

THE MINERAL INDUSTRIES OF PARAGUAY AND URUGUAY

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PARAGUAY

The Republic of Paraguay, which is located northeast of Argentina in central South America, has an area of about 406,750 square kilometers (km²). The area supported a population of about 6 million people, the gross domestic product (GDP) per capita was \$4,300, and the GDP based on 2002 purchasing power parity was \$25.2 billion. Of the total population, 36% was estimated to exist below the poverty line. Industry accounted for about 27% of the GDP compared with services at 46% and agriculture at 27%. The large informal segment of the economy included microenterprises, urban street vendors, and re-exporters of consumer goods. Paraguay was heavily integrated with the economies of its neighboring Mercado Común del cono Sur (MERCOSUR) members—Argentina, Brazil, and Uruguay. Paraguay has vast hydropower potential and had two large hydroelectric plants—Itaipu, which was the largest in the world, and Yacyreta. The formal economy has grown by an average of about 3% per year, but the GDP has declined slightly in recent years (U.S. Central Intelligence Agency, 2003¹).

The mineral industry of Paraguay accounted for less than 1% of the country's GDP and was focused on the production of cement and industrial minerals, such as clays, gypsum, kaolin, limestone, marble, ocher, ornamental stone, silica sands, and talc. Cement was produced by Industria Nacional de Cemento, which also operated the limestone quarries in Concepcion. The Ministerio de Industria y Comercio was investigating the supposed dumping of cement from Brazil. Cemento Yguazú was planning the installation of a cement mill and clinker furnace in Paraguay. Ornamental stone has been exported in the past, in addition to domestic consumption. Good-quality limestone deposits have been developed and operated at Itapucumi and Puerto Vallemi in the Department of Concepcion. Other mineral-related activities, which depended on imported raw materials, included the production of pig iron and steel and the refining of petroleum (Ellis, 2003).

Paraguay's state oil company Petroleos Paraguayos (Petropar) controlled the country's domestic oil market and handled all crude and processed petroleum imports. Crude oil and petroleum product demand was estimated to have averaged about 28,000 barrels per day (bbl/d) in 2003; all was imported. Companies that supplied oil to the country included Glencore International AG of Switzerland, Repsol YPF, S.A. of Spain, and the Vitol Group of the Netherlands. The Paraguayan Government planned to decide in January 2004 whether to privatize Petropar and to deregulate the pricing of diesel fuels.

¹References that include a section mark (§) are found in the Internet References Cited sections.

A new investment group in Paraguay applied for a prospecting permit for hydrocarbons in the Cretaceous Pirity Subbasin, which includes part of the Cano Martinez 470/90 concession areas (U.S. Energy Information Administration, 2004§).

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URUGUAY

The Republic of Uruguay, which is located in southern South America and borders the South Atlantic Ocean between Argentina and Brazil, has an area of about 176,220 km². In 2003, the population was about 3.41 million. The GDP per capita was \$7,900, and the overall GDP based on 2002 purchasing power parity was \$27 billion. The Uruguayan economy was highly integrated with the other members of MERCOSUR [Argentina, Bolivia (associate member), Brazil, Chile (associate member), and Paraguay]. The devaluation of the Argentinean and Brazilian currencies and associated economic troubles caused Argentinean-Uruguayan cross-border trade to collapse and led to the abandonment of Uruguay's fixed exchange rate. Uruguay's adoption of a flexible (free-floating) exchange rate in June 2002 resulted in dramatically higher inflation—20% in 2003 compared with 25.9% in 2002 and 4.4% in 2001 (International Monetary Fund, 2004§).

The GDP real growth rate fell to 1.0% in 2003 from an estimated 10.8% in 2002. The unemployment rate was estimated to be about 19.4%, inflation surged, and the burden of external debt doubled. Cooperation with the International Monetary Fund (IMF) and the United States limited the damage. Moves to reschedule debt and promote economic recovery may help limit a further decline in output in 2003 and 2004. In 2002, the estimated labor force of about 1.2 million was distributed as follows: services, 70%; industry, 16%; and agriculture, 14% (U.S. Central Intelligence Agency, 2003§).

Although the country is small, it has a significant industrial minerals sector. The industrial minerals mined included basalt, dolomite, feldspar, gypsum, limestone, marl, quartz, and sand. Ornamental rocks, such as flagstone, granite, and marble, were

also produced. The country was also an important producer of cement, construction materials, dimension stone, and semiprecious stones, such as agate and amethyst, for jewelry. The operating extraction projects totaled more than 350 small-scale mines.

