



2008 Minerals Yearbook

MOZAMBIQUE

THE MINERAL INDUSTRY OF MOZAMBIQUE

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In 2008, Mozambique played a significant role in the world's production of aluminum, ilmenite, tantalum, and zircon. The country's share of world tantalum output amounted to about 9%; ilmenite and zircon, 2% each; and aluminum, 1%. Other domestically significant mineral processing operations included cement and natural gas. Mozambique was not a globally significant consumer of minerals or mineral fuels (Bray, 2009; Gambogi, 2009a, b).

Minerals in the National Economy

In 2006 (the latest year for which data were available), the manufacturing sector accounted for 15% of the gross domestic product, and mining and quarrying, 1.1%. The Mozambique Aluminum S.A.R.L. (Mozal) smelter accounted for about one-half of manufacturing output but had a much more modest effect on employment. About 50,000 artisanal miners were estimated to be employed in the production of colored gemstones and gold. In the first 9 months of 2007, aluminum exports were \$1.14 billion, or nearly 62% of national exports; natural gas exports were \$85 million (Government of Mozambique, 2008, p. 31; Lehto and Goncalves, 2008, p. 310; Organisation for Economic Cooperation and Development, 2008, p. 463).

Production

In 2008, the production of gold increased by 207%; morganite, 178%; ilmenite, 134%; niobium (columbium), an estimated 100%; tantalum, an estimated 96%; crude bentonite, 76%; coal, 60%; zircon, 25%; and natural gas, 12%. Beryl output declined by 75%; diatomite, 42%; bauxite, 37%; rutile, 25%; and processed bentonite, 19%. Semimanufactured steel production restarted in 2008. Natural gas accounted for 64% of the value of production in the mineral industry excluding aluminum; titanium minerals, 17%; and tourmaline, 9% (Eduardo Alexandre, Director, National Directorate of Mines, written commun., October 27, 2009).

Structure of the Mineral Industry

Most of Mozambique's mining and mineral processing operations were privately owned, including the cement plants, the Moma mineral sands mine, the Mozal aluminum smelter, the Noventa tantalum mine, and the Temane gas processing plant. Artisanal miners produced gold and gemstones. Carbomoc E.E., which was the country's only coal producer, was state-owned.

Commodity Review

Metals

Aluminum and Bauxite.—Mozambique was Africa's second ranked producer of aluminum after South Africa. The Mozal

aluminum smelter, which used alumina imported from western Australia as raw material, produced 536,000 metric tons (t) in 2008 compared with 564,000 t in 2007. Output declined because of power shortages in South Africa. The power shortages also delayed plans by BHP Billiton Ltd. of Australia to increase Mozal's capacity (table 2; BHP Billiton Ltd., 2008, p. 6; 2009, p. 6; Mining Journal, 2008b).

E.C. Meikles (Pty) Ltd. of Zimbabwe operated the Moriangane bauxite mine in Manica Province. Most of the mine's output was exported to Zimbabwe for use in the production of aluminum sulfate. In 2007, production declined at Moriangane because of power supply problems. Subsequent declines in 2008 may also be attributable to lack of consistent power supplies or the economic crisis in Zimbabwe (Government of Mozambique, 2008, p. 70; Lehto and Goncalves, 2008, p. 314).

Copper and Gold.—Agrupamento Mineiro (a joint venture of Companhia Mineira de Gile and Metais de Moçambique of Angola) produced gold at its mine in the Manica District. Agrupamento planned to produce 720 kilograms per year (kg/yr) of gold during the 10-year life of the mine. The company planned to export its output to the Rand refinery in South Africa (Machirica, 2007).

In November 2008, Delta Trading Company Lda. was granted a mining license for the Monarch Mine. The company planned to reopen Monarch in 2009. Delta spent nearly \$8 million on gold exploration in 2008 and planned to spend \$14 million in 2009; expenditures for 2009 were likely to include an estimate of reserves at Monarch (Africa Mining Intelligence, 2008b).

