



2020–2021 Minerals Yearbook

ZAMBIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF ZAMBIA

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Note: In this chapter, information for 2020 is followed by information for 2021.

In 2020, Zambia ranked seventh in world output of mined copper and accounted for an estimated 4% of world production. Zambia was also a leading world producer of gemstones, particularly emerald. The Zambia Chamber of Mines reported that the country accounted for about 20% of the world's production of emerald. The country also produced cement; coal; cobalt; gold; lime; limestone; manganese; nickel; other gemstones, such as amethyst, beryl, and tourmaline; refined petroleum products; raw steel; and sulfuric acid. Zambia had been a member of the Common Market for Eastern and Southern Africa (COMESA) since 2000 and a member of the Extractive Industries Transparency Initiative (EITI) since 2009 (table 1; Chama, 2019; Giuliani and Groat, 2019, p. 476; Extractive Industries Transparency Initiative, 2020, p. 9; Common Market for Eastern and Southern Africa, 2022; Flanagan, 2022).

Minerals in the National Economy

The nominal gross domestic product (GDP) of Zambia was \$18.1 billion¹ in 2020; the mining and quarrying sector accounted for 15.3% of the nominal GDP. The real GDP decreased by 2.8% compared with an increase of 1.4% in 2019. The output value of the mining and quarrying sector increased by 8.0% in 2020 compared with a decrease of 5.1% (revised) in 2019. In 2020, the mining and quarrying sector employed 59,371 workers, accounting for 2.0% of total employment. Of those working in mining and quarrying, 31% worked in the informal sector as artisanal and small-scale miners (Zambia Statistics Agency, 2021, p. 33, 38; Ministry of Finance, 2022, p. 77–79).

The value of total exports increased by 10% in 2020; a large portion of that increase was attributed to an increase in total copper exports. Copper exports accounted for 73% of the value of all goods exported in 2020. The value of copper exports increased by 17% and the quantity increased by 11%. Other mineral commodities for which the export value increased included refinery products, by 47%; cement and lime, by 14%; and gold, by 12%. Mineral commodities for which the export values decreased included cobalt, by 75%; gemstones, by 56%; manganese ores and concentrates, by 45%; and sulfuric acid, by 36% (Bank of Zambia, 2021, p. 17, 19–20).

Zambia had a net import balance with the United States in 2020 of about \$32 million. Exports of goods from Zambia to the United States were valued at \$40 million in 2020 compared with \$83 million in 2019, which was a decrease of 51%. Gemstones (other), which were valued at \$35 million, accounted for about 88% of these exports. Other mineral-related exports to the

United States from Zambia included gem diamond valued at \$456,000; and nonmonetary gold, \$106,000. Imports to Zambia from the United States were valued at \$72 million in 2020 compared with \$99 million in 2019, which was a decrease of 28%. Excavating machinery valued at about \$24 million accounted for about 34% of these imports. Zambia's other mineral-related imports from the United States included specialized mining (equipment) valued at \$1,478,000; minor amounts of petroleum products (other), \$434,000; nonmetallic minerals, \$333,000; nonferrous metals, \$11,000; and aluminum and alumina, \$6,000 (U.S. Census Bureau, 2022a, b).

Government Policies and Programs

The mining sector is regulated by Act No. 11 of 2015 (the Mines and Minerals Development Act of 2015), which replaced Act No. 7 of 2008 (the Mines and Minerals Development Act of 2008). The Mines and Minerals Development Act of 2015 established guidelines for exploration licenses; large- and small-scale mining licenses; import and export permits; mining rights; safety, health, and environmental protections; mineral trading permits; and processing of minerals. Investments in most types of mineral operations are covered by the Zambia Development Agency Act of 2006, although minerals produced for the construction industry, such as clay, sand, and most types of stone, are excluded. Petroleum exploration and production are regulated by Act No. 10 of 2008 [the Petroleum (Exploration and Production) Act of 2008] (LEX Africa, 2019, p. 78–82).

In 2019, the Government announced an increase in the sliding scale for royalty rates to 5.5%–7.5% from 4%–6%. The actual royalty would depend on commodity prices, with higher prices resulting in a higher royalty and lower prices resulting in a lower royalty. Additionally, there would be a 10% tax on copper when the price exceeds \$7,500 per metric ton. The Government also announced that a 15% export duty would be imposed on precious metals and gemstones and a 5% import duty on copper and cobalt concentrates. In February 2020, the 15% export duty was suspended for all gemstone exports except diamond (Mfula, 2018, 2019; Diamond World News Service, 2020).

Production

Notable increases in mineral production in Zambia in 2020 compared with production in 2019 included that of refined copper, which increased by 43%; nickel, by 29%; coal (bituminous), by 23%; smelted copper, by 18%; cement and sulfur, by 13% each; and lime, by 10%. Notable decreases in production included that of refined cobalt, which decreased by 100% because of the closure of the Chambishi cobalt plant (owned by Chambishi Metals Plc) owing to a disruption in the supply of raw materials. Other metals with notable decreases in

¹Where necessary, values have been converted from Zambian kwacha (ZMK) to U.S. dollars (US\$) at the annual average exchange rate of 18.3433ZMW=US\$1.00, for 2020.

production included raw steel, for which production decreased by 33%; manganese, 27%; mined cobalt, 17%; and gold, 12%. Various gemstones had notable decreases (estimated) in production, including beryl, for which production decreased by 59%; emerald, 58%; amethyst, 46%; and tourmaline, 17%. Production of petroleum refinery products decreased by 47% owing to the shutdown of the Indeni refinery (which was owned by Government-owned Indeni Petroleum Refinery Ltd.) during part of the year. Data on mineral production are in table 1.

