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The Mineral Industry of Bolivia

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Bolivia was estimated to have produced about 6% of the world's total mine output of tin and silver during 2009; 4%, of zinc; between 2% and 3%, of lead; about 2%, of antimony and tungsten; between 1% and 2%, of boron; and slightly below 1%, of bismuth. Bolivia was the leading exporter (by way of pipelines to Argentina and Brazil) and the third ranked producer of natural gas in South America. Tin, some antimony, and small amounts of some other mined minerals were refined or further processed into mill products in the country but most were exported in crude form (ores and concentrates) by rail to ports on the coasts of Argentina, Brazil, Chile, and (or) Peru and then shipped further on to processing facilities located in Asia, Europe, and North America (table 1; Angulo, 2010; BP p.l.c., 2010b, p. 24, 30; Brooks, 2010; Carlin, 2010a-c; Guberman, 2010; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 17; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 47-48, 53-55, 64-65, 125-126; Shedd, 2010; Tolcin, 2010).

Minerals in the National Economy

According to preliminary estimates, the value of output of the mineral industry of Bolivia accounted for about 13% (approximately $2,300 million[1]) of the country's gross domestic product (GDP) in 2009 compared with about 14.2% ($2,360 million) in 2008. The mining sector accounted for about 8% ($1,400 million) of the GDP and the mineral fuels sector accounted for 5% ($880 million) in 2009 compared with about 8.55% ($1,420 million) and 5.7% ($940 million), respectively, in 2008. In 2009, most of the value of mineral fuel output was accounted for by the production of natural gas. Zinc led all the nonfuel minerals in Bolivia in terms of both the value and the volume of production. The value of mined zinc was estimated to be about $680 million followed by that of silver ($610 million), tin ($260 million), and gold ($230 million). Ulexite (a boron mineral) led all the industrial minerals in Bolivia (not including manufactured products, such as cement) in terms of both the value and the volume of production, and the value of mined ulexite was estimated to be about $13 million (International Monetary Fund, 2010; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 45, 48; Instituto Nacional de Estadística, Bolivia, undated b).

In 1990 prices, the real GDP of Bolivia increased by 3.36% in 2009 compared with that of 2008 and by 6.1% in 2008 compared with that of 2007. In 2009, the real value of production by the industrial minerals products manufacturing sector (including the manufacturing of cement) increased by 12% and led all sectors of the Bolivian economy in terms of its contribution to the growth in the real GDP of the country; the real value of production by the construction sector increased by about 11% (and ranked second); and the mining sector grew by 9.9% in terms of its real value of production and was the third-ranked sector. The real value of production of mineral fuels appeared to decrease by 13.5% during this same timeframe (Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 43; Instituto Nacional de Estadística, undated a).

In 2009, the total labor force employed in mining was estimated to be about 65,100 workers compared with a reported figure of 62,218 in 2008. Of these workers, an estimated 51,900 were officially registered with a cooperative through the Government compared with 49,890 in 2008; 5,550 were estimated to be employed by medium-scale mining companies (private or joint ventures with state-owned Corporación Minera de Bolivia [COMIBOL]) compared with 5,138 in 2008; and at least 2,450 small-scale and artisanal miners were estimated to be working in 2009, which was the same number as estimated in 2008. In 2007 [the latest year for which these data were available from the Instituto Nacional de Estadística (INE), Bolivia], the total number of employees in the entire mineral industry of the country was about 72,400 (Instituto Nacional de Estadística, Bolivia, 2009, p. 286; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 59).

According to the Ministerio de Minería y Metalurgia (MMM), Bolivia, total investment in the mining sector was about $176 million in 2009 compared with $342 million in 2008 owing to a decrease in private investment in the sector to about $127 million compared with about $304 million in 2008. The remainder of investment in the mining sector during each of these years was listed as public (Government) investment, which appeared to increase by about 26% during this timeframe. Information about what proportion of total investment or private investment in the mining sector might be attributable to foreign direct investment (FDI) did not appear to be available from the MMM for either 2008 or 2009, and other sources (that report FDI in the mining sector) appear as if they could be more inclusive in determining investment in the sector (possibly including investment in mining services or other investment related to mining in the country). According to the INE, preliminary data indicated that total investment in the mining sector was about $512 million in 2008 (the latest year for which these data were available from the INE), of which $478 million was FDI and $34 million was public investment. Preliminary data from the Banco Central de Bolivia (BCB) indicated that FDI in the mining sector could have decreased to about $92 million in 2009 compared with $480 million in 2008, and the 2008 figure from BCB appears to agree with that of the INE (Instituto Nacional de Estadística, Bolivia, 2009, p. 629; Banco Central de Bolivia, 2010, p. 29; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 55).

According to the Ministerio de Hidrocarburos y Energía (MHE), Bolivia, total investment in the primary activities of the crude petroleum and natural gas sector (only extraction and exploration; excluding such activities as transportation and

[1]Where necessary, nominal values have been converted from Bolivian bolivianos (Bs) to U.S. dollars (US$) at an annual average exchange rate of Bs7.27=US$1.00 for 2008 and an estimated Bs6.97=US$1.00 for 2009. All values are nominal, at current prices, unless otherwise stated.

refining) increased to $286 million compared with $281 million in 2008. Information concerning the relative amounts of total investment in the sector that might be attributable to public sources or private sources (including FDI) was not available in the cited MHE publication, and data on Government investment in the primary activities of the oil and gas sector did not appear to be available for 2009. According to the latest year of data available from INE, preliminary figures indicated that total investment in the primary activities of the oil and gas sector was about $431 million in 2008, of which about $380 million was FDI and about $51 million was public investment. Preliminary data from the BCB indicated that FDI in the same sector could have decreased to about $325 million in 2009 compared with about $377 million in 2008. The 2008 data of the BCB appear to agree with that of the INE, but reliable information concerning investment in which additional activities related to the production of oil and natural gas might be included in the BCB and INE data but not in the MHE data was not available (Instituto Nacional de Estadística, Bolivia, 2009, p. 681; Banco Central de Bolivia, 2010, p. 29; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 7-9, 14-15).

For Bolivia, the value of trade in minerals may include the value of some transportation and (or) pipeline services. According to preliminary data, the mineral trade balance (not including some trade of chemical substances that may have been mineral based) decreased to about $2.9 billion in 2009 compared with about $4.4 billion in 2008 primarily owing to a decrease in the value of natural gas exports. Natural gas still remained Bolivia's leading mineral export, but the value of exports of natural gas decreased to about $1.97 billion compared with $3.16 billion in 2008. Zinc in concentrates was the leading nonfuel mineral export, and the value of exports of zinc decreased to $690 million compared with $740 million in 2008. Production and exports of silver were of growing economic importance, and the value of the country's exports of silver (mostly contained in concentrates) was reported to be $610 million compared with about $525 million in 2008. The leading mineral import category consisted of manufactured mineral fuels and related materials (including petroleum refinery products), and the value of imports decreased to $457 million compared with about $545 million in 2008. The second ranked mineral import category was common manufactured (refined) metals, and the value of imports of these intermediate metallic mineral products also decreased to $450 million compared with $480 million in 2008 (López and Ferrufino, 2009, p. 28-30, 70; Banco Central de Bolivia, 2010, p. 4-5, 9-19; Instituto Nacional de Estadística, Bolivia, 2010a, b).