In 2008, Pan African Resources plc of the United Kingdom (Metorex Ltd. of South Africa, 55%) was engaged in a prefeasibility study of the development of a mine at the Fair Bride deposit. Resources at Fair Bride, which is located near Manica, were estimated to be 7.9 million metric tons (Mt) at a grade of 5.49 grams per metric ton gold (g/t) (Mining Journal, 2008b).

Baobab Resources plc of Australia explored at the Mundonguara copper-gold deposit; the Mundonguara Mine closed in 1989. In August 2008, Baobab announced a resource estimate of 3.1 Mt of ore at a grade of 1.4% copper, 2.1 g/t silver, and 0.11 g/t gold. The company commenced a scoping study at Mundonguara (Dixon, 2008a).

ABM Resources NL of Australia explored for copper and gold at the Mimosa project. Artisanal miners produced gold at Mimosa; ABM reached an agreement with the miners to include their tenements in the project in return for a royalty (Mining Journal, 2008b).

Iron and Steel.—In 2008, ArcelorMittal South Africa Ltd. restarted production at the Trem de Varao rolling mill in Maputo. The plant, which had a capacity of 35,000 metric tons per year (t/yr), processed billet imported from South Africa. ArcelorMittal also planned to complete a new bar and rod mill at Matola in 2009. The new plant was expected to have a capacity

of 400,000 t/yr; estimated capital costs were \$80 million. Billet was also likely to be imported from the Newcastle steel plant in South Africa. In November, the company decided to suspend production at the Maputo plant and development of the new plant at Matola until the second quarter of 2009 (Africa Mining Intelligence, 2008a; Bain, 2008).

Niobium and Tantalum.—Noventa Ltd. operated the Marropino Mine, which produced 65,196 kilograms (kg) of columbite-tantalite concentrate in 2008 compared with its target of about 91,000 kg. Production was limited by equipment problems in the processing plant, low ore grades and recovery rates, and power shortages because of delays in the delivery of grid power to the mine. By the end of 2009, Noventa planned to increase its capacity to between 205,000 and 250,000 kg/yr of tantalum pentoxide (Ta_2O_5) from 160,000 kg/yr (Noventa Ltd., 2008; 2009, p. 3-4).

Noventa also planned to reopen the Morrúa Mine; production was expected to be about 225,000 kg/yr of Ta_2O_5 . The reopening of Morrúa depended on the availability of grid power, which was expected by the end of the first quarter of 2009, and securing capital for the project. The life of the Morrúa Mine was estimated to be between 10 and 11 years, and the Marropino Mine, 6 years (Noventa Ltd., 2008; Ruffini, 2008).

Titanium and Zirconium.—Kenmare Resources plc of Ireland produced ilmenite, rutile, and zircon at the Moma Mine; the production of ilmenite amounted to 328,875 t in 2008. The company experienced problems with equipment in the first half of 2008 that limited production. In September, irregular power supplies caused the mine to shut down temporarily and damaged equipment. At the end of 2008, reserves at Moma were estimated to be 634 Mt at a grade of 3.3% ilmenite (Mining Journal, 2008a; Mozambique News Agency, 2008b; Kenmare Resources plc, 2009, p. 9-10).

Kenmare planned to increase ilmenite production to its full capacity of 800,000 t/yr by the end of 2009; the output of zircon would be 56,000 t/yr, and rutile, 21,000 t/yr. Depending on market conditions, Kenmare could expand capacity to 1.2 million metric tons per year (Mt/yr) of ilmenite, 80,000 t/yr of zircon, and 30,000 t/yr of rutile (Mozambique News Agency, 2008b; Kenmare Resources plc, 2009, p. 1, 12).

BHP Billiton planned to start its new feasibility study of the Corridor Sands Project, which was based upon deposits of heavy-mineral sands at Chibuto in southern Mozambique. Depending on favorable results of the study, BHP Billiton could produce 250,000 t/yr of titanium slag from ilmenite mined at Chibuto. Full production was not expected until after 2015; capital costs of the first stage of the project were estimated to be between \$500 million and \$550 million (Mining Journal, 2008b).

