



2010 Minerals Yearbook

GHANA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF GHANA

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Ghana was among the world's top 10 producers of gold and was ranked 13th among the world's leading producers of diamond, by volume. Other mineral commodities produced in the country included manganese, salt, and silver (George, 2011; Kimberley Process Rough Diamond Statistics, 2011).

Minerals in the National Economy

Ghana's mineral sector, which grew by 10.4% in 2010, was a major contributor to Government revenues and accounted for about 11% of fiscal receipts by the Internal Revenue Service. Gold, in particular, accounted for more than 80%, by value, of the total income from the mineral sector. About 20,000 Ghanaian nationals were directly employed in large-scale mining, 6,000 were employed in providing services to the mineral sector, and about 500,000 were employed in small-scale mining of diamond, gold, and industrial minerals for the construction sector (Ministry of Finance and Economic Planning, 2010, p. 5; 2011, p. 76; African Economic Outlook, 2011, p. 6, 10).

Government Policies and Programs

The legislative framework for the mineral sector in Ghana is provided by the Minerals and Mining Act (703) of 2006. In March, the Government amended section 25 of this law to allow for the establishment of a fixed 5% royalty rate on total revenues earned from minerals by all companies holding a mining license in Ghana. The former section 25 of the law allowed for a royalty rate not to exceed 6% but to be no less than 3% of a company's gross revenues. In Ghana, all minerals are owned by the state. In the metals sector, reconnaissance licenses may be granted for an initial period not to exceed 12 months and may be extended only once for a period not to exceed an additional 12 months. A prospecting license may be granted for an initial period not to exceed 3 years and may be extended only once for a period not to exceed an additional 3 years. Upon the expiration of a reconnaissance or prospecting license, the holder may apply for a mining lease. A mining lease may be granted for an initial term not to exceed 30 years and may be extended only once for a period not to exceed an additional 30 years. The Government is entitled to a free-carried equity interest of 10% in all mineral ventures (Parliament of the Republic of Ghana, 2006, p. 12–23; Ministry of Finance and Economic Planning, 2010, p. 85).

In the industrial minerals sector, reconnaissance and prospecting licenses and mining leases may be granted only to Ghanaian citizens unless the proposed investment exceeds \$10 million. Small-scale mining licenses are also reserved only for Ghanaian citizens and are granted for a period not to exceed 5 years; upon the expiration of the license, it may be renewed for a period to be determined by the Minerals Commission (Parliament of the Republic of Ghana, 2006, p. 36–40).

Production

Gold production, which excluded production from small-scale and artisanal mining, decreased by about 4% to 76,332 kilograms (kg) compared with 79,883 kg produced in 2009. Cement production increased by 33% to 2.4 million metric tons (Mt), mined manganese production increased by 20% to 420,000 metric tons (t), and diamond production decreased by 11% to 334,000 carats. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Ministry of Lands and Natural Resources (MLNR), through the Geological Survey Department (GSD), the Minerals Commission, and the Precious Minerals Marketing Co. Ltd. (PMMC), oversees all aspects of Ghana's mineral sector. The GSD is responsible for providing reliable and up-to-date geologic information and serves as the repository of the country's geoscientific data. The Minerals Commission is responsible for regulating and managing the use of Ghana's mineral resources and for coordinating Government policy related to them. Through its Inspectorate Division, the Minerals Commission institutes and enforces environmental, health, and safety standards in the country's mines and ensures that mining companies and all mining-related activities comply with Ghana's Mining and Mineral law. The PMMC is responsible for marketing the country's precious minerals and jewelry industry. The National Petroleum Authority is the Government agency responsible for overseeing, monitoring, and regulating the activities of the downstream petroleum industry. Ghana National Petroleum Corp. (GNPC) is the Government-owned petroