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The Mineral Industry of Mozambique

By Thomas R. Yager

In 2015, Mozambique's share of world ilmenite production was about 7%; zircon, 3%; tantalum, 2%; and aluminum and rutile, 1% each. Other mineral and mineral-processing operations included bauxite; cement; clays; coal; construction materials; diatomite; such gemstones as aquamarine, dumortierite, garnet, ruby, and tourmaline; gold; refined lead; natural gas; natural gas condensate; niobium (columbium); quartz; rutile; and salt. Mozambique was not a globally significant consumer of nonfuel minerals or mineral fuels in 2015 (table 1; Imprensa Nacional de Mocambique, 2015, p. 12; Kenmare Resources plc, 2016, p. 37; South32 Ltd., 2016; Bedinger, 2017a, b; Bray, 2017; Papp, 2017).

Minerals in the National Economy

The manufacturing sector accounted for 9% of the gross domestic product in 2015, and the mining and quarrying sector, 3.7%. Employment in artisanal mining operations was estimated to be 100,000 workers, which included nearly 27,000 gold miners and 4,000 tourmaline miners in Manica Province (Bertrams, 2015; Machirica, 2015; Banco de Mocambique, 2016b, p. 73).

In 2015, Mozambique's total exports were valued at $3.41 billion, of which aluminum accounted for 26.6%; coal, 11%; natural gas, 8%; and ilmenite, rutile, and zircon, a total of 4.7%. In 2010, aluminum accounted for 49.7% of the value of national exports; natural gas, 5.7%; and ilmenite, rutile, and zircon, a total of 4.2%; no coal exports were reported. In 2015, total imports were valued at $7.58 billion, of which mineral fuels accounted for 8%; construction materials other than cement, 7.8%; alumina, 5.6%; and cement, 1.3% (Banco de Mocambique, 2015, p. 54–55; 2016a, p. 33–35).

In 2014, the Government passed the Mining Law (law No. 20/2014 of August 18), which replaced law No. 14/2002 of June 26, 2002. The Mining Law mandated that minerals mined in Mozambique be beneficiated domestically when economically feasible. The Mining Law also encourages preferences to be given to goods and services purchased from Mozambican companies or individuals. The new High Authority for the Extractive Industry would be established to oversee the mining and quarrying sector. As of yearend 2015, it was unclear what powers the High Authority would have, and regulations about domestic beneficiation and local content had not been established (Lex Africa, 2015).

The Mining Law mandated differing levels of environmental impact assessments for each category of mining activities, which were classified as Category A (large-scale mining), Category B (mining in quarries and small-scale mining), and Category C (artisanal mining and nonmechanized exploration). Environmental regulations applicable to the mining and quarrying sector were Regulation on Health and Safety for Mineral Activities (Decree No. 61/2006 of December 26); Environmental Regulation for Mineral Activities (Decree No. 26/2004 of August 20); and The Basic Rules on Environmental Management for Mineral Activities (Ministerial Diploma No. 189/2006 of December 14) (Lex Africa, 2015).

In 2014, the Government also passed the Specific Regime of Taxation and Fiscal Benefits for Mining Operations (law No. 28/2014 of September 23), which replaced laws No. 11/2007 and No. 13/2007 of June 27, 2007. Under the new law, royalty rates for diamond were set at 8%; for gemstones, heavy-mineral sands, and precious metals, at 6%; for base metals, coal, ornamental stone, and other minerals, at 3%; and sand and stone, at 1.5%. All mineral products consumed by local industries received a reduction of 50% in royalties paid. Under the previous law, royalty rates for diamond were set at 15%; for precious gemstones and precious metals, at 10%; for semiprecious stones, at 6%; for base metals, at 5%; and for coal and other mineral products, at 3%. In late December 2015, Decree No. 28/2015 of December 28 established the assessment and payment rules for the taxation regime under law No. 28/2014 (Lex Africa, 2015; Morieta and Fernandes de Almeida, 2016b; Conrad, undated).