Industrial Minerals

Cement.—Cimentos de Mocambique SARL [Cimentos de Portugal, SGPS, SA (Cimpor), 82.46%] produced cement at its Dondo, Matola, and Nacala plants, which together had a total capacity of 710,000 t/yr. In April 2008, Cimpor announced plans to build a kiln at Dondo with a capacity of about 550,000 t/yr and to increase the clinker grinding capacity at Dondo to

600,000 t/yr from 240,000 t/yr. The company also planned to double the grinding capacity at the Matola plant. The expansion at Dondo was expected to be completed by 2010. ARJ Group's cement plant at Nacala had a capacity of 250,000 t/yr; the plant was not operating in late 2008 (table 2; International Cement Review, 2008; Mozambique News Agency, 2008e).

National cement consumption increased to about 900,000 t in 2008 from about 850,000 t in 2007. Production by domestic plants was insufficient to meet demand; the Government suspended the tariff on cement imports for a period of 2 years in December 2008. Cement shortages were particularly severe in the northern provinces of Mozambique; prices were more than twice as high in Niassa as in Maputo (Mozambique News Agency, 2008e; Cimentos de Portugal, SGPS, SA, 2009, p. 96-97).

Diatomite.—Mining of diatomite took place at the Diana quarry, which is located about 10 kilometers (km) southwest of Manhica. Diatomites de Manhica produced processed diatomite; the plant operated substantially below its capacity because of limited domestic markets. Diatomite was used as fertilizer and as an insulator in bakery ovens in Maputo Province (Mozambique News Agency, 2008c).

Gemstones.—Aquamarine, morganite, tourmaline, and other gemstones were mined in Zambezia Province; dumortierite, in Tete Province; and garnet, in Niassa Province. Sociedade Mineira de Cuamba E.E. mined pyrope and pyrope-almandine garnet at Cuamba. In 2007, production at the Cuamba Mine increased to 8,887 kg from 5,730 kg in 2006.

Copper-containing elbaite tourmaline was mined from an alluvial deposit about 3 km northeast of Mavuco in the Alto Ligonha District of Nampula Province. About 600 artisanal miners using labor-intensive methods accounted for most of the production. Mozambique Gems planned to start mechanized mining operations at Mavuco in early to mid-2008 after building a washing plant with a capacity of between 150 and 200 metric tons per day. About 100 artisanal miners produced elbaite and rossmanite tourmaline at an alluvial deposit 13 km northeast of Mavuco. Production amounted to about 50 kilograms per week (Laurs and others, 2008, p. 8, 10-12; Laurs, Zwaan, Simmons, and Falster, 2008).

Morganite, which is a pink beryl that obtains its color from trace amounts of manganese, was produced at the Marropino Mine. Noventa mined 7,274 kg of morganite at Marropino in 2008 compared with 2,613 kg in 2007. The company exceeded its target of 5,000 kg for 2008; the quality of the morganite was substantially less than expected (Noventa Ltd., 2009, p. 3).

Graphite.—The Government initiated a tender to reopen the Ancuabe graphite mine in Cabo Delgado Province in May 2008. The Ancuabe Mine, which operated from 1994 to 1999, shut down because of high power costs. In December, TIMCAL Ltd. of Switzerland was awarded the license to reopen the Ancuabe Mine. The Government and TIMCAL agreed to complete negotiations on the contract by March 2009. By the end of 2008, power costs were expected to decline sharply when the Ancuabe Mine started to receive electricity from the Cahora Bassa hydroelectric plant (Mozambique News Agency, 2008f).

Salt.—Marine salt was produced from evaporation ponds. Salt production declined in 2007 because of machinery

breakdowns, rain, changes in management, and problems with quality that limited exports to Malawi. In 2007, 93% of domestically produced salt was iodized compared with 74% in 2006 and 44% in 2005 (Government of Mozambique, 2008, p. 79-80; United Nations Children's Fund Mozambique, 2008, p. 17).

Mineral Fuels and Related Materials

Coal.—Vale S.A. (formerly Companhia Vale do Rio Doce) of Brazil planned to produce 11 Mt/yr of coking and thermal coal at the Moatize Mine starting in 2011. The coking coal was likely to be consumed by steel plants in Brazil; thermal coal would be consumed by a new coal-fired powerplant built by Vale at Moatize with a capacity of more than 2,000 megawatts (MW). In the second phase of the project, Vale planned to increase coal production to 21 Mt/yr, of which 14 Mt/yr would be exported and 7 Mt/yr would be consumed domestically. Capital costs of the project were estimated to be \$1.4 billion (Mining Journal, 2008b, d).

