

BOLIVIA¹

By Pablo Velasco

The Republic of Bolivia, which is in central South America southwest of Brazil, has an area of about 1,098,580 square kilometers (km²). In 2001, the population was 8.3 million, and the gross domestic product (GDP) was \$20.9 billion with a GDP per capita of \$2,600 based on purchasing power parity (U.S. Central Intelligence Agency, 2000²). According to the International Monetary Fund (IMF), public information notices for 2000 and 2001 indicate that the Bolivian economic recovery in 2000 was weaker than expected (2.4% growth of real GDP) owing to sluggish economic growth of domestic demand (MBendi Information Services (Pty) Ltd., 2001b³). In February 2000, the Boards of the IMF and the International Development Agency (IDA) agreed that Bolivia was eligible for debt relief of \$854 million in net present value terms under the enhanced Heavily Indebted Poor Countries Initiative. The structural reforms programmed for 2001 were focused primarily on tax and customs administration, budget management, and fiscal decentralization with the aims of enhancing transparency; improving the monitoring of expenditure, particularly for local governments; and increasing tax revenue (MBendi Information Services (Pty) Ltd., 2001a³).

Bolivia has traditionally been a mining country that produces antimony, bismuth, copper, gold, lead, silver, tin, tungsten, and zinc. It has large reserves of gold, lithium, iron ore, natural gas, and petroleum.

Bolivia is in a period of political and economic difficulties. A slower world economy in 2001, especially in the United States and in Bolivia's neighbors, has translated to slower-than-expected economic growth in Bolivia. Increased natural gas exports to neighboring Brazil, which had a critical energy shortage, could help boost Bolivia's economic condition. Foreign direct investment in Bolivia peaked in 1999 as privatization brought in record revenues of about \$1 billion. In 2001 and 2002, investment was expected to be about one-half that amount with increased activity in the oil and gas sectors as the driving force (U.S. Energy Information Administration, 2001³).

The Economist Intelligence Unit anticipated that real GDP growth in 2001 would be about 4.0%. The services sector is responsible for 50% of the GDP; manufacturing, 18%; and agriculture, 15.5%. Mining remained important in 2001 and provided about 5.27% of the GDP; crude oil and natural gas provided an additional 6.67% (Fox, 2001).

In 2001, export revenues increased by about 3.65% to about \$1.46 billion owing to increases in the exports of crude oil, gold, natural gas, silver, tin, and zinc (Instituto Nacional de

Estadística, 2001³). Bolivia exported \$334.5 million worth of minerals, which was a decrease of 21.3% compared with 2000; the hydrocarbons exports were \$289.3 million, which was an increase of 74.5% compared with that of 2000; natural gas was worth \$236.9 million, which was an increase of 94.5% compared with the previous year; and nontraditional exports amounted to \$500.9 million, which was a decrease of 8.3% compared with 2000 (Ministerio de Desarrollo Económico, YPFB y Aduana Nacional, 2001³). Brazil accelerated its commitment to purchase 30 million cubic meters per day of natural gas from Bolivia between 2003 and 2006. This rise in demand has prompted speculation that a second pipeline may have to be built sooner than planned (American Chamber of Commerce of Bolivia, 2001³).

Environmental Issues

Environmental standards were monitored by the Ministry of Sustainable Development at the national level and its Departmental Secretary of Sustainable Development and Environment at regional and departmental levels. In response to investors, the Bolivian Government was planning an extensive overhaul of its environmental regulations. Critics have claimed a lack of clarity in existing rules that has led to slow and arbitrary decisions by officials and a wide variation in the interpretation of regulatory requirements. The recently appointed Minister for Sustainable Development and Planning announced a complete reworking of the 1995 regulations. Passage of a new regulatory decree in early 2001 was intended to close loopholes and to clarify gray areas that have led in the past to lengthy legal cases. Investors are unhappy about Bolivia's "three-strikes-and-you're-out" policy. Any company that causes an environmentally harmful incident, no matter what the scale, stands to forfeit its concession rights and be forced to leave the country following three such incidents, no matter how small. The new Minister emphasized that reforms introduced will aim to define clearly responsibilities and actions to be taken, and that future environmental penalties will be classified and graded accordingly to the severity of the incident (Metals & Minerals Latin America, 2001b).