In 2014, the Government passed the Petroleum Law (law No. 21/2014 of August 18), which replaced law No. 3/2001 of February 21. The Petroleum Law established that Government-owned Empresa Nacional de Hidrocarbonetos E.P. (ENH) would represent the Government in natural gas and petroleum operations. ENH would be involved in all natural gas and petroleum operations and in every stage including exploration, natural gas and crude petroleum production, petroleum refining, natural gas processing to liquefied natural gas, transportation, storage, and marketing. The Petroleum Law also mandated that 25% of natural gas production from new discoveries be sold to the domestic market. In December 2015, new regulations pertaining to the Petroleum Law were implemented by Decree No. 33/2015 of December 31. The new regulations mandated giving preference for natural gas and petroleum operations to Mozambican suppliers of goods and services; minimum levels of local content were not established (Campbell, 2015b; Lex Africa, 2015).

In 2014, the Government passed Specific Rules on Taxation and Tax Benefits of Petroleum Operations (law No. 27/2014 of September 23, 2014), which replaced laws No. 12/2007 and No. 13/2007 of June 27, 2007. In December 2015, new regulations pertaining to the Petroleum Law were implemented by Decree No. 32/2015 of December 28 (Morieta and Fernandes de Almeida, 2016a).

Production

In 2015, the production of natural gas condensate increased by an estimated 100% compared with that of 2014; bauxite, by an estimated 55%; limestone, by an estimated 33%; gold, by an estimated 27%; refined lead, by 20%; and tourmaline, by an estimated 12%. The production of ruby decreased by an

estimated 44% in 2015; sand, by an estimated 22%; niobium, by an estimated 16%; tantalum, by an estimated 13%; and ilmenite, by an estimated 10% (Imprensa Nacional de Mocambique, 2015, p. 12; Eduardo Alexandre, National Director of Mines, Mozambique National Directorate of Mines, written commun., January 9, 2015).

Structure of the Mineral Industry

Most of Mozambique's mining and mineral-processing operations were privately owned, including the cement plants, the coal mines, the Muiane tantalum mine, the Moma mineral sands mine, and the Mozal aluminum smelter. The Government held a 30% share in the Pande and Temane gasfields through ENH. The mineral industry also included a number of small-scale and artisanal operations that produced construction materials, gemstones, gold, niobium (columbium), and tantalum. Capacity, location, ownership, and production information were not readily available for many of these operations (table 2).

Commodity Review

Metals

Aluminum.—Mozambique was Africa's second-ranked producer of aluminum after South Africa in 2015. The Mozal aluminum smelter, which used alumina imported from Western Australia as raw material, produced 558,000 metric tons (t) in 2015 compared with 567,000 t in 2014. In 2015, BHP Billiton Ltd. of Australia spun off assets, including its share in the Mozal smelter into a new company called South32 Ltd. of Australia (BHP Billiton Ltd., 2015, p. 25; South32 Ltd., 2016).

Gold.—In 2015, Xtract Resources Plc of the United Kingdom signed an agreement to purchase the Manica project from Auroch Minerals NL of Australia. The company planned to start mining at Manica in 2016 and to produce nearly 2,600 kilograms per year (kg/yr) of gold. Nearly 1,600 kg/yr would be produced from a new open pit mine, and 1,000 kg/yr would be produced from alluvial deposits in a joint venture with Mineral Technologies International Ltd. of Australia (Xtract Resources Plc, 2015a, b).

Iron Ore and Vanadium.—In March 2013, Baobab Resources plc of the United Kingdom completed a prefeasibility study with successful results on a new mine located north of Tete. Titaniferous-vanadiferous magnetite from the mine was expected to be smelted into pig iron and ferrovanadium. For the estimated 37-year life of the mine, planned production was 2 million metric tons per year (Mt/yr) of iron ore at a grade of 56% iron, which would be processed to produce 1 Mt/yr of pig iron and 3,200 metric tons per year (t/yr) of ferrovanadium. Pig iron would be processed at a new steel plant. Total resources at the project were 759 million metric tons (Mt) at grades of 33.8% iron and 0.35% vanadium pentoxide (V_2O_5). Baobab planned to complete a feasibility study for the project in 2016. Depending on the results of the study, production could start in the first half of 2019 (Baobab Resources plc, 2014, p. 7, 12, 20; 2015, p. 9; 2016, p. 26, 28).

