



2017–2018 Minerals Yearbook

BOTSWANA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF BOTSWANA

By Thomas R. Yager

Note: In this chapter, information for 2017 is followed by information for 2018.

In 2017, Botswana accounted for 24% and 15% of global mined diamond production by value and volume, respectively. The country also accounted for 2% of the world's polished diamond production by value. Botswana's share of the world's mined soda ash production was nearly 2%. In 2017, Botswana was not a globally significant consumer of minerals or mineral fuels (Idex Magazine, 2018; Bolen, 2019; Olson, 2019a, b).

Minerals in the National Economy

In 2017, the mining and quarrying sector accounted for 18.1% of Botswana's gross domestic product (GDP), and the manufacturing sector, 5.1%. The value of output in the mining and quarrying sector decreased by 11.2% in 2017 after decreasing by a revised 3.5% in 2016. Formal employment in the mining and quarrying sector was reported to be 16,285 workers in 2017 compared with 21,328 in 2016; employment decreased in 2017 as copper and nickel mining operations were placed on care-and-maintenance status (Bank of Botswana, 2018, S.8, S.11; Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

In 2017, Botswana's exports were valued at \$5.93 billion, of which diamond accounted for 88.6%; soda ash, 1.6%; and gold, 0.6%. Botswana's imports were valued at \$5.21 billion in 2017, of which diamond (mostly rough diamond) accounted for 25.6%; fuels, 14.1%; metal and metal products, 4.5%; and salt, ores, and related products, 0.9% (Bank of Botswana, 2018, p. S.84–S.85, S.88–S.89, S.92).

Botswana's mining and quarrying sector is governed by the Mines and Minerals Act of 1999. The petroleum sector is governed by the Petroleum (Exploration and Production) Act of 1981. Botswana is a signatory to the Kimberley Process Certification Scheme, which is a certification system established to reduce the trade in conflict diamond. The cutting and polishing of diamond is regulated by the Diamond Cutting Act. The Government stopped issuing licenses for river sand mining in late 2015 because of safety issues and the increased flooding caused by degradation of river beds as a result of mining in rivers and streams (Moses Tshetlhane, Chief Minerals Officer, Ministry of Mineral Resources, Green Technology, and Energy Security, oral commun., February 15, 2017).

Production

In 2017, Botswana's coal production increased by 18% and gold, by 10%. Mined copper production decreased by 90% and soda ash, by 19%. Palladium, platinum, and silver production was shut down in 2015, and cobalt, smelted copper, and nickel production was shut down in 2016. Data on mineral production are in table 1 (Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

Structure of the Mineral Industry

The Government owned BCL Ltd. and maintained an equity position in the soda ash and salt mining operations at Sua Pan and most of the diamond mines. Diamond, gold, salt, and soda ash were produced by large-scale mines. The mineral industry also consisted of a number of small-scale mines and artisanal operations that produced agate, aggregates, brick, and dimension stone. Capacity, location, ownership, and production information were not readily available for these operations. Major commodities and the companies that produced those commodities are listed in table 2.

Commodity Review

Metals

Cobalt, Copper, Nickel, and Silver.—Until 2016, BCL mined copper and nickel at its Phoenix and Selebi-Phikwe Mines; the company also smelted copper and nickel from its mining operations at Selebi-Phikwe. In 2016, production at BCL's smelter was 14,273 metric tons (t) of nickel, 11,348 t of copper, and 248 t of cobalt in matte. In October 2016, the Government placed BCL into provisional liquidation status because of high costs and decreased copper prices on world markets. At the end of 2017, BCL's mines and smelter remained shut down (Cornish, 2017c; Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

MMC Norilsk Nickel of Russia had agreed to sell its interest in the Phoenix Mine, which formerly produced cobalt, copper, nickel, and platinum-group metals, in October 2014. In April 2017, Norilsk announced intentions to pursue legal action against the Government regarding BCL's reported failure to pay for its purchase of Norilsk's share in the Phoenix Mine (Cornish, 2017c).