Government Policies and Programs

On January 25, 2009, Bolivians approved a new Constitution, which was enacted on February 7. The new Constitution appears to contain provisions that could allow the Government to exercise greater control over the management of Bolivia's natural resources, including exploration, production, processing, transportation, and marketing of minerals, but how the revisions to the Constitution are implemented and the timing of implementation appears to depend upon the drafting and passing of subsequent regulations by the Government. During 2009, the Government drafted a new mining law to replace the Mining Code of 1997 (law No. 1777 of March 17, 1997), but the provisions of the new mining law were still being debated and no consensus had been reached by the end of the year. Although such regulations may have still been in the legislative process throughout the year, the Executive Branch of the Government was able to issue Supreme Decrees (possibly to implement at least some of the provisions described in the articles of the new Constitution as soon as possible or to proceed more quickly with some other Government programs or plans). Among Supreme Decrees concerning the mineral industry that were issued during 2009, Supreme Decree No. 29888 was issued on January 23 to authorize the transfer of all the ownership shares of Pan American Energy LLC of Argentina in Empresa Petrolera Chaco S.A. to the state-owned oil and gas company Yacimientos Petrolíferos Fiscales Bolivianos (YPFB). Through the end of 2009, it was not clear whether Supreme Decree 29888 had gone into effect, because Pan American Energy appeared still to be pursuing international arbitration to receive compensation from the Bolivian Government for the almost complete nationalization of Chaco. Another Supreme Decree in 2009 having to do with the mineral industry was Supreme Decree No. 0085, which was issued on April 18 to authorize COMIBOL's acquisition of the lands needed to mine the El Mutun iron ore deposit. On December 7, 2009, the incumbent President won a national election to another 5-year term, and his political party obtained controlling majorities in both houses of Congress. Some analysts claimed that this could allow more rapid passage of regulations to implement provisions of the new Constitution in 2010 (Economist, The, 2009a, b; García, 2009a, 2010a; García and Gray, 2009; López and Ferrufino, 2009, p. 80-82; Mapstone and Schipani, 2009; Romero, 2009a, b; Wade, 2009; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 3, 18-19, 22, 25, 28-29, 33; Ministerio de Minería y Metalurgia, Bolivia, 2010a; 2010b, p. 25, 37-39, 64-65, 67, 75-78, 93, 114-116, 124; Ore and García, 2010; U.S. Commercial Service, 2010, p. 13-14, 28-35).

During all of 2009, the main mining law was still the Mining Code of 1997. In 2007, this mining code was modified to allow for restructured royalties (mining-specific taxes) and other taxes to be charged to mining companies. The 2007 law (law No. 3787 of November 24, 2007) included measures that (1) require companies to pay an additional income tax of 12.5% if the prices of the minerals produced exceed certain thresholds (specific to each mineral), and (2) restructure both the royalty rates and the percentages of redistributions (to local, State, or Federal entities) of Government royalty and tax revenue from private mining companies in the country. In 2009, Government combined revenues from mining royalties and other taxes on mining companies were estimated to have decreased to about $104 million compared with about $151 million in 2008 and $118 million in 2007. During 2009, it appeared that the main law governing private investment (including FDI) was still law No. 1182 of September 17, 1990, although it appears that some provisions of this investment law could conflict with related provisions in the new Constitution. The main environmental law appeared to still be law No. 1333 of

March 27, 1992 (Ministerio de Minería y Metalurgia, Bolivia, 2007; 2010b, p. 57, 95; López and Ferrufino, 2009, p. 2, 7-9, 73, 80-87; Romero, 2009b; Coeur d'Alene Mines Corp., 2010, p. 23; U.S. Commercial Service, 2010, p. 3, 8, 15, 28-35).

During 2009, the Hydrocarbons Law of 2005 (law No. 3058 of May 17, 2005) was still in effect. On May 2, 2007, operations contracts came into effect for private oil and gas companies in accordance with the terms of the Government's program to nationalize the sector. These operations contracts were approved as part of the Hydrocarbons Law of 2005, which also allowed for two other new types of contracts between private companies and the state—production-sharing contracts and association contracts. Under all three types of contracts, oil and gas reserves and any production belong to the state, and the contractor (private company) must deliver the full amount of production to the state-owned oil and gas company, YPFB. These contracts were designed to replace risk-sharing contracts, which existed under the previous Hydrocarbons Law of 1996 (law No. 2689 of April 30, 1996). In effect, the contractors bore all of the risks and costs for the exploration and production of hydrocarbons under the risk-sharing contracts but were allowed to claim ownership of production and sell it on the open market, subject only to paying royalties and taxes. On May 1, 2006, the President issued Supreme Decree No. 28701 to nationalize the hydrocarbon resources of Bolivia. Following this decree, the Government negotiated 44 operations contracts with existing private producers of oil and natural gas in the country, and the contracts were approved by the Government on April 23, 2007. These contracts still require the private contractors to bear the risks and costs of production. In addition, however, the private companies cannot claim ownership of oil and gas reserves in the country and must rely on reimbursement by the Government to cover any recoverable costs and (or) be compensated for any profits they might earn. Also according to Supreme Decree No. 28701, 50% plus one voting share in various oil and gas companies was to be transferred to YPFB in order to nationalize those companies, and it appeared as if all of the terms of the transfers of these shares were settled by the end of 2009, except in the case of Empresa Petrolera Chaco S.A. (Vargas, 2007; López and Ferrufino, 2009, p. 2, 7-9; Ore and García, 2010; Repsol YPF, S.A., 2010, p. 7, 85-87; U.S. Commercial Service, 2010, p. 3, 13-14, 29-35).

Production

Data on mineral production are in table 1. In 2009, production of most mineral fuels, most industrial minerals, and some metallic minerals (such as antimony, gold, and tungsten) decreased significantly (or even substantially) compared with production in 2008. These decreases in production in Bolivia could have been a supply response to decreases in global demand (and prices) for most of these minerals during this timeframe. Production of many other minerals in Bolivia actually increased (including production of mined lead, silver, tin, and zinc), despite a decrease in the average annual (export) prices compared with those of 2008. According to various media reports of Government announcements, it appeared that the companies that scaled back production too far, reduced investment too much, or stopped production (even in response to market conditions) ran a considerable risk of having their mineral concessions revert back to the Government, and this aspect of the business environment in the country could have helped to limit private companies' willingness to decrease production. In addition, the Government appeared to be attempting to provide incentives for small-scale, cooperative, or artisanal (SMACA) miners to maintain at least some production of some minerals during downturns in prices, including offering a temporary subsidy to some unemployed zinc miners. With respect to Bolivia's production of tin, production of mined tin and tin metal increased at the state-owned parts of the Huanuni Mine and Vinto smelting and refinery complex, respectively, compared with that of 2008 (table 1; Harris, 2007; Business News Americas Ltda., 2008b; Kosich, 2008, 2010; Petroleum Economist, 2008; Alibaba.com Hong Kong Ltd., 2009; ITRI Ltd., 2009a; 2010a, b; Ore, 2009a, b; Quiroga and Burke, 2009; García, 2010c; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 39, 46-52, 67, 105-106, 124).

The volume of mine production of the country's leading (in terms of value) nonfuel mineral (zinc) increased significantly compared with that of 2008, almost entirely owing to an increase in production at Sumitomo Corp. of Japan's San Cristobal Mine and despite a scaling back of production at Sinchi Wayra S.A. (a subsidiary of Glencore International AG of Switzerland)'s mines. The volume of mine production of Bolivia's second ranked (in terms of value) nonfuel mineral (silver) increased substantially compared with that of 2008, mostly owing to a full year of production at Coeur d'Alene Mines Corp. of Idaho's San Bartolomé Mine and partly owing to increased production at the San Cristobal Mine. The volume of mine production of tin (ranked third in the value of production of nonfuel minerals in the country) increased significantly, mostly owing to an increase in production of tin at COMIBOL's Huanuni Mine. Company information concerning the significant decreases in Bolivia's mine production of antimony and tungsten was not available. The substantial decrease in the production of gold in Bolivia could have been owing to a substantial decrease in production at Orvana Minerals Corp. of Canada's Don Mario Mine and to a decrease in production at the Kori Chaca (Kori Kollo) Mine, which Newmont Mining Corp. of Colorado had expected to be closed during the second half of 2009 (table 1; Newmont Mining Corp., 2009; 2010, p. 61; Orvana Minerals Corp., 2009, p. 4, 13, 19; Coeur d'Alene Mines Corp., 2010, p. 2, 23, 61; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 46-52).