Production

In 2001, the value of mining production in Bolivia declined to \$334.5 million, which was a decrease of 21.3% compared with that of 2000. The medium-sized mining sector continued to be the dominant producer and was responsible for about 68.6% of the value of mine production in 2001 followed by the small-sized mining sector with 31.4%. Corporación Minera de Bolivia (COMIBOL) had no production during 2001 (Ministerio

¹Revised on March 16, 2004.

²References that include a section twist (§) are found in the Internet References Cited section.

de Desarrollo Económico and Vice Ministerio de Minería y Metalurgia, 2001a).

Bolivia produced about 12.8 million barrels (Mbbbl) of crude oil and 10 billion cubic meters of natural gas in 2001 (table 1).

Mining prospects were clouded by the worldwide downturn in metal prices that delayed or deterred some anticipated investments. The generally depressed conditions of 2000 continued in 2001 and showed few signs of alleviating a growing crisis within the mining industry. In contrast, the reform and development of the hydrocarbon sector continued to be of great importance to the Bolivian Government. This sector represented more than 30% of the Government's annual revenues and 20% of the country's export revenues. The success of the sector made direct and indirect contributions to ending poverty in Bolivia because the Government uses hydrocarbon revenues for education and health care.

Trade

The United States remained Bolivia's largest trading partner followed by the Andean Pact countries, the European Union, and Brazil. In 2001, the United States exported \$217.1 million of merchandise to Bolivia and imported \$166.4 million of merchandise from Bolivia according to the U.S. Census Bureau (2001§). Bolivia's major exports to the United States were mineral fuels and lubricants. Its major imports from the United States were computers, machinery, vehicles, and wheat.

Structure of the Mineral Industry

The Ministry of Mining and Metallurgy, which is a branch of the Ministry of Economic Development, is legally responsible for formulating mining policy for the sector's development. It provides investors with the necessary information about the rights and guarantees of mining concession holders, tax and mining laws, and environmental regulations for mining. It controls and participates in the mineral industry through the Instituto de Investigaciones Minero-Metalúrgicas de Oruro, the Servicio Geológico y Minero de Bolivia, the Sistema Nacional de Información Minera, COMIBOL, and the Servicio Nacional de Catastro Minero, which are autonomous state-owned entities.

In accordance with the provisions established in Supreme Decree 23230-A of July 30, 1992, the Government of Bolivia sought to transfer several mining, metallurgical, and infrastructural assets, which included joint ventures, leases, and optional arrangements, held by COMIBOL, to private sector interests. COMIBOL's continuing attempts to dispose of the three main assets it still controls (the Cerro Rico silver deposit, the shuttered Karachipampa lead-silver smelter, and the Mutún iron deposit) made slow progress. Poor infrastructure and a high manganese content has long hampered the sale of Mutún's estimated 40 billion metric tons (Gt) of iron ore reserves (Deutsche Montan Technologie GmbH and Panamerican Investments S.A., undated§). COMIBOL's Karachipampa smelter has been dormant since its completion in 1984 owing to a lack of appropriate feed for the Russian-developed Kivcet Flash-Smelter furnace. The plan depended on the development of Apex Silver Mines Ltd.'s San Cristobal zinc-silver project, which was expected to produce around 500,000 metric tons per

year (t/yr) in 2003 or later (Metals & Minerals Latin America, 2001c).

The private mining sector, which comprised medium- and small-scale mining entities and cooperatives, maintained its position as the leading producer of antimony, barite, gold, lead, tin, tungsten, ulexite, and zinc in the country. In 2001, the number of affiliated mining companies in the private Medium-Size Miners Association decreased to 13 from 15 in 2000. The new list comprised the following affiliated mining companies: Andean Silver Corporation (lead, silver, and zinc), Empresa Minera Arisur S.A. (lead, silver, and zinc), Empresa Minera Allied Deals Huanuni (tin), Empresa Minera Allied Deals Vinto (tin), Empresa Minera Barrosquira/Bajadería (tin), Cía. Minera Concepción S.A. (silver), Cía. Minera del Sur S.A. (silver, lead, and zinc), Cía. Minera Colquiri S.A. (tin and zinc), Empresa Minera Inti Raymi S.A. (gold and silver), Empresa Minera Himalaya S.A. (tungsten), L & M Mining Bolivia Co. (gold), Empresa Minera La Solución S.A. (lead, silver, and zinc), and Empresa Minera San Cristobal S.A. (lead, silver, and zinc) (Asociación Nacional de Mineros Medianos, 2001, p. 66).

