BOLIVIA

By David Fox

2001 was a disheartening year for the Bolivian mining industry. The optimism of the mid-1990s was replaced by a sense of potential unfulfilled and doubts about the future. Political uncertainties, stagnant economic growth, civil unrest and natural disasters set the domestic scene; depressed metal prices, diminished foreign investment, the perception of more attractive mining opportunities elsewhere, and the slow-down in the US economy aggravated by the terrorist attacks of September 11, adversely coloured the international setting. Mine production dropped and the income of miners fell; exploration effort flagged, significant mineral discoveries were absent, and investor sentiment waned. Happily, the prospects for 2002 are a little brighter and those for 2003 slightly more so.

At the best of times Bolivia is in a vulnerable situation. It is by European standards a large country of a little over 1 million km^2 but has a sparse population of only 8.5 million. Its frigid Andean peaks, cold high deserts, and inaccessible Amazonian forests mean most of the country is virtually uninhabited and contributes little to the economy. Bolivia is landlocked and maritime access to the world markets is at the will of its neighbours. Severe flooding added to the difficulties of life during 2001 and recurred in early 2002. Its people are the poorest in South America with a per capita GDP of only US$1,000 (Peru US$2,000, Brazil US$4,000): it qualifies for help under the World Bank and International Monetary Fund's heavily indebted poor countries (HIPC) initiative, thus placing Bolivia in the same global category as the poorer countries of sub-Saharan Africa and separate from her South American neighbours. Many Bolivians remain peasant farmers; 40% are Aymara - or Quechua-speaking indians; and health and educational services are meagre. Bolivia is an archetypal underdeveloped country and its limited physical and social infrastructures add to the costs of mine development and production. In the international mining competition to attract foreign investment Bolivia has dropped behind its neighbours, Peru, Brazil, Argentina and Chile.

2001 saw a change of head of state as President Hugo Banzer Suárez abdicated before his five-year mandate had been completed and Vice-President Jorge Quiroga Ramïrez took his place. Until recently it was normal for Presidents to be involuntarily deposed in coup d'etat giving the country a notorious reputation for political instability. However, since constitutional government returned in 1982 this is the first time that a President has not seen out his term of office. Aged 75, Hugo Banzer has been stricken with cancer and on his resignation, 42-year-old Jorge Quiroga assumed office on August 7. The change was significant, not so much for any notable change in policy, but more because of a change in political style. General Banzer had served as an autocratic President following a military coup from 1971 to 1978 before founding a political party, Acción Democrática Nacionalista (ADN) and subsequently offering himself as a candidate for president three times before winning office in 1997; he represents the old-fashioned clientalist tradition in Bolivian politics. Mr Quiroga, also of the ADN, is cast in the modern technocratic mould, educated in the US, and a former finance minister (1992). He is a stop-gap President since a general election will be held on June 30 2002; the constitution debars him from succeeding himself but he would be eligible to stand in 2007. Meanwhile, a multitude of would-be candidates are jostling to be accepted as presidential candidates. It is certain that none will win 50% or more of the popular vote and be directly elected, indeed it is improbable that any will gain more than a quarter of the electorates votes. This means that after the election the three leading contenders will look for political alliances to ensure majority support in Congress: a coalition government is inevitable. It would be unprecedented for the ADN candidate to be elected - such is the unpopularity of most sitting government parties in Bolivian politics.

The leading presidential contender is former President (1993-97) Gonzalo Sánchez de Lozada of the Moviemento Nacionalista Revolucionario (MNR); he was the architect of the New Economic Policy during the 1980s which transformed the economy into its modern form. He is also Bolivia's leading mining entrepreneur. Another former president (1989-93), Jaime Paz Zamora of the Movimiento de la Izquierda Revolucionario (MIR), and a member of Banzer's coalition, is expected to be in the running despite a tainted reputation. Other interested candidates include several populists who share an antipathy for the traditional parties and conceivably could become king-makers as political compacts are sought: they include Felipe Quispe who rose to prominence in 2001 as the militant leader of the rural trade union, CSUTCB, and should attract many indigenous voters. The Unidad Cívica Solidaridad has rather lost its shine following the tax problems in Santa Cruz (and death) of its founder Max Fernández. It may be worth stating that the military is not politicised nor is it a threat to democratic government. Whoever succeeds President Quiroga, the larger economic scenario for mining is unlikely to change. The dependency of the country on the goodwill and support of the International Monetary Fund and the World Bank will ensure that Bolivia will continue to sustain the interests of commercial miners and foreign investors: the alternatives are too stark to contemplate.