Production of antimony metal decreased substantially, although information concerning exactly where decreases in production may have taken place was not available. Production of bismuth metal also decreased substantially, and most of this decrease in production was estimated to be owing to decreased production at the Vinto smelting complex because reliable information was not available concerning how much (if any) production took place at COMIBOL's Telamayu bismuth refinery (since it was officially reopened in November 2008). Production of copper metal increased (from almost zero production) owing to the startup of COMIBOL's Coro Coro pilot plant in October 2009. Data on production of gold metal

in Bolivia are included in table 1 because of the availability of separate statistics concerning the gold and silver content of doré or bullion produced in Bolivia. Production of silver metal in the country is estimated to have decreased significantly, but detailed information was not available concerning how much of the silver mined at the San Bartolomé Mine was further processed within Bolivia to produce silver metal or refined silver. If production of silver metal from the ores mined at San Bartolomé is not already included in the data in table 1, then production of silver metal in the country could have actually increased in 2009 compared with that of 2008. Production of tin metal increased substantially compared with that of 2008 mostly owing to increased production at Vinto (table 1; Harris, 2007; Coeur d'Alene Mines Corp., 2010, p. 2, 23, 61; ITRI Ltd., 2010b; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p.16, 47-48, 78-80, 87-88).

In percentage terms, production of mined bismuth (expected to be almost entirely at the Tasna Mine) and mined copper increased substantially (although not necessarily in terms of the volumes produced). Production of mined bismuth may have increased in 2009 in anticipation of being able to sell the concentrate to be processed at the Telamayu bismuth refinery, and it was expected that Cooperativa Minera "Locatarios Tasna" Ltda. would be the principal supplier of mined material to the Telamayu refinery if the plant restarts production. The production of mined copper in the country appeared to increase because of increased production by COMIBOL as part of the startup of the Government's Coro Coro copper project during the second half of 2009. Although current information concerning the production of tantalum in table 1 was unavailable, it could have been almost entirely from the processing of survey samples of pegmatite ore from exploration operations in eastern Bolivia, and some tantalum may have also been produced (until 2009) in the same region by SMACA miners (table 1; Business News Americas Ltda., 2002; General Minerals Corp., 2002; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p.16, 47-48, 78-80, 87-88).

In 2009, production of cement in Bolivia increased substantially compared with that of 2008 because almost all the cement companies in the country increased production, but production of most industrial minerals primarily used in the construction sector (such as gypsum) decreased substantially. Production of the gemstones amethyst and pink quartz appeared to have increased substantially, but production of ametrine is estimated to have decreased substantially. Reliable information concerning the sources of these changes in gemstone production was unavailable. Bolivia's production of ulexite increased substantially, but accurate information concerning the source(s) of this increase was not available. Production of rock salt also increased substantially, and it could be that production of such minerals as salt and ulexite increased at least partially owing to COMIBOL's evaporite resources project, which was implemented to increase investment, exploration, and development of minerals concessions in the Salar de Coipasa and the Salar de Uyuni (table 1; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 38-39, 48, 53, 80-83, 106, 113, 122; Instituto Boliviano del Cemento y el Hormigón, undated).

Marketable production of natural gas decreased substantially, primarily owing to a supply response to decreased demand for imports of Bolivian natural gas by Brazil combined with limited pipeline capacity to export greater volumes of natural gas to Argentina or to consume more natural gas domestically. Production of crude petroleum decreased by approximately the same percentage as production of natural gas. Production of petroleum refinery products may not be closely correlated with production of crude petroleum in the country because Bolivia imports crude petroleum to be refined domestically (Ellsworth, 2009; López and Ferrufino, 2009, p. 63, 77-78; García, 2010b; Instituto Nacional de Estadística, Bolivia, 2010a, b; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 13-32).

Structure of the Mineral Industry

Table 2 is a listing of the major mineral industry facilities, together with the major owners and (or) operators. The vast majority of the mining workforce in Bolivia consists of SMACA miners, and these small-scale operations often manage to combine to produce more of many mined mineral commodities than the few medium-scale mines. SMACA miners accounted for 100% of mined bismuth and tungsten production in 2008 and 2009, about 72% of antimony in 2009 compared with 66% in 2008, 49% of gold compared with 40% in 2008, about 39% of tin in 2008 and 2009, 30% of copper in 2009 compared with about 77% in 2008, 20% of silver compared with about 24% in 2008, about 15% of zinc compared with about 22% in 2008, and about 12% of lead in 2008 and 2009. In 2009, medium-scale mining operations accounted for the remainder of mined metal production in Bolivia that was not produced by SMACA miners, except for copper and tin (for which state-owned mining companies accounted for some production) (Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 44- 47, 50-52, 59).

With respect to medium-scale mining in the country in 2009, Empresa Minera San Cristóbal S.A. was the leading privately owned mining company (in terms of the value and volume of mined minerals produced), and it was the leading producer of mined lead, silver, and zinc in Bolivia. The company's production was from the San Cristobal Mine, which the company's owner (Sumitomo) claimed was the third-ranked producer of mined silver and the sixth-ranked producer of mined zinc in the world during 2009. Sumitomo owned 35% of Minera San Cristóbal at the end of 2008 and completed acquisition of the remaining ownership interest from Apex Silver Mines Ltd. on March 24, 2009. The second-ranked producer of mined zinc in Bolivia was Sinchi Wayra (a subsidiary of Glencore), and the second-ranked producer of mined silver in the country was Empresa Minera Manquiri S.A. (a subsidiary of Coeur d'Alene Mines). On July 23, 2009, Newmont announced the transfer of the company's 88% ownership interest in Empresa Minera Inti Raymi S.A., which operated the Kori Chaca (Kori Kollo) Mine, to Compañía Procesadora de Minerales S.A. (a private Bolivian company reportedly owned by Jose Mercado). In November 2008, Apogee Minerals Ltd. of Canada's subsidiary Empresa Minera La Solución Ltda. stopped production at the company's lead-silver-zinc mines in Bolivia, and Apogee agreed to sell Minera La Solución to a Bolivian company in May 2009.

It appears that Minera La Solución did not restart production through the end of 2009 (table 2; Apogee Minerals Ltd., 2009; Newmont Mining Corp., 2009; Coeur d'Alene Mines Corp., 2010, p. 2, 22; Golden Minerals Co., 2010, p. 5; Sumitomo Corp., 2010, p. 3; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 46-51; Glencore International AG, undated).

In 2009, the Government (COMIBOL) accounted for 51% of the production of mined tin in Bolivia compared with about 45% in 2008, and accounted for about 24% of production of mined copper (as a result of the startup of the Government's Coro Coro copper project) compared with zero in 2008. In 2006, state-owned COMIBOL reassumed control of the Huanuni tin mine, which was the leading producer of mined tin in the country, and appeared to expand productivity (tin production capacity) at the mine in 2009 through issuing additional equipment and machinery to the miners that worked Huanuni. In February 2007, the Government nationalized the country's leading producer of tin metal, Empresa Metalurgica Vinto (EMV), and EMV increased its tin-metal production capacity at the company's Vinto smelting and refining complex in 2009 through Government investment to refurbish and reactivate two or three older furnaces at Vinto that were not operating in 2008 (ITRI Ltd., 2009a; 2010a, b; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 16, 45-47, 50, 53, 78-79, 84-90, 106, 126).