Cradle Arc plc of the United Kingdom (formerly Alecto Minerals plc) purchased a 60% share in the Mowana copper mine from African Copper plc of the United Kingdom in 2017. Cradle Arc planned to reopen the mine and to build a new processing plant that would increase production to about 22,000 metric tons per year (t/yr) of copper in concentrate; production levels were less than 10,000 t/yr when the mine was operated by African Copper. Resources at Mowana were estimated to be more than 1.6 million metric tons (Mt) of contained copper. By yearend, production was 1,239 t (Cornish, 2017a; Modern Mining, 2017a; Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

Cupric Canyon Capital LP (CCC) of the United States estimated that resources at Zone 5 of the Khoemacau copper-silver project (which was adjacent to the Boseto copper-silver mine) were more than 100 Mt at a grade

of 2% copper and 20 grams per metric ton (g/t) silver. The company planned to start a new mine at Zone 5 by late 2019. Initial planned production was 50,000 t/yr of copper and nearly 44,000 kilograms per year (kg/yr) of silver in concentrate. The estimated life of the mine was 27 years. CCC was considering an expansion to 80,000 t/yr of copper after mining started (Cornish, 2017b).

CCC planned to use the concentrator from the Boseto Mine to process ore from Khoemacau; capacity at the concentrator would be increased to 3.65 million metric tons per year (Mt/yr) from 3 Mt/yr. The company purchased Boseto, which was on care-and-maintenance status, from Discovery Metals Ltd. of Australia in February 2015 (James, 2016; Cornish, 2017b).

In late September 2016, MOD Resources Ltd. of Australia completed a scoping study on a new mine at the T3 copper-silver deposit with favorable results. MOD could produce about 21,800 t/yr of copper and 20,700 kg/yr of silver during an estimated 10-year mine life at T3. Resources at T3 were estimated to be 28.4 Mt at grades of 1.24% copper and 15.7 g/t silver. The company planned to complete a prefeasibility study in early 2017 and a feasibility study in the first quarter of 2018. MOD had planned to start mining in 2019, depending on the results of the studies; the prefeasibility study, however, was not completed as of the end of 2017 (Barradas, 2017; Modern Mining, 2017b; Piper, 2018b).

Lead and Zinc.—Mount Burgess Mining NL of Australia planned to complete a revised resource estimate for its Kihabene-Nxuu project in early 2018; resources were estimated to be 25.3 Mt at grades of 1.8% zinc and 1.1% zinc. Nxuu was located in Ngamiland West near the border with Namibia. The company also planned to complete a feasibility study in 2018 (Mount Burgess Mining NL, undated; Washbourne, 2018).

Industrial Minerals

Cement and Stone, Crushed.—Matsiloje Portland Cement Co. produced small amounts of cement from imported clinker. National cement consumption was between 620,000 and 650,000 t/yr, most of which was imported from South Africa. Most of the remainder was imported from Namibia and Zimbabwe. Portland Pretoria Cement Ltd. (PPC) of South Africa operated a cement blending plant near Gaborone that used cement imported from South Africa and quarries near Francistown and Gaborone (Tuelo Bothhole, Sales and Distribution Manager, PPC Botswana (Pty) Ltd., oral commun., February 15, 2017).

Diamond.—The distribution arm of De Beers Group of Companies of Luxembourg operated a sorting center in Gaborone from where it shipped its products worldwide. The Government-owned Okavango Diamond Trading Co. was responsible for marketing the Government's portion of Debswana Diamond Co. (Pty) Ltd.'s production. Under the Government's agreement with De Beers, Okavango had the right to market between 10% and 15% of Debswana's production.

The value of Botswana's rough diamond production was estimated to be \$3.28 billion in 2017, the majority of which was exported before any cutting and polishing. In 2017, total rough diamond exports were valued at \$4.71 billion, of which \$3.48 billion were reported to be from domestic production

(domestic exports may include some reexports from other countries). In 2016, total rough diamond exports were a revised \$6.08 billion, of which \$4.02 billion were reported to be from domestic production. Imports of rough diamond from countries that included Canada, Namibia, and South Africa were valued at \$1.2 billion in 2017 compared with \$1.69 billion in 2016, the majority of which was reexported from Botswana before any cutting and polishing (Bank of Botswana, 2018, p. S.88–S.89; Idex Magazine, 2018).

Debswana produced nearly 22.7 million carats at the Damtshaa, the Jwaneng, the Letlhakane, and the Orapa Mines in 2017 compared with 20.5 million carats in 2016. In 2017, production at Orapa increased to 10.2 million carats from 7.93 million carats in 2016, and at Letlhakane, to 607,000 carats from 595,000 carats. Production at Jwaneng decreased to 11.9 million carats from 12 million carats. The Damtshaa Mine reopened in December 2017 and produced 35,000 carats by yearend. Increased production at Orapa was partially attributable to some of Plant 1's processing capacity being taken off care-and-maintenance status (Anglo American plc, 2018, p. 48, 198).