During his months in office President Quiroga has attempted to tackle some of the pervading problems of the country, notably poverty, unemployment and corruption. He loosened tight financial controls slightly and, for example, directed limited funds to support small-scale community development in the Altiplano, the historic mining area of the country; he assuaged the problem of unemployment slightly by creating a few make-work programmes: but, with only 46% of the workers occupied in the formal sector of the economy, there is a limit to what can be expected. He came to an accommodation with the peasant union following widespread violent demonstrations and blockades in April, June and September; with only a fragmentary road network it is easy to halt traffic, for example, and disrupt supplies to and from the mines. Businessmen should be aware of the unsavoury reputation the country has for corruption - in the 2001 annual Transparency International survey of 91 countries by managers of foreign companies, Bolivia was placed 84th down the list, lower than any other country in South America. The vice-minister for mining, Mario Paulsen, was obliged to resign in early 2001 amid allegations of partiality and fraud; he countered by accusing the then minister of economic development, Carlos Saavedra (MIR), of corruption. Pressure from international agencies has helped Mr Quiroga introduce tougher legal restraints. Meanwhile, the appointments in July, 2001, of Carlos Kempff (Independent) as Minister of Economic Development, Ramiro Cavero (ADN) as Minister of Trade and Investment, and Claudio Mansilla (ADN) as Minister of Sustainable Development (succeeding Ronald Maclean (ADN)) gave a temporary fillip to his year in office.

Macro-economic policy follows free-market principles and is carefully monitored and kept on track by the Washington-based public financial institutions. During the past ten years virtually all the former nationalised enterprises - for example, in mining, oil, energy utilities, and transport - have been privatised and legislation introduced designed to attract foreign direct investment. New tax and mining codes have been introduced. The Ley Corazón has opened up frontier regions to overseas investors and a modern land registry is under way: legal disputes over mineral prospecting and ownership rights have frequently bedevilled mine developments. The boliviano effectively floats against the dollar and is freely convertible. There is little restriction placed on exports and imports, duties are relatively low and there are tax concessions on the importation of certain capital goods including those useful in the mining industry; smuggling has been reduced. Much of the formal economy is dollarised (which removes some of the ability of the government to respond to external shocks); domestic Inflation in 2001 was only about 2%; the current account deficit was probably about 5% of GDP and covered by sustained multilateral aid: all indications of relative stability. Unfortunately they were accompanied by a very modest (0.5%) growth in the economy - not enough to keep pace with a growing population (increasing by about 2.0% annually). Over 40% of the labour force remains agricultural, most outside the commercial sector. In contrast, no more than about 80,000 or 2%, work as miners or in the oil and natural gas fields. Like the farmers, the great majority of the miners are peasants who rely heavily on manual labour and have access to only primitive technology; only a few thousand work in the commercial mines using twentieth or even twenty-first century engineering techniques and commercial acumen.

The production of primary raw materials remains the distinguishing mark of the economy. Together, agriculture (14% of GDP), mining (4.5%) and the petroleum industry (4.6%) are more important in fuelling the formal economy than manufacturing (16.6%) or transport and communications (10.9%) or commerce (8.5%) or even public administration (8.9%). The contribution of the infamous criminal economy is difficult to measure. However, under US pressure, the coca eradication programme has been more actively pursued and the drugs trade in cocaine has been effectively reduced in the past two years (to the detriment of some domestic investments and the livelihoods of some 40,000 coca growers). It is in the export economy where the importance of commodities, legal and illegal, is most marked. In 2000, 46% of the value of Bolivia's legitimate exports were supplied by just four commodities: soya (US$188 million), zinc (US$171 million), natural gas (US$122 million) and gold (US$88 million). During the first nine months of 2001 preliminary figures show that mining continues to be an economic mainstay. Production figures for the main minerals during the first nine months of 2001 were at about the same level as during the same period in 2000.