On March 26, 2008, the Government issued Supreme Decree No. 29486, which set a deadline of April 30, 2008, for the transfer of ownership shares in various oil and gas companies operating in Bolivia to YPFB, such that YPFB would own at least 50% plus one of the voting shares in these companies (as stipulated in Supreme Decree No. 28701 of May 1, 2006). Information concerning exactly when (or if) the latest transfers of shares in some of these companies to YPFB took place was not available. It appeared that Repsol YPF, S.A. transferred 1.08% of voting shares in Empresa Petrolera Andina S.A. to YPFB in May 2008, so that YPFB ended up with about a 51% interest in Andina during 2009. Pan American Energy (PAE) still appeared to be negotiating the terms of a transfer of shares in Chaco until January 23, 2009, when the Government issued Supreme Decree No. 29888 to nationalize all PAE shares in Chaco. By the end of March 2008 (if not earlier), YPFB apparently already owned 48.92% of Andina and 48.96% of Chaco following the Government's transfer of shares in these two oil and gas companies from two Bolivian pension funds (AFP Futuro de Bolivia S.A. and BBVA Previsión AFP S.A.) to YPFB (Empresa Petrolera Chaco S.A., 2008, p. 13, 53, 58; BP p.l.c., 2009, p. 21; 2010a, p. 23-24, 26; Pan American Energy LLC, 2009; Ore and García, 2010; Repsol YPF, S.A., 2010, p. 85, 99, 102).

Mineral Trade

In 2009, the decrease in the value of Bolivia's exports of natural gas was the leading cause of the decrease in the mineral trade balance compared with that of 2008. This decrease in the value of natural gas exports was the result of both a relative decrease in the average annual export price and in the annual volume exported. In terms of volume, the estimated average decrease to 22.2 million cubic meters per day of exports to Brazil compared with about 30.5 million cubic meters per day in 2008 outweighed the estimated increase to 4.5 million cubic meters per day to Argentina compared with 2.5 cubic meters per day in 2008. In 2009, the average price for natural gas exports to Argentina was $6.34 per thousand cubic feet compared with $9.43 per thousand cubic feet in 2008, but these prices were still greater than the average price of $5.54 per thousand cubic feet compared with $7.23 per thousand cubic feet for exports to Brazil. The country's net exports of natural gas decreased to about 9.8 trillion cubic meters in 2009 compared with slightly less than 12.1 trillion cubic meters in 2008, and the average annual price was about $5.60 per thousand cubic feet of natural gas exports compared with $7.30 per thousand cubic feet in 2008. The total value of exports of mineral fuels decreased to about $2.0 billion compared with $3.5 billion in 2008 (Banco Central de Bolivia, 2010, p. 4-5, 9-14; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 17).

In 2006, the Governments of Bolivia and Argentina entered into a framework agreement that included a 20-year supply contract for exports of between 7.7 and 27.7 million cubic meters per day of natural gas from Bolivia to Argentina. However, 7.7 million cubic meters per day appears to be the capacity of the existing pipeline, so any additional exports of natural gas to Argentina would require the construction of an additional pipeline between Bolivia and Argentina called the Gasoducto del Noreste Argentino (GNEA), which was expected to have a delivery capacity of 20 to 27 million cubic meters per day of natural gas and was originally conceived to be completed in 2010. Through 2009, the supply contract with Argentina had a clause that promised deliveries of natural gas up to about 7.7 million cubic meters per day, subject to the availability of natural gas for export after first fulfilling Bolivia's domestic demand requirements and allocating necessary volumes for export to Brazil. From 2007 through 2009, Bolivia has averaged substantially less than 7.7 million cubic meters per day in exports of natural gas to Argentina. In 2009, however, decreasing demand from Brazil allowed more Bolivian natural gas to be available for export to Argentina, and there appeared to be renewed interest in the GNEA project (Fargo, 2009; López and Ferrufino, 2009, p. 27-39; García, 2010b; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 17-18, 62-63; Repsol YPF, S.A., 2010, p. 59).

According to preliminary data, almost all the unit prices for nonfuel mineral exports were estimated to have been lower, on average, in 2009 than in 2008, but the total volume of nonfuel mineral exports increased by about 8.3% during this timeframe. In terms of total export value and volume, zinc was the leading mineral export in both 2008 and 2009. The average unit price for Bolivia's exports of zinc decreased to $1,605 per metric ton in 2009 compared with about $1,915 per metric ton in 2008, but the volume of the country's zinc exports increased to about 429,000 t compared with about 386,000 t in 2008. Following zinc, in decreasing order of the total value of Bolivia's exports in 2009, the average unit price of silver exports decreased to $460,438 per metric ton compared with $472,862 per metric ton in 2008, but the volume of silver exports increased to 1,324 t compared with 1,110 t in 2008; for tin (including tin metal) exports, the average price decreased to $13,436 per metric ton

compared with $18,640 per metric ton, but the volume increased to 17,609 t compared with 15,324 t in 2008; and for lead exports, the average price decreased to $1,635 per metric ton compared with $2,048 per metric ton, but the volume increased to 84,739 t compared with 83,117 t in 2008. For Bolivia's exports of antimony and tungsten, the average unit price and the volume decreased during this timeframe. In 2009, the volume of the country's exports of antimony decreased to 3,044 t of antimony from 4,039 t in 2008, and that of tungsten decreased to 1,290 t from 1,448 t in 2008. The volume of gold exports decreased to about 3,900 kilograms (kg) from about 5,100 kg in 2008 despite an increase of about 7% in the annual average unit price of Bolivia's gold exports (López and Ferrufino, 2009, p. 65-71; Banco Central de Bolivia, 2010, p. 5, 11-17; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 52-53).

The total value of the country's nonfuel mineral exports decreased to about $1.85 billion from $1.94 billion in 2008. In terms of the total export value, the Republic of Korea was the leading destination and was estimated to have accounted for about $600 million of Bolivia's nonfuel mineral exports in 2009 compared with $810 million in 2008. In order of decreasing value, Japan was the second ranked destination and accounted for about $230 million of Bolivia's nonfuel mineral exports in 2009 compared with about $200 million in 2008; Switzerland, $184 million compared with $160 million in 2008; the United States, about $180 million compared with $156 million in 2008; Belgium, about $130 million compared with $150 million in 2008; and China, about $110 million compared with $80 million in 2008 (Banco Central de Bolivia, 2010, p. 12; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 53-55).

Commodity Review

Metals

Antimony.—During 2009, about 28% of the mined antimony produced in Bolivia appeared to be produced by medium-scale mining companies, and this medium-scale production was expected to have been by Empresa Minera Unificada S.A. (EMUSA), even though company information concerning EMUSA's production of antimony during the year was unavailable. The country's production of antimony metal was expected to consist entirely of antimony produced as a byproduct of tin refining by Operaciones Metalúrgicas S.A. (OMSA) or as part of an antimony-tin alloy possibly produced by OMSA. Reportedly, the Vinto antimony plant was inactive in 2009 and had been inactive since about 2000 (table 2; Metal Bulletin, 2007; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 30, 47-48, 71, 86, 125; 2010c; Operaciones Metalúrgicas S.A., undated).

Bismuth.—In 2009, production of mined bismuth was expected to be entirely by Cooperativa Minera Locatarios Tasna Ltda., which appeared to increase production by about 93% compared with that of 2008. On November 14, 2008, the President of Bolivia inaugurated the Telamayu bismuth smelter, which had stopped production at least 20 years before. Through the end of 2009, however, it appeared that no bismuth metal had been produced at Telamayu since its inauguration owing to a problem with energy provision (Harris, 2007; García, 2008; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 80).

Copper.—On October 27, 2009, the Government started up a state-owned copper plant as part of the Coro Coro copper project. The Government also announced that Korea Resources Corp. had agreed to enter into a 50-50 joint venture with COMIBOL to continue to develop the project (Business News Americas Ltda., 2008a; Latin American Herald Tribune, 2009; McNamee and Arce-Burgoa, 2010; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 78-79).