Structure of the Mineral Industry

Many of the country's large copper mining and processing operations were in Copperbelt Province in north-central Zambia. The Government continued to hold a minority interest in most of the large copper projects in Zambia through its holding company Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH). The mining sector is administered by the Ministry of Mines and Minerals Development (MMMD). The Department of Geological Survey compiles and disseminates geoscience data and maps and provides professional technical expertise to the Government. The Ministry of Commerce, Trade and Industry oversees the industrial manufacturing sector (Extractive Industries Transparency Initiative, 2020, p. 47). Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Cobalt and Copper.—In 2020, mined copper production was 706,700 metric tons (t), which was an increase of about 8% compared with the 655,500 t produced in 2019. In 2020, Zambia also produced 378,400 t of refined copper and 750,600 t of smelter copper compared with 264,500 t (revised) of refined copper and 638,500 t of smelter copper in 2019. During the year, Jubilee Metals Group Plc of the United Kingdom (Jubilee) reported that the Sable refinery, which it had acquired from Glencore plc of Switzerland (Glencore) in 2019, had become fully operational. The refinery had the capacity to produce 14,000 metric tons per year (t/yr) of copper cathode. Jubilee noted that the refinery would serve as a central processing facility for the company's Kabwe operations (located adjacent to the refinery in Kabwe in Copperbelt Province) and as a processing facility for 300 million metric tons of copper tailings from third-party operators in the surrounding areas (table 1; Jubilee Metals Group Plc, 2021a; 2021b, p. 14–15).

In September 2020, First Quantum Minerals Ltd. (First Quantum) of Canada announced plans to expand the production capacity at its Kansanshi Mine by 25 million metric tons per year. First Quantum expected the expansion would cost \$650 million and would be completed by 2025. The mine, which First Quantum controlled with an 80% share (ZCCM-IH controlled the remaining 20%), was located north of Solwezi in North-Western Province. In October 2020, EMR Capital Management Ltd. (EMR Capital) of Australia also announced that it was in talks with the Government seeking tax breaks that would allow the company to expand the production capacity of its Lubambe Mine by 160,000 t/yr of copper (in concentrate)

during a 30-year period. The expansion was expected to cost about \$1 billion. The Lubambe Mine, which EMR Capital controlled with an 80% share (ZCCM-IH controlled the remaining 20%), was located near Chililabombwe in Copperbelt Province near the border with Congo (Brazzaville) (Singh, 2020; Thomson Reuters, 2020).

In November 2020, representatives of ZCCM-IH announced that the company was in talks to increase ZCCM-IH's shares in Mopani Copper Mines Plc, which was jointly owned by Glencore (73.1%), First Quantum (16.9%), and ZCCM-IH (10%), although Glencore and First Quantum had expressed interest in selling their entire stakes in the company. A full acquisition would involve ZCCM-IH taking on the more than \$1.5 billion in debt held by Glencore in the company. Mopani Copper Mines operated two mines in Copperbelt Province: the Nkana Mine, which was located southwest of Kitwe, and the Mufulira Mine, which was located in Mufulira (table 2; Nijini and Biesheuvel, 2020).

Gold.—In 2020, gold output from First Quantum's Kansanshi Mine and smelter decreased by almost 12% to 3,993 kilograms (kg) from 4,522 kg in 2019. The decreased production was due to a decline in the gold concentrates produced by the gravity concentrator and the processing of stockpiled oxide ore. The Kansanshi Mine was the sole source of gold production in the country from a large-scale producer. There was additional gold production in the country by artisanal and small-scale miners; however, the amount produced was not reported (table 2; First Quantum Minerals Ltd., 2021, p. 16–17).

To encourage more mining activity on active mining licenses and to raise revenue, the Government announced a plan in 2019 to formalize the artisanal and small-scale gold mining sector in Zambia to prevent environmental damage from illegal mining and to provide a domestic market with competitive prices for the miners. At the end of 2019, ZCCM-IH's board of directors approved a proposal to establish a joint venture called Consolidated Gold Company Zambia Ltd. (CGCZ) with Karma Mining Services and Rural Development Company of Sudan, in which Karma would hold a 55% share and ZCCM-IH would hold the other 45% share. The joint venture would create a gold purchasing and processing operation that caters to artisanal and small-scale miners. In May 2020, ZCCM-IH established a joint-venture company in which CGCZ held a 65% share and Array Metals held the other 35%; the joint venture would process gold in Mumbwa. Also in May 2020, the Government announced that 10 milling plants had been built to process gold. ZCCM-IH reported that the milling plants had a combined production capacity of 90 kilograms per year of gold (Zambia Consolidated Copper Mines Investments Holdings Plc, 2019a, 2019b, 2020; Mfula, 2020).

Manganese.—In 2020, manganese (manganese content) production was an estimated 82,000 t which was a 27% decrease compared with the estimated production of 113,000 t (revised) in 2019. In May 2020, Kabundi Resources Ltd., a subsidiary of ZCCM-IH, started mining operations at the Serenje Mine in Central Province. The mine was expected to have a production capacity of 240,000 t/yr of manganese. Hu-Cheng Mining Co. of China (Hu-Cheng) continued to develop a \$20 million manganese smelter with 40,000-t/yr capacity in the Kapiri Mposhi District of Central Province; the smelter was expected

to be completed in 2021. In December 2020, Chi Metal Co. of China started operations of a manganese-processing plant in Serenje; the plant's construction cost was \$9 million (Construction Review Online, 2019; Kombe, 2020; Lusaka Times, 2020; Malumo, 2020).

