



2006 Minerals Yearbook

PARAGUAY AND URUGUAY

THE MINERAL INDUSTRIES OF PARAGUAY AND URUGUAY

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PARAGUAY

Paraguay's mineral industry included the production of cement, iron and steel, and petroleum derivatives. Paraguay was a major producer and exporter of hydroelectric power from three hydroelectric dams in the Parana River: the Central Acaray, which was managed by the state-owned Administración Nacional de Electricidad; the Itaipu Binacional, which was a joint project with Brazil; and the Yacyreta Binacional, which was a joint project with Argentina. Paraguay had no known natural gas or oil reserves. To meet its crude oil and petroleum products demand, Paraguay relied completely on imports of approximately 25,400 barrels per day (bbl/d) based on 2006 estimates (U.S. Energy Information Administration, 2006).

The country's gross domestic product (GDP) grew by 4% in 2006 compared with 3.3% in 2005. The sectors that contributed to Paraguay's GDP were services (59.2%), agriculture (22.4%), and industry (18.4%). The mining sector contributed the least to the country's economy, accounting for only 0.1% of the GDP. A combination of economic growth in Argentina and Brazil and high world prices for Paraguay's agricultural exports assisted Paraguay's economic recovery in 2006. Paraguay's economy was also dependent on its partners of the Mercado Común del Cono Sur (MERCOSUR), which was the second ranked trade association in the Americas and the eighth worldwide. MERCOSUR was created as a free trade zone by members Argentina, Brazil, Paraguay, and Uruguay (Banco Central del Paraguay, 2007; U.S. Central Intelligence Agency, 2007; World Bank, The, 2007).

In 2006, Paraguay's exports constituted about \$3.1 billion for such products as cement, cotton, hydropower, leather, meat, soybean, and wood. Export partners included Uruguay (26.7%), Brazil (15.2%), Argentina (4.8%), Chile (4.7%), and others (48.6%). Imports of such goods as consumer goods, electrical machinery, petroleum products, tobacco, and vehicles totaled about \$3.8 billion. Import partners included Brazil (26.8%), Argentina (21.1%), the United States (20.8%), China (9.5%), and others (21.8%) (Banco Central del Paraguay, 2007).

Paraguay's tax exemptions on imports of equipment for natural gas and petroleum exploration, development, and production are expected to continue in the medium and long terms. Cement, natural gas, and petroleum investors have shown interest in the country, which could support continued economic growth and foreign direct investment (FDI) in new technologies well into the next decade (Ministerio de Industria y Comercio, 2007).

Production

In 2006, Paraguay produced mostly cement, clays, iron ore, natural gas, pig iron, and steel. Paraguay's mineral reserves and

resources were unidentified. Data on mineral production are provided in table 1.

Structure of the Mineral Industry

The mineral industry of Paraguay mostly consisted of Paraguayan state-owned firms (table 2). The structure of the country's mineral industry would, however, change, particularly in the natural gas sector, to a privately and (or) joint-venture owned, Government-regulated regime from one that was only Government owned (Banco Central del Paraguay, 2007). FDI inflows to MERCOSUR increased to \$25.1 billion in 2006 from \$21 billion in 2005, or by 19.5%. Paraguay's FDI inflows increased to \$116.6 million in 2006 from \$74.6 million in 2005, which mostly reflected the high international prices of several commodities, such as cement, hydroelectric power, steel, sugar, textiles, and wood products (Economic Commission for Latin America and the Caribbean, 2007).

Commodity Review

Metals

Iron and Steel.—Based on the world crude steel production report of the International Iron and Steel Institute, Paraguay produced 118,000 metric tons (t) of crude steel in 2006 compared with 101,000 t in 2005, which was an increase of 16.8%. The increase in metal prices and higher output of pig iron provided this boost to the steel sector. The country produced 126,000 t of pig iron in 2006 compared with 124,000 t in 2005, which was an increase of 1.6% (table 1; International Iron and Steel Institute, 2007a, b).

Industrial Minerals

Cement.—In 2006, Government-owned Industria Nacional del Cemento (INC) was the only cement producer in Paraguay. In 2006, INC's cement production was about the same level as that of 2005 (550,000 t). In 2006, the National Customs Department registered almost 100,000 t of imported cement; 85% of Paraguay's consumption (620,000 t) was satisfied by domestic production and 15% was imported (Ministerio de Industria y Comercio, 2007).