Development of the Moatize Mine depended upon the reopening of the railway from Moatize to Beria, which was severely damaged during the civil war of the 1980s. The railway was expected to be reopened in mid-2009 at a cost of \$375 million (Mining Journal, 2008b).

Riversdale Mining Ltd. of Australia planned to complete its feasibility study of the Benga coal project near Tete by the end of 2008. In September, the company revised its estimate of coal resources at Benga to 2.1 billion metric tons. Depending on favorable results from the study, Riversdale and its joint-venture partner Tata Steel Ltd. of India could open a new mine with a capacity of 20 Mt/yr by the end of 2011. Riversdale planned to use coal from Benga in its new powerplant with an initial capacity of 500 MW; capacity was expected to increase to 2,000 MW by 2015 (Dixon, 2008b; Mining Journal, 2008c).

In May 2008, Central African Mining and Exploration Company plc (CAMEC) of the United Kingdom announced the discovery of a new coal deposit in the Tete Province. Preliminary estimates of resources in five of the eight zones of the deposit were as much as 868 Mt. CAMEC planned further drilling to improve the resource estimate (Mining Journal, 2008b).

In February 2008, Global Steel Holdings Ltd. of India was awarded a 5-year prospecting license in Tete Province. The license was renewable for an additional 5-year period. Reserves in the area covered by the license were estimated to be 70 Mt (Mining Journal, 2008b).

Natural Gas.—Production of natural gas from the Temane gasfield increased to about 3.07 billion cubic meters in 2008 from 2.75 billion cubic meters in 2007. Sasol Ltd. of South Africa, which operated the project, exported most of Temane's output through an 865-km pipeline to supply its South African chemical plants. The company planned to increase production capacity by about 50% by 2010; higher capacity would be at least partially attributable to the startup of the Pande gasfield in 2009. The capacity of the pipeline was likely to increase to 3.89 billion cubic meters from 3.16 billion cubic meters by the end of 2009. Sasol planned to use the increased output from

Mozambique to supply its expanded synthetic fuels plant in South Africa (Mozambique News Agency, 2008d; Petroleum Economist, 2008b).

Sasol drilled its first well at offshore Blocks 16 and 19 in October 2008; the company formed a joint venture with Petronas Carigali Overseas Shd. Bhd. of Malaysia and the state-owned Empresa Nacional de Hidrocarbonetos de Mocambique (ENH) to explore in Blocks 16 and 19 in December (Petroleum Economist, 2008a).

Petroleum.—Mozambique produced neither crude petroleum nor refined petroleum products and relied on imports. Ayr Logistics Ltd. of the United States and its joint-venture partners planned to build a new refinery at Nacala. The refinery was expected to have a capacity of 300,000 barrels per day (bbl/d) and to be completed by 2015. Costs were estimated to be \$5.5 billion. The refinery's capacity was substantially greater than Mozambique's petroleum products consumption; exports of the refinery's output to southern African countries were likely (Mozambique News Agency, 2008a).

In December 2008, the Government awarded the contract for preliminary studies of a second new refinery to Shell Global Solutions Inc. of the United States. Depending upon successful results of the studies, the refinery was expected to have a capacity of 350,000 bbl/d; construction of the refinery was expected to be completed in 2014 (Petroleum Economist, 2008a).

Petronas signed an agreement with ENH to explore Blocks 3 and 6 in the offshore Rovuma Basin in December 2008. The first phase of the work program involved seismic work and coring (Petroleum Economist, 2008a).