The Small-Size Miners Association, which was grouped under the Cámara Nacional de Minería, included 600 small operating mines. Mining cooperatives were organized under the Federación Nacional de Cooperativas Mineras and included most of the gold mining cooperatives of Gonzata, Guanay, Mapirí, and Tipuani.

Commodity Review

Metals

Antimony.—Improved world prices for antimony resulted in an increase in Bolivian antimony output to 2,264 t/yr in 2001 from 1,907 t/yr in 2000; this was an increase of 18.7%. The small-sized mines produced 84% of the total, and the medium-sized mines, 16% (Asociación Nacional de Mineros Medianos, 2001 p. 66).

Gold.—In 2001, official gold production in Bolivia, which increased by 3.3% compared with that of 2000, amounted to 12,395 kilograms (kg) (398,508 troy ounces). The low price of gold in 1999 and 2000 delayed progress on a number of small gold projects that might otherwise have reached production. For example, feasibility work at the Don Mario Project of Orvana Minerals Corp. of Canada was virtually halted, as was the Amaya Pampa-Capacirca Project of Vista Gold Corp. of the United States. Eaglecrest Explorations Ltd. of Canada continued to drill in the vicinity of the Paititi pit in its San Simon property.

The Kori Kollo open pit gold and silver mine is on the high plain in northwestern Bolivia near Oruro on concessions issued to the Bolivian corporation Empresa Minera Inti Raymi S.A.

Newmont Mining Corp. of the United States acquired an 88% equity interest in Inti Raymi after its merger with Battle Mountain Gold Co. of the United States. The remaining 12% was owned by Zeland Mines, S.A. Inti Raymi owned and operated the mine. In 2001, the mine produced 9,505 kg (305,600 troy ounces) and sold 9,713 kg (312,300 troy ounces)

of gold; total cash costs declined by 21% to \$158 per ounce from \$200 per ounce (Newmont Mining Corp., 2002, p. 17). An Inti Raymi pilot plant, which adjoins Kori Kollo, used bio-oxidation heap leaching on oxide ore from the Llallagua deposit. A production decision was pending. Bio-oxidation was very successful in Ghana and South Africa. Inti Raymi is evaluating the possibility of adapting this technology to other refractory deposits.

Historically, Vancouver, British Columbia, Canada-based Orvana Minerals Corp. has conducted its exploration activities in foreign jurisdictions through subsidiary companies incorporated in those jurisdictions. Its active subsidiaries and holding companies in Bolivia, all of which were wholly owned, were as follows: Empresa Minera Paititi S.A. (for the Don Mario concession), Compañía Minera Las Tojas S.A. and Imperial Mining S.A. (for the other concessions of the Don Mario property), and Minera El Alto S.A. (for all other projects). During 2001, Orvana was able to generate a modest amount of working capital through the sale of Minera Orvana Andes Ltda. (its Chilean subsidiary), which had significant tax credits. This was supplemented with a \$50,000 loan from a third party in late February 2001 and a non-interest-bearing loan from Cía. Minera del Sur S.A. (Comsur) in late November 2001. In view of the difficult financial situation throughout 2001, Orvana continued the Don Mario and Pederson Projects on a care-and-maintenance basis at staffing levels adequate to ensure the physical security of the properties.

