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The Mineral Industry of Kenya

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In 2016, Kenya played a significant role in the world's production of ilmenite, rutile, natural soda ash, and zircon. The country's share of the world's mine production of rutile was about 11%; ilmenite, 5%; and soda ash and zircon, 3% each. Other domestically significant mining and mineral-processing operations included cement production. Kenya was not a globally significant consumer of minerals in 2016 (Base Resources Ltd., 2017; Bedinger, 2018a, b; Bolen, 2018).

Minerals in the National Economy

In 2016, the manufacturing sector accounted for 9.2% of the country's gross domestic product; the construction sector, 5%; and the mining and quarrying sector, 0.8%. The value of output in the mining and quarrying sector increased by 9.5% in 2016. Kenya's total exports were valued at $4.99 billion in 2016, of which iron and steel accounted for 2.6%; ilmenite, rutile, and zircon, 2.2%; soda ash, 1.1%; and other minerals and mineral products, including cement, fluorspar, glassware, salt, and stone, sand, and gravel, 2.1%. Total imports were valued at $14.1 billion in 2016, of which mineral fuels accounted for 13.7%; iron and steel, 5.3%; chemical fertilizers, 1.6%; and nonferrous metals, 1% (Kenya National Bureau of Statistics, 2017a, p. 23, 25, 128–129).

Formal employment in mining and quarrying operations was reported to be 15,196 workers in 2016 compared with 14,442 in 2015 and 9,001 in 2011. The clay, sand, and stone quarrying subsector employed 8,864 workers in 2016; chemical and fertilizer mineral mining, 2,841; and other mining and quarrying, 3,491. Employment in mineral-processing operations was reported to be at least 18,804 workers in 2016. The basic iron and steel manufacturing subsector employed 7,985 Kenyans in 2016; cement, lime, and plaster, 5,111; other nonmetallic mineral products, 3,568; glass and glass products, 1,866; and refined petroleum products, 274. Mining and quarrying and downstream mineral processing operations accounted for 1.3% of Kenya's formal employment in 2016 (Kenya National Bureau of Statistics, 2017b, p. 62–63, 66).

The natural gas and petroleum sector was governed by the Petroleum Exploration and Production Act of 1986. At the beginning of 2016, the mining and quarrying sector of Kenya was governed by the Mining Act 1940. In May, the President of Kenya signed the Mining Act 2016, which replaced the Mining Act 1940 (Piper, 2016).

The new legislation gave the Government a 10% free-carried interest in mining operations, legalized artisanal mining, simplified the types of mining and exploration permits and licenses, established requirements to use domestic goods and services as much as possible and submit mine closure plans, and mandated that companies' production volumes and taxes paid to the Government and copies of mining agreements be made publicly available. Small-scale mining operations were eligible to receive reconnaissance, prospecting, or mining permits, and large-scale mining operations were eligible to receive reconnaissance, prospecting, mining, or retention licenses. The Mining Act 2016 also created the National Mining Corporation and mandated that the central Government receive 70% of mining royalties; the county governments, 20%; and the communities in which mining operations take place, 10% (Piper, 2016; Finan and Beatrice, 2017).

Production

In 2016, Kenya's production of sapphire increased by 133%; zircon, by 53%; gold, by 49%; green garnet, by 26%; raw steel, by an estimated 14%; rolled steel, by an estimated 13%; rutile, by 12%; and clay and shale other than bentonite and kaolin, by an estimated 10%. Between 2012 and 2016, the production of sapphire increased by 190%. Data on mineral production are in table 1. The increase in clay production was attributable to increased demand for its use in cement. The increase in sapphire production could be attributable to the opening of new mines (Kenya National Bureau of Statistics, 2017a, p. 173; Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Cordierite production decreased by 98% in 2016; aquamarine, by 93%; diatomite, by 89%; garnet other than green garnet, by 54%; tourmaline, by 48%; amethyst, by 40%; and fluorspar, by 34%. Vermiculite mining shut down in 2016. Between 2012 and 2016, cordierite output decreased by nearly 100%; gold, by 94%; diatomite, by 93%; garnet other than green garnet, by 90%; aquamarine, by 81%; fluorspar, by 61%; and soda ash, by 33%. Decreased fluorspar production was attributable to lower prices on world markets (table 1; Kenya National Bureau of Statistics, 2017a, p. 173; Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Structure of the Mineral Industry