Unfortunately, weak metal prices pushed down their value on the international markets: the LME cash price of zinc began the year at about US$1,030/t and finished it at US$775/t; cash tin declined from US$5,125/t to US$3,945/t and by March 2002 had fallen to a 13-year low of US$3,700/t; lead stagnated at around US$480/t; the average price of the precious metals remained depressed at only US$4.37/oz for silver and US$271/oz for gold.

Many of the smaller tin and zinc mines were uneconomical at these prices and in October the government introduced the Programa Minero de Empleo Productivo which effectively gives accredited small producers of zinc and tin concentrates a subsidy (in bolivianos equivalent to US$666/t of refined tin content, and US$52/t of refined zinc). The programme is to have a life of one year (unless a sudden improvement in metal prices makes it unnecessary) and the money is being distributed through the medium of the municipalities. Comibol will bear US$2 million of the total cost of about US$6-7 million and the European Union the remainder. The (perhaps, vain) hope is that during the year improvements in productivity will result in lower costs and allow employment levels to be maintained without further subsidy.

Mine production was about equally split in value in 2001 between the precious metals, gold and silver, and the non-ferrous minerals, particularly zinc and tin. Most gold and some silver is produced from large open-pit, heap-leaching operations by subsidiaries of international mining corporations. In contrast, zinc with some silver and lead is largely a product of traditional underground mining and milling, with domestic companies significantly involved. Further, much of the tin, Bolivia's staple for most of the twentieth century, continues to be produced by peasant miners, some organised into mining co-operatives, some using primitive labour-intensive working practices little changed from colonial times. The Corporacion Minera de Bolivia (Comibol), the state mining corporation which was the dominant force in Bolivian mining until the 1980s, has now been reduced to a holding company, the last of its working assets having been effectively transferred to the private sector in 2000. Most of the Comibol mines had become economically unviable under state control and there was pressure from Bolivia's international bank lenders to offload them. Some continue to contribute to Bolivia's mining output, having been transferred to mining co-operatives many of whose members were recruited from those made redundant when the Comibol mines closed; others have enjoyed a modest revival with the injection of new management and outside capital and expertise; a few have been opened as tourist attractions to the trickle of hardy visitors who take an interest in Bolivia's rich mining heritage.

Mineral Production
('000 t except where stated)

	1995	**1999**	**2000**	**Jan-Sept 2001**
Zinc	146.1	146.3	110.6	107.9
Gold (kg)	14,405	11,780	8,500	9,100
Silver (t)	425	419	329	312
Tin	14.4	12.4	8.8	9.2
Lead	20.4	10.2	6.9	7.0
Antimony	6.4	2.8	1.3	1.4
Wolfram	0.8	0.4	0.36	0.45
Natural Gas (bn cu ft)	-	110	92 95^{e}	114.3

Source: Viceministerio de Minas y Metalurgia, EIU.

The difficulty of privatising the nationalised mines is illustrated by the history of Huanuni tin mine in 2001. A 30-year contract to operate the mine was won from Comibol in 2000 by metals trader Allied Deals (now RBG Resources plc) as part of its bid to purchase the Vinto tin smelter. The cost was a little over US$500,000 but with a commitment to invest US$14 million over five years. Subsequent exploration at depth has revealed significant additional reserves averaging 4.5% Sn to be added to the 3.7 Mt of ore grading 2.6% Sn established by Comibol; new 2km-long tunnel ramps are being driven into the hillside to give truck access by mid-2002 to the lower reserves, obviating some of the need for vertical lifts. Modern extraction machinery is to be installed to enhance productivity and improved milling equipment to increase processing capacity. One of the features of the mine is that the upper levels have long been abandoned to mining co-operatives and many old workings link the two; theft of minerals from the working mine has been a perennial problem and proved difficult for the state administrators to clamp down on. Allied is gutting the upper reaches and in 2002 intends to seal them using waste from the mill - thus killing two birds with the one stone.