On September 12, 2001, Orvana and certain of its subsidiaries entered into an agreement with Comsur. Under the terms of the agreement, on January 11, 2002, Comsur was to invest \$4 million in return for the issuance by Orvana to Comsur of 52,995,143 common shares, together with the right to receive additional common shares, at no additional cost to Comsur on an one-for-one basis for each common share issued by Orvana. Completion and commissioning are expected in early 2003 (Orvana Minerals Corp., 2001 p. 17). Orvana had outlined two separate mineralized ore bodies at Don Mario—the upper and lower mineralized zones. The upper zone oxide resources were estimated to be 2.4 million metric tons (Mt) at 1.66 grams per metric ton (g/t) gold, 51.9 g/t silver, and 1.94% copper; the upper zone sulfide resources were estimated to be 2 Mt at 2.66 g/t gold, 48.9 g/t silver, and 1.39% copper; and the lower zone's resources were estimated to be 1.17 Mt at 10.24 g/t gold. Under the terms of the agreement, Empresa Minera Paititi would buy a gold-milling plant and equipment from Comsur valued at \$8 million, and Comsur would lend Orvana \$6 million to buy additional equipment, to develop open pit and underground mining on the concession, and to put the lower mineralized zone into production at the minimum rate of 600 metric tons per day (t/d) of ore within 18 months of the deal. Placing the deposit in production was estimated to cost a total of \$18 million (Mining Journal, 2001).

Golden Eagle International Inc. of the United States had previously completed primary engineering work on an 11,000-t/d processing plant and a block-caving operation in the Cangalli area of the Tipuani gold district but had abandoned further development of the project in 1999 (Metals & Minerals Latin America, 2001d). Gold mining cooperatives had been active in the district for some time; low gold prices had resulted in

the closure of many of the artisanal workings (Fox, 2001). Golden Eagle, however, had acquired two additional leases on the region in late 1999 to raise its leaseholds to nearly 200 km² (49,000 acres). In 2001, Golden Eagle continued to seek funding to allow its Bolivian subsidiary Golden Eagle Bolivia Mining S.A. to reactivate the dormant Cangalli gold prospect.

Iron and Steel.—The World Bank was studying a financing proposal of about \$600,000 to reassess COMIBOL's dormant El Mutún iron ore and steel industry project, which is in the Department of Santa Cruz. The Bolivian Government selected a consortium made up of Germany's Deutsche Montan Technologie GmbH (DMT Montan) and Panamerican Investments S.A. to develop a privatization strategy and to handle the sale of the giant El Mutún iron ore deposit. The final privatization plan should be adopted by the Government by the end of March 2002. El Mutún was one of the world's largest iron ore deposits with reserves estimated to be 40 Gt of medium-quality mineral at a grade of 50%. The ore is high in phosphorous and includes carbonates, oxides, and silicates. It was in the hands of COMIBOL.

Brazilian steelmaker Sidersul Ltda. made a proposal to the Santa Cruz Government to develop a 500,000-t/yr iron ore mine and 300,000-t/yr pig iron plant at El Mutún (MIGA Investment Promotion Network, 2002).

Government officials suggested that some of the iron ore be processed locally in a proposed direct-reduction-iron (DRI) plant and steel minimill. Bolivian natural gas would provide a low-cost energy source. Steel output could be used to satisfy Bolivia's domestic construction industry demand of about 120,000 t/yr of concrete reinforcing bar (rebar). Additional rebar production could be exported to Argentina or Brazil (Metals & Minerals Latin America, 2001f).

Lead, Silver, and Zinc.—Zinc concentrates represented Bolivia's largest mineral export. Bolivian concentrate production had a zinc content of 141,226 metric tons (t) in 2001; this was a decrease of 5.3% compared with that of 2000. Production of lead concentrates was 8,857 t, or 7% less than that of 2000. Silver content of produced concentrates was about 408 t, and the output of metallic silver decreased to about 32,603 kg (1,048,209 ounces). The medium-sized mining sector was the dominant lead and zinc producer with 69% of total lead and 78.3% of total zinc (Ministerio de Desarrollo Económico and Vice Ministerio de Minería y Metalurgia, 2001b).