Among the industrial minerals, mined limestone, which was used in the manufacture of cement, had a significant potential for export growth. In 2003, Uruguayan output of limestone was 1.3 million metric tons, which was the same as that of 2002. In 2003, cement production remained at about the same level as in 2002.

Uruguay has no fossil fuel resources and only a small amount of hydroelectric power and thus relies heavily on imports to meet its energy needs. Energy integration was on the rise throughout MERCOSUR. The use of natural gas in particular was increasing rapidly and will play a major role in the country's energy sector. Uruguay must import about 42,000 bbl/d for its consumption. Administración Nacional de Combustibles, Alcohol y Portland (ANCAP), which was the state cement and oil company, owned Uruguay's only refinery, the 37,000-bbl/d La Teja Refinery in Montevideo (Administración Nacional de Combustibles, Alcohol y Portland, 2003§).

Four consortia presented bids to ANCAP for a contract to expand and upgrade La Teja Refinery. The consortia that expressed interest were from Argentina, Brazil, Chile, Spain, the United Kingdom, and the United States. Whether or not such a partnership will be possible, modernization and expansion appeared to have been put on hold. The region's recent economic deterioration was hindering this goal because public spending had been reduced and the instability of the different currencies made prices hard to agree on. Despite such setbacks, Uruguay has been importing natural gas from Argentina through the 13-mile Gasoducto del Litoral since 1998. The pipeline begins in Colon, Argentina, and terminates in Paysandu, Uruguay. The pipeline belonged to ANCAP, which was also responsible for its operation and maintenance. In January 2003, Argentine natural gas began to flow to Montevideo through the Gasoducto Cruz del Sur (GCDS). The pipeline was significant because the GCDS project included a concession that covered a possible extension from Uruguay to Porto Alegre in southern Brazil. Partners in the project were British Gas (40%), Pan American Energy L.L.C. (30%), ANCAP (20%), and Wintershall AG (10%) (U.S. Energy Information Administration, 2003§).

In 2002, Crystallex International Corp. had proposed closing the San Gregorio Mine in late 2003. The company cited the exhaustion of reserves in the existing mine. Crystallex sold its Uruguayan interest on October 1, 2003, which included the San Gregorio mining operations, to Uruguayan Mineral Explorations Inc. (UME). UME agreed to pay Crystallex \$2 million in two equal installments; the first installment was due 6 months after closing, and the second installment, 12 months after closing. Formal closing was completed on October 27, 2003 (Crystallex International Corp, 2003).

In addition, UME paid approximately \$2.8 million for the closing out of San Gregorio gold forward sales contracts

and swap agreements (approximately 37,600 ounces) and assumed specific closure costs incurred by Crystallex through the Uruguayan mining operations. The sale was completed through the transfer of the shares of Crystallex's Uruguayan subsidiary companies, which owned the mining assets. The company recorded a noncash \$1.3 million loss as a result of this transaction. During the first 9 months of 2003, Crystallex produced 1,298 kilograms (reported as 41,720 troy ounces) of gold. The average ore grade processed by Crystallex declined to 1.86 grams per ton (g/t) gold in 2003 from 2.4 g/t gold in 2002. Total cash cost of production increased to \$276 per ounce in 2003 from \$237 per ounce in 2002 (Crystallex International Corp., 2003).

The Dirección Nacional de Minería y Geología (Dinamiga) is responsible for the control and administration of all mining and exploration in the country, procedures to obtain licenses for the different stages of prospecting, and exploration and exploitation of mineral resources. Dinamiga believes that Uruguay has one of the few still-unexplored greenstone belts in the world and has stated that Uruguay's Florida Greenstone Belt has similar characteristics to South African geologic formations and host rocks that are mineralized with seams of copper, gold, silver, and zinc. High-quality Uruguayan amethysts, which are famous for their deep violet color, occur in the Department of Artigas. Traditional open pit exploitation methods have been replaced by modern room and pillar systems that provide access to highly productive levels. There are important granite reserves in a broad range of colors, such as absolute black, oriental black, and grays. Uruguayan granites are of a high quality and are renowned for their brightness and the purity of their colors. Black granites stand out and are comparable to those of South Africa (Ellis, 2003).

In 2003, a group called The Commission of Defense of ANCAP delivered several thousand of signatures, collected during 2002, to call for a referendum that would overturn the hydrocarbon law No. 17,448 of December 2001. The Electoral Court had to verify the validity of the signatures within 5 months prior to a referendum that would be held in September 2003. The ANCAP labor union, however, collected 650,000 signatures to force a plebiscite on whether the moves should go forward.