Gold.—During 2009, Empresa Minera Paititi S.A. (a subsidiary of Orvana Minerals) mostly depleted reserves in the lower mineralized zone of the Don Mario Mine, from which the company had been producing a gold-silver doré since 2003, and began mining another lower grade gold deposit on the same concession. The company expected to begin mining the upper mineralized zone of the Don Mario Mine sometime in 2010 and to produce copper (in addition to gold and silver) from this new extension of the mine (Orvana Minerals Corp., 2009, p. 1-5).

Iron and Steel.—Through 2009, negotiations continued between the Government and Jindal Steel & Power Ltd. of India concerning potential development of El Mutun iron ore deposit. The Government appeared to express concern that Jindal was delaying investment or was planning to invest less than the amount agreed to in 2007, and Jindal appeared to be concerned that there was insufficient land alotted, roads constructed, and power infrastructure installed for the company to develop the project in the manner agreed to in the original joint-venture contract with COMIBOL. The contract reportedly required Jindal to construct a pellet plant, a sponge iron plant, a steel plant, and a powerplant, in addition to developing the El Mutun Mine (Jindal Steel & Power Ltd., 2009, p. 64, 67-68, 88; Steel Guru, 2009, 2010; Kosich, 2010).

Lead, Silver and Zinc.—During 2009, Apex Silver Mines Ltd. of the United States managed the operation of the San Cristobal Mine (on behalf of Sumitomo) under the new company name Golden Minerals Co. following emergence from Chapter 11 bankruptcy proceedings in the United States on March 24, 2009. Early in 2009, Coeur d'Alene Mines expected the San Bartolomé Mine (which is located on the flanks of the Cerro Rico Mountain) to produce about 280,000 kg of silver during the year, but total production of silver at the mine during the year ended up being about 233,000 kg. This may have been partly owing to an announcement by COMIBOL on October 14, 2009, that the Government was temporarily suspending mining activities on Cerro Rico above the elevation of 4,400 meters above sea level so that COMIBOL could perform stability studies on the mountain. Coeur d'Alene Mines adjusted its mine plan and continued to mine in areas of the San Bartolomé Mine that lay below this elevation. As the price of zinc decreased during the latter part of 2008, Sinchi Wayra appeared to attempt to scale back production and reduce the labor force at its mines. In response, the Bolivian Government announced that it would increase funding to support zinc miners in an attempt to provide them with some income until the price of zinc could recover. The labor unrest at Sinchi Wayra's mines appeared to continue until at least March 2009, and this disruptive situation further delayed progress in negotiations

between Glencore and the Government to transfer 50% control of the Colquiri tin and zinc mine to COMIBOL as well as to finalize the terms of compensation to be paid by the Government to Glencore for nationalization of the Vinto smelting complex in February 2007. These negotiations between the Government and Glencore appeared to be ongoing through the end of 2009 (Kosich, 2008; Coeur d'Alene Mines Corp., 2009, p. 22; 2010, p. 2, 13, 19, 22-23, 61; ITRI Ltd., 2009b; Walsh, 2009; Golden Minerals Co., 2010, p. 5, 40-43; Sumitomo Corp., 2010, p. 3).

Tantalum.—General Minerals Corp. of Colorado appeared to produce some tantalite until 2002 from the processing of exploration samples and test mining in the Rio Blanco area in eastern Bolivia and at other concessions within the Bolivian shield. In early 2003, the company temporarily suspended its tantalum operations in Bolivia because of a drop in demand by the telecommunications sector that led to a substantial decrease in the price of tantalum oxide compared with the price when the company began the tantalum project in early 2001. Also in 2002, some miners from a private mining company reportedly formed a cooperative to mine tantalum on that company's concessions in Catalina and Potrerito, which are also located in eastern Bolivia. Production of tantalite listed in table 1 was expected still to be from these areas (table 1; Business News Americas Ltda., 2002; General Minerals Corp., 2003, p. 1, 4).

Tin.—In 2009, production of tin at COMIBOL's Huanuni tin mine increased to 9,968 t compared with 7,875 t in 2008, and the increase appeared to be at least partly owing to smaller scale Government investments to increase the capacity of an existing mill at the mine to achieve a throughput of about 1,500 metric tons per day (t/d) of ore at the Huanuni Mine compared with an average rate of about 1,000 t/d in 2008. In January 2009, the Government planned to invest an additional $40 million to further expand the throughput capacity at the Huanuni Mine to about 3,000 t/d of ore, including construction of a new mill, but the Government had to make a new call to tender this investment in March 2010. In 2009, state-owned Empresa Metalúrgica Vinto (EMV) increased production of refined tin at the Vinto smelting and refining complex to about 11,800 t compared with 9,544 t in 2008, owing to the company's reactivation of at least one older rotary furnace, a reverberatory furnace, and an increase in the supply of tin in concentrates to Vinto from the Huanuni Mine. The Government planned to install a new tin-smelting furnace (together with Ausmelt Ltd. of Australia) and plant at Vinto with the capacity to produce between 17,000 metric tons per year (t/yr) and 18,000 t/yr of tin metal; the new plant was expected to be completed by sometime in 2011. The planned expansion at the Huanuni Mine does not appear as if it would provide sufficient feed of tin in concentrates to operate both the new furnace (plant) and the older furnaces (plant) at full capacity, so the older furnaces could be (re)retired or there could be further tin mine expansions to provide feed for the expanded Vinto complex (Harris, 2007; Ausmelt Ltd., 2008, García, 2009b; ITRI Ltd., 2010a, b; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 16, 45-48, 50-53, 84-90).

Industrial Minerals

Boron and Lithium.—In May 2008, construction began on a pilot plant for lithium processing in the Salar de Uyuni, and construction of the plant was expected to be completed in 2010. This Government lithium project was expected to be the first stage of a project to eventually produce lithium carbonate on a larger scale as well as other mineral resources from the salar, such as boron, magnesium, and potassium. After negotiating with many private companies during 2009, the Government appeared to be planning to continue the project on its own and hoped to develop the larger scale lithium production capacity by sometime in 2014. The country's production of borax and ulexite increased to 1,124 t and 85,530 t, respectively, in 2009 compared with 297 t and 55,710 t, respectively, in 2008; the increases in the production of boron materials could be at least partly owing to greater exploration, development, and investment as part of the Government's lithium development project in the Salar de Uyuni (table 1; Beltran, 2009; García, 2009c; Gleeson, 2009; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 16, 48, 80-84).

Cement.—In 2009, the increase in production of cement in Bolivia was mostly owing to the increased production of cement by Cooperativa Boliviana de Cemento Ltda. (COBOCE) and Fábrica Nacional de Cemento S.A. (FANCESA) to about 450,000 t and 625,000 t, respectively, compared with 349,000 t and about 532,000 t, respectively, in 2008. Company information concerning the sources of the increased production at either COBOCE or FANCESA during the year was not available. In August 2008, the Government created a national cement company named Cementos de Bolivia and planned to invest $230 million to construct two cement plants that would be operated by the new state-owned company, but information concerning a definitive timeline for this company to begin production of cement was not available through the end of 2009. An undisclosed amount of the funding for the construction of the new cement plants was expected to be supplied by the Governments of Iran and Venezuela (Medalla, 2008; Instituto Boliviano del Cemento y el Hormigón, undated).