The major producer of lead, silver, and zinc was Comsur S.A. A long-term commitment to Bolivian mining and a relatively successful history has given Comsur easier access than most to external sources of concessional and commercial finance. Comsur's Porco Mine remained Bolivia's most important producer of zinc. Reportedly, it had 4 Mt in probable reserves at a grade of 11.2% zinc, 0.7% lead, and 107 g/t silver. The plant had a processing capacity of 1,500 t/d. The initial 30-year Porco leasing agreement with COMIBOL had been renewed for an additional 15 years in mid-1999.

Elsewhere on the Bolivian Altiplano, the focus was on the large silver-zinc deposit at San Cristobal. A positive feasibility study completed in 1999 by Kvaerner Group for Andean Silver Corp. LDC (the local subsidiary of Apex Silver Mines Ltd.

of Denver, Colorado, and the Cayman Islands) gave proven and probable reserves of 240 Mt at a grade of 68.6 g/t silver, 1.67% zinc, and 0.58% lead. The study estimated the capital costs needed for an open pit project with a treatment capacity of 40,000 t/d of ore to be \$413 million. For the first 5 years, average production was projected to be nearly 840 t/yr of contained silver and 260,000 t/yr of zinc-in-concentrate; cash operating costs (and life-of-mine costs) were forecast to be \$1.23 per ounce for silver and \$0.23 per pound for zinc (Apex Silver Mines Ltd., 2002§). Washington Group International, Inc. was awarded the contract to provide and maintain mining equipment and to carry out contract mining during the first 5 years of the mine's working life. Nor Oeste Pacifico Generación de Energía Ltda. was awarded the contract to provide power to San Cristobal. Production could begin as early as 2003 and should more than significantly increase Bolivia's silver production. San Cristobal could be one of the top three silver mines in the world (Fox, 2001).

Pan American Silver Corp. of Canada signed a 2-year contract with Empresa Minera Unificada S.A. of Bolivia to extract 250 t/d from the San Vicente silver mine in southern Bolivia. The new small-scale operation will mine high-grade ore for processing at an existing nearby facility to produce approximately 31 t/yr of silver-in-concentrate. Pan American completed a study on future production at San Vicente in June 2001 but decided to defer development of a large mining operation at the mine. Pan American held an option to earn a 100% working interest in San Vicente and planned to begin the next phase of project development when metal prices improve (Metals & Minerals Latin America, 2001e).

Tin.—In 2001, tin production decreased by 1.3% to 12,298 t compared with that of 2000, and the value of the tin output attributed to the country's total mineral exports decreased to \$55.1 million, a 16% decline. For the 15th consecutive year, the small-sized mines and cooperatives replaced COMIBOL as the country's leading tin producer with an output of about 54% of Bolivia's tin production. In 2001, COMIBOL did not produce any tin (Ministerio de Desarrollo Económico and Vice Ministerio de Minera y Metalurgia, 2001b).

Allied Deals Huanuni (the wholly owned Bolivian subsidiary of the United Kingdom-based Allied Deals PLC.) planned to increase production from its Huanuni tin mine. Allied was studying a 1,600- to 2,000-meter (m)-long ramp entrance to the underground mining operations. Improved access to levels below 160 m will be combined with increased mining mechanization. Allied claimed that preliminary results of a resource evaluation by Behre Dolbear & Co. Inc. indicated an expansion of mineralization at depth and improved grades. The Huanuni Mine produced around 750 t/d of tin ore compared with 351 t/d in 1999 before the company took over management from COMIBOL. The installation of an additional mill and increased maintenance frequency has reduced downtime owing to equipment failures.

In 2001, Allied projected expenditures of about \$12 million. Total near-term investment was expected to be more than \$18 million. Under Allied's contract with COMIBOL, Allied had to invest \$14.5 million in the mine and mill; \$10.5 million had to be invested by March 2002. Huanuni's output was shipped to

Allied's Vinto tin smelter (Metals & Minerals Latin America, 2001a).