In June 2006, the joint venture of three cement enterprises—Camargo Correa Cimentos S.A. and Votorantim Cimentos of Brazil and Concret-Mix Co. of Paraguay—expressed interest in investing \$17 million to build a cement mill in the city of Mariano Roque Alonso in Paraguay. The mill would have an annual production capacity of 200,000 t, which would be sold domestically and internationally. The plant was expected to meet about 25% of the future cement needs of Paraguay (Business News Americas, 2005; Portal Paraguayo de Noticias, 2006).

Mineral Fuels

Natural Gas.—Paraguay has no proven natural gas reserves and no domestic production and does not consume natural gas. In June 2006, however, the Governments of Bolivia and Paraguay approved a plan to construct a pipeline from southern Bolivia to Asuncion, Paraguay. The pipeline would have an initial capacity of 700 million cubic feet per day and would require an investment of about \$2 billion (CDS Oil & Gas Group Plc, 2006b; U.S. Energy Information Administration, 2006).

Paraguay has attracted some interest from international natural gas companies, with CDS Energy S.A. (CDS) (the Paraguayan subsidiary of CDS Oil & Gas Group Plc of the United Kingdom) announcing in early 2005 that CDS had successfully completed a production test at its Independencia-1 well in the Chaco region of Paraguay. Other companies that had signed exploration concessions with the Paraguayan Government included Chaco Resources Plc, H.A. & E.R. Exploraciones, and Hidroener Consultora. Chaco had acquired two Paraguayan companies, Amerisur S.A. and Bohemia S.A., and obtained the right to approximately 4.7 million hectares held under three applications. Two of the applications covered about 2.4 million hectares, which encompassed the Curupaty and the San Pedro Blocks; the third concession was known as Canindeyu. In August 2005, the Congress of Paraguay approved two acts that granted Chaco's subsidiary, Amerisur, two exploration concessions and one production permit for the Curupaty and the San Pedro Blocks. As a requirement of the Paraguayan legislation, Chaco was to select an area of no more than 800,000 hectares per block for its two concessions (Curupaty and San Pedro) in order to enter into a 4-year exploration phase. Chaco's future plans for its Paraguay properties included the analysis and interpretation of the historical seismic data for all locations to produce regional structural maps of key seismic horizons and opportunities for joint venture partnerships for exploration (Alexander's Gas & Oil Connections, 2005; Chaco Resources Plc, 2006). In 2006, CDS planned to finance its property obligations by securing additional financing or through joint-venture participation. The company also planned to continue exploration of deep Devonian gas in the Gabino Mendoza Block (CDS Oil & Gas Group Plc, 2006a).

Petroleum.—State-owned Petróleos Paraguayos (Petropar) had a monopoly on all crude oil and petroleum product sales and imports in Paraguay. Petropar operated the country's sole refinery, the 7,500 bbl/d Villa Elisa facility. In 2006, Paraguay's petroleum consumption amounted to 28,000 bbl/d. In September 2005, Paraguay and Venezuela discussed the possibility of building an oil refinery in Paraguay that could process Venezuela's heavy crude. This effort could help satisfy Paraguay's crude demand, and Venezuela's supply to Paraguay could reach 15,000 bbl/d of crude in the form of gasoil. In February 2006, the Paraguayan Government announced that crude oil had been discovered in the western Chaco region by CDS, but according to CDS, the reservoir was too tight to facilitate unassisted crude oil production. CDS planned to continue its exploration of shallow oil in the Emilia well, which is located within the Boqueron Block. Although no hydrocarbon reserves had been proven at the Emilia prospect, it was considered to be the most potentially productive property

of CDS with an estimated recoverable resource of 40 million barrels of oil (CDS Oil & Gas Group Plc, 2006b; Ministerio de Industria y Comercio, 2007).

Outlook

Paraguay's economy is expected to continue to grow, but its GDP is likely to be highly dependent on the outcome of MERCOSUR's economic stability and growth in 2007. According to the Banco Central del Paraguay (2007) and the Economic Commission for Latin America and the Caribbean (2007), leading transnational companies are interested in investing in the Paraguayan mineral industry and, in particular, in the cement, natural gas, and petroleum sectors. As an exporter of hydroelectricity, the country is poised to gain from the continued FDI inflows into its economy, which represented an increase of more than 56% in 2006 (\$116.6 billion) compared with that of 2005 (\$74.6 million). The cement industry is expected to grow in 2007 if the planned construction of a new mill by the joint venture of Camargo, Concret-Mix, and Votorantim takes place; annual production at the mill is expected to cover about 20% of Paraguay's future cement demand. The Paraguayan mineral fuels sector is set to continue its exploration activities during 2007 and beyond owing to CDS's and Chaco's continued exploration efforts.