Industrial Minerals

Gemstones.—In 2020, production of amethyst, tourmaline, emerald, and beryl in Zambia was estimated to be 600,000 kg, 10,000 kg, 6,400 kg, and 3,400 kg, respectively. Gemfields Group Ltd. of the United Kingdom (Gemfields), owner of the Kagem Mine and the Mbuva-Chibolele Mine, was the single largest producer of emerald in the country, producing 1,880 kg (9.4 million carats) of emerald and beryl in 2020. Gemstone production was also performed by artisanal and small-scale miners. In February 2020, the Government suspended the 15% export duty on gemstones; producers had warned that the export duty would have harmed small-scale miners. The removal of the export duty was also expected to benefit large operators, such as Gemfields, allowing them to profitably expand operations (table 1; Diamond World News Service, 2020; Gemfields Group Ltd., 2021, p. 52).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

In 2021, the nominal GDP of Zambia was \$20.9 billion;² the mining and quarrying sector accounted for 19.4% of the nominal GDP. The real GDP increased by 3.6%, and the output value of the mining and quarrying sector decreased by 6.3%. Mineral royalties accounted for about 49% of nontax Government revenues, and mining companies contributed about 66% of Government revenues collected from company income taxes. In August 2020, a new President was elected to lead the country of Zambia. The new President announced changes to the mining tax regulations, namely reforms that would allow mining companies to deduct mining royalties from the corporate tax. The mining sector consumed the largest share of electricity generated, at 47%, followed by the services sector (35%); the total electricity generated was about 13 terawatt hours. Imports of feedstock for petroleum refining decreased by 86% owing to the prolonged shutdown of the Indeni refinery, as well as the commencement of the petroleum sector reforms that were aimed at enhancing supply chain efficiencies (McKay, 2021; Ministry of Finance, 2022, p. 18–19, 40, 77–79).

In 2021, the value of total exports from Zambia increased by nearly 40%. A large portion of the increase was attributed to higher copper exports, the value of which increased by 42%. Copper exports accounted for 75% of the value of all goods exported in 2021. Zambia had a net import balance with the United States in 2021 of about \$81 million. Exports of goods to the United States from Zambia were valued at \$175 million in 2021. Copper accounted for about 65% of these exports, which were valued at \$113 million. Other mineral-related exports to the United States included gemstones (other) valued

at \$50 million; and minor amounts of gem diamond, \$588,000. Imports to Zambia from the United States were valued at \$94 million in 2021. Excavating machinery accounted for about 22% of these imports, which were valued at about \$20 million. Other mineral-related imports from the United States included specialized mining (equipment) valued at \$2.7 million; gem diamond, \$2 million; petroleum products (other), \$394,000; drilling and oilfield equipment, \$127,000; and nonmetallic minerals, \$69,000 (Ministry of Finance, 2022, p. 67; U.S. Census Bureau, 2022a, b).

In 2021, coal (bituminous) production increased by 49% owing to an increase in demand by domestic electric powerplants and by domestic manganese plants, according to the Ministry of Finance. Other mineral commodities with notable increases in production in 2021 were manganese, by 46% (estimated); beryl, by 32% (estimated); emerald, by 31% (estimated); sulfuric acid, by 31%; tourmaline, by 20% (estimated); nickel, by 19%; amethyst, by 17% (estimated); and stone (crushed limestone), by 11% (estimated). Notable decreases in Zambia's mineral production included that of petroleum (refined), by 61% (estimated) owing to the prolonged shutdown of the Indeni refinery. The other mineral commodity with a notable decrease in production in 2021 was mined cobalt, by 22% (Ministry of Finance, 2022, p. 15, 18). Data on mineral production are in table 1.

In January 2021, ZCCM–IH acquired 100% of Mopani Copper Mines plc from Glencore and First Quantum at a cost of \$1.5 billion. Prior to the acquisition, ZCCM–IH's share of the company was 10%. Mopani Copper Mines operated underground mines in addition to a concentrator, a smelter, and a refinery at its Mufulira mine site. At the Nkana mine site, the company operated open pit mines, a concentrator, and a cobalt plant. In September 2021, CNMC Luanshya Copper Mines Plc announced that it was considering shutting down its Baluba Mine, which was an underground mine in Luanshya, Copperbelt Province, owing to the depletion of reserves. The company expressed concern for the 3,000 miners who had worked at the Baluba Mine, noting that they could remain employed if the nearby Mashiba open pit mine started operations. First Quantum announced that it was planning to spend \$270 million on a proposed expansion at its Kansanshi Mine. If approved, the copper-gold expansion project was expected to begin in 2023 (First Africa Guide, 2021; Hall, 2021; Hotter, 2021; Zambia Consolidated Copper Mines Investments Holdings Plc, 2021).

Huaxin Cement Co. Ltd. of China agreed to purchase a 75% stake in Lafarge Zambia plc (a subsidiary of LafargeHolcim Ltd. of Switzerland) for \$150 million in June 2021. Included in the purchase were the Chilanga I and II cement plants, located about 15 kilometers south of Lusaka, Lusaka Province; these cement plants had a combined production capacity of 950,000 t/yr of cement. The purchase also included a cement plant located in Ndola, Copperbelt Province, with a production capacity of 550,000 t/yr. In December 2021, Huaxin Cement renamed Lafarge Zambia Plc to Chilanga Cement Plc (table 2; Global Cement, 2021; African Financials, 2022).

Gemfields reported that its Kagem Mine restarted operations in March 2021 after having been closed since March 2020 owing to the coronavirus disease 2019 (COVID-19) pandemic.

²Where necessary, values have been converted from Zambian kwacha (ZMK) to U.S. dollars (US\$) at the annual average exchange rate of 20.351ZMW=US\$1.00 for 2021.