In late July 2014, Syrah Resources Ltd. of Australia completed a scoping study on producing vanadium from its Balama graphite project. Depending on the results of a feasibility study completed after the startup of its new graphite mine, Syrah could produce about 5,000 t/yr of V_2O_5 at Balama. Resources at Balama were estimated to be 1.15 billion metric tons (Gt) at a grade of 0.23% V_2O_5 (Syrah Resources Ltd., 2014).

Lead.—Gravita Mozambique Lda. (a subsidiary of Gravita India Ltd.) operated a secondary lead refinery in Maputo with a capacity of 4,500 t/yr. In fiscal year 2015 (April 1, 2014, to March 31, 2015), the company's production increased to 2,310 t from 1,933 t in fiscal year 2014 (Gravita India Ltd., 2014, p. 17; 2015, p. 18–19).

Niobium and Tantalum.—TAN Mining and Exploration of South Africa (a subsidiary of Pacific Wildcat Resources Corp. of Canada) produced niobium and tantalum at the Muiane Mine. In November 2015, the mine reportedly was attacked and destroyed during local civil unrest (Pacific Wildcat Resources Corp., 2015).

Titanium and Zirconium.—Kenmare Resources plc of Ireland produced ilmenite, rutile, and zircon at the Moma Mine in Nampula Province. In 2015, ilmenite concentrate production decreased to 763,500 t from 854,600 t in 2014 and rutile production, to 6,000 t from 6,100 t. Kenmare's planned ilmenite production was between 900,000 t and 1 Mt in 2015; output was constrained by power supply interruptions resulting from storms. Zircon production increased to 51,800 t from 50,800 t because of improvements in recovery rates. Kenmare planned to increase ilmenite, rutile, and zircon production in 2016. Reserves at Moma were estimated to be 1.56 Gt at grades of 2.7% ilmenite, 0.18% zircon, and 0.059% rutile (Kenmare Resources plc, 2016, p. 10–11, 16, 18, 37).

Haiyu (Mozambique) Mining Company Lda of China operated a mineral sands mine at Sangage in the Angoche District of Manica Province. Haiyu produced 72,188 t of ilmenite and 12,311 t of zircon in 2014; total ilmenite and zircon production was 67,713 t in 2013 (Intellica S.A., 2015, p. 142–143).

Pathfinder Minerals plc of the United Kingdom was considering the development of a new mine at the Moebase/Naburi project that could produce 1.24 Mt/yr of ilmenite, 65,000 t/yr of zircon, and 24,000 t/yr of rutile. Capital costs of the project were estimated to be $533 million. Resources were estimated to be about 2 Gt at grades of 3.32% ilmenite, 0.17% zircon, and 0.062% rutile. As of yearend 2015, Pathfinder was engaged in a dispute with JV Consultores Internacionais regarding the rights to the Moebase/Naburi project (Industrial Minerals, 2015; Pathfinder Minerals plc, 2016).

Industrial Minerals

Cement.—Cimentos de Portugal, SGPS, SA (Cimpor) produced cement at five plants in Dondo, Matola, and Nacala with a total capacity of 3.1 Mt/yr. The company planned to complete a new plant at Nacala with a capacity of 1.5 Mt/yr by 2018. In 2015, Cimentos de Beira (a subsidiary of Ambrian plc of the United Kingdom) completed and commissioned its new cement plant at Beira with a capacity of 800,000 t/yr. Limak Holding of Turkey also planned to complete a new plant near Maputo with a capacity of 2 Mt/yr by the first quarter of 2016; construction started in October (International Cement Review, 2015, 2016).

Diamond.—Mustang Resources Ltd. explored for diamond at its Save River project, which is located on the border with Zimbabwe. In June 2015, the company announced the discovery of diamond at Save River. The diamonds may have flowed downstream from the Marange and the Murowa diamond fields in Zimbabwe. Mustang planned to expand its pilot mining, processing, and sampling program (Andrews, 2015).