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URUGUAY

Uruguay's GDP grew by 7% in 2005 and 2006. The sectors that contributed to the country's GDP were services (57%), industry (33.7%), and agriculture (9.3%). The mining sector contributed only 0.1% to the country's GDP. Uruguay's healthy economy had a strong export-oriented agriculture sector and was also dependent on its partners in MERCOSUR (World Bank, The, 2007). The main industries in Uruguay included chemicals, electrical machinery, food processing, petroleum refinery products, textiles, and transportation equipment. Uruguay's mineral commodities included clays, semiprecious gemstones, gold, iron and steel, sand and gravel, and stone. In 2006, exports amounted to \$4 billion for such commodities as cement, leather, meat, rice, and wool. Export partners included Brazil (14%), the United States (12.3%), Argentina (8.2%), China (6.1%), Germany and Russia (5% each), Mexico (4.3%), and others (45.1%). Imports of such goods as chemicals, crude petroleum, and others amounted to \$4 billion in 2006. Import partners included Brazil (17.2%), Argentina (16.4%), the United States (8.9%), Paraguay (7.8%), China (7.5%), Venezuela (5.2%), Nigeria (4.8%), and others (32.2%). Uruguay has no proven natural gas or oil reserves but it does have substantial hydroelectric capacity (U.S. Energy Information Administration, 2006; U.S. Central Intelligence Agency, 2007).

Production

In 2006, Uruguay produced mostly agate, cement, clays, gravel, gold, iron ore, marble, and steel. Uruguay's mineral reserves and resources were unidentified. Data on mineral production are provided in table 1.

Structure of the Mineral Industry

The mineral industry of Uruguay mostly consisted of Uruguayan state-owned firms (table 2). The structure of the country's mineral industry could change to a privately owned, Government-regulated regime from one that was Government owned and Government operated. Foreign direct investment (FDI) inflows to MERCOSUR had a positive effect on Uruguay's FDI inflows, which increased to \$1.4 billion in 2006 from \$847.4 million in 2005, and mostly reflected the high international prices of several commodities, such as cement, steel, sugar, textiles, and wood products (Economic Commission for Latin America and the Caribbean, 2007).

Commodity Review

Metals

Gold.—Gold production in Uruguay remained at about the same level as that of 2005 (table 1).

Iron and Steel.—Based on the world crude steel production report of the International Iron and Steel Institute, Uruguay produced 57,000 t of crude steel in 2006 compared with 64,000 t in 2005, which was a decrease of 10.9%. The increase in metal prices and higher output of iron ore did not provide the necessary boost to the steel sector. According to the Uruguayan Dirección Nacional de Minería y Geología (Minerals Questionnaire, 2005-06), the country produced 15,525 t of iron ore in 2006 compared with 12,436 t in 2005, which was an increase of almost 25% (table 1; International Iron and Steel Institute, 2007a, b).

Mineral Fuels

Natural Gas.—In June 2006, the Administración Nacional de Combustibles, Alcohol y Portland (ANCAP) announced the completion of an appraisal of natural gas reserves in Uruguay's offshore Punta del Este basin. According to ANCAP, the basin contained at least 1 trillion to 2 trillion cubic feet of potential reserves and first production could take place as early as 2015 provided that exploration takes place in the basin.

Two natural gas pipelines connect Uruguay and Argentina. The first, CR. Federico Slinger or Gasoducto del Litoral, which runs 12 miles from Colon, Argentina, to Paysandu, Uruguay, was constructed and operated by ANCAP and had an operating capacity of 4.9 million cubic feet per day. The second, the Gasoducto Cruz del Sur (GCDS), was operated by a consortium led by British Gas Group (BG Group). This pipeline extends 130 miles from Argentina's natural gas grid to Montevideo and has a capacity of 180 million cubic feet per day. The GCDS-BG Group project also held a concession for a possible pipeline extension of 540 miles to Porto Alegre, Brazil. Argentina, however, had begun to disrupt its natural gas exports to Chile and Uruguay because of natural gas output shortages. As a result, Uruguay approached the Bolivian Government to discuss the possibility of direct supply of natural gas. In March 2006, both Governments agreed to conduct a feasibility study of such a plan (U.S. Energy Information Administration, 2006).

Petroleum.—ANCAP, the state-owned oil company, operated Uruguay's single oil refinery, La Teja, which had a production capacity of 50,000 bbl/d. To meet its oil consumption demand, Uruguay relied completely on imports (mainly from Venezuela) of approximately 35,700 bbl/d based on 2006 estimates (U.S. Energy Information Administration, 2006).