Most of Kenya's mining and mineral processing operations were privately owned, including the diatomite, fluorspar, gemstone, mineral sand, salt, and soda ash mines; the lime plants; and the steel mills except for Numerical Machining Complex Ltd. All cement plants except for East Africa Portland Cement Company Ltd. (EAPC) were privately owned; the Government held a 52% share in EAPC. Artisanal miners produced gemstones and gold. Diatomite, fluorspar, mineral sands, and soda ash were produced by one company each. Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Gold.—In 2015, Mid Migori Mining Company Ltd. (Red Rock Resources plc of the United Kingdom, 75%) was considering the development of a new mine at the Nyanza deposit, which was part of the Migori project in southwestern Kenya. The Government

revoked two of Red Rock's special prospecting licenses at Migori in 2015; the company was appealing the decision as of December 2016 (Red Rock Resources plc, 2016, p. 8).

Iron Ore and Iron and Steel.—Wanjala Mining Co. mined iron ore at Kishushe in 2012; the company's mining operations were suspended by the Government in 2013 because of a legal dispute regarding land ownership. As of the end of 2016, the dispute with Kishushe Ranching Cooperative Society had not been resolved (Mkanyika, 2017).

Kenya's rolling mills produced about 680,000 metric tons (t) of steel products in 2016 compared with 600,000 t in 2015. The majority of crude steel supplied to the rolling mills was from scrap, including domestic scrap. The country also imported 1.44 million metric tons (Mt) of iron and steel products in 2016 compared with about 1.53 Mt in 2015 and about 779,000 t in 2012. Recent increases in production and imports of iron and steel products were attributable to growth in the construction sector (Jiwaji, 2014; Kenya National Bureau of Statistics, 2017a, p. 126, 190).

In 2015, the Government signed an agreement with Sinosteel Corp. of China for the development of a new integrated steel plant with a capacity of 2.5 million metric tons per year (Mt/yr). The Government and Sinosteel were considering the development of domestic iron ore deposits to supply the plant. At the end of 2016, it was unclear when production would start (XNews, 2015).

Niobium (Columbium) and Rare Earths.—Before August 2013, Pacific Wildcat Resources Corp. (PAW) of Canada explored for niobium and rare earths at the Mrima Hill project. In August 2013, the Government canceled all exploration, mining, and prospecting licenses issued between January 15, 2013, and May 15, 2013, including PAW's mining license, because the licenses reportedly were issued without proper documentation. As of the end of 2016, PAW was engaged in a legal dispute with the Government regarding the mining license (Jiwaji, 2013; Alfan, 2017).

Titanium and Zirconium.—In December 2013, Base Resources Ltd. of Australia started mining at the Kwale mineral sand deposit. In 2016, Base Resources produced 468,903 t of ilmenite, 88,288 t of rutile, and 39,687 t of zircon compared with 444,999 t of ilmenite, 78,947 t of rutile, and 25,951 t of zircon in 2015. Zircon recovery rates increased to 73% in December 2016 from 68% in December 2015. The company planned to produce between 450,000 and 480,000 t of ilmenite, between 88,000 and 93,000 t of rutile, and between 41,000 t and 47,000 t of zircon at Kwale in its fiscal year 2017. Production from the mine was exported to Europe and China (Base Resources Ltd., 2016, 2017).

Industrial Minerals

Cement.—Kenya had seven cement-producing companies with a combined capacity of about 9.6 Mt/yr. National cement output increased to 6.71 Mt in 2016 from 6.35 Mt in 2015 and 4.48 Mt in 2011. Increased cement production in recent years was attributable to the opening of new plants and the expansion of existing plants. From 2014 to late 2016, National Cement Company Ltd. completed the expansion of its capacity to 900,000 metric tons per year (t/yr) from 350,000 t/yr in the first stage and to 1.7 Mt/yr in the second stage. The company also completed a new clinker plant at Kajiado with a capacity of 1.1 Mt/yr (Kiarie and Njihia, 2014; International Cement Review, 2016a; Njanja, 2016; Kenya National Bureau of Statistics, 2017b, p. 211).