In October 2017, Debswana was commissioning the Letlhakane Mine Tailings Resource Treatment project. The new processing plant was expected to treat 3.6 Mt/yr of tailings and to produce 800,000 carats per year of diamond. The life of the Letlhakane Mine could be extended by 20 years (Dikuelo, 2017b).

Lucara Diamond Corp. of Canada operated the Karowe Mine, which produced diamond from the AK6 kimberlite. In 2017, Lucara mined about 250,000 carats at Karowe compared with 354,000 carats in 2016. The company planned to produce between 270,000 and 290,000 carats of diamond at Karowe in 2018 (Lucara Diamond Corp., 2018).

Mining was expected to continue at the Karowe open pit mine until 2026. In late 2017, Lucara completed a preliminary economic assessment that supported the development of an underground mine at Karowe. The underground mine could extend the life of Karowe by 10 years (Engineering & Mining Journal, 2017).

Gem Diamonds Ltd. of the British Virgin Islands started production at the new underground Ghaghoo Mine in 2014. The company produced 40,976 carats of diamond in 2016 compared with 91,499 carats in 2015. In 2016, production decreased because of lower ore grades and lower prices for smaller diamonds in world markets. Gem Diamonds placed Ghaghoo on care-and-maintenance status in 2017 (Gem Diamonds Ltd., 2017; Mining Journal, 2017).

Kimberley Diamonds Ltd. of Australia operated the Lerala Mine. In 2017, the company placed Lerala on care-and-maintenance status because of low demand in world markets for small diamonds (Tassell, 2017).

National net exports of polished diamond were valued at \$399 million in 2017 compared with \$365 million in 2016. As of mid-2017, Botswana had 17 companies that cut and polished diamond. In 2016, the Overseas Private Investment Corp. (OPIC) of the United States agreed to guarantee a loan of \$125 million from Barclays Bank of Botswana to capitalize local diamond-cutting and -polishing companies (African Mining, 2017; Dikuelo, 2017a; Bank of Botswana, 2018, p. S.88–S.89).

Potash, Salt, and Soda Ash.—Botswana Ash (Pty.) Ltd. (BotAsh) had a production capacity of 650,000 t/yr of salt and 300,000 t/yr of soda ash at the Sua Pan Mine near Sowa. The company's soda ash production decreased to 226,667 t in 2017 from 280,457 t in 2016, and salt production, to 369,613 t from 399,837 t. BotAsh was engaged in expanding its salt production and was considering the production of potash at Sua Pan (Chansonette Yun, Economic and Commercial Officer, U.S. Embassy Gaborone, oral commun., February 15, 2017; Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

Mineral Fuels and Related Materials

Coal.—In 2017, production at the Morupule Mine increased to nearly 2.22 Mt of coal from 1.87 Mt in 2016. Coal from the Morupule Mine was used at the Morupule B power station. Morupule B accounted for between 450 and 500 megawatts (MW) of the country's electrical generation capacity; diesel power stations accounted for about 160 MW; and imports accounted for about 50 MW. Expansion of the Morupule Mine was expected to be completed by 2019 to supply Morupule B after the power station's expansion was completed (Moses Tshetlhane, Chief Minerals Officer, Ministry of Mineral Resources, Green Technology, and Energy Security, oral commun., February 15, 2017; Kenalemang Charles, Botswana Department of Mines, written commun., July 10, 2018).

African Energy Resources Ltd. (AER) of the United Kingdom and First Quantum Minerals Ltd. of Canada were engaged in the development of a new coal mine and coal-fired power station at the Sese project, which had estimated resources of 2.5 billion metric tons. The initial planned capacity of the mine was 1.5 Mt/yr of thermal coal, and the power station, 300 MW. The companies planned to start the power station by no later than 2019. As of November 2017, AER had increased the planned capacity of the power station to 450 MW. It was unclear when mining or power generation would start (Cornish, 2014; van Wyngaardt, 2016; African Energy Resources Ltd., 2017, p. 3).

In March 2014, AER completed a prefeasibility study on a new mine at the Mmamabula West project. The company planned to complete a feasibility study by the end of 2016. Depending on the results of the study, the new mine at Mmamabula West could produce 3 Mt/yr of thermal coal during an estimated 20-year life. As of November 2017, it was unclear when the feasibility study would be completed (Dickinson, 2015; Piper, 2016).