Uranium.—The Mavuzi Mine in northwestern Mozambique produced uranium during the 1950s. Mavuzi Minerals Ltd. of Australia held exploration licenses for the Mavuzi Mine and the surrounding area. In March 2008, Mavuzi Minerals merged with Mantra Resources Ltd. of Australia. Mantra explored for uranium at the Mavuzi, the Meponda, the Mucumbura, the Murrupula, the Niassa, and the Zumbu projects. Mozambique Minerals Ltd. (a subsidiary of Kenmare) explored for uranium at its Tete licenses in the Zambezi valley. At the end of 2008, exploration was on temporary hold (Kenmare Resources plc, 2009, p. 12; Mantra Resources Ltd., 2009, p. 7-9).

Outlook

The mineral industry of Mozambique is likely to experience substantial growth in the near future. Growth is expected to be broadly based, with higher production of gold, ilmenite, rutile, steel, and zircon planned in 2009; cement, natural gas, niobium, and tantalum, in 2010; and coal, from 2011 to 2015. New petroleum refineries were likely to open in 2014 and 2015. Graphite mining could also restart. The outlook for ilmenite, niobium, rutile, tantalum, and zircon could be negatively affected by unstable domestic power supplies or the world economic crisis of 2008. The development of new coal mines also depended on the rehabilitation of the rail network. New mines and related infrastructure could lead to increased consumption and production of local construction materials. The expansion of the Mozal smelter is unlikely before 2013

because of power shortages in South Africa. Development of the Corridor Sands project also depends upon reliable power supplies.

References Cited

- Africa Mining Intelligence, 2008a, ArcelorMittal projects suspended: Africa Mining Intelligence, no. 191, November 19-December 2, p. 2.
- Africa Mining Intelligence, 2008b, Zainu Labedin Rawjee family goes for gold: Africa Mining Intelligence, no. 190, November 5-18, p. 2.
- Bain, Julie, 2008, ArcelorMittal sets its sights on growing Mozambican market: Metal Bulletin, no. 9050, June 9, p. 28.
- BHP Billiton Ltd., 2008, BHP Billiton production report for the half year ended 31 December 2007: Melbourne, Australia, BHP Billiton Ltd. press release, January 23, 15 p.
- BHP Billiton Ltd., 2009, BHP Billiton production report for the half year ended 31 December 2008: Melbourne, Australia, BHP Billiton Ltd. press release, January 21, 15 p.
- Bray, E.L., 2009, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 18-19.
- Cimentos de Portugal, SGPS, SA, 2009, Annual report and accounts—2008 financial year: Lisbon, Portugal, Cimentos de Portugal, SGPS, SA, 282 p.
- Dixon, Katherine, 2008a, First resource for Mundonguara: Mining Journal, August 8, p. 11.
- Dixon, Katherine, 2008b, Riverside upgrades resources: Mining Journal, September 12, p. 9.
- Gambogi, Joseph, 2009a, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 174-175.
- Gambogi, Joseph, 2009b, Zirconium and hafnium: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 188-189.
- Government of Mozambique, 2008, Review of the economic and social plan for 2007: Maputo, Mozambique, Government of Mozambique, 207 p.
- International Cement Review, 2008, Cimpor invests in Mozambique: International Cement Review, April, p. 16.
- Kenmare Resources plc, 2009, 2008 annual report & accounts: Dublin, Ireland, Kenmare Resources plc, 80 p.
- Laurs, B.M., Zwaan, J.C., Breeding, C.M., Simmons, W.B., Beaton, Donna, Rijdsdijk, K.F., Befi, Ricardo, and Falster, A.U., 2008, Copper-bearing (Paraiba type) tourmaline from Mozambique: *Gems & Gemology*, v. 44, no. 1, Spring, p. 4-30.
- Laurs, B.M., Zwaan, J.C., Simmons, W.B., and Falster, A.U., 2008, Tourmaline from Muva, Mozambique: *Gems & Gemology*, v. 44, no. 3, Fall, p. 273-275.
- Lehto, Tapio, and Goncalves, Reinaldo, 2008, Mineral resources potential in Mozambique, *in* GTK Consortium geological surveys in Mozambique 2002-2007: Espoo, Finland, Geological Survey of Finland, p. 307-321.
- Machirica, Victor, 2007, Em Manica—PR inaugura empresa de produção de ouro: *Noticias* [Maputo, Mozambique], May 25, 2 p.
- Mantra Resources Ltd., 2009, December 2008 quarterly report: Perth, Australia, Mantra Resources Ltd., 17 p.
- Mining Journal, 2008a, Kenmare sourcing funds for Moma production: *Mining Journal*, September 5, p. 6.
- Mining Journal, 2008b, Mining potential, *in* Mozambique—A Mining Journal supplement: *Mining Journal*, July, p. 6-7.
- Mining Journal, 2008c, Riversdale power: *Mining Journal*, July 11, p. 6.
- Mining Journal, 2008d, Vale tracks more aggressive copper and coal targets: *Mining Journal*, August 15, p. 5.
- Mozambique News Agency, 2008a, Design documents for oil refinery signed: Mozambique News Agency, May 16, 1 p.
- Mozambique News Agency, 2008b, Electricity problems overcome, claims Kenmare: Mozambique News Agency, December 11, 1 p.
- Mozambique News Agency, 2008c, Mozambican businesses fail to use local diatomite: Mozambique News Agency, July 21, 1 p.
- Mozambique News Agency, 2008d, Mozambique to expand production of natural gas: Mozambique News Agency, April 11, 1 p.
- Mozambique News Agency, 2008e, Surtax on cement imports suspended: Mozambique News Agency, December 24, 1 p.
- Mozambique News Agency, 2008f, Swiss company wins tender to exploit Ancuabe graphite mines: Mozambique News Agency, December 31, 2 p.
- Noventa Ltd., 2008, Unaudited interim results for the six month period ended 30 June 2008: Jersey, Channel Islands, Noventa Ltd., 13 p.
- Noventa Ltd., 2009, Annual report 2008: St. Helier, Jersey [United Kingdom], Noventa Ltd., 50 p.
- Organisation for Economic Cooperation and Development, 2008, Mozambique, *in* African Economic Outlook 2008: Paris, France, Organisation for Economic Cooperation and Development, p. 459-474.
- Petroleum Economist, 2008a, News in brief—Mozambique: *Petroleum Economist*, v. 75, no. 12, December, p. 34.
- Petroleum Economist, 2008b, News in brief—Mozambique-South Africa: *Petroleum Economist*, v. 75, no. 3, March, p. 34.
- Ruffini, Antonio, 2008, Africa remains key to future tantalum supply: *Engineering & Mining Journal*, v. 209, no. 7, September, p. 68, 70, 72.
- United Nations Children's Fund Mozambique, 2008, Consolidated donor report—2007 Mozambique: Maputo, Mozambique, United Nations Children's Fund Mozambique, 60 p.