Industrial Minerals

Cement.—Traditionally, Bolivia's cement industry has been able to match its cement production to the requirements of the market. According to International Cement Review (2000), Bolivia produced about 1.1 Mt of cement and more than 1.2 Mt of clinker in 2001; production declined by 10.7% in 2000 compared with that of 1999. In 2001, Bolivia had five cement producers that had a joint clinker production capacity of almost 1.4 million metric tons per year (Mt/yr) and a combined cement production capacity of more than 1.2 Mt/yr installed in five cement works and two grinding plants. Sociedad Boliviana de Cemento SA (Soboce), whose owners included Compañía de Inversiones Mercantiles S.A. (52.99%) and the Commonwealth Development Corporation Group plc of the United Kingdom (44.67%), was the main player with three works—plants at Viacha and Warnes and the Tarija works of the former Cemento El Puente S.A. that Soboce acquired in 1999; these totaled some 267,000 t/yr of clinker production capacity and 557,000 t/yr of cement capacity (International Cement Review, 2000).

Fábrica Nacional de Cemento (Fancesa) was the second largest cement producer with a 334,000-t/yr unit at Cal Oro that was based on a clinker line rated at 276,000 t/yr. This plant was owned equally by the local government, Soboce, and Universidad San Francisco Xavier, which is the local university. Soboce managed the Fancesa works, which effectively made Soboce-Fancesa the major producer in Bolivia. Other cement producers included the Cooperativa Boliviana de Cemento (Coboce), which ran a 300,000-t/yr (clinker) works and a 315,000-t/yr (cement) integrated works at Cochabamba, and Empresa Mineral Industrial S.A. (Emisa) (owned by Fletcher Building Ltd. of New Zealand and Itacamba Cemento S.A. of Bolivia). In 2000 (the last year for which data are available), Soboce had a national market share of 37.4%; Fancesa, 28.9%; Coboce, 18.7%; Itacamba, 8.8%; and Emisa, 6.2% (International Cement Review, 2000).

Mineral Fuels

At yearend 2001, Bolivia's total oil reserves amounted to an estimated 440.5 Mbbbl of proven resources. Bolivia, which was largely self-sufficient in crude oil, consumed an estimated 43,000 barrels per day (bbl/d); this about equaled production during 2001. Almost all crude oil produced in Bolivia was for domestic consumption except for a small amount that was exported to Chile through the Sica Sica-Arica pipeline (U.S. Energy Information Administration, 2002§). According to *Petróleo & Gas Magazine* of the Bolivian Chamber of Hydrocarbons, Bolivia's proven natural gas reserves were estimated to be 24 trillion cubic feet as of January 1, 2002. Another estimate, however, was much higher (52 trillion cubic feet or more), which made Bolivia potentially a major world natural gas exporter with the second largest gas reserves (after Venezuela) in South America. Bolivia's proven natural gas reserves have increased enormously during the past few years from only about 4.3 trillion cubic feet in 1999 (U.S. Energy

Information Administration, 2002§). According to the most recent DeGolyer & MacNaughton evaluation (January 1, 2002), Bolivian natural gas reserves had increased more than 600% since 1997, and petroleum reserves increased 350% since 1997 (Petróleo & Gas Magazine, 2002).

Bolivia has been producing natural gas since the 1960s. Exports have primarily been to Brazil (under a 20-year contract) since December 1998; small volumes began flowing to Argentina in June 2002. The domestic Bolivian gas market is small, and although it is expected to grow, export markets will remain the key destination for Bolivian gas.

In February 2002, Bolivia and Brazil pledged to strengthen bilateral ties in the energy field. One possibility is a \$5 billion gas pipeline, known as Gafin, that would connect southern Bolivia with southern Paraguay, northern Argentina, the southern Brazilian State of Santa Catarina, and Brazil's capital city of Brasilia. Aggressive exploration efforts in recent years have led to many large discoveries; several fields were more than 5 trillion cubic feet. Blocks that contain significant gas reserves include block 20 (Tarija West), San Antonio and San Alberto, Caipipendi, and El Dorado.

Companies that controlled the larger natural gas reserves included Empresa Petrolera Andina, Total E.P. Bolivie, Petróleo Brasileiro S.A. (Petrobrás), BG Group, and Maxus Bolivia, Inc.