Gemstones.—Gem-quality ruby was found in eluvial and primary deposits in Niassa Province and at Montepuez in Cabo Delgado Province. Ruby was mined by Montepuez Ruby Mining (MRM) (Gemfields plc of the United Kingdom, 75%, and Mwiriti Lda., 25%), which was a large-scale mining operation, at Montepuez and by artisanal miners near MRM's mine.

MRM started bulk sampling operations at Montepuez in August 2012. In 2015, MRM's ruby and corundum production decreased to 840 kilograms (kg) from more than 1,500 kg in 2014. Low-grade ruby accounted for between 20% and 25% of total ruby and corundum output; premium-grade, about 8%; and other grades, between 10% and 12%. Decreased production was attributable to lower ore grades. The company planned to increase production in the first half of 2016 to nearly 2,400 kg/yr of ruby and corundum. In July, reserves were estimated to contain more than 86,000 kg of ruby and corundum. The estimated life of the mine was 21 years (Shor and Weldon, 2015; Gemfields plc, 2016, p. 3, 6, 11).

Rhodolite garnet was mined in Niassa Province; national garnet production was an estimated 390,000 kg in 2015 compared with 362,762 kg in 2014 and 283,175 kg in 2013. In 2014, 10,233 kg of garnet production was gem quality. Tourmaline was produced in the Barue District of Manica Province; national tourmaline production was an estimated 580,000 kg in 2015 compared with 520,000 kg in 2014. Increased output of garnet and tourmaline in recent years was attributable to new producers starting operations, including new discoveries in Barue District in 2015, and increased inspections of mines by the Government that resulted in improved reporting of output. Dumortierite was mined in Tete Province (Imprensa Nacional de Mocambique, 2015, p. 12; Machirica, 2015; Eduardo Alexandre, National Director of Mines, Mozambique National Directorate of Mines, written commun., January 9, 2015).

Graphite.—The Ancuabe graphite mine in Cabo Delgado Province, which operated from 1994 to 1999, was shut down because of high power costs and decreasing graphite prices. AMG Advanced Metallurgical Group N.V. of the Netherlands planned to reopen Ancuabe in April 2016. AMG planned to produce 6,000 t/yr of graphite at Ancuabe initially; the mine could be scaled up to 9,000 t/yr. The company was also considering the possibility of opening a new mine at the nearby Nipacue project by 2020 (Syrett, 2015).

In May 2015, Syrah Resources Ltd. of Australia completed a feasibility study on a new graphite mine at the Balama project in northern Mozambique with favorable results. Syrah planned to start mining at Balama in the first quarter of 2017. The planned capacity of the mine was 356,000 t/yr of concentrates with a content of more than 95% graphite. Total reserves at Balama were estimated to be 81.4 Mt at a grade of 16.2% graphite (Syrah Resources Ltd., 2015).

In November 2014, Triton Minerals Ltd. of Australia completed a scoping study on a new mine with favorable results at the Nicanda Hill deposit, which is located near Syrah's Balama project. As of December 2015, Triton was engaged in a feasibility study on Nicanda Hill. Depending on the results of the study, Triton could start construction on the new mine in the first quarter of 2016 and start mining in the second quarter of 2017. Production was likely to be 100,000 t/yr of concentrates with a content of 94% graphite in the first phase of mining. In October 2015, resources at Nicanda Hill were estimated to be 1.44 Gt at grades of 11.1% graphite and 0.29% V_2O_5 (Barradas, 2015; Triton Minerals Ltd., 2015).

In November 2015, Metals of Africa Ltd. (MTA) of Australia announced an initial resource estimate for its Montepuez Central project in Cabo Delgado Province. Resources at Montepuez Central were estimated to be 61.6 Mt at grades of 10.3% graphite and 0.26% V_2O_5. MTA planned to complete a concept study at Montepuez; the company also planned to complete an initial resource estimate at the Balama Central project in Cabo Delgado Province by February or March 2016 (Metals of Africa Ltd., 2015).