Mineral Fuels and Related Materials

Natural Gas and Petroleum.—According to the Ministerio de Hidrocarburos y Energía, Bolivia, Petróleo Brasileiro S.A. (Petrobras) of Brazil planned to invest $174.5 million in exploration and production of natural gas and crude petroleum in Bolivia during 2009; Repsol, about $110 million; Andina, about $89 million; BG Group plc of the United Kingdom, about $88 million; Chaco, about $55 million; and Total S.A. of France, about $48 million. The total planned foreign investment in the mineral fuels sector for the entire country was expected to be about $625 million. In addition, the Government appeared to be attempting to secure additional investment by OAO Gazprom of Russia and state-owned Petróleos de Venezuela S.A. (PDVSA) of Venezuela. According to preliminary data, the amount of investment that was actually realized in the sector during 2009 appeared to be substantially less than what was planned. Until additional pipelines are constructed, any

increase in Bolivian production that may result from investment in this sector could be exported only to Argentina or Brazil, or consumed domestically. During 2009, decreased consumption by Brazil, a relatively low capacity to export to Argentina, and limited domestic consumption of natural gas may have deterred investment in the sector. In December 2009, however, the Government of Brazil reaffirmed the country's contract with Bolivia (to import an average of 24 million cubic meters per day of natural gas) and agreed to a price hike for imports of natural gas from Bolivia. Also, the Governments of Argentina and Bolivia continued negotiations through the end of 2009 and into 2010 on gradual increases of natural gas exports to Argentina and the construction of the GNEA pipeline. The Government also had plans to attempt to reach agreements with the Governments of Paraguay and Uruguay for eventual construction of natural gas pipelines from Bolivia into those countries. In addition, about 6.9 million cubic meters per day, on average, of Bolivia's natural gas production was estimated to have been consumed domestically in 2009 compared with about 5.3 million cubic meters per day during 2008. Increased domestic consumption of Bolivia's own natural gas production was expected to continue as part of the Government's program to promote use of natural gas by the domestic industry (including the mineral industry), in homes and commercial buildings, and in vehicles (Ellsworth, 2009; Ministerio de Hidrocarburos y Energía, Bolivia, 2009, p. 30; 2010, p. 7-9, 14-15, 19-23; 30-31; Petroleum Economist, 2009a, b; García 2010b, c).

Uranium.—In 2009, the government of Potosi Department announced that it was investing in research and exploration for uranium in the central Potosi region. As part of the project, the Potosi government appeared to also be considering restarting a uranium mine at the Cotaje deposit that had apparently been closed for 25 years. At the time, the Federal Government stated that it was not involved in this project (Kosich, 2009).

Reserves and Resources

The reserves estimates in table 3 include proven and probable reserves as of the end of 2008 (where possible) compiled from company, Government, and other published sources. In 2009, the Government contracted with the Ryder Scott Co. petroleum consultants to quantify and certify Bolivia's reserves of natural gas and petroleum. Data on the country's reserves of natural gas and petroleum had apparently not been updated at the national level since 2005. Information concerning the results of the Bolivian reserves assessment by Ryder Scott did not appear to be available through the end of 2009, and it was estimated that Bolivia's proven reserves of natural gas (about 750 billion cubic meters) were second only to those of Venezuela among countries in Latin America and the Caribbean (table 3; BP p.l.c., 2010b, p. 22; Ministerio de Hidrocarburos y Energía, Bolivia, 2010, p. 13-15, 17; U.S. Energy Information Administration, undated).

Outlook

During 2009, there appeared to be both public and private investment in the mining, metallurgy, and oil and gas sectors, and Bolivia's production of many minerals, including silver, tin, and zinc, increased despite decreases in prices. To continue producing minerals at higher levels in the near future, however, greater levels of investment than were made in 2009 could be required. Private investment in the mineral industry of the country could be more forthcoming if prices for the minerals that Bolivia produces increase significantly in 2010, but there were mixed opinions among metals analysts at the beginning of 2010 concerning the likelihood of increases in metals prices during the rest of the year. In addition, mining companies and consultants surveyed by the Fraser Institute considered Bolivia to have the most substantial barriers to investment in the crude petroleum and natural gas sector among 143 jurisdictions worldwide in 2009, and the Fraser Institute's ranking of the country as a desirable destination for investment by private companies in the mining sector was 66th out of 72 jurisdictions worldwide in 2009. Therefore, public investment in the mineral industry will probably have to increase in 2010 compared with that of 2009, and the Government reportedly announced plans to invest about $5 billion in the oil and gas sector from 2010 through 2015 (Angevine, Brown, and Cervantes, 2009, p. 5, 10, 14, 20, 23, 42-45, 49-67; Ore, 2009b; McMahon and Cervantes, 2010, p. 7, 9-10, 12; Moore, Briggs, and Major, 2010).

It was also reported that the Government planned to continue to invest in the mining and metallurgy sector in 2010, including in projects to expand production at the Huanuni tin mine further, construct a pilot plant to produce lithium carbonate in the Salar de Uyuni, develop capacity for the potential larger scale production of evaporite mineral resources there, and continue installation of a new tin-smelting furnace and plant at the Vinto smelting complex (together with Ausmelt Ltd. of Australia). If (or when) COMIBOL lifts its altitude restriction on mining Cerro Rico, Coeur d'Alene Mines expected to be able to complete ramping up production at the San Bartolomé Mine to be able to produce at or near the capacity of about 280 t/yr of silver contained in doré according to the mine plan before it was revised to accommodate the COMIBOL restriction. Jindal still planned to invest $2.1 billion in El Mutun iron and steel project, but it was uncertain how rapidly this investment might be made until negations with the Government concerning provision of additional land, a secure energy supply, and other infrastructure issues could be resolved. The company still planned for the eventual design capacity at El Mutun to be 10 million metric tons (Mt/yr) of iron ore pellets, 6 Mt/yr of sponge iron, and 1.7 Mt/yr of crude steel (Gleeson, 2009; Jindal Steel & Power Ltd., 2009, p. 64, 67-68, 88; Steel Guru, 2009, 2010; Coeur d'Alene Mines Corp., 2010, p. 2, 13, 19, 22-23, 61; Kosich, 2010; Ministerio de Minería y Metalurgia, Bolivia, 2010b, p. 16, 45-48, 50-53, 80-90).

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TABLE 1
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[p]
METALS[3]						
Antimony:						
Mine output, Sb content		5,098 [r]	5,460	3,881	3,905	2,990
Metal, including Sb content of trioxide		2,941	2,782 [r]	2,862	2,984 [r]	2,340
Arsenic, mine output, arsenic trioxide, arsenic sulfide		120	90	--	74 [r]	115
Bismuth:						
Mine output, Bi content		44	155	147	28 [r]	54
Metal, smelter		--	1 [r]	(4)	92 [r]	73
Copper:						
Mine output, Cu content		32 [r]	218	606	731	882
Metal, primary		--	--	--	8 [r, e]	250 [e]
Gold:						
Mine output, Au content[5]	kilograms	8,801 [r]	9,628	8,818	8,405	7,217
Metal, including Au content of bullion and doré	do.	5,375	6,513	5,551	5,067	3,667
Lead:						
Mine output, Pb content		11,231	11,955	22,798	81,602	84,537
Metal, smelter, primary		33	318 [r]	301	473 [r]	418
Silver:						
Mine output, Ag content[6]	kilograms	418,505 [r]	472,208	524,989	1,113,764 [r]	1,325,700
Metal, including Ag content of bullion and doré	do.	18,223 [r]	21,561 [r]	23,657	35,861 [r]	33,000 [e]
Tantalum, tantalite	do.	4,080	8,000 [e]	3,914	161 [r]	--
Tin:						
Mine output, Sn content		18,433 [r]	18,444 [r]	15,972	17,320 [r]	19,581
Metal, smelter		13,941 [r]	14,089 [r]	12,251	12,666	14,995
Alloys, Sn-Pb alloyed metal		498	1,030 [e]	473	-- [r]	--
Tungsten, mine output, W content		531	868	1,107	1,148	1,023
Zinc, mine output, Zn content		158,582 [r]	172,747	214,053	383,618	430,879
INDUSTRIAL MINERALS						
Barite		11,379	8,943	8,245	10,900 [r]	2,069
Bentonite		(4) [r]	--	--	1 [r]	323
Borax		--	56 [e]	8,245 [r]	297 [r]	1,124
Boric acid		13,584	12,136	15,032	10,539 [r]	11,114
Cement, hydraulic	thousand metric tons	1,440	1,636	1,739	1,985	2,292
Gemstones, rough						
Amethyst	kilograms	89,092	175,715 [r, 7]	671,588 [r, 7]	228 [r]	503
Ametrine	do.	20,011	33,675	8,933	20,600 [r, e]	10,000 [e]
Quartz, pink	do.	49,210	3,756	38	67 [r]	12,001
Emerald	do.	7,742	2,219	--	--	--
Gypsum, crude		26	617	4,458	4,107 [r]	1,931
Lime[e]		--	--	--	75 [8]	26 [8]
Salt, natural, all types[e]		45,000	45,000	45,000	45,000	45,000
Of which, rock salt		552	688	1,545	1,415 [r]	1,947
Stone, natural:						
Flint	kilograms	4,174	4,427	25	-- [r]	--
Granite		368	119	205	200 [e]	62
Limestone as dimension stone		--	--	(4)	75 [r]	26
Marble		102	102	81	(4) [r]	32
Slate (pizarra)		297	192	233	266 [r]	190
Sulfur, native		--	3	--	508 [r]	3
Ulexite		62,604	38,591 [r]	64,499	55,710	85,530
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross	million cubic meters	14,672	14,689	15,230	15,374 [9]	13,500 [e]
Marketable	do.	12,536	13,434	14,301	14,895 [9]	12,787