By May 2021, the mine had reached full capacity. Although the mine's production of emerald and beryl decreased by 74% to 1,880 kg (reported as 9.4 million carats) in 2020 from 7,300 kg (36.3 million carats) in 2019, production recovered in 2021 to 6,400 kg (32 million carats). The company noted that the Kagem Mine, which is located in the Ndola Rural Emerald Restricted Area (NRERA) and lies south of Kitwe and west of Ndola in Copperbelt Province, was considered the leading emerald-producing mine in the world and accounted for about 25% of global emerald production. The Kagem Mine was 75% owned by Gemfields and 25% owned by the Government (Gemfields Group Ltd., 2022, p. 24–25; Mining Review Africa, 2022).

Outlook

The real GDP of Zambia is projected to increase by 3.1% in 2022, according to the International Monetary Fund. The mineral industry is expected to benefit from changes to mining tax regulations as well as growing global demand for minerals. New metal-processing facilities, Hu-Cheng's manganese smelter, and Jubilee's Sable refinery will provide new mineral commodity revenue streams. Continuing formalization of the artisanal and small-scale mining sector is likely to increase gold-mining production, similar to that which has taken place for gemstones. The Government's suspension of the 15% gemstone export duty is expected to increase gemstone production and likely attract more investment (International Monetary Fund, 2022, p. 143).

References Cited

African Financials, 2022, Lafarge Zambia Plc changes name to Chilanga Cement Plc: African Financials, January 13. (Accessed May 17, 2022, at <https://africanfinancials.com/lafarge-zambia-plc-changes-name-to-chilanga-cement-plc/>.)

Bank of Zambia, 2021, Annual report 2020: Lusaka, Zambia, Bank of Zambia, 150 p. (Accessed February 15, 2022, at <https://www.boz.zm/BankofZambia2020AnnualReport.pdf>.)

Chama, Precious, 2019, Zambia Chamber of Mines President's speech at the ninth Zambia Investment in Mining and Energy Conference 2019: Lusaka, Zambia, Zambia Chamber of Mines, June 17. (Accessed February 15, 2022, at <http://mines.org.zm/zambia-chamber-of-mines-presidents-speech-at-the-9th-zambia-investment-in-mining-and-energy-conference-2019/>.)

Common Market for Eastern and Southern Africa, 2022, Zambia country profile: Lusaka, Zambia, Common Market for Eastern and Southern Africa. (Accessed February 14, 2022, at <https://www.comesa.int/zambia/>.)

Construction Review Online, 2019, Zambia to construct US \$15M manganese smelting plant: Construction Review Online, January 17. (Accessed February 14, 2022, at <https://constructionreviewonline.com/news/zambia-to-construct-us-15m-manganese-smelting-plant/>.)

Diamond World News Service, 2020, Zambia cuts export duty on gemstones by 15 per cent, paves way for all round prosperity: Diamond World News Service, February 24. (Accessed February 17, 2022, at <https://www.diamondworld.net/contentview.aspx?item=24776>.)

Extractive Industries Transparency Initiative, 2020, Zambia EITI Report 2019: Tunis, Tunisia, BDO Tunisia Consulting, December, 167 p. (Accessed February 17, 2022, at <https://eiti.org/document/zambia-2019-eiti-report>.)

First Africa Guide, 2021, LCM has exhausted all copper reserves at Baluba shaft, considering shutting down operations: Johannesburg, South Africa, First Africa Guide, September 29. (Accessed May 17, 2022, at <https://firstafricaguide.com/2021/09/29/lcm-has-exhausted-all-copper-reserves-at-baluba-shaft-considering-shutting-down-operations/>.)

First Quantum Minerals Ltd., 2021, Annual report 2020: Vancouver, British Columbia, Canada, First Quantum Minerals Ltd., February 16, 122 p. (Accessed February 18, 2022, at https://s24.q4cdn.com/821689673/files/doc_downloads/2020-annual-report/First_Quantum_2020_Annual_Report.pdf.)

Flanagan, D.M., 2022, Copper: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 54–55.

Gemfields Group Ltd., 2021, Annual report 2020: St. Peter Port, Guernsey [United Kingdom], Gemfields Group Ltd., March 29, 188 p. (Accessed February 14, 2022, at <https://www.gemfieldsgroup.com/annual-report-2020/>.)

Gemfields Group Ltd., 2022, Annual report 2021: St. Peter Port, Guernsey [United Kingdom], Gemfields Group Ltd., March 24, 195 p. (Accessed June 24, 2022, at <https://gemfields.s3.amazonaws.com/Documents/2022/Reports/20211231%20GGL%20Annual%20Report.pdf>.)

Giuliani, Gaston, and Groat, L.A., 2019, Geology of corundum and emerald gem deposits—A review: *Gems & Gemology*, v. 55, no. 4, p. 464–489. (Accessed February 15, 2022, at <https://www.gia.edu/doc/Winter-2019-Gems-Gemology.pdf>.)

Global Cement, 2021, Huaxin Cement completes acquisition of plants in Zambia and Malawi from Holcim: Global Cement, December 27. (Accessed May 17, 2022, at <https://www.globalcement.com/news/item/13460-huaxin-cement-completes-acquisition-of-plants-in-zambia-and-malawi-from-holcim>.)

Hall, Matthew, 2021, Glencore agrees \$1.5bn sale of Mopani to Zambian Government: Mining Technology, January 19. (Accessed May 17, 2022, at <https://www.mining-technology.com/news/deal-news/glencore-zambia-mopani-sale/#:~:text=Commodities%20trader%20and%20miner%20Glencore,a%20deal%20worth%20%241.5bn>.)