Cemtech Ltd. of India started construction on its new plant at Pokot with a capacity of 1.2 Mt/yr in the first half of 2016. Karsan Ramji & Sons Ltd. was engaged in the construction of a new plant with a capacity of 210,000 t/yr near Nakuru. ARM Cement Ltd. planned to complete a new plant in Kitui County by 2021; the capacity was expected to be 2.5 Mt/yr. Dangote Group of Nigeria's two new plants with a capacity of 1.5 Mt/yr each at Mombasa and Nairobi were expected to be completed by 2020 or 2021. The Government-owned Coast Development Authority was promoting the development of the Shimoni Cement plant, which could have a capacity of 1 Mt/yr. It was unclear when the plant would start operations (Global Cement, 2016; International Cement Review, 2016a, b; Dangote Cement plc, 2017, p. 69).

Cement capacity also was likely to increase because of the expansions of existing plants. Savannah Cement Ltd. was producing at about 80% of its capacity of 1.5 Mt/yr in 2016; the company planned to increase capacity at its plant at Athi River to 2.4 Mt/yr by mid-2018. Bamburi Cement Ltd. planned to increase capacity at its plant at Athi River by 800,000 t/yr. Kenya's cement capacity could increase to as much as 18 Mt/yr (Mwaniki, 2016).

Domestic clinker capacity was likely to increase to about 7.4 Mt/yr from 4.3 Mt/yr. Savannah Cement was engaged in the construction of a new clinker plant at Athi River with a capacity of 1.2 Mt/yr. Other projects included Dangote's new plant with a capacity of 1.2 Mt/yr by 2020 or 2021 and Cemtech Ltd. of India's new plant at Pokot with a capacity of 750,000 t/yr (Kiarie and Njihia, 2014; International Cement Review, 2016a, b; Dangote Cement plc, 2017, p. 69).

Cement consumption increased to 6.3 Mt in 2016 from 5.71 Mt in 2015 and 3.82 Mt in 2011 because of growth in the construction sector. From 2011 to 2016, private nonresidential and residential construction activity in Kenya's main cities increased by 209% and 130%, respectively. From 2012 to 2016, the paved road network increased to 11,796 kilometers (km) from 9,612 km (Kenya National Bureau of Statistics, 2017b, p. 208, 211, 245).

Fluorspar.—In 2016, Kenya Fluorspar Co. Ltd. (KFC) produced 42,656 t of fluorspar at its Kimwarer Mine compared with 64,395 t in 2015. Production was exported to countries that included Germany, India, and Italy. The company suspended mining operations in 2016 because of decreased demand and prices for fluorspar on world markets. At yearend, it was unclear when mining would restart (Patel, 2017; Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Gemstones.—Amethyst, aquamarine, cordierite, garnet, ruby, sapphire, tourmaline, and other gemstones were mined in Kenya. The production of amethyst decreased to 24,168 kilograms (kg) in 2016 from 40,243 kg in 2015; aquamarine, to 60 kg from 858 kg; and cordierite, to 1 kg from 59 kg (Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Garnet production decreased to 1,634 kg in 2016 from 1,820 kg in 2015. In 2016, green garnet production was 1,253 kg; color-change garnet, 368 kg; and red garnet, 13 kg. Tourmaline production decreased to 8,064 kg in 2016 from 15,530 kg in 2015. In 2016, green tourmaline production was 6,086 kg; mixed color tourmaline, 1,228 kg; and yellow tourmaline, 750 kg. Sapphire production increased to 22,900 kg in 2016 from 9,810 kg in 2015. In 2016, more than 99% of national sapphire production was blue sapphire (Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Most of Kenya's gemstone production was exported before cutting and polishing. In 2015 and 2016, total cut and polished gemstone production was less than 1 kilogram per year (Ngigi Colin, Kenya Ministry of Mines, written commun., August 4, 2017).