Mineral Fuels

Coal.—Vale S.A. of Brazil operated the Moatize Mine in Tete Province. The company's production was 4.96 Mt of salable coal in 2015 compared with 4.91 Mt in 2014. Mining was limited by port and rail capacity constraints. Capacity was 11 Mt/yr of salable coal, of which 8.5 Mt/yr was coking coal and 2.5 Mt/yr was thermal coal. In the fourth quarter of 2015, Vale increased capacity to 22 Mt/yr of salable coal, of which 17 Mt/yr was coking coal and 5 Mt/yr was thermal coal. The company planned to increase output to 15 Mt in 2017 and 18 Mt in 2019. Power International of Saudi Arabia planned to build a new power station with a capacity of 300 megawatts (MW) at the Moatize Mine (Engineering & Mining Journal, 2014; TEX Report, The, 2015a, 2016; Zitamar News, 2016).

Indian companies International Coal Ventures Private Ltd. (ICVL) and Tata Steel Ltd. produced coal at the Benga Mine, which is adjacent to the Moatize Mine. Capacity at Benga was 5.3 Mt/yr of run-of-mine coal, of which 1.6 Mt/yr was salable coking coal and 0.8 Mt/yr was salable thermal coal. In late July 2015, the companies were producing at the rate of 4 Mt/yr of run-of-mine coal; output was limited by port and rail capacity constraints. Benga operated at about 66% of capacity in 2014 (Intellica S.A., 2015, p. 144; Stoddard, 2015; TEX Report, The, 2015b).

The previous owner of ICVL's share planned to increase capacity to 20 Mt/yr of run-of-mine coal, of which 6 Mt/yr would be salable coking coal for export, 4 Mt/yr would be salable thermal coal for export, and 2 Mt/yr would be consumed in a new coal-fired power station near Tete. ICVL scaled back expansion plans at Benga to 13 Mt/yr of run-of-mine coal, of which 4.5 Mt/yr would be salable coking coal. The company also planned to build a new 300-MW coal-fired power station. By 2017, the power station and the mine expansion were planned to be completed at a cost of $830 million and $800 million, respectively. ICVL subsequently delayed

the expansion of the mine to 2020; the delay probably was attributable to rail capacity constraints and decreased coal prices on world markets (Campbell, 2015a; Stoddard, 2015; TEX Report, The, 2015b).

ICVL held a mining license for the Zambeze coal project, which was adjacent to the Benga Mine. The previous owner planned to produce 7 Mt/yr of salable coking coal and 5 Mt/yr of salable thermal coal at Zambeze; mining was expected to start in 2023. The project could be delayed by decreased prices for coking coal on world markets (TEX Report, The, 2014b, 2015c).

Jindal Steel & Power Ltd. of India produced coal at its Chirodze Mine in western Tete Province. In fiscal year 2015 (which ran from April 1, 2014, to March 31, 2015), the company produced 1.31 Mt of run-of-mine coal compared with 354,000 t in fiscal year 2014. About 306,000 t of coking coal was exported to India in fiscal year 2015; thermal coal was stockpiled for future consumption at a power station. The mine had a capacity of 3 Mt/yr of run-of-mine coal in 2015; Jindal planned to increase capacity to 10 Mt/yr eventually (TEX Report, The, 2015a).

Ncondezi Energy Ltd. of South Africa planned to develop a new 300-MW coal-fired power station for domestic consumption, which could be expanded to a capacity of as much as 1,800 MW. The company expected to produce about 1.5 Mt/yr of thermal coal to supply the power station in the initial stage from its new Ncondezi Mine; resources at Ncondezi were estimated to be 4.7 Gt. Ncondezi Energy had planned to complete the mine in the second half of 2016 and the power station in the first half of 2018. As of November 2015, it was unclear when production would start at the mine and power station. In December 2015, Ncondezi Energy was negotiating a joint development agreement for the initial stage of the power station with Shanghai Electric Power Co. Ltd. of China (Projects in Progress, 2014; Ncondezi Energy Ltd., 2015; TEX Report, The, 2015c).

In 2013, the Government granted a mining license to Midwest Africa Ltd. (MAL) of India. MAL planned to start production at a new mine in the Moatize District in Tete Province by 2019. At full capacity, production was likely to be 6 Mt/yr of thermal coal and 1 Mt/yr of coking coal. The estimated capital cost of the project was $1.4 billion. As of November 2015, it was unclear when production would start because of low coal prices on world markets (TEX Report, The, 2014a, 2015c).