See footnotes at end of table.

TABLE 1—Continued
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2005	2006	2007	2008	2009[p]
MINERAL FUELS AND RELATED MATERIALS—Continued						
Natural gas liquids[e]	thousand 42-gallon barrels	4,600	4,600	4,800	4,800	4,200 [e]
Petroleum:						
Crude	do.	15,417	14,882	15,027	14,233 [9]	12,330
Refinery products:						
Liquefied petroleum gas	do.	864	855	895	685 [r, e]	645 [e]
Gasoline:						
Aviation	do.	25	28	32	25 [e]	20 [e]
Motor	do.	3,726	3,877	4,558	5,390 [r, e]	5,530 [e]
Jet fuel	do.	1,104	3,877	992	950 [e]	900 [e]
Kerosene	do.	151	3,877	131	130 [e]	100 [e]
Distillate fuel oil	do.	4,450	3,877	4,880	5,050 [r, e]	4,100 [e]
Lubricants:						
Oil, automotive	do.	83	102	105	100 [e]	80 [e]
Oil, industrial	do.	7	10	8	5 [e]	3 [e]
Greases[10]	do.	3	4	3	3 [e]	2 [e]
Asphalt[10]	do.	15	15	13	10 [e]	8 [e]
Paraffin oil[10]	do.	3	1	--	-- [e]	-- [e]
Total	do.	10,431	10,736	11,617	12,300 [r, e]	11,400 [e]

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [p]Preliminary. [r]Revised. do. Ditto. -- Zero.
[1]Table includes data available through August 19, 2010.
[2]In addition to the commodities listed, a variety of industrial minerals (clays, crushed and broken stone, dimension stone, and sand and gravel) are produced, but available information is inadequate to make reliable estimates of output.
[3]Unless otherwise specified, data represent actual production by Corporación Minera de Bolivia and small- and medium-sized mines.
[4]Less than 1/2 unit.
[5]May include production of metallic gold.
[6]May include production of metallic silver.
[7]Includes production by previously unregistered miners whose production was not officially accounted for prior to 2007, and the units of the reported data were revised to be in grams instead of kilograms (as was previously assumed).
[8]Reported figure.
[9]This number was reported as preliminary in Instituto Nacional de Estadística, Bolivia's Anuario estadístico 2008.
[10]Reported figures were converted from metric tons to equivalent barrels.

TABLE 2
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Antimony	Empresa Minera Unificada S.A. (EMUSA) (private, 100%)	Caracota, Chilcobija, and Espiritu Santo Mines, Potosi Department	1,100.
Do.	Small-scale mining operations and cooperatives (private, 100%)	San Jose Mine, Oruro Department; Mines in Caracota District, Nor Chichas, Quijarro, and Sud Chichas Provinces, Potosi Department	4,500.
Antimony, refined	Compañía Minera Colquiri S.A. (Glencore International AG, 100%)	Vinto antimony plant,[1] Carretera Vinto, Oruro Department	60.
Do.	Operaciones Metalúrgicas S.A. (OMSA)	Huajara Industrial Park, east of the City of Oruro, Oruro Department	3,000.
Do.	Fundestaño de Oruro S.A. (Empresa Minera Unificada S.A., 100%)	City of Oruro, Oruro Department	1,100.
Antimony trioxide	Empresa Minera Bernal Hermanos S.A. (private, 100%)	Palala smelter, Tupiza, Potosi Department	1,900.
Bismuth	Cooperativa Minera Locatarios Tasna Ltda.	Tasna Mine, near City of Oruro, Oruro Department	200.
Bismuth, refined	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Telamayu bismuth refinery, Telamayu, Potosi Department	350.
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex,[1] Carretera Vinto, Oruro Department	90.
Cement thousand metric tons	Sociedad Boliviana de Cemento S.A. (SOBOCE) (Grupo Cementos de Chihuahua S.A. de C.V., 47.02%, and other private, 52.98%)	El Puente (near city of Tarija), EMISA (near city of Oruro), VIACHA (near city of La Paz), and WARNES (near city of Santa Cruz) plants	1,510 cement; 760 clinker.
Do. do.	Fábrica Nacional de Cemento S.A. (Sociedad Boliviana de Cemento S.A., 33.34%; Municipal Government of Sucre, 33.33%; Universidad San Francisco Xavier de Chuquisaca, 33.33%)	Cal Orcko industrial complex near city of Sucre, including grinding plant, and FANCESA cement plant near city of Chuquisaca	630 cement; 620 clinker.
Do. do.	Cooperativa Boliviana de Cemento Ltda. (COBOCE)	Irpa Irpa Plant, near city of Cochabamba	470 cement; 330 clinker.
Do.	ITACAMBA Cemento S.A.	Plant, Santa Cruz Department	200 cement.
Copper	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	350.
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Coro Coro Mine, and a pilot plant to produce copper cathodes, La Paz Department	300.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Mining operations in Chuquisaca, La Paz, Oruro, and Potosi Departments	650.
Gemstones, ametrine	Minerales y Metales del Oriente S.R.L.	Anahi Mine, Santa Cruz Department	NA.
Gold kilograms	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	Don Mario Mine,[2] Chiquitos Province, Santa Cruz Department	2,100.
Do. do.	Golden Eagle International Inc. (private, 100%)	Cangalli Mine,[3] Santa Cruz Department	150.
Do. do.	Grupo Minero La Roca S.A. (private, 100%)	La Paz Department	200.
Do. do.	Mining Cooperatives (private, 100%)	Tipuani, Guanay, Mapiri, Huayta, Kaka, and Teoponte Rivers, La Paz Department	4,350.
Gold-silver doré, bullion do.	Empresa Minera Inti Raymi S.A. (Compañía Procesadora de Minerales S.A., 88%, and Empresa Minera Unificada S.A., 12%)	Kori Chaca open pit mine and Kori Kollo leaching plant, near city of Oruro	2,300 gold; 1,800 silver.
Lead	Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	8,000.
Do.	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	82,000.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	10,200.
Do.	Empresa Minera La Solución Ltda.	Asientos and Monserrate lead-silver-zinc mines,[3] Cochabamba Department	610.
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead-silver-zinc mine, Potosi Department	200.