Hotter, Andrea, 2021, First Quantum sees higher copper production over next three years: Fastmarkets [London, United Kingdom], January 26. (Accessed May 17, 2022, at <https://www.fastmarkets.com/insights/first-quantum-sees-higher-copper-production-over-next-three-years>.)

International Monetary Fund, 2022, World economic outlook—War sets back the global recovery: Washington, DC, International Monetary Fund, April, 178 p. (Accessed May 18, 2022, at <https://www.imf.org/-/media/Files/Publications/WEO/2022/April/English/text.ashx>.)

Jubilee Metals Group Plc, 2021a, Copper operations: London, United Kingdom, Jubilee Metals Group Plc. (Accessed February 10, 2022, at <https://jubileemetalsgroup.com/operations/copper/>.)

Jubilee Metals Group Plc, 2021b, Unaudited interim results for the six months ended 31 December 2020: London, United Kingdom, Jubilee Metals Group Plc, March 25, 29 p. (Accessed February 22, 2022, at <https://tools.eurolandir.com/tools/Pressreleases/GetPressRelease/?ID=3939036&lang=en-GB&companycode=uk-jlp&v=>.)

Kombe, 2020, Serenje manganese mine fires up: Daily Nation Newspaper [Nairobi, Kenya], December 2. (Accessed February 22, 2022, at <https://www.pressreader.com/zambia/daily-nation-newspaper/20201202/281522228654809>.)

LEX Africa, 2019, Guide to mining regimes in Africa: Sandton, South Africa, LEX Africa, 86 p. (Accessed February 16, 2022, at <https://www.lexafrica.com/wp-content/uploads/2019/02/LEX-Africa-MINING-GUIDE-DIGITAL.pdf>.)

Lusaka Times, 2020, Works at the ZCCM–IH supported manganese mine in Serenje commences: Lusaka [Zambia] Times, May 5. (Accessed February 22, 2022, at <https://www.lusakatimes.com/2020/05/05/281933/>.)

Malumo, Silumesi, 2020, Government has disclosed that two Chinese mining companies are setting up manganese processing plants in Central Province: Daily Nation [Lusaka] Zambia, October 12. (Accessed February 22, 2022, at <https://dailynationzambia.com/2020/10/chinese-set-up-manganese-processing-plants/>.)

McKay, David, 2021, Barrick's Bristow says Zambian fiscal reform “a very significant event” for copper producer: Rivonia, South Africa, MiningMX, November 4. (Accessed May 17, 2022, at <https://www.miningmx.com/news/gold/48040-barricks-bristow-says-zambian-fiscal-reform-a-very-significant-event-for-copper-producer/>.)

Mfula, Chris, 2018, Update 3—Zambia hikes mining taxes in 2019 budget to rein in debt: Thomson Reuters, September 28. (Accessed February 17, 2022, at <https://www.reuters.com/article/zambia-budget/update-3-zambia-hikes-mining-taxes-in-2019-budget-to-rein-in-debt-idUSL8N1WE5RK>.)

Mfula, Chris, 2019, Zambia suspends 15% export duty on gemstones—Minister: Thomson Reuters, December 19. (Accessed February 15, 2022, at <https://www.reuters.com/article/idUSL8N28TOLE>.)

Mfula, Chris, 2020, Zambia, in diversification push, starts processing artisanal gold: Thomson Reuters, May 13. (Accessed February 22, 2022, at <https://www.reuters.com/article/zambia-mining/zambia-in-diversification-push-starts-processing-artisanal-gold-idUKL8N2CV2UE>.)

Mining Review Africa, 2022, Kagem optimistic about Zambia's gemstone future: Mining Review Africa, January 12. (Accessed June 24, 2022, at <https://www.miningreview.com/diamonds-gems/kagem-optimistic-about-zambias-gemstone-future/>.)