In December 2005, ANCAP and Venezuela's state-owned oil company, Petróleos de Venezuela S.A. (PdVSA), agreed to finance a study for the proposed doubling of the capacity of La Teja refinery. The study would upgrade the facilities at the refinery to handle heavier Venezuelan crude varieties at an estimated cost of \$800 million (U.S. Energy Information Administration, 2006).

Outlook

Uruguay's economy was expected to continue to grow in 2007. Such growth, however, would be highly dependent on the continued regional economic stability of Argentina and Brazil, which were the leading members of MERCOSUR.

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TABLE 1
PARAGUAY AND URUGUAY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	2002	2003	2004	2005	2006
PARAGUAY²					
Cement, hydraulic ^c thousand metric tons	450	520	470	550	550
Clays: ^c					
Kaolin	66,700	66,600	66,600	66,000	66,000
Other, unspecified	233,000	230,000	230,000	230,000	230,000
Gypsum ^c	4,300	4,500 ³	4,500	4,500	4,500
Iron and steel:					
Pig iron	87,600	98,000 ⁴	119,000 ⁴	124,000 ^{r,4}	136,000
Semimanufactures ^c	51,700 ³	51,600	51,600	51,500	51,500
Steel, crude	80,400	91,000 ^{r,4}	109,000 ⁴	101,000 ^{r,4}	118,000
Lime ^c	100,000	90,000	90,000	90,000	90,000
Petroleum, refinery products: ^c					
Distillate fuel oil thousand 42-gallon barrels	600	600	600	600	600
Gasoline do.	670	660	660	660	660
Jet fuel do.	20	20	20	20	20
Kerosene do.	200	250	250	250	250
Liquefied petroleum gas do.	630	630	630	630	630
Residual fuel oil do.	450	460	460	460	460
Unspecified do.	37	40	40	40	40
Total do.	2,610	2,660	2,660	2,660	2,660
Pigments, mineral, natural, ocher ^c	300	250	250	250	250
Sand, including glass sand ^c	25,000	25,500	25,500	25,500	25,500
Stone: ^c					
Dimension thousand metric tons	70	70	70	70	70
Crushed and broken:					
Limestone, for cement and lime	16,000	16,300	16,300	16,000	16,000
Marble	750	750	750	750	750
Other	2,000	2,000	2,000	2,000	2,000
Talc, soapstone, pyrophyllite ^c	200	200	200	200	200
URUGUAY					
Aluminum, secondary ^c	45	45	45	45	45
Barite ^c	15	15	15	15	15
Bentonite	70 ⁵	230 ⁵	122 ⁵	195 ⁵	515
Cement, hydraulic ^c thousand metric tons	1,000	1,050	1,050	1,050	1,050
Clays, unspecified	26,076 ⁵	35,444 ⁵	47,519 ⁵	70,209 ^{r,5}	82,162
Coke, gashouse ^c	5,000	5,000	5,000	5,000	5,000
Feldspar	1,550 ⁵	2,450 ⁵	2,450 ⁵	2,150 ⁵	2,470
Gemstones, semiprecious:					
Agate	1,004 ⁵	5,361 ⁵	14,560 ⁵	10,166 ^{r,5}	18,369
Amethyst	140 ⁵	390 ⁵	435 ⁵	433 ⁵	468
Gold ⁶ kilograms	2,079 ^r	1,550 ^r	2,334	3,151	3,200
Gypsum ^c thousand metric tons	1,130	1,130	1,130	1,130	1,150