In April 2013, Talbot Group Investments (Pty) Ltd. of Australia and its joint-venture partners received a mining license for the Revuboe project, which is adjacent to the Moatize Mine. The companies planned to start mining at Revuboe by 2016. Planned production was 5 Mt/yr of coking coal, which would be exported to such countries as Japan and the Republic of Korea. The project was on hold at the end of 2015; it was unclear when development would start (TEX Report, The, 2014c; Zitamar News, 2016).

In December 2015, Vale and Caminhos de Ferro de Mocambique completed a new railway from Tete Province to the Port of Nacala. Vale also completed a new coal-handling terminal at Nacala with a capacity of 18 Mt/yr in December. The railway was unlikely to reach full capacity for several years; initial operations would be at about 10% of capacity. The Sena railway from Tete Province to the Indian Ocean Port of Beira was Mozambique's only operating railway for the export of coal in 2015. The expansion of Sena's capacity by Portuguese companies Mota Engil Group and Visabeira Group to 20 Mt/yr from 6.5 Mt/yr was likely to be completed by June 2016. The coal-handling capacity at Beira was unlikely to increase to 10 Mt/yr from 6.5 Mt/yr until at least 2020 (Zitamar News, 2016).

Natural Gas.—Production of natural gas from the Pande and Temane gasfields increased to an estimated 4.4 billion cubic meters in 2015 from 4.22 billion cubic meters in 2014. Sasol Ltd. of South Africa, which operated the Pande-Temane Petroleum Production Agreement license, exported most of its output through a pipeline to supply its chemical plants in South Africa. Natural gas was also supplied to the power station at Ressano Garcia. The capacity at the natural gas processing plant for Pande and Temane was 4.71 billion cubic meters per year. In 2015, Sasol was engaged in debottlenecking operations to increase capacity to 5.07 billion cubic meters per year. The company planned to increase capacity subsequently to 6.54 billion cubic meters per year as part of its plan to develop the Pande-Temane Petroleum Production Agreement license. Government approval of Sasol's plans for the license was pending in 2015. At the end of June, estimated reserves were about 39 billion cubic meters (Sasol Ltd., 2015, p. 42, 76, G-5).

As of yearend 2015, Mozambique used natural gas from Pande and Temane in two power stations. Aggreko plc of the United Kingdom operated a 232-MW power station at Ressano Garcia that supplied power to Electricidade de Mocambique (EDM), Eskom of South Africa, and NamPower of Namibia. In February, EDM and Sasol completed a new power station with a capacity of 175 MW at Ressano Garcia (Energize, 2014; Sasol Ltd., 2015, p. 48).

Anadarko Petroleum Corp. of the United States and its joint-venture partners held the exploration rights for Offshore Area 1, which is located in the Rovuma Basin. Eni S.p.A. of Italy and its joint-venture partners held the exploration rights for Offshore Area 4. As of December 2015, total reserves in Offshore Areas 1 and 4 were estimated to be 5.1 trillion cubic meters of natural gas (International Monetary Fund, 2016, p. 3).

Anadarko and Eni were considering the development of liquefied natural gas (LNG) plants that would use natural gas from Offshore Areas 1 and 4. The initial production at Anadarko's onshore plant could be 11 Mt/yr (15.2 billion cubic meters per year of natural gas), and Eni's floating plant, 3 Mt/yr. Depending on a decision to proceed with the projects by mid-2016, production could start at Anadarko and Eni's plants by 2021. Capacity expansions could increase total production to 89 Mt/yr by 2028. The total investment in the LNG projects was likely to be more than $100 billion. Most of the production from the LNG plant was likely to be exported, especially to Asian countries (International Monetary Fund, 2016, p. 3–4).

Outlook

The mineral industry of Mozambique is likely to have substantial growth in the near future. Growth is expected to be broad based, with increased production of ilmenite, rutile, and zircon planned for 2016; cement, for 2016 through 2020; coal, for 2016 through 2025; and natural gas, for 2021 through 2028. Iron ore mining could start at the Tete project in 2019.