Caipipendi contained the largest field, Margarita, which held 13 trillion cubic feet, according to some estimates. Growth in supply has outpaced growth in demand, and exploration has slowed considerably since 1999. In 2002, Petrobrás said that it expected natural gas production in the southern San Alberto field to double by 2003 to nearly 500 million cubic feet per day. The adjacent San Antonio gasfield was being developed by the same consortium (Petróleo & Gas Magazine, 2002).

Infrastructure

The transportation network of Bolivia comprised 52,216 kilometers (km) of highways. The Pan-American highway, which links Argentina and Peru, crosses the country from south to northwest. The rail system consisted of two independent lines that were separated by the eastern Andes. The western line connects the cities of Cochabamba, La Paz, which is the capital, and Oruro with northern Argentina and the Chilean ports of Antofagasta and Arica. The eastern line connects Santa Cruz with northern Argentina and western Brazil. The Bolivia-Brazil pipeline, which tapped Bolivia's Rio Grande sources, came onstream in July 1999. It was the largest private sector infrastructure project in South America, and partners included Enron Corp., which was planning to sell its share; BG; El Paso Corporation; Petrobrás; Shell Oil Co; and Totalfina Elf S.A. The project began in 1996 and cost \$2.1 billion. It serves São Paulo, Brazil, with an extension southward to Porto Alegre. Petrobrás's preferential access to the Brazilian section of the Bolivia-Brazil pipeline and the pricing of Bolivian gas have become controversial. Among other problems, the depreciation of Brazil's currency and high transportation tariffs have raised the price of Bolivian gas, making it less competitive with fuel oil and liquefied petroleum gas. In July 2001, Bolivia's largest natural-gas-producing companies—Repsol-YPF, BG, and British Petroleum—decided to form a liquefied natural

gas (LNG) export consortium (called Pacific LNG) in hopes of delivering Bolivian gas to the U.S. market. The project could involve constructing a 692-km (430-mile) pipeline from Bolivia's southern Margarita field to a port (most likely Ilo) in southern Peru or to Cobija or Mejillones in northern Chile (U.S. Energy Information Administration, 2002§).

Outlook

The Bolivian economy will continue to rely heavily on the hydrocarbon sector. Slow economic growth in the United States, which has been Bolivia's major trading partner, regional economic problems, and low prices for Bolivia's commodity exports (for example, tin) have not helped matters. In general, the weak global economy has stifled Bolivian exports and foreign investment flow into the country. Making matters even worse, La Paz was hit by the worst flooding in 25 years in late February 2002. Taxes and royalties to be paid on internal sales of finished petroleum products will remain essential revenues for the national treasury. The Bolivia-Brazil natural gas pipeline project is expected to become a major driving force for the Bolivian economy in addition to transporting natural gas to Brazil, which is the largest South American market. At the same time, the project will help attract private investments for the hydrocarbon sector because the volumes of natural gas to be provided to Brazil will activate exploration and production activities. Bolivia's main hope for future economic growth hinges on increasing natural gas exports and becoming a major energy hub for natural gas for South America's Southern Cone in coming years. Possible markets for Bolivian natural gas include Argentina, Brazil, Mexico, and the United States. Progress, however has been slow. Bolivia is on its way to becoming a natural gas hub for the Southern Cone as well as a major exporter of LNG to Mexico and the United States. The country's oil and natural gas production potential has not yet been reached. The value of these exports will range from \$125 million for the first year to \$500 million per year after 5 years of operation. If thermoelectric powerplants are included and the pipeline system is expanded, then exports can be doubled. Other benefits for Bolivia included attraction of private investment needed for natural gas exploration and development and infrastructure development along the pipeline (compression facilities, liquid extraction plants).

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Major Sources of Information

Vice Ministerio de Minería y Metalurgia
Ave. Mariscal Santa Cruz
Palacio de Comunicaciones Piso 14
La Paz, Bolivia
Telephone: (591-2) 371165
Fax: (591-2) 359998

Asociación Nacional de Mineros Medianos,
Calle Pedro Salazar No. 600
Casilla 6190, La Paz, Bolivia
Telephone: (591-2) 417522
Fax: (591-2) 414123

Cámara Boliviana de Hidrocarburos,
Radial 17 ½ 6to. Anillo, Zona Oeste
Santa Cruz de la Sierra, Bolivia
Telephone: (591-3) 538799
Fax: (591-3) 577868

Major Publications

Ministerio de Desarrollo Económico, Vice Ministerio de Minería y Metalurgia, La Paz:
Boletin Estadístico 2001
Publicación Oficial No. 194

Asociación Nacional de Mineros Medianos: Memoria e Informe Anual—2001

Camara Boliviana de Hidrocarburos: *Petróleo & Gas Magazine*, bimonthly publication.