In 2016, the Government approved Shumba Energy Ltd.'s environmental and social impact assessment for the proposed Mabesekwa Mine and power station in northeastern Botswana. The power station was expected to have a capacity of 600 MW. Shumba had planned to obtain financing for the project by the end of 2017 and to start supplying power by the second half of 2020. In 2017, the company moved the planned start date for the mine to mid-2018 and reduced the planned capacity of the power station to 300 MW. Planned production at Mabesekwa was 1.4 Mt/yr (Kotze, 2016; Modern Mining, 2017c; Shumba Energy Ltd., undated).

In 2017, Shumba acquired a 75% interest in the Sechaba project from Hodges Resources Ltd. of Australia. Shumba

was considering a new mine at Sechaba that would produce 1.5 Mt/yr for consumption in a power station with a capacity of 300 MW (Modern Mining, 2017c).

Uranium.—In September 2016, the Government granted A-Cap Resources Ltd. of Australia a mining license at its Letlhakane uranium project. Depending on the results of studies that the company planned to complete in 2018 or 2019, construction could start at Letlhakane in 2019, and mining, in 2021. Planned production was nearly 1,400 t/yr of uranium oxide (U_3O_8); the estimated life of the mine was 18 years. Resources were estimated to be 822 Mt at a grade of 0.02% U_3O_8 (A-Cap Resources Ltd., 2017).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

In 2018, Botswana's GDP was about \$18.6 billion. The mining and quarrying sector accounted for 16.4% of the GDP. The principal mineral exports were (in decreasing order of value) diamond, soda ash, and gold (Bank of Botswana, 2019, p. S.8, S.90, S.92).

Botswana's soda ash production increased by 31% in 2018; gold, by 20%; mined copper, by 18%; and coal, by 12% (Kenalemang Charles, Botswana Department of Mines, written commun., December 3, 2019). Cement production decreased by an estimated 93% in 2018 and clay, by an estimated 12%. Decreased cement production was attributable to the closure of Matsiloje's plant (table 1).

Cradle Arc planned to increase copper production at the Mowana Mine to 8,000 t/yr in the second half of 2018. In early December, the company placed Mowana on care-and-maintenance status. The shutdown could be attributable to silicates in the ore resulting in low recovery rates (Webb, 2018; Whiterow, 2018).

In January 2018, MOD completed its prefeasibility study of the T3 project. Planned production in the study was 23,000 t/yr of copper and more than 21,000 kg/yr of silver. The company also was considering production of 28,000 t/yr of copper and 28,000 kg/yr of silver. MOD planned to complete a feasibility study by March 2019 (MOD Resources Ltd., 2018, p. 1–2; Piper, 2018a).

The Phoenix and Selebi-Phikwe Mines remained on care-and-maintenance status in 2018. At yearend, the legal dispute between BLC and Norilsk had not been resolved (Mguni, 2019).

Giyani Metals Corp. of Canada was considering the reopening of the manganese mines at K. Hill and Otse. In September 2018, the company estimated that resources at K. Hill were 1.1 Mt at a grade of 31.2% manganese oxide. Giyani planned to start production of battery-grade manganese by the end of 2020 (Kotze, 2019).

In 2018, Botswana's cement production decreased to an estimated 1,000 t from 15,000 t in 2017. Matsiloje's plant closed in January because of competition with cement imported from South Africa (table 1; Global Cement, 2019).

In 2018, national clay production decreased to an estimated 150,000 t from 170,000 t in 2017. The decrease was attributable to the closure of Lobatse Clay Works (Pty.) Ltd.'s plant (table 1; Mguni, 2018b).

PPC produced aggregates at the Francistown, the Kgale, and the Mokolodi quarries. In 2018, Kgale was producing at the rate of 750,000 t/yr; Francistown, 300,000 t/yr; and Mokolodi, more than 250,000 t/yr. PPC planned to more than double Mokolodi's capacity (Aggregates Business, 2018).

Debswana's production at the Damtshaa, Letlhakane, and Orapa Mines increased to a total of 12.2 million carats in 2018 from 10.8 million carats in 2017. Production started at the Letlhakane Mine Tailings Resource Treatment project in 2018. The company's production at Jwaneng remained nearly unchanged at about 11.9 million carats; higher volumes of ore treated were offset by lower ore grades (Debswana Diamond Co. (Pty) Ltd., 2019, p. 8, 28).

In 2018, Lucara mined about 366,000 carats at Karowe compared with about 250,000 carats in 2017. Increased output was attributable to higher ore grades and improvements in the recovery of small diamonds. The company planned to produce between 300,000 and 330,000 carats of diamond at Karowe in 2019 (Lucara Diamond Corp., 2018, 2019).