New Mozambican mines are likely to have substantial effects upon world markets for graphite and vanadium. Graphite production could restart in 2016 and increase to about 420,000 t/yr. World graphite production was estimated to be nearly 1.2 Mt in 2015. Vanadium production could start in 2019 and increase to more than 4,000 t/yr. World vanadium production was estimated to be nearly 78,000 t in 2015 (Olson, 2017; Polyak, 2017).

The new LNG plant could have a substantial effect upon the domestic economy and world markets. The annual GDP growth rate between 2021 and 2025 could be 24% because of the LNG projects. The share of the LNG projects in the GDP could be about 20% by 2021 and 50% by 2026; the projects could continue to account for at least 30% of the GDP through 2041. LNG could account for about 75% of the country's exports by the mid-2020s. Mozambique could become the world's third-ranked exporter of LNG by 2028 (International Monetary Fund, 2016, p. 5, 7).

Niobium and tantalum production is expected to decrease in 2016 because of the closure of the Muiane Mine. Reduced output from Muiane could be offset by the reopening of the Morrua and the Mutala Mines.

The outlook for coal, gemstones, ilmenite, natural gas, rutile, and zircon will likely depend heavily upon world market conditions. Increases in coal production also will depend on the expansion of the port handling capacities and the rail network. The development of new mines and related infrastructure could lead to increased consumption and production of local construction materials.

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TABLE 1
MOZAMBIQUE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2011	2012	2013	2014	2015[e]
METALS						
Aluminum:						
Bauxite		10,352	8,352	6,761	3,235	5,000
Metal, refined		562,000	564,000	562,000	567,000	558,000 [3]
Beryllium, beryl	kilograms	57,800	532,000	103,100	--	--
Gold[4]	do.	111	178	198	197	250
Lead, secondary refined[5]		800 [e]	892	1,704	1,933	2,310 [3]
Niobium (columbium) and tantalum, columbite-tantalite, ore and concentrate:						
Gross weight	kilograms	139,145	407,734	210,746	111,767	95,000
Nb content[e]	do.	10,000	21,000	11,000	5,700	4,800
Ta content[e]	do.	39,000	83,000	43,000	23,000	20,000
Titanium:						
Ilmenite concentrate		636,800	574,400	780,000 [r, e]	926,800 [r]	830,000
Rutile concentrate		6,455	4,000	4,000	6,100	6,000
Zircon concentrate		43,600	46,900	39,000 [r, e]	63,100 [r]	64,000
INDUSTRIAL MINERALS						
Cement, hydraulic[6]	thousand metric tons	976	1,184	1,299	1,512 [r]	1,585
Clays:						
Bentonite:						
Crude		423	24,000	21,135	27,167	28,000
Processed		493	1,459	968	1,250	1,300
Brick[e]		99,561 [6]	46,691 [6]	32,000	32,000	34,000
Diatomite		48	541	675	680 [e]	700
Gemstones:						
Aquamarine	kilograms	60	588	645	--	--
Dumortierite		58	58	28	30 [e]	30
Garnet	kilograms	174,928	170,980	283,175	362,762	390,000
Ruby	do.	NA	NA	236	610 [r, e]	340
Tourmaline	do.	26,279	486,468	513,654	520,000 [e]	580,000
Quartz	do.	838,684	51,750	56,599	57,000 [e]	60,000
Salt, marine[e]		150,000	150,000	150,000	160,000	160,000
Sand		1,678,736	2,137,613	3,237,285	1,222,000	950,000
Stone:						
Gravel and crushed rock	cubic meters	951,069	1,007,802	2,032,191	1,700,312	1,800,000
Limestone		415,883	1,322,424	2,856,999	900,788	1,200,000
Granite, block		NA	NA	NA	57	60
Marble, block	cubic meters	225,144	--	--	--	--
Rhyolite	do.	71,881	293,184	72,746	29,925	32,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous		648,220	4,954,000	6,343,400	7,200,000 [r, e]	7,500,000
Natural gas	million cubic meters	3,438	3,837	5,008	4,223	4,400
Natural gas condensate	thousand 42-gallon barrels	398	408	420 [e]	298	600

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through July 29, 2016.