Nitrogen, Phosphate Rock, and Potash.—Between 2012 and 2016, Kenya imported an average of about 570,000 t/yr of fertilizer. In October 2016, Toyota Tsusho East Africa Ltd. (a subsidiary of Toyota Tsusho Corp. of Japan) completed a new fertilizer plant at Chesegem with a capacity of 150,000 t/yr of compound nitrogen, phosphate, and potash fertilizers. Raw materials for fertilizer production would be imported; the plant's production costs were expected to be 60% of that of imported fertilizers. The Government spent about $300 million on fertilizer imports (Nyataya, 2016; Kenya National Bureau of Statistics, 2017a, p. 126).

Soda Ash.—Tata Chemicals Magadi Ltd. (an indirect subsidiary of Tata Group of India) mined trona from Lake Magadi. In 2016, production decreased to 301,719 t from a revised 319,761 t in 2015 and 409,845 t in 2014 because of the closure of one of the company's processing plants and the siltation of Lake Magadi. About 85% of soda ash production was exported to India and to African, Asian, and Middle Eastern countries in 2015 and 2016. Soda ash was consumed domestically by glass producers and by ARM in the production of sodium silicate (Kenya National Bureau of Statistics, 2017a, p. 125, 173).

Mineral Fuels

Coal.—Centum Investment Company Plc and a consortium of Chinese companies planned to build a new coal-fired power station with a capacity of 1,000 megawatts in Lamu County. The power station was expected to be completed by June 2018. Construction was planned to start in December 2015; the license for the plant had not been issued at the end of 2016 because of environmental concerns (Wesangula, 2017).

Natural Gas and Petroleum.—Tullow Oil plc of the United Kingdom and its joint-venture partners Africa Oil Corp of Canada and Mærsk Olie og Gas A/S of Denmark planned to start small-scale production of about 2,000 barrels per day (bbl/d) of crude petroleum at the South Lokichar basin in 2017. The companies planned to make a final investment decision on large-scale production by late 2018; production of 100,000 bbl/d could start in late 2021. Resources at the South Lokichar basin were estimated to be 766 million barrels (Blair, 2016; Otuki, 2017).

Between December 2016 and July 2017, Africa Oil, Mærsk, and Tullow planned to drill as many as eight exploration and appraisal wells in the South Lokichar basin. The companies hoped to identify additional resources to increase the viability of a pipeline to the Kenyan coast. The Governments of Kenya and Uganda had planned to build a joint pipeline that also would export crude petroleum from Uganda. In 2016, the Government of Uganda decided to build its own pipeline that would pass through Tanzania (Blair, 2016).

Outlook

Cement production is likely to increase between 2017 and 2023 because of the planned new plants and expansions of existing plants. Cement consumption is expected to increase because of the Government's plans to build new infrastructure, including airports, railways, and roads. The production of clay and shale, gypsum, and limestone for use in the cement industry also is likely to increase because of planned expansions of clinker production capacity.

Growth in the construction sector is also likely to result in increased steel demand. Kenya's steel production could increase with the opening of a new plant with a capacity of 2.5 Mt/yr. The new plant could lead to the development of domestic iron ore deposits, depending on the cost competitiveness relative to imported iron ore.

Rutile and zircon production are likely to increase at the Kwale Mine in 2017. Fertilizer production is expected to increase with the opening of Toyota Tsusho East Africa's plant. Small-scale crude petroleum production could start in 2017, and large-scale production, in late 2021. The outlook for fluorspar, gemstones, and soda ash will depend mostly on world market conditions.