On August 12, 2003, Uruguayans voted to overturn a law that would have opened up the country's oil market to foreign investors. Early results of the referendum show that voters rejected the controversial law by a majority of more than 60%. The oil trade privatization "no" vote was a setback for Uruguay's center right administration and would have an effect on the presidential election scheduled for October 2004. The oil trading law allowed for an injection of foreign capital into the country's energy sector by permitting ANCAP to set up joint ventures.

In a referendum on December 7, Uruguayans voted on whether to strike down a new law that would end ANCAP's monopoly and open it up to outside investors. The implications could be far reaching (Alexander's Gas & Oil Connections, 2004§).

References Cited

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 Alexander's Gas & Oil Connections, 2004, Uruguay votes to overturn oil policy, accessed January 16, 2004, at URL <http://www.gasandoil.com/goc/news/ntl40240.html>.
 International Monetary Fund, 2004, Uruguay, Selected Economic Indicators, accessed June 4, 2004, at URL <http://www.imf.org/external/np/sec/pn/2003/pn0391.htm>.

Major Source of Information

Ministerio de Industria-Energía y Minería (M.I.E.M.)
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TABLE 1
 PARAGUAY AND URUGUAY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

| Country and commodity | 1999 | 2000 | 2001 | 2002 ^c | 2003 ^c |
|--|--------------------|---------------------|----------------------|---------------------|-------------------|
| PARAGUAY ² | | | | | |
| Cement, hydraulic thousand tons | 730 | 650 | 650 | 650 | 660 |
| Clays: | | | | | |
| Kaolin | 66,600 | 66,500 | 66,500 | 66,700 | 66,600 |
| Other, unspecified | 38,192 | 233,500 | 233,500 | 233,000 | 230,000 |
| Gypsum ^c | 4,300 | 4,400 | 4,300 ³ | 4,300 | 4,300 |
| Iron and steel: | | | | | |
| Pig iron | 61,281 | 82,018 | 71,765 | 87,600 ³ | 87,500 |
| Semimanufactures | 46,774 | 63,287 | 56,729 | 51,700 ³ | 51,600 |
| Steel, crude | 55,689 | 76,784 | 67,034 | 80,400 ³ | 80,300 |
| Lime ^c | 90,000 | 90,000 | 100,000 ³ | 100,000 | 90,000 |
| Petroleum, refinery products: | | | | | |
| Distillate fuel oil ^c thousand 42-gallon barrels | 600 | 600 | 600 | 600 | 600 |
| Gasoline do. | 250 ^e | 632 | 675 | 670 | 660 |
| Jet fuel do. | 100 ^e | 21 | 21 | 20 | 20 |
| Kerosene do. | 50 ^e | 191 | 249 | 200 | 250 |
| Liquefied petroleum gas do. | 10 ^e | 628 | 638 | 630 | 630 |
| Residual fuel oil do. | 450 ^e | 255 | 263 | 450 | 460 |
| Unspecified ^c do. | 37 | 37 | 37 | 37 | 40 |
| Total do. | 1,500 ^e | 2,364 | 2,483 | 2,610 | 2,660 |
| Pigments, mineral, natural, ocher ^c | 300 | 300 | 300 | 300 | 250 |
| Sand, including glass sand ^c | 10,000 | 25,000 | 27,500 | 25,000 | 25,500 |
| Stone: ^c | | | | | |
| Dimension thousand tons | 70 | 70 | 70 | 70 | 70 |
| Crushed and broken: | | | | | |
| Limestone, for cement and lime | 16,300 | 16,320 ³ | 16,320 ³ | 16,000 | 16,300 |
| Marble | 750 | 750 | 750 | 750 | 750 |
| Other ^c | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Talc, soapstone, pyrophyllite ^c | 200 | 200 | 200 | 200 | 200 |

See footnotes at end of table.