TABLE 1
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1997	1998	1999	2000	2001
METALS					
Antimony:					
Mine output, Sb content	5,999	4,735	2,790	1,907	2,264
Metal including Sb content of trioxide	4,136	3,836	2,241	1,285	1,992
Arsenic, mine output, arsenic trioxide, arsenic sulfide	282	284	437	318	846
Bismuth:					
Mine output, Bi content	684	1,032	708	75 e/	60
Metal, smelter	55	83	57	6	66
Copper, mine output, Cu content	182	48	252	110	18
Gold, mine output, Au content 3/ kilograms	13,292	14,444	11,788	12,001 r/	12,395
Lead:					
Mine output, Pb content	18,608	13,848	10,153	9,523	8,857
Metal, smelter, primary	77	65	45	251	106
Silver:					
Mine output, Ag content kilograms	387,200	404,000	422,492	433,592	408,000
Refined 4/ do.	1,112,411	1,157,954	72,195	55,720	32,603
Tantalum, tantalite do.	727	15,624	8,808	9,443	11,992
Tin:					
Mine output, Sn content	12,898	11,308	12,417	12,464	12,298
Metal, smelter	16,853	11,102	11,166	9,353	11,293
Alloys	123	160	75	217	139
Tungsten, mine output, W content	513	497	334	382	533
Zinc, mine output, Zn content	154,491	152,110	146,316	149,134	141,226
INDUSTRIAL MINERALS					
Arsenic trioxide	282	284	437	318	846
Barite	4,402	2,500	6,005	3,050	6,253
Bentonite	50	50 e/	50 e/	--	159
Cement, hydraulic	1,034,800	1,169,000	1,201,000 r/	1,072,000 r/	1,100,000 e/
Gemstone, amethyst:					
Polished kilograms	18	21	20 e/	20 e/	20 e/
Rough do.	122	140	314	320	65
Gypsum, crude	20	--	--	--	--
Marble	274	250	468	673	374
Quartz kilograms	39	31	36	--	7
Salt	869	562	688	327	308
Slate (pizarra)	458	484	198	269	246
Ulexite	12,309	7,026	15,362 r/	41,021 r/	32,477
MINERAL FUELS AND RELATED MATERIALS					
Gas, natural:					
Gross million cubic meters	5,349	6,756	6,800 e/	6,900 e/	10,000 e/
Marketed do.	3,341	3,426	3,396	3,398 r/	4,870 e/
Natural gas liquids: e/					
Natural gasoline thousand 42-gallon barrels	3,000	3,000	3,000	3,000	3,000
Other (consumption) do.	2,600	2,600	2,600	2,600	3,000
Petroleum:					
Crude including condensate do.	10,585	12,775 r/	10,680 r/	10,150 r/	12,775
Refinery products: e/					
Liquefied petroleum gas do.	730 5/	730 5/	700	720	720
Gasoline do.	3,650 5/	4,015 5/	3,700	3,690	3,700
Jet fuel do.	1,095 5/	1,095 5/	1,000	1,100	1,100
Kerosene do.	365 5/	365 5/	400	400	400
Distillate fuel oil do.	2,920 5/	2,920 5/	3,000	3,000	3,100
Residual fuel oil do.	365 5/	365 5/	200	200	210
Unspecified do.	4,015 5/	5,110 5/	4,200	4,500	4,400
Total do.	13,140 5/	14,600 5/	13,200	13,600	13,600

e/ Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. r/ Revised. -- Zero.

1/ Table includes data available through July 29, 2002.

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 levels.

3/ Includes production of metallic gold.

4/ Includes production of metallic silver.

5/ Reported figure.