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TABLE 1
KENYA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2012	2013	2014	2015	2016
METALS						
Aluminum metal, secondary[e]		16,000	18,000	17,000	12,000 [r]	12,000
Gold, mine, Au content	kilograms	3,600	2,100	200	134 [r]	200
Iron ore, mine production:						
Gross weight		70,500	--	--	--	--
Fe content		40,000 [e]	--	--	--	--
Iron and steel:						
Raw steel[e]		300,000 [r]	360,000 [r]	370,000 [r]	360,000 [r]	410,000
Products:						
Galvanized		254,760 [r]	305,200 [r]	284,508 [r]	256,829 [r]	261,500
Rolled[e]		510,000	600,000	610,000 [r]	600,000 [r]	680,000
Iron ore, mine:						
Gross weight		70,500	--	--	--	--
Fe content		40,000 [e]	--	--	--	--
Lead, refinery, secondary[e]		1,000 [r]	940	1,000	1,100	1,100
Titanium mineral concentrates:						
Ilmenite		--	5,539	368,239	444,999	468,903
Rutile		--	152	59,348	78,947	88,288
Zirconium mineral concentrates, zircon		--	--	15,004	25,951	39,687

See footnotes at end of table.

TABLE 1—Continued
KENYA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2012	2013	2014	2015	2016
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	4,694	5,059	5,883	6,353	6,707
Clay and shale:						
Bentonite[e]		75	80	110	130 [r]	130
Kaolin[e]		-- [r]	-- [r]	-- [r]	-- [r]	--
Other[e]		150,000 [r]	170,000 [r]	220,000 [r]	200,000 [r]	220,000
Diatomite		1,746	1,054	1,195	1,090	116
Feldspar		-- [r, e]	-- [r, e]	-- [r, e]	-- [r, e]	3
Fluorspar, acid grade		110,000	48,500	74,000	64,395 [r]	42,656
Gemstones:[3]						
Amethyst	kilograms	22,100	20,100	30,000 [r, e]	40,243 [r]	24,168
Aquamarine	do.	320	500	680 [r, e]	858 [r]	60
Cordierite	do.	200	300	180 [r, e]	59 [r]	1
Garnet:						
Green	do.	1,258	1,100	1,210	994 [r]	1,253
Other	do.	3,800	15,100	8,000 [r, e]	826 [r]	381
Ruby	do.	6,625	5,500	6,100	6,000 [r]	6,000 [e]
Sapphire	do.	7,900 [r, e]	8,500 [r, e]	9,200 [r, e]	9,810 [r]	22,900
Tourmaline	do.	9,400	34,300	25,000 [r, e]	15,530 [r]	8,064
Zoisite	do.	NA	NA	NA	44	--
Gypsum, including anhydrite, crude[4]		6,653	5,500	5,900	5,800 [r]	5,900 [e]
Lime[e]		55,000	55,000	57,000	57,000	57,000
Salt, refined		230,872	207,147	223,295	242,100	258,800
Sand and gravel, industrial		26,000	21,000	22,000	27,000	27,000
Soda ash, natural		449,269	468,215	409,845	319,761 [r]	301,719
Sulfur compounds, sulfuric acid		16,000	16,000	16,000	16,000	16,000
Vermiculite		457	400	440	410 [r]	--
MINERAL FUELS AND RELATED MATERIALS						
Petroleum, refinery:						
Distillate fuel oil	thousand 42-gallon barrels	1,786	1,153	--	--	--
Gasoline	do.	999	615	--	--	--
Jet fuel	do.	1,245	770	--	--	--
Kerosene	do.	518	325	--	--	--
Liquefied petroleum gas	do.	198	144	--	--	--
Residual fuel oil	do.	1,995	1,225	--	--	--
Total	do.	6,740	4,230	--	--	--

[e]Estimated. [r]Revised. do. Ditto. NA Not available. -- Zero.

[1]Table includes data available through January 9, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits.

[2]In addition to the commodities listed, brick clay, gravel, murram (laterite), crushed rock, and construction sand may have been produced in Kenya, but available information was inadequate to make reliable estimates of output.

[3]Rough gemstones only. Small amounts of cut and polished gemstones also were produced.

[4]Not including gypsum production for use in cement.