TABLE 1
MOZAMBIQUE: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2004	2005	2006	2007	2008 ^e	
Aluminum:						
Bauxite	6,723	9,518	11,069	8,650 ^r	5,443 ³	
Metal, refined	549,000	555,000	564,000	564,000	536,000 ³	
Beryl	kilograms	45,200	146,000	16,400 ^r	30,600 ^r	7,600 ³
Cement, hydraulic ^e	thousand metric tons	550 ^r	490 ^r	600 ^r	800 ^r	730
Clays:						
Bentonite:						
Crude	3,336	17,318	3,515	9,707 ^r	17,047 ³	
Processed	578	547	692	762 ^r	614 ³	
Brick	108,231	32,031	222,052	230,000 ^e	230,000	
Coal, bituminous	16,525	3,417	40,953	23,602 ^r	37,700 ³	
Diatomite ^e	1,300 ^r	1,300 ^r	1,300 ^r	651 ^{r,3}	379 ³	
Gemstones:						
Aquamarine	kilograms	18	16	14 ^r	14 ^{r,e}	14
Dumortierite		113	10	664	63 ^r	60
Garnet	kilograms	2,686	2,172	5,730	8,887 ^r	8,900
Morganite	do.	NA	1,750	2,052	2,613	7,274 ³
Tourmaline	do.	1,570	245	25,138	31,000 ^r	32,000
Gold ⁴	do.	56	63	85	97 ^r	298 ³
Natural gas	million cubic meters	1,309 ^r	2,340 ^r	2,689 ^r	2,751 ^r	3,069 ³
Niobium (columbium) and tantalum, columbite-tantalite, ore and concentrate:						
Gross weight	kilograms	712,095	281,212	95,100 ^r	196,400 ^r	395,600 ³
Nb content ^e	do.	51,000 ^r	20,000 ^r	6,800 ^r	14,000 ^r	28,000
Ta content ^e	do.	205,000	81,000	27,000 ^r	56,000 ^r	110,000
Quartz	do.	173,478	294,668	195,100	200,000 ^e	200,000
Salt, marine ^e		80,000	140,000 ^r	150,000 ^r	110,000 ^r	110,000
Sands	cubic meters	1,429,743	833,113	1,404,184	1,470,000 ^r	1,500,000
Steel, semimanufactured		--	--	--	--	21,000
Stone:						
Granite	cubic meters	521	2,198	5,500 ^r	5,500 ^{r,e}	5,500
Gravel and crushed rock	do.	779,581	850,919	1,178,998	1,200,000 ^e	1,200,000
Limestone		1,593,450	654,179	155,871	1,350,000 ^r	1,400,000
Marble:						
Block	cubic meters	617	509	472	535 ^r	540
Slab	square meters	13,666	12,318	12,825	16,647 ^r	17,000
Titanium:						
Ilmenite concentrate		--	--	--	140,515 ^r	328,875 ³
Rutile concentrate		--	--	--	8,782 ^r	6,552 ³
Zirconium concentrate		--	--	--	26,347 ^r	32,985 ³