- Ministry of Finance, 2022, 2021 Annual economic report: Lusaka, Zambia, Ministry of Finance, 80 p. (Accessed May 16, 2022, at https://www.mof.gov.zm/?wpfb_dl=448.)
- Nijini, Felix, and Biesheuvel, Thomas, 2020, Zambia sees deal with Glencore over Mopani Copper within a month: BNN Bloomberg [Toronto, Ontario, Canada], November 16. (Accessed February 22, 2022, at <https://www.bnnbloomberg.ca/zambia-sees-deal-with-glencore-over-mopani-copper-within-a-month-1.1523027>.)
- Singh, Shradha, 2020, Canada's First Quantum eyes operations expansion at Zambia mine: Thomson Reuters, September 14. (Accessed February 17, 2022, at <https://www.reuters.com/article/us-zambia-fst-quantum-min/canadas-first-quantum-eyes-operations-expansion-at-zambia-mine-idUSKBN2653GM>.)
- Thomson Reuters, 2020, EMR Capital seeks concessions to develop \$1 bln Zambia copper mine: Thomson Reuters, October 2. (Accessed February 22, 2022, at <https://www.reuters.com/article/zambia-mining/emr-capital-seeks-concessions-to-develop-1-blm-zambia-copper-mine-idUSL8N2GS4QM>.)
- U.S. Census Bureau, 2022a, Foreign trade-country and product trade data—Product detail and partner country—End-use-country by 5-digit end-use code, annual totals, 2012–present—Download full exports dataset: U.S. Census Bureau. (Accessed May 23, 2022, via <https://www.census.gov/foreign-trade/statistics/country/index.html>.)
- U.S. Census Bureau, 2022b, Foreign trade-country and product trade data—Product detail and partner country—End-use-country by 5-digit end-use code, annual totals, 2012–present—Download full imports dataset: U.S. Census Bureau. (Accessed May 23, 2022, via <https://www.census.gov/foreign-trade/statistics/country/index.html>.)
- Zambia Consolidated Copper Mines Investments Holdings Plc, 2019a, Bank of Zambia to buy 40,000 kilos of gold in 2020: Lusaka, Zambia, Zambia Consolidated Copper Mines Investments Holdings Plc, December 29. (Accessed February 18, 2022, at <https://www.zccm-ih.com.zm/2019/12/29/bank-of-zambia-to-buy-40000-kilos-of-gold-in-2020/>.)
- Zambia Consolidated Copper Mines Investments Holdings Plc, 2019b, Market announcement-joint partnership: Lusaka, Zambia, Zambia Consolidated Copper Mines Investments Holdings Plc, December 23. (Accessed February 17, 2022, at <https://zccm-ih.financifi.com/download/market-announcement-joint-venture-partnership/>.)
- Zambia Consolidated Copper Mines Investments Holdings Plc, 2020, Consolidated Gold Company signs joint venture with Array Metals to process gold in Mumbwa: Lusaka, Zambia, Zambia Consolidated Copper Mines Investments Holdings Plc, May 20. (Accessed February 17, 2022, at <https://www.zccm-ih.com.zm/2020/05/20/consolidated-gold-company-signs-joint-venture-with-array-metals-to-process-gold-in-mumbwa/>.)
- Zambia Consolidated Copper Mines Investments Holdings Plc, 2021, Directors' interim unaudited financial results for ZCCM Investments Holdings and its subsidiaries ("The Group") for the six months period ended 30th June 2021: Lusaka, Zambia, Zambia Consolidated Copper Mines Investments Holdings Plc, October 7. (Accessed May 17, 2022, at <https://zccm-ih.financifi.com/download/2021-half-year-financial-statement/#>.)
- Zambia Statistics Agency, 2021, 2020 Labour force survey report: Lusaka, Zambia, Zambia Statistics Agency, 120 p. (Accessed August 24, 2022, at <https://www.mlss.gov.zm/wp-content/uploads/2022/03/2020-Labour-Force-Survey.pdf>.)

TABLE 1
ZAMBIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
METALS						
Cobalt:						
Mine, Co content	990	835	379 ^r	316	247	
Refinery, metal	2,520 ³	1,613 ³	1,500 ⁴	-- ^e	--	
Copper:						
Mine, concentrates, Cu content	628,400	677,300	655,500	706,700	675,000 ^e	
Refinery:						
Primary:						
Electrowon	201,300 ^r	210,000 ^r	144,400 ^r	146,000	140,000 ^e	
Other	264,800	248,200	120,100	232,400	223,000 ^e	
Total	466,100 ^r	458,200 ^r	264,500 ^r	378,400	363,000 ^e	
Smelter, primary ⁵	787,900	828,700	638,500	750,600	720,000 ^e	
Gold, mine, Au content ⁶	kilograms	4,565	4,044	4,522	3,993	3,987
Iron and steel, raw steel ^c		54,000	75,000	75,000	50,000	50,000
Manganese, mine:						
Gross weight		131,000 ^r	159,000 ^r	257,000 ^r	186,000	270,000 ^e
Mn content ^c		58,000 ^r	70,000 ^r	113,000 ^r	82,000	120,000
Nickel, mine, concentrate, Ni content		--	--	2,500 ^r	3,226	3,834
INDUSTRIAL MINERALS						
Cement, hydraulic		2,210,307	2,751,073	2,480,000 ^e	2,796,896	2,732,013
Gemstones:						
Amethyst	kilograms	749,425	546,821	1,104,372	600,000 ^e	700,000 ^e
Beryl ^e	do.	21,000	6,600	8,300	3,400	4,500
Emerald ^c	do.	38,000	12,000	15,400	6,400	8,400
Tourmaline ^c	do.	18,000	6,000	12,000	10,000	12,000
Lime, calcined ^c	thousand metric tons	310	320	290	320	320
Stone, crushed, limestone	do.	4,122	3,413	3,310 ^e	3,150 ^e	3,500 ^e
Sulfur, compounds, sulfuric acid:						
Gross weight		594,533	593,983	700,303	793,221	1,041,490
S content, 32.6% S		193,818	193,638	228,299	258,590	339,526
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous		208,608	344,717	361,648 ^r	446,153	663,345
Petroleum, refinery	thousand 42-gallon barrels	4,287	4,670	4,839	2,573	1,000 ^e

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through June 2, 2022. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, bismuth, clays, fluorspar, lead, palladium, platinum, selenium, and silver may have been produced, but available information was inadequate to make reliable estimates of output.

³Production reported by the Cobalt Institute (formerly Cobalt Development Institute), except as noted.

⁴Reported by Eurasian Resource Group.

⁵Includes low-grade electrowon.

⁶Does not include artisanal and small-scale production.