TABLE 2
KENYA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, secondary	Kaluworks Ltd.	Plant at Mombasa	15,000.
Do.	Booth Manufacturing Ltd.	Plant at Nairobi	4,000.
Do.	Aluminium Enterprises	Plant at Kikuyu	1,200.
Do.	Crystal Industries Ltd.	do.	1,000.
Do.	Narcol Aluminium Rolling	Plant at Mombasa	1,000.
Do.	Aluminium Extruders	Plant at Nairobi	800.
Cement	Bamburi Cement Ltd. (Lafarge Group, 58.6%)	Plants at Athi River and Mombasa	2,300,000.
Do.	National Cement Company Ltd. (Devki Group of Companies)	Plant at Athi River	1,700,000.
Do.	Mombasa Cement Ltd.	do.	800,000.
Do.	do.	Plant at Vipengo	800,000.
Do.	Savannah Cement Ltd. (Savannah Heights, 40%; Wan-Ho, 40%; Acme Cement, 20%)	Plant at Athi River	1,500,000.
Do.	East African Portland Cement Company Ltd. (EAPC) [Lafarge Group, 41.7%; National Social Security Fund (Government-owned), 27%; Government, 25%]	do.	1,300,000.
Do.	ARM Cement Ltd.	Plant at Nairobi	650,000.
Do.	do.	Plant at Kaloleni	350,000.
Do.	Karsan Ramji & Sons Ltd.	Plant at Athi River	210,000.
Diatomite	African Diatomite Industries Ltd.	Kariandusi and Soysambu	10,800.
Fluorspar	Kenya Fluorspar Company Ltd. (KFC)	Mine at Kimwarer[1]	120,000.
Gold kilograms	Artisanal miners	Mines in Nyanza, Rift Valley, and Western Provinces	NA.
Iron ore	Wanjala Mining Co.	Mine at Kishushe[1]	10,000.
Lead, refined secondary	Associated Battery Manufacturers Company Ltd.	Plant at Athi River	3,000.
Lime	Homa Lime Company Ltd.	Plant at Koru	33,000.
Do.	ARM Cement Ltd.	Plant at Kaloleni	25,000.
Petroleum, refined thousand 42-gallon barrels	Kenya Petroleum Refineries Ltd. (KPRL) (Government, 50%, and Essar Energy Overseas Ltd., 50%)	Refinery at Mombasa[1]	29,200.
Ruby and sapphire kilograms	Rockland Kenya Ltd.	Mine at Kasigau	6,000.[e]
Salt	Krystalline Salt Ltd.	Plant near Malindi	280,000.[e]
Do.	Kensalt Ltd.	Plant at Mombasa	200,000.[e]
Do.	Tata Chemicals Magadi Ltd.	Plant at Magadi	45,000.
Soda ash	do.	Mine at Magadi	715,000.[2]
Sodium silicate	ARM Cement Ltd.	Plants at Athi River	60,000.
Steel:[3]			
Crude	Devki Steel Mills Ltd.	Three plants in Kenya	250,000.
Do.	Athi Steel Ltd.	Plant at Athi River	120,000.
Do.	Numerical Machining Complex Ltd.	Plant at Nairobi	20,000.
Do.	Kenya United Steel Company Ltd. (Alam Group of Companies)	Plant at Mombasa	20,000.
Rolled	Devki Steel Mills Ltd.	Three plants in Kenya	250,000.[e]
Do.	Mabati Rolling Mills Ltd.	Plant at Mombasa	200,000.[e]
Do.	Athi Steel Ltd.	Plant at Athi River	120,000.[e]
Do.	Numerical Machining Complex Ltd.	Plant at Nairobi	100,000.
Do.	Tarmal Wire Products Ltd.	Plant at Mombasa	84,000.
Do.	Standard Rolling Mills Ltd.	do.	80,000.
Do.	Kenya United Steel Company Ltd.	do.	30,000.
Sulfuric acid	Kel Chemicals Ltd.	Plant at Thika	14,600.
Do.	Pan Africa Chemicals Ltd.	Plant at Webuye	NA .
Titanium minerals	Base Resources Ltd.	Mine in Kwale County	480,000 ilmenite; 93,000 rutile.
Zircon	do.	do.	47,000.

[e]Estimated. Do., do. Ditto. NA Not available.
[1]Not operating at the end of 2016.
[2]Only 360,000 metric tons of capacity operating at the end of 2016.
[3]In addition to its billet and rolled steel facilities, Kenya had several galvanized steel plants.