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Country and commodity	2002	2003	2004	2005	2006
URUGUAY—Continued					
Iron and steel:					
Iron ore	7,768 ⁵	5,941 ⁵	9,319 ⁵	12,436 ⁵	15,525
Metal:					
Ferroalloys, electric-furnace ferrosilicon crust ^c	200	200	200	200	200
Semimanufactures ^c	32,400	32,300	32,000	32,000	32,000
Steel, crude	34,900 ^e	41,000 ⁴	58,000 ⁴	64,000 ⁴	57,000
Lime ^c	10,000	10,000	10,000	10,000	10,000
Petroleum, refinery products: ^c					
Distillate fuel oil thousand 42-gallon barrels	4,100	4,200	8,810 ^{3,7}	8,476 ^{3,7}	8,500
Gasoline do.	2,200	2,200	1,793 ^{3,7}	1,830 ^{3,7}	1,850
Kerosene do.	500	500	75 ^{3,7}	67 ^{3,7}	100
Liquefied petroleum gas do.	400	400	915 ^{3,7}	1,005 ^{3,7}	1,000
Residual fuel oil do.	3,600	3,650	3,650	3,650	3,650
Unspecified do.	280	280	401 ^{3,7}	201 ^{3,7}	200
Total do.	11,100	11,200	15,600 ^r	15,200 ^r	15,300
Sand and gravel:					
Sand, common thousand metric tons	1,265 ⁵	958 ⁵	1,270 ⁵	1,666 ^{r,5}	1,940
Gravel	24,095 ⁵	29,417 ⁵	48,023 ⁵	71,711 ^{r,5}	68,309
Stone:					
Flagstone	3,278 ⁵	2,697 ⁵	5,605 ⁵	5,869 ⁵	5,900 ^e
Granite:					
Dimension	3,463 ⁵	3,768 ⁵	4,834 ⁵	6,270 ^{r,5}	7,643
Crushed and broken, alum schist thousand metric tons	392 ⁵	1,072 ⁵	625 ⁵	699 ⁵	700 ^e
Other, rough stone ⁵	10,765	5,450	4,950	10,299	10,300 ^e
Diorite thousand metric tons	1,100	1,019 ⁵	798 ⁵	226 ⁵	169
Dolomite	4,518 ⁵	12,177 ⁵	9,839 ⁵	11,159 ^{r,5}	10,152
Limestone thousand metric tons	754	830	1,052	1,185	1,200 ^e
Marble, in blocks and broken: ^c					
Onyx	120	121 ^{3,5}	122 ^{3,5}	120	120
Travertine	30	27 ^{3,5}	-- ^{3,5}	--	--
Other, unspecified	160	115 ^{3,5}	120	39 ^{3,5}	40
Marl	4,860 ⁵	3,140 ⁵	3,310 ⁵	4,350 ⁵	6,320
Quartz	150 ^e	150 ^e	1,130 ⁵	104 ⁵	150
Other, including ballast thousand metric tons	1,580 ⁵	1,035 ⁵	1,453 ⁵	1,811 ⁵	1,800
Sulfur, elemental, byproduct ^c	3,000	3,000	3,000	3,000	3,000
Talc, soapstone, pryophyllite	816 ⁵	1,095 ⁵	1,042 ⁵	1,131 ⁵	1,150
Tuff, tufa thousand metric tons	341 ⁵	1,281 ⁵	142 ⁵	244 ⁵	250

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

¹Table includes data available through November 2007.

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.

³Reported figure.

⁴Source: International Iron and Steel Institute.

⁵Source: Dirección Nacional de Minería y Geología (Minerals Questionnaire 2005-06).

⁶Source: Uruguay Mineral exploration Inc. Data are for fiscal year ending March 31 of the following year.

⁷Source: Administración Nacional de Combustible, Alcohol y Portland (ANCAP). Numbers were converted into 42-gallon barrels (bbl) from thousand cubic meters using the U.S. Energy Information Administration conversion factor of 1 cubic meters = 6.289812 bbl.

TABLE 2
PARAGUAY AND URUGUAY: STRUCTURE OF THE MINERAL INDUSTRIES IN 2006

Country and commodity		Major operating companies or deposits	Location or deposit name	Annual capacity
PARAGUAY				
Cement	thousand metric tons	Industria Nacional del Cemento (INC) (100%)	Plantas Vallemi y Villeta	675
Petroleum, refinery products	thousand 42-gallon barrels	Petróleos Paraguayos (Petropar)	Villa Elisa refinery at Villa Elisa municipality	2,700
Steel	thousand metric tons	Consorcio Siderúrgico de Paraguay (Cerro Lorito, 67%, and Cooperativa de Trabajadores de ACEPAR, 33%)	ACEPAR steel mill at Villa Hayes	150
URUGUAY				
Cement	thousand metric tons	Compañía Uruguaya de Cemento Portland S.A.	Mine and clinker plant in Lavalleja Department	1,100
Gold	kilograms	Uruguay Mineral Explration Inc. (UME) (100%)	Minas de Corrales Gold in Rivera Department	3,000
Iron and steel	thousand metric tons	Gerdau Laisa S.A.	Gerdau Laisa S.A.	70
Petroleum, refinery products	thousand 42-gallon barrels	Administración Nacional de Combustibles, Alcohol, y Portland (ANCAP)	La Teja oil refinery near Montevideo	18,000