^eEstimated; estimated data are rounded to no more than three significant digits. ^rRevised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through September 28, 2009.

²Other gemstones, such as amethyst and topaz, were produced, but available information is insufficient to estimate production.

³Reported figure.

⁴Does not include unreported production; total output of gold was estimated to be roughly 600 to 900 kilograms per year.

TABLE 2
MOZAMBIQUE: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ¹
Aluminum		Mozambique Aluminum SARL (BHP Billiton Ltd., 47%)	Mozal smelter at Beluluane	506,000.
Bauxite		E.C. Meikles (Pty) Ltd.	Monte Snuta	12,000. ^e
Bentonite		Cia Desenvolvimento Mineira	Boane	30,000.
Cement		Cimentos de Moçambique, SARL [Cimentos de Portugal, SGPS, SA (Cimpor), 82.46%]	Dondo, Matola, and Nacala	710,000.
Do.		ARJ Group	Nacala ²	250,000.
Coal, bituminous		Carbomoc E.E. (Government owned)	Chipanga XI Mine at Moatize	60,000.
Diatomite		Diatomites de Manhica	Diana quarry near Manica	NA.
Garnet	kilograms	Sociedade Mineira de Cuamba E.E.	Cuamba	8,900. ^e
Gold	do.	Agrupamento Mineiro (joint venture of Companhia Mineira de Gile and Metais de Moçambique)	Manica District	720.
Do.	do.	Artisanal miners	do.	600.
Graphite		TIMCAL Ltd.	Ancuabe ²	10,000.
Marble, block	cubic meters	Marmonte E.E.	Pemba	1,500.
Morganite	kilograms	Noventa Ltd.	Marropino	5,000. ^e
Natural gas	million cubic meters	Sasol Ltd. (70%)	Temane	3,280.
Niobium (columbium) and tantalum, columbite-tantalite, ore and concentrate	kilograms	Noventa Ltd. (Highland African Ventures Ltd., 36.7%)	Marropino	160,000 Ta ₂ O ₅ .
Steel, semimanufactured		ArcelorMittal South Africa Ltd.	Trem de Varao plant at Maputo ²	35,000.
Titanium		Kenmare Resources plc	Moma Mine in Nampula Province	800,000 ilmenite; 21,000 rutile.
Tourmaline	kilograms	Artisanal miners	13 kilometers northeast of Mavuco	2,600. ^e
Do.	do.	do.	3 kilometers northeast of Mavuco	NA.
Zirconium		Kenmare Resources plc	Moma Mine in Nampula Province	56,000 zircon.

^eEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Abbreviations used in this table for commodities include the following: Ta₂O₅—tantalum oxide.

²Not operating at the end of 2008.