National net exports of polished diamond were valued at \$572 million in 2018 compared with a revised \$396 million in 2017. Lazare Kaplan International Inc. of the United States, OPIC, and Stanbic Bank Botswana agreed in October to guarantee another loan of \$125 million to support local diamond cutting and polishing companies (Bates, 2018; Bank of Botswana, 2019, p. S.90–S.91).

In 2018, BotAsh's production of soda ash increased to 297,237 t from 226,667 t in 2017. The company's salt production remained nearly unchanged at 367,988 t in 2018 (Bank of Botswana, 2019, p. S.21; Kenalemang Charles, Botswana Department of Mines, written commun., December 3, 2019).

Debswana increased coal production at the Morupule Mine to 2.48 Mt in 2018 from nearly 2.22 Mt in 2017. Production was expected to increase to 8 Mt/yr by 2025; the company planned to export to South Africa, Zambia, and Zimbabwe (Mguni, 2018a; Kenalemang Charles, Botswana Department of Mines, written commun., December 3, 2019).

The Morupule B power station was operating at 81% of its capacity in early June 2018. The planned expansion of Morupule B was cancelled because of a dispute over contract terms (Macharia, 2018).

As of yearend, Shumba had not started mining coal at the Mabesekwa project. It was unclear when the mine and power station would start production (Shumba Energy Ltd., 2019, p. 24).

In 2018, A-Cap shifted its focus to cobalt projects in Australia. Work on the feasibility study for the Letlhakane uranium project was on hold; it was unclear when mining would start (A-Cap Resources Ltd., 2018, p. 2–4).

Outlook

Mined diamond production is expected to increase slightly because of the reopening of the Damtshaa Mine and the startup of the Letlhakane Mine Tailings Resource Treatment project. Copper production is expected to increase between 2019 and 2022 with the reopening of the Mowana Mine and the startup of the Khoemacau and the T3 projects. Silver mining is likely to restart in 2019 because of the startup of Khoemacau and T3.

Manganese mining could start in 2020. Aggregate production also could increase in the near term.

New investment would be required to restart nickel and cobalt production. The remaining resources at Selebi-Phikwe are low-grade and at least 2 kilometers deep. The Phoenix Mine required investment to increase its life by between 4 and 5 years (Cornish, 2017c; Chansonette Yun, Economic and Commercial Officer, U.S. Embassy Gaborone, oral commun., February 15, 2017).

Coal production is expected to nearly triple by 2025 because of the expansion of the Morupule Mine. The lack of new mines opening and the depletion of existing mines in South Africa could increase its demand for Botswana's coal. It was unclear when mining would start at the Mabesekwa, Mmamabula West, Sechaba, or Sese projects (Mguni, 2018a).

Botswana's peak electricity demand was 520 MW in 2018. By 2025, peak demand was projected to increase to 856 MW. It was unclear when the planned new coal-fired power stations would start operation (Macharia, 2018).

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TABLE 1
BOTSWANA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²		2014	2015	2016	2017	2018
METALS						
Cobalt, mine, matte, Co content ³		196	316	248	--	--
Copper:						
Mine, concentrates, Cu content		38,000	9,126	12,415	1,239	1,462
Smelter, primary, matte ⁴		14,628	13,888	11,348	--	--
Gold, mine, Au content	kilograms	958	756	833	920	1,105
Nickel:						
Mine, concentrate, Ni content		14,958 ^r	16,789 ^r	14,273 ^r	--	--
Smelter, matte		14,958	16,789	14,273	--	--
Platinum-group metals, mine, elemental content:						
Palladium	kilograms	1,120	930 ^{r, e}	-- ^{r, e}	--	--
Platinum	do.	249 ^r	190 ^{r, e}	-- ^{r, e}	--	--
Silver, mine, Ag content ⁵	do.	22,228 ^r	2,801	--	--	--
INDUSTRIAL MINERALS						
Cement, hydraulic		15,000	15,000	15,000	15,000 ^e	1,000 ^e
Clay, brick ^c		170,000	170,000	170,000	170,000	150,000
Diamond, gem and industrial ⁶	thousand carats	24,700 ^{r, e}	20,824	20,954	22,900	24,498
Gemstones, semiprecious stones	kilograms	90,000	77,000 ^e	64,000 ^e	64,000 ^e	64,000 ^e
Salt ⁷		515,311	404,295	399,837	369,613	367,988
Sand and gravel, construction, aggregates, unspecified ^e		3,700,000	3,800,000	3,900,000	4,100,000	4,100,000
Soda ash, natural		268,529	243,369	280,457	226,667	297,237
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous		1,711,555	2,065,775 ^r	1,873,547	2,215,782	2,482,313

^aEstimated. ^bRevised. ^cdo. ^dDitto. ^e-- Zero.