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Lead, metal		Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex,[1] Carretera Vinto, Oruro Department	120.
Do.		Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery,[4] Potosi Department	30,000.
Natural gas	million cubic meters	Operated by Empresa Petrolera Andina S.A. [Yacimientos Petrolíferos Fiscales Bolivianos (Government, 100%), 51.08%, and Repsol YPF, S.A., 48.92%] and owned by Empresa Petrolera Andina, S.A., 50%, Petróleo Brasileiro S.A., 35%, and Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani fields, Santa Cruz Department	2,700.
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF, S.A., 37.5%; Pan American Energy LLC, 25%	Margarita field, Caipipendi Block, Tarija Department; Paloma field, Mamore Block, Cochabamba and Santa Cruz Departments	1,300.
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo field, San Antonio Block; San Alberto field and Block, Tarija Department	7,200.
Do.	do.	Operated and owned by Empresa Petrolera Chaco S.A. [Pan American Energy LLC (BP p.l.c., 60%, and BRIDAS Corp., 40%), 50%, Yacimientos Petrolíferos Fiscales Bolivianos (Government, 100%), 48.96%, and other private, 1.14%]	Vuelta Grande field, Chuquisaca Department; Bulo Bulo, Carrasco and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,200.
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La Vertiente Block; Los Suris field and Block, all in Tarija Department	630.
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (owned by Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	520.
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (owned by Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	350.
Petroleum	thousand 42-gallon barrels	Operated by Empresa Petrolera Andina S.A. [Yacimientos Petrolíferos Fiscales Bolivianos (Government, 100%), 51.08%, and Repsol YPF, S.A., 48.92%] and owned by Empresa Petrolera Andina, S.A., 50%, Petróleo Brasileiro S.A., 35%, and Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani fields, Santa Cruz Department	2,100.
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sabalo field, San Antonio Block; San Alberto field and Block, Tarija Department	7,500.
Do.	do.	Operated and owned by Empresa Petrolera Chaco S.A. [Pan American Energy LLC (BP p.l.c., 60%, and BRIDAS Corp., 40%), 50%, Yacimientos Petrolíferos Fiscales Bolivianos (Government, 100%), 48.96%, and other private, 1.14%]	Vuelta Grande field, Chuquisaca Department; Bulo Bulo, Carrasco and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,900.
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC, 25%	Margarita field, Caipipendi Block, Tarija Department; Paloma field, Mamore Block, Cochabamba and Santa Cruz Departments	5,000.
Do.	do.	Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La Vertiente Block; Los Suris field and Block, all in Tarija Department	610.
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (owned by Pluspetrol S.A., 100%)	Bermejo and Madrejones fields, Tarija Department; Tacobo field, Santa Cruz Department	160.
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (owned by Occidental Petroleum Corp., 100%)	Chaco Sur and Ñupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	140.

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Silver kilograms	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	525,000.
Do. do.	Empresa Minera Manquiri S.A. (Coeur d'Alene Mines Corp., 100%)	San Bartolomé Mine, by Cerro Rico, near Potosi Potosi Department	280,000.
Do. do.	Small-scale mining operations and cooperatives (private, 100%)	Candelaria and other mines, Cerro Rico deposit, as well as in areas immediately surrounding the San Bartolome Mine (under construction), Oruro and Potosi Departments	280,000.
Do. do.	Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	180,000.
Do. do.	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	60,000.
Do. do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead-silver-zinc mine, Potosi Department	30,000.
Do. do.	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	Don Mario Mine,[2] Chiquitos Province, Santa Cruz Department	7,500.
Do. do.	Empresa Minera La Solución Ltda.	Asientos and Monserrate lead-silver-zinc mines,[3] Cochabamba Department	2,000.
Silver, metal	Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery,[4] Potosi Department	310.
Do.	Empresa Minera Manquiri S.A. (Coeur d'Alene Mines Corp., 100%)	San Bartolomé Mine, by Cerro Rico, near Potosi, Potosi Department	NA.
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex,[1] Carretera Vinto, Oruro Department	2.
Tin	Empresa Minera Huanuni [Corporación Minera de Bolivia (Government, 100%), 100%]	Huanuni Mine, Dalence Province, Oruro Department	11,000.
Do.	Compañía Minera Colquiri S.A. (Glencore International AG, 100%)	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	2,500.
Do.	Empresa Minera Barrosquira Ltda. (private, 100%)	Caracoles Mine, Inquisivi Province, La Paz Department	500.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Caracoles, Huanuni, Viloco, and other current or former Corporación Minera de Bolivia mines, in Oruro, Potosi, and La Paz Departments	10,000.
Tin, refined	Operaciones Metalúrgicas S.A. (OMSA)	Huajara Industrial Park, east of the City of Oruro, Oruro Department	3,360.
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	12,500.
Tin-lead alloys	do.	do.	200.
Tungsten, W content	Small-scale mining operations and cooperatives (private, 100%)	Bolsa Negra, Enramada, Reconquistada Mines, near the former International Mining Company's Chojilla Mine, Sud Yungas Province; Chambilaya and Chicote Grande Mines, Inquisivi Province; Mercedes, San Antonio, Ucumarini Mines, Larecaja Province, La Paz Department	1,200.
Zinc	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	270,000.
Do.	Sinchi Wayra S.A. (Glencore International AG, 100%)	Bolivar, Colquechaquita, Don Diego, Porco, and San Lorenzo Mines, Oruro and Potosi Departments	240,000.
Do.	Small-scale mining operations and cooperatives (private, 100%)	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	85,000.
Do.	Compañía Minera Colquiri S.A. (Glencore International AG, 100%)	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	14,000.
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead-silver-zinc mine, Potosi Department	12,000.

See footnotes at end of table.

TABLE 2—Continued
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2009

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Zinc—Continued	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp., 95%, and Empresa Minera Unificada S.A., 5%)	San Vicente Mine, Potosi Department	2,000.
Do.	Empresa Minera La Solución Ltda.	Asientos and Monserrate lead-silver-zinc mines,[3] Cochabamba Department	1,300.
Zinc, refined	Empresa Metalúrgica de Karachipampa (Atlas Minerals Inc., 65%, and Corporación Minera de Bolivia, 35%)	Karachipampa lead-silver smelter, and zinc refinery,[4] Potosi Department	150,000.

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]There was no reported production of refined antimony or bismuth, nor of lead or silver metal (unless in alloys) at the Vinto smelting complex in 2009 (Ministerio de Minería y Metalurgia, Bolivia, 2010, Cuadro No. 15, Memoria Anual 2006-2009: La Paz, Bolivia, Ministerio de Minería y Metalurgia).
[2]An undisclosed proportion of the gold and silver production from this mine was in the form of metal contained in doré or bullion.
[3]Inactive during all of 2009.
[4]Inactive since completion of construction in 1985; through 2009.

TABLE 3
BOLIVIA: ESTIMATED RESERVES OF MAJOR MINERAL COMMODITIES IN 2009[1]

(Thousand metric tons unless otherwise specified)

Commodity		Reserves	World ranking	World percentage
Antimony, metal content		310	4	15
Bismuth, metal content		10	3	3
Gold, metal content	metric tons	28	NA	(2)
Lead, metal content		1,600	8	2
Natural gas[3]	billion cubic meters	750	29	(2)
Petroleum[3]	million 42-gallon barrels	465	45	(2)
Silver, metal content	metric tons	22,000	8	5.5
Tin, metal content		400	6	7
Tungsten, W content		53	5	2
Zinc, metal content		6,000	9	3

do. Ditto. NA Not available.
[1]Combined proven plus probable reserves estimated from a combination of company, Government, and secondary sources.
[2]Less than 1/2 unit.
[3]Proved reserves only. Source: International Energy Statistics, U.S. Energy Information Administration, undated.