These radical moves, which include significant redundancies amongst existing miners in a region where the emasculated miners' union has retained some of its militancy and where there are few other sources of employment, have not gone unopposed. A 48-hour strike in October, eventually lasting three weeks as local issues over wages, conditions of work and improvements in housing provision and domestic services (the latter no longer the formal responsibility of the company), combined with the demand of the mining co-operatives that the mine be handed over to them, escalated to become part of the nation-wide protest against the poor economic performance of the government. During this period members of the co-operatives helped themselves to ore in the mine and reportedly damaged equipment. During the strike the company estimates it lost around 300-355 t of tin-in-concentrate. Nevertheless, it is able to point to some success during the year, claiming that output has risen from 351t/d of ore in 1999 to about 750 t/d in late 2001 and may reach 1,500 t/d by the end of 2002.

Mineral Exports (US$ million)

	1995	1999	2000	2001 Jan-Sept	% change
Zinc	151.3	154.3	128.9	92.6	-16.9
Gold	130.8	89.1	67.6	60.7	-6.6
Silver	70.8	68.1	58.0	41.0	-15.3
Tin	88.6	68.7	56.0	45.4	-14.3
Total Mining	**479.7**	**397.0**	**323.0**	**253.7**	**-21.3**
Natural Gas	92.4	35.5	25.4	na	
Petroleum	48.1	38.2	20.7	na	

Source: Viceministerio de Mineria y Metalurgia, EIU,
[e] estimate

Huanuni was acquired to provide feed for the Vinto tin smelter, bought by Allied in its successful bid of US$29 million for the two. Vinto had been producing some 11,000 t/y of refined tin prior to privatisation, well below its notional 30,000 t/y capacity. Production had declined with the ending in 1998 of a contract with Minsur to treat Peruvian concentrates. In 2001, Vinto believes it had a production of some 11,500 t of tin and anticipates increasing this to 16,000 t in 2002. This increased output is expected to come in part from Huanuni; part from an expansion of a network of purchasing centres amongst small miners (now served by independent middlemen); and partly from expanded production from two other ex-Comibol mines which have undergone technical refurbishment. One is Caracoles which became a joint-venture managed by Barrosquira in 1997. After bearing the brunt of a long occupation by disgruntled miners and trouble with local mining co-operatives the company has invested about US$1 million in raising the volume of mineral treated (to about 77t/mth of refined tin equivalent).

More significant to Vinto will be the resumption of production from Colquiri, a zinc-tin mine whose management was taken over by a partnership between Cía Minera del Sur (Comsur) and Commonwealth Development Corp. Capital Partners (CDC) of the UK in March 2000. This is CDC's first mining investment in Latin America (although it has US$500 million invested in the continent). Rio Tinto has a 30% interest in Comsur, the company which ex-President (and perhaps the next President) Gonzalo Sánchez de Lozada has built into the most important domestic mining company in the country. Colquiri, with a stated 23 Mt of proven zinc and tin reserves averaging 0.85% Sn and some 13.5 Mt of tailings averaging 0.5% Sn, was put on a care-and-maintenance basis following its transfer of management. It returned to production in August 2001 after an investment of US$10 million, including drilling which had doubled reserves, giving it a potential throughput of 1,000 t/d. Vinto expects to be buying some 3,000 t/y of tin-in-concentrates from Colquiri in the immediate future.

In June this year, a consortium comprising CDC and Comsur took control of Vinto after paying US$24 million to RBG Resources. RBG had only invested US$2 million of its US$10 million promised during the first two years of its operation of the smelter. The CDC-Comsur consortium will be given extra time to complete the remaining US$8 million investment in thecomplex.

Most of Bolivia's tin comes from mining co-operatives and small mines but they are in a conventional sense very inefficient: the average peasant miner produces no more than about 200kg/y of tin-in-concentrates. Various ways have been put forward to modernise production - improved technology, consistent legislation, closer attention to market demand, diversification, access to finance, greater help from government and non governmental organisations, etc - and some may be given limited support. For example, some redundant Comibol equipment was given to the 514 co-ops who are members of the Federación. In practice, the present arrangement helps soak up labour which would otherwise be without a livelihood and a potential thorn in the flesh of government. A minority of the tin refined at Vinto originates as concentrates from Brazil but this is always going to be only a modest addition to the smelter's supply.