[2]Other gemstones, such as corundum and sapphire, were produced, but available information was inadequate to make reliable estimates of output.

[3]Reported figure.

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

[5]Fiscal year ending on March 31 of calendar year.

[6]Reported cement sales by Cimentos de Moçambique SARL only.

TABLE 2
MOZAMBIQUE: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[1]
Aluminum		Mozambique Aluminum SARL (South32 Ltd., 47.1%; Mitsubishi Corp., 25%; Industrial Development Corp. of South Africa Ltd., 24%)	Mozal smelter at Beluluane	561,000.
Bauxite		Mina Alumina Lda.	Vila de Manica	12,000.[e]
Bentonite		Minerais Industriais de Moçambique Lda	Mine at Mufiane	30,000.
Beryllium, beryl		African Rare Gemwood	Mine in Zambezia Province[2]	NA.
Cement		Cimentos de Moçambique SARL [Cimentos de Portugal, SGPS, SA (Cimpor), 82.46%]	Plants at Dondo, Matola, and Nacala	2,750,000.
Do.		Cimentos de Nacala S.A. [Cimentos de Portugal, SGPS, SA (Cimpor), 100%)	Plant at Nacala	350,000.
Do.		Cimentos de Beira (Ambrian plc, 100%)	Plant at Beira	800,000.
Coal, bituminous		Vale S.A.	Moatize Mine in Tete Province	22,000,000.
Do.		International Coal Ventures Private Ltd., 65%, and Tata Steel Ltd., 35%	Benga Mine in Tete Province	2,400,000.
Do.		Jindal Steel & Power Ltd.	Chirodze Mine in Tete Province	1,700,000.[e]
Do.		Beacon Hill Resources plc (BHR)	Minas Moatize Mine near Tete[2]	880,000.
Diatomite		Diatomites de Moçambique Lda	Diana quarry near Manica	4,800.
Gemstones:				
Aquamarine	kilograms	Mozambique Gems Ltd.	Mine near Mavuco[2]	3,600.[e]
Garnet	do.	Sociedade Vision 2000 Lda	Cuamba in Niassa Province	8,000.[3]
Do.	do.	Artisanal miners	Various locations	NA.
Ruby	do.	Montepuez Ruby Mining (MRM) (Gemfields plc, 75%, and Mwiriti Lda., 25%)	Montepuez Mine in Cabo Delgado Province	1,600.[e]
Do.	do.	Artisanal miners	Mines near Montepuez Mine in Cabo Delgado Province	NA.
Tourmaline	do.	do.	Various mines in Barue District in Manica Province	NA.
Gold	do.	do.	do.	600.
Lead, refined		Gravita Mozambique Lda. (Gravita India Ltd., 100%)	Plant at Maputo	4,500.
Marble, block	cubic meters	Marmonte Moçambique	Quarry at Pemba[2]	1,500.
Natural gas	million cubic meters	Sasol Ltd., 70%, and Empresa Nacional de Hidrocarbonetos, E.P., 30%	Pande and Temane	4,710.
Niobium (columbium) and tantalum, columbite-tantalite, ore and concentrate		Noventa Ltd.	Mine at Marropino[2]	270 Ta_2O_5.
Do.		TAN Mining and Exploration (Pacific Wildcat Resources Corp., 100%)	Mine at Muiane[2]	34 Ta_2O_5.
Titanium		Kenmare Resources plc	Moma Mine at Topuito in Nampula Province	1,200,000 ilmenite; 21,000 rutile.
Do.		Haiyu (Mozambique) Mining Company Lda	Mine at Sangage in Manica Province	80,000[e] ilmenite.
Zirconium		Kenmare Resources plc	Moma Mine at Topuito in Nampula Province	75,000 zircon.
Do.		Haiyu (Mozambique) Mining Company Lda	Mine at Sangage in Manica Province	14,000[e] zircon.

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Abbreviations used in this table for commodities include the following: Ta_2O_5—tantalum oxide.
[2]Not operating at the end of 2015.
[3]Gem-quality only.