TABLE 2
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Bismuth	Chambishi Copper Smelter Co. Ltd. [China Nonferrous Metal Mining (Group) Co. Ltd., 60%, and Yunnan Copper Industry (Group) Co. Ltd., 40%]	Chambishi copper smelter, 75 km northwest of Ndola, Copperbelt Province	NA.
Cement	Amaka Cement Industries Ltd. (Sciocco Enterprises Ltd.)	Makeni cement plant, 15 km west of Lusaka, Lusaka Province	100,000.
Do.	Baudot Cement Zambia Ltd.	Plant near Lusaka, Lusaka Province	300,000.
Do.	Chilanga Cement Plc (Huaxin Cement Co. Ltd.)	Chilanga I and II plants near Lusaka, Lusaka Province	950,000.
Do.	do.	Plant in Ndola, Copperbelt Province	550,000.
Do.	Dangote Industries (Zambia) Ltd. (Dangote Cement Plc, 100%)	do.	1,500,000.
Do.	Sinoma Mpande Limestone Ltd. [China National Building Materials Co. Ltd. (CNBM)]	Chongwe cement plant, 40 km east of Lusaka, Lusaka Province	1,000,000.
Do.	Zambezi Portland Cement Ltd.	Plant in Ndola, Copperbelt Province	800,000.
Coal, bituminous	Maamba Collieries Ltd. [Nava Bharat consortium, 65%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 35%]	Siankondobo coalfield, 350 km south of Lusaka, Sinazongwe District, Southern Province	400,000.
Do.	Nkandabwe Coal Mine Ltd. [Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 100%]	Kandabwe Mine, ² near Sinazongwe, Southern Province	240,000.
Copper and cobalt:			
Ore and concentrate	Chibuluma Mines Plc [Metorex Ltd.(Jinchuan Group International Resources Co. Ltd., 100%), 85%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 15%]	Chibuluma South Mine, about 12 km west of Kitwe, Copperbelt Province	600,000 ore, which yields about 19,000 copper in concentrate.
Do.	CNMC Luanshya Copper Mines Plc [NFC Africa Mining Plc, 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20%]	Baluba Center underground mine, ² Luanshya, Copperbelt Province	1,500,000 ore.
Do.	do.	Luanshya North Mine, Luanshya, Copperbelt Province	4,500,000 ore.
Do.	do.	Luanshya slag recovery from tailings, Luanshya, Copperbelt Province	500,000 slag, which yeilds 3,500 copper in concentrate.
Do.	Kalumbila Minerals Ltd. (First Quantum Minerals Ltd, 100%)	Sentinel Mine, Northwestern Province	57,000,000 ore.
Do.	Kansanshi Mining Plc [First Quantum Minerals Ltd., 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20%]	Kansanshi Mine, north of Solwezi, Northwestern Province	14,000,000 sulfide ore, 8,800,000 oxide ore, 8,600,000 mixed ore.
Do.	Konkola Copper Mines Plc (KCM) [Vedanta Resources Plc, 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20.6%]	Chingola open pit A ² and Nchanga open pit, ² Chingola, Copperbelt Province	4,500,000 ore.
Do.	do.	Nchanga underground mine, ² Chingola, Copperbelt Province	2,800,000 ore.
Do.	do.	Konkola Mine, ² Chililabombwe, Copperbelt Province	2,400,000 ore.
Do.	do.	Fitwaola open pit, ² Chingola, Copperbelt Province	NA.

See footnotes at end of table.

TABLE 2—Continued
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Copper and cobalt:—Continued			
Ore and concentrate—Continued	Konkola Copper Mines Plc (KCM) [Vedanta Resources Plc, 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20.6%]	Reprocessing material from the TD3a, ² the TD3b, ² TD5, ² and the TD7, ² tailings dams, Chingola, Copperbelt Province	NA.
Do.	Lubambe Copper Mine Ltd. [EMR Capital, 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20%]	Lubambe copper mine, near Chililabombwe, Copperbelt Province	2,400,000 ore, which yields about 45,000 copper in concentrate.
Do.	Lumwana Mining Co. Ltd. (Barrick Gold Corp., 100%)	Lumwana Mine (Chimwungo and Malundwe pits), 20 km west of Chingola, Copperbelt Province	40,000,000 ore.
Do.	Mkushi Copper Joint Venture Ltd. (Seringa Mining Ltd., 51%, and Katanga Resources Ltd., 49%)	Mkushi heap leach facility, Central Province	NA.
Do.	NFC Africa Mining Plc [China Nonferrous Metal Mining (Group) Co. Ltd., 85%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 15%]	Chambishi Main Mine, 75 km northwest of Ndola, Copperbelt Province	2,145,000 ore, which yields about 50,000 copper in concentrate.
Do.	do.	Chambishi West Mine, 75 km northwest of Ndola, Copperbelt Province	990,000 ore.
Do.	Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH)	Nkana Mine, includes the Central the Mindola North, the Mindola Sub-Vertical, and the South Ore Body shafts for underground operations, and the Area A, the Area E, and the Mindola open pits, southwest of Kitwe, Copperbelt Province	5,500,000 ore.
Do.	do.	Mfulira Mine, Mfulira, Copperbelt Province	2,500,000 ore.
Metal	Chambishi Metals Plc [Eurasian Resources Group, S.a.r.l. (ERG), 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 10%]	Chambishi cobalt plant, 75 km northwest of Ndola, Copperbelt Province	55,000 copper cathode, 6,800 cobalt metal.
Do.	Chambishi Copper Smelter Co. Ltd. [China Nonferrous Metal Mining (Group) Co. Ltd., 60%, and Yunnan Copper Industry (Group) Co. Ltd., 40%]	Chambishi copper smelter, 75 km northwest of Ndola, Copperbelt Province	250,000 copper anode (blister copper).
Do.	CNMC Luanshya Copper Mines Plc [NFC Africa Mining Plc, 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20%]	Muliashi leach plant, Luanshya, Copperbelt Province	40,000 copper cathode.
Do.	Jubilee Metals Group Plc	Sable copper leach and electrowinning plant at Kabwe, Copperbelt Province	14,000 copper cathode, 600 cobalt carbonate.
Do.	Kansanshi Mining Plc [First Quantum Minerals Ltd., 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20%]	Kansanshi smelter, north of Solwezi, Northwestern Province	340,000 copper cathode.
Do.	Konkola Copper Mines Plc (KCM) [Vedanta Resources Plc, 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM–IH), 20.6%]	Nchanga tailings leach plant ² at Chingola, Copperbelt Province	80,000 copper cathode.
Do.	do.	Nchanga copper smelter, ² Chingola, Copperbelt Province	311,000 copper anode (blister copper), 3,000 copper-cobalt alloy.
Do.	do.	Nkana copper refinery, ² Kitwe, Copperbelt Province	300,000 copper cathode.