TABLE 1--Continued
 PARAGUAY AND URUGUAY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

| Country and commodity | 1999 | 2000 | 2001 | 2002 ^e | 2003 ^e | |
|---|----------------------------|--------------------|------------------|-------------------|--------------------|--------|
| URUGUAY | | | | | | |
| Aluminum, secondary ^e | 45 | 45 | 45 | 45 | 45 | |
| Barite | 50 | 33 | 12 | 15 | 15 | |
| Bentonite | 55 ^e | 120 | 125 | 125 | 120 | |
| Cement, hydraulic | thousand tons | 789 | 700 ^e | 1,015 | 1,000 | 1,050 |
| Clays, unspecified | 38,192 | 24,483 | 24,886 | 25,000 | 24,900 | |
| Coke, gashouse | 5,000 | 5,000 | 5,500 | 5,000 | 5,000 | |
| Feldspar | 1,556 | 2,493 | 4,722 | 4,700 | 4,700 | |
| Gemstones, semiprecious: | | | | | | |
| Agate | 362 ^e | 529 | 416 | 420 | 420 | |
| Amethyst | 45 ^e | 87 | 179 | 180 | 170 | |
| Gold | kilograms | 2,400 ^e | 2,177 | 2,083 | 2,079 ³ | 1,730 |
| Gypsum | thousand tons | 1,050 | 1,076 | 1,127 | 1,130 | 1,130 |
| Iron and steel: | | | | | | |
| Iron ore | 3,837 | 5,853 | 9,743 | 9,800 | 9,750 | |
| Metal: | | | | | | |
| Ferroalloys, electric-furnace ferrosilicon crust ^e | 200 | 200 | 200 | 200 | 200 | |
| Semimanufactures | 41,611 | 34,312 | 28,830 | 32,400 | 32,300 | |
| Steel, crude | 45,404 | 38,102 | 30,890 | 34,900 | 34,000 | |
| Lime ^e | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | |
| Petroleum, refinery products: ^e | | | | | | |
| Distillate fuel oil | thousand 42-gallon barrels | 4,150 | 4,100 | 4,100 | 4,100 | 4,200 |
| Gasoline | do. | 2,150 | 2,200 | 2,200 | 2,200 | 2,200 |
| Kerosene | do. | 525 | 500 | 500 | 500 | 500 |
| Liquefied petroleum gas | do. | 395 | 400 | 400 | 400 | 400 |
| Residual fuel oil | do. | 3,620 | 3,600 | 3,600 | 3,600 | 3,650 |
| Unspecified | do. | 280 | 280 | 280 | 280 | 280 |
| Total | do. | 11,100 | 11,100 | 11,100 | 11,100 | 11,200 |
| Sand and gravel: | | | | | | |
| Sand, common | thousand tons | 2,506 | 2,699 | 2,697 | 2,700 | 2,700 |
| Gravel | do. | 49,887 | 49,776 | 40,373 | 41,000 | 40,500 |
| Stone: | | | | | | |
| Flagstone | 4,100 | 3,688 | 3,590 | 3,600 | 3,550 | |
| Granite: | | | | | | |
| Dimension | 6,397 | 6,817 | 4,369 | 4,400 | 4,350 | |
| Crushed and broken, alum schist | thousand tons | 470 | 810 | 528 | 530 | 530 |
| Other, rough stone | -- | 2,386 | 4,052 | 4,100 | 4,050 | |
| Diorite | thousand tons | 1,050 | 1,076 | 1,092 | 1,100 | 1,050 |
| Dolomite | 8,439 | 8,229 | 5,468 | 5,470 | 5,400 | |
| Limestone | thousand tons | 1,471 | 1,259 | 1,300 | 1,300 | 1,300 |
| Marble, in blocks and broken: ^e | | | | | | |
| Onyx | 119 | 60 | 121 ³ | 120 | 120 | |
| Travertine | 15 | 35 | 39 | 30 | 30 | |
| Other, unspecified | 192 | 163 | 170 | 160 | 160 | |
| Marl | 33,387 | 35,000 | 6,780 | 6,800 | 6,750 | |
| Quartz | 50 | 20 | 146 | 150 | 150 | |
| Other, including ballast ^e | thousand tons | 2,500 | 2,821 | 2,523 | 2,500 | 2,500 |
| Sulfur, elemental, byproduct ^e | 3,119 ³ | 3,000 | 3,000 | 3,000 | 3,000 | |
| Talc, soapstone, pryophyllite | 2,905 | 2,903 | 1,694 | 1,700 | 1,700 | |
| Tuff, tufa | thousand tons | 800 ^e | 1,044 | 1,185 | 1,200 | 1,150 |

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^fRevised. -- Zero.

¹Includes data available through May 2004.

²In addition to the commodities listed, construction materials (clays, miscellaneous rock, sand, and weathered tuffs) were presumably produced, but available information is inadequate to make reliable estimates of output levels.

³Reported figure.