiu, 2012).

### **Outlook**

Mongolia's GDP, real economic growth, and growth of the mineral and nonmineral sectors have been rising steadily for the past several years, as have both the export and the import volumes and values. Inflation has been on the rise, too, but has remained far below the 34% rate that was reached in 2008 when economic growth and price increases prior to the global economic downturn seriously affected the country's economy. Growth in the GDP is expected to continue to increase significantly to at least 2016. The value derived from mining and mineral exploration will also likely continue to increase. The inflation rate is projected to level out at about 10% by the end of 2014, and foreign trade is expected to continue to increase until at least 2016 (Coal Mongolia, 2012, p. 35–43).

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TABLE 1  
MONGOLIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2007	2008	2009	2010	2011
Cement, hydraulic	180	270	235	323	426
Coal, unspecified	9,560	9,692	13,164	25,246	30,940
Copper:					
Mine output, Cu content	130,160	126,796	129,800	124,985	121,590
Metal, refined	3,007	2,587	2,470	2,746	2,390
Fluorspar:					
Acid grade	131	116	115	141	116
Submetallurgical and other grade	250	219	344	259	232
Total	381	335	459	400	461
Gold, mine output, Au content <sup>3</sup>	17,473	15,184	9,803	6,037	5,703
Iron ore:					
Gross weight	265	1,387	1,380	3,203	5,678
Iron content	170	888	883	2,050	3,600
Lime, hydrated and quicklime	43	55	43	50	45
Molybdenum, mine output, Mo content	1,978	1,780	2,140	2,198	1,960
Petroleum, crude	913	1,174	1,870	2,181	2,549
Salt, mine output	1,143	1,176	1,402	1,861	2,183
Silver, mine output, Ag content <sup>4</sup>	28,100 <sup>c</sup>	28,890	29,321	28,710	28,254
Steel, crude	80,400	81,400	50,100	64,200	60,000
Stone, crushed	144	103	123	101	94
Tungsten, mine output, W content	245	142	39	20	20
Zinc, mine output, Zn content	77,350	143,600	141,500	112,600	104,700

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. do. Ditto.

<sup>1</sup>Table includes data available through July 11, 2012.

<sup>2</sup>In addition to the commodities listed, crude construction materials, such as gypsum, sand and gravel, and varieties of stones, such as limestone and silica, are produced, but available information is inadequate to make reliable estimates of output.

<sup>3</sup>Reported raw gold production but excludes gold contained in copper concentrate.

<sup>4</sup>Based on 55 grams per metric ton of silver in copper concentrate.

Sources: Mineral Resources Authority of Mongolia (2007–2009); National Statistical Office of Mongolia (2007–2011).

TABLE 2  
MONGOLIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities <sup>1</sup>	Annual capacity <sup>e</sup>
Calcium oxide		Qinhua MAK Naryn Sukhait LLC (Mongolia-China joint venture)	316 km from Ulaanbaatar at the Olon Oovoot station of the Trans Mongolia railway	50
Cement		Khutul Cement and Lime Factory	Darhan, Darhan-Uul Aymag	500
Coal		Baganuur Joint Stock Co. (Government, 75%, and public, 25%)	Baganuur Mine, Tov Aymag	3,000
Do.		Government, 95%, and public, 10%	Shivee Ovoo Mine, Dundgovi [Middle Gobi] Aymag	2,000
Do.		SouthGobi Energy Resources Ltd. (Ivanhoe Mines Ltd., 80%)	Ovoot Tolgoi Mine, Omnogovi [South Gobi] Aymag	4,500
Do.		MAK Mongolyn Alt Group, 100%	Eldev Mine, Dornogovi Aymag, 300 km southeast of Ulaanbaatar	500
Do.		do.	Naryn Sukhait Mine, Omnogovi [South Gobi] Aymag, 900 km southwest of Ulaanbaatar	3,000
Do.		Qinhua MAK Naryn Sukhait LLC (Mongolia-China joint venture)	Naryn Sukhait Mine and infrastructure	1,500
Copper, Cu in concentrates		Samsung Corp., 51%, and Erdenet Mining Corp. (Mongolia-Russia Government joint venture), 49%	Erdenet Ovoo open pit mine and processing plant, Bulgan Aymag, 225 km northwest of Ulaanbaatar	20,000
Copper, Cu in cathodes		Erdenet Mining Corp. (Mongolia-Russia joint venture), 51%, and Strand Holdings Ltd., 49%	Erdmin solvent extraction-electrowinning plant	3
Fluorspar		Mongolrosvetmet LLC	Bor-Undur Mine and processing plant, Hentiy Aymag, 310 km southeast of Ulaanbaatar; 2 underground and 3 open pit mines	450
Do.		do.	Urgen Mine, Dornogovi Aymag, 525 km from Ulaanbaatar	120
Gold	kilograms	Centerra Gold, Inc., 100%	Boroo operation; 110 km northwest of Ulaanbaatar	3,000
Do.	do.	Java Gold Corp., 100%	Gazar placer gold operation, Tov Aymag, 240 km southwest of Ulaanbaatar	2,000
Limestone		MAK Mongolyn Alt Group, 100%	14 km from the Olon Oovoot station of the Trans Mongolia railway	NA
Molybdenum, Mo in concentrates	metric tons	Erdenet Mining Corp. (Mongolia-Russia joint venture)	Erdenet, Bulgan Aymag	3,000
Steel		Darkham metallurgy plant	Darhan, Darhan-Uul Aymag	100
Tungsten	metric tons	A state-owned company	Hovd Gol area, Bayan-Olgii Aymag	150
Zinc, Zn in concentrates		Tsait Minerals Co. Ltd. (China-Mongolia joint venture)	Sukhe Bator, Suhbaatar Aymag	70

<sup>e</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>Abbreviations used for units of measure in this table include the following: km—kilometer.