A modest proportion of Bolivia's gold is won from simple alluvial workings organised around individual dredges, excavators, pumps and hand operations in the Yungas and the Amazonian lowlands of the Beni; the valleys of the Aracas, Challana, Kaka and Mapirí rivers are all locations for desultory commercial interests. Golden Eagle Bolivia is currently evaluating some 28,300 ha in the Tipuani region, for long Bolivia's most important alluvial gold region, and the province of some of Bolivia's more successful mining co-operatives. Paradoxically perhaps, deteriorating economic conditions in the Bolivian hinterland have forced more casual labourers to turn to the search for gold and marginally increased overall production during 2001.

But most gold comes from operations conducted by multinational mining companies employing state-of-the-art technologies and few operators. The front-runner, responsible for 75% of Bolivia's gold output, is Kori Kollo on the arid Altiplano north of Oruro. It introduced modern open-pit workings to Bolivia in 1985, the first major overseas mining investment in the country for decades. It is owned by the Empresa Minera Inti Raymi in which Newport Mining Corp. holds an 88% stake. In 2001 some 18.44 Mt of material was mined - virtually the same volume as in 2000 - but by the final quarter of the year production was running at 25% above that of the same period in 2000, thanks to the addition of heap-leaching to the milling process. In consequence, gold production in 2001, at 305,600 oz, was 12% higher than in 2000 (273,900 oz). This increase was accompanied by a fall in production costs from US$301/oz in 2000 to US$229 in 2001 (and to US$206 during the final quarter). These figures helped Newmont into profit for the year. Unfortunately, Kori Kollo's reserves fell significantly during the year, reducing from 30.3 Mt at 0.038 oz/t (or 1.148 Moz gold) to 21.75 Mt averaging 0.032 oz/t (698,000 oz gold). The low price of gold has discouraged exploratory work to establish fresh reserves. When the mine began it was given an anticipated life of about 15 years and its future is clearly limited. The local impact of eventual closure will be limited by the relatively small number of operators (currently only 600) employed by the mine, many of whom retain their homes and families in La Paz and Oruro and commute to the mine on a two-weekly basis, and by the commitments to reclamation which the mine developers entered into: this is in contrast to the many ruined landscapes and communities which earlier abandoned mines in Bolivia have bequeathed.

Low prices have slowed progress on the development by Apex Silver Mines of its San Cristóbal silver-zinc open-pit project in the south of the Altiplano. The mineralised area extends over about 30 km^2 and has attracted the interest of miners since Europeans first explored the region. The company has already ascertained the viability of what promises to be one of the top three silver mines in the world and a major zinc producer. A feasibility study completed in 1999 for Andean Silver Corp. (the local subsidiary of Apex) gave proven and probable reserves of 240 Mt at 68.6 g/t Ag, 1.67% Zn and 58% Pb. The study estimated the capital costs needed for an open pit with a treatment capacity of 40,000 t/d of ore as US$413 million; current proven and probable reserves are sufficient to maintain this daily production rate for 17 years. Subsequent improvements in mining and metallurgical treatments predict an average annual production for the first five years of 27 Moz of contained silver (and over 560 Mlb of zinc-in-concentrates): cash operating costs (and life-of-mine costs) were forecast to be US$1.23/oz (US$1.83/oz) for silver and US$0.23/lb (US$0.27/lb) for zinc. A letter of intent has been signed with Nor Oeste Pacifico Generacion de Energia (NOPEL) of Chile to supply power, and port facilities in Chile are being negotiated. When it reaches production San Cristóbal should double Bolivia's silver exports and increase zinc exports by 75% according to the President of Apex, Keith Hulley. The company is also evaluating silver deposits at Pulacayo, historically a great silver producer.

Pan American Silver (of Canada) decided to postpone a possible development of San Vincente into a larger mining operation until metal prices improve; instead, it chose to sign a short-term, two-year contract with a local company allowing it to mine high-grade ore with the expectation of producing 1 Moz/y of silver. Low prices for silver helped make it easy to close the loss-making Itos tailings plant; a final blow to the former San José empresa of Comibol.