¹Table includes data available through October 7, 2019. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, dimension stone may have been produced, but available information was inadequate to make reliable estimates of output.

³Reported cobalt content of pelletized nickel-copper matte.

⁴Copper content of nickel-copper matte exported to Norway for refining.

⁵Silver was produced and exported in the nickel-copper-cobalt matte.

⁶About 70% gem and near-gem quality and 30% industrial quality.

⁷From natural soda ash production.

TABLE 2
BOTSWANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aggregates, unspecified		Portland Pretoria Cement Ltd. (PPC)	Quarry at Kgale	830,000. ^c
Do.		do.	Quarry at Francistown	330,000. ^c
Do.		do.	Quarry at Mokolodi	280,000. ^c
Cement		Matsiloje Portland Cement Co.	Plant at Matsiloje, 45 kilometers southeast of Francistown ¹	36,000.
Clay ²		Makoro Brick and Tile (Pty.) Ltd.	Makoro, 10 kilometers south of Palapye	100,000. ^c
Do.		Lobatse Clay Works (Pty.) Ltd. (Botswana Development Corp. and Interkiln Corp. joint venture)	Lobatse, 70 kilometers south-southwest of Gaborone ¹	70,000. ^c
Coal		Morupule Colliery (Pty) Ltd. [Debswana Diamond Co. (Pty.) Ltd., 100%]	Morupule Mine, 14 kilometers west of Palapye	3,200,000.
Diamond thousand carats		Debswana Diamond Co. (Pty.) Ltd. (Government, 50%, and De Beers Centenary AG, 50%)	Jwaneng Mine near Jwaneng	30,000.
Do.	do.	do.	Orapa Mine near Orapa	20,000.
Do.	do.	do.	Lethakane Mine near Lethakane	1,000.
Do.	do.	do.	Damtsha Mine, 220 kilometers west of Francistown	670.
Do.	do.	Lucara Diamond Corp.	Karowe Mine in Boteti Sub-District	460. ^c
Do.	do.	Kimberley Diamonds Ltd.	Lerala Mine near Lerala ¹	400.
Do.	do.	Gem Diamonds Ltd.	Ghaghoo Mine ¹	210.
Gemstones, semiprecious kilograms		Agate Botswana (Pty.) Ltd.	Processing plant at Pilane, 45 kilometers north of Gaborone	70,000. ^c
Do.	do.	Masa Semi-Precious Stones (Pty.) Ltd.	Bobonong, east of Selebi-Phikwe	20,000. ^c
Gold		Galane Gold Ltd.	Mupane Mine, 30 kilometers southeast of Francistown	2,000.
Nickel-copper-cobalt:				
Mine		BCL Ltd. (Government, 100%)	Selebi-Phikwe Mines, 350 kilometers northeast of Gaborone ¹	3,000,000 ore matte content (of which 30,000 nickel, 25,000 copper, 400 cobalt).
Do.		Tati Nickel Mining Co. (Pty.) Ltd. (BCL 100%)	Phoenix and Selkirk Mines, 23 kilometers east of Francistown ¹	5,000,000 ore matte content (of which 21,000 nickel, 12,500 copper, 800 cobalt, 4,400 kilograms palladium, 700 kilograms platinum).
Do.		Cupric Canyon Capital LP (CCC)	Boseto Mine ¹	36,000 copper.
Do.		Cradle Arc plc, 60%	Mowana Mine ¹	10,000 ^c copper.
Smelter		BCL Ltd. (Government, 100%)	Selebi-Phikwe Mines, 350 kilometers northeast of Gaborone ¹	30,000 nickel; 25,000 copper; 400 cobalt.
Salt		Botswana Ash (Pty.) Ltd. (BotAsh) (Government, 50%, and Chlor Alkali Holdings, 50%)	Sua Pan near Sowa	650,000.
Silver	kilograms	Cupric Canyon Capital LP (CCC)	Boseto Mine ¹	34,000.
Soda ash		Botswana Ash (Pty.) Ltd. (BotAsh) (Government, 50%, and Chlor Alkali Holdings, 50%)	Sua Pan near Sowa	300,000.

^cEstimated. Do., do. Ditto. NA Not available.

¹Not operating at the end of 2018.

²For brick and tiles.