See footnotes at end of table.

TABLE 2—Continued
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Copper and cobalt:—Continued				
Metal—Continued		Sino-Metals Leach Zambia Ltd. [China Nonferrous Metals Mining (Group) Co. Ltd., Sino-Africa Mining Investments Ltd., NFC Africa Mining Plc, and China Hainan Construction Co. Ltd.]	Chambishi plant, 75 km northwest of Ndola, Copperbelt Province	8,000 copper cathode.
Do.		do.	Mwambashi Mine, Kalulushi, Copperbelt Province	600,000.
Do.		Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH)	Mufulira West heap-leach facility, Mufulira, Copperbelt Province	NA.
Do.		do.	Mufulira (ISASMELT) smelter, ³ Copperbelt Province	200,000 copper anode.
Do.		do.	Mufulira refinery, Copperbelt Province	275,000 copper cathode.
Do.		do.	Nkana solvent extraction plant, southwest of Kitwe, Copperbelt Province	15,000 copper cathode.
Do.		do.	Nkana cobalt plant, ² southwest of Kitwe, Copperbelt Province	2,800 cobalt metal.
Fluorspar		ZamFluorspar Ltd.	Mine, 80 km southeast of Mazabuka, Southern Province	10,000.
Gemstones:				
Amethyst		Artisanal miners	Various locations	NA.
Do.		Kariba Minerals Ltd. [Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 100%]	Kariba Mine, Mapatizya area, Kolomo District, Southern Province	1,100.
Beryl and emerald		Artisanal miners	Various locations	NA.
Do.		Grizzly Mining Ltd.	Lufwanyama Mine, Copperbelt Province	NA.
Do.	kilograms	Kagem Mining Ltd. [Hagura Mining Ltd. (Gemfields Group Ltd., 100%), 75%, and Government, 25%]	Kagem Mine, Ndola District, Copperbelt Province	7,300.
Do.		do.	Mbuva-Chibolele, Kafubu, Copperbelt Province	NA.
Tourmaline		Artisanal miners	Various locations	NA.
Gold, Au content of ore		do.	do.	NA.
Do.	kilograms	Consolidated Gold Co. Ltd. of Zambia (CGCZ) [Karma Mining Services and Rural Development Co., 55%, and Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 45%]	10 milling plants, various locations	90.
Do.	do.	Kansanshi Mining Plc [First Quantum Minerals Ltd., 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20%]	Kansanshi Mine, north of Solwezi, Northwestern Province	5,300.
Iron and steel, crude steel		Universal Mining and Chemical Industries Ltd. (Trade Kings Group)	Facility in Kafue, Lusaka Province	100,000.
Lime, quicklime		Ndola Lime Co. Ltd. [Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 100%]	Plant in Ndola, Copperbelt Province	300,000. ⁴
Do.		Neelkanth Lime Ltd.	Plant near Ndola, Copperbelt Province	144,000. ⁵
Limestone		Dangote Quarries (Zambia) Ltd. (Dangote Cement Plc, 100%)	Quarry in Ndola, Copperbelt Province	NA.
Do.		Ndola Lime Co. Ltd. [Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 100%]	do.	NA.
Manganese		Chi Metal Co.	Serenje processing plant, Central Province	18,000.

See footnotes at end of table.

TABLE 2—Continued
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Manganese—Continued		Green Core Enterprises	Mine in Mansa area, Luapula Province	240,000.
Do.		Kabundi Resources Ltd. [Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 100%]	Serenje Mine, Central Province	240,000.
Do.		Liaoning San He Mining Investment Co. Ltd.	Kampumba and Kabanga Manganese Mines in Kapiri, Central Province	10,000.
Do.		Small-scale miners and artisanal miners	Mines in Mansa area, Luapula Province and Mkushi area, Central Province	120,000.
Nickel, Ni content of ore		Consolidated Nickel Mines Ltd.	Munali Mine, about 70 km south of Lusaka, Lusaka Province	4,500.
Petroleum, refined	42-gallon barrels	Indeni Petroleum Refinery Ltd. (Government, 100%)	Indeni refinery at Ndola, Copperbelt Province	9,000,000.
Sulfur:				
	Pyrite ore, gross weight	Konkola Copper Mines Plc (KCM) [Vedanta Resources Plc, 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Nampundwe Mine, ² 48 km west of Lusaka, Lusaka Province	300,000.
	Sulfuric acid, gross weight	do.	Nchanga acid plant ² in Chingola, Copperbelt Province	675,000.
Do.		Chambishi Copper Smelter Co. Ltd. [China Nonferrous Metal Mining (Group) Co. Ltd., 60%, and Yunnan Copper Industry (Group) Co. Ltd., 40%]	Chambishi copper smelter, 75 km northwest of Ndola, Copperbelt Province	600,000.
Do.		Kansanshi Mining Plc [First Quantum Minerals Ltd., 80%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20%]	Kansanshi smelter, north of Solwezi, Northwestern Province	1,000,000.

Do., do. Ditto. NA Not available.

¹Abbreviations used for units of measure in this table are as follows: km—kilometer

²Operations suspended. Facility on care-and-maintenance status.

³Smelter shutdown during the second half of 2019 for planned maintenance.

⁴Plant has the capacity to produce up to 5,000 metric tons per year of hydrated lime (slaked) from quicklime.

⁵Plant has the capacity to produce up to 27,000 metric tons per year of hydrated lime.