The slight improvement in the price of tungsten explains the modest rise in production during 2001 compared with the previous year. The largest company, EM Urania, raised monthly output from 60 to 80 t of 70% WO_3 by re-opening and expanding existing workings using hand labour; the tin-wolfram mine at Chojilla raised production using existing mine and mill capacities. Production is highly price-sensitive and it would be difficult to infer a longer term trend from this, nevertheless welcome, activity.

Comsur is the major source of Bolivia's zinc production. The company, in which Rio Tinto has a 30% interest, is a subsidiary of Minera SA with interests in Argentina as well as Bolivia. Comsur is responsible for about 75% of Bolivia's lead, half its zinc and 40% of its silver output. Its association with ex-President Gonzalo Sánchez de Lozada has proved a mixed blessing when his political opponents have been in power but a reputation for honesty has helped attract overseas investment. Its portfolio of properties is growing more diverse and includes: the former Comibol mine at Porco, which is the company's and country's largest zinc mine; the recently acquired Colquiri tin-zinc mine, now producing again; and the Don Mario gold-silver-copper prospect in the Pre-Cambrian lowlands in the east of the country. In mid-2001, Comsur bought Don Mario from the Canadian corporation Orvana Minerals for US$4 million in cash and expected to invest US$8 million in plant and equipment, and finance US$6 million to construct a 600t/d mine, mill and appropriate infrastructure. Shafts are being sunk to depths of 225 m to give access to the main ore reserves. If all goes according to plan it should start producing in mid-2003 and Comsur expects a yield of a minimum of 350,000 oz of gold during its first six years in operation. Plans for another new Comsur acquisition, the Vinto antimony smelter, may include conversion to treat zinc or even tin.

Other recent developments have included the award of a grant by the US Trade and Development Agency (TDA) towards the cost of a feasibility study of the San Bartolomé silver project in the Potosí department. The owner is Minera Manquiri, a subsidiary of Coeur d'Alene, and a pre-feasibility study has suggested potential reserves of 122 Moz of silver, with a possibility of an investment of US$70 million leading to an annual output of 6-9 Moz of silver. Eaglecrest Explorations Ltd. (Vancouver) continues to explore its San Simon property near Paititi in northeast Bolivia; it suffered a setback in 2001 when, halfway along the 1 km-long adit it was driving to intersect promising gold-bearing vein stockworks, it hit a sand aquifer and flooded. The vast tailing reserves at Catavi attracted a feasibility study by MensisLux (of Australia): there has been a perennial interest in mechanically unlocking the tin they contain but the dumps remain largely the support of manual scavengers. Comibol continues to harbour the dream of a joint venture to work the huge, high-grade, iron ore deposits of El Mutún close to the Brazilian frontier in remote eastern Bolivia, while the possibility of the open-pit mining of the ores of the symbolic

Cerro Rico de Potosí deposit remains an anathema. The mothballed Comibol lead and silver smelter at Karachipampa continues to attract some interest even after the Russian company, Gas Energy Finance, decided to withdraw. The German metallurgical company Lurgi is persisting in a search for other investors willing to contemplate supplementing the existing smelter by a plant to treat zinc concentrates and using the residues to extract silver and lead at Karachipampa.

The prospects for mining seem a little brighter than the reality of mining in 2001. External circumstances may be expected to gradually improve as 2003 approaches and some current developments show promise. A new President should bring greater stability and the country remains in good standing with the multilateral lending agencies; metal prices are seemingly destined to fall no further. More particularly, the opening of the natural gas pipeline to Sao Paulo in 2000, combined with the virtual privatisation of Bolivia's petroleum industry, has created new sources of both export revenues and opportunities on the domestic energy front to bolster Bolivia's faltering economy. In brief, the contribution of oil and natural gas to the national economy is expected to rise threefold to 15% in 2006; gas supplies to Brazil are expected to double and there is talk of exporting liquified gas to northwest Mexico and California. Investment in the industry in 2000 reached US$644 million and is running at over ten times that in mining. Foreign companies have increased Bolivia's natural gas reserves some fourfold since 1997. As in petroleum so in mining: large areas of potential value remain open to modern exploratory techniques. It is anticipated that the reflected success of the developments in the oil fields, expected progress at San Cristóbal and in the Oriente, and the revival of some existing mines under new management, should encourage investors to take a fresh interest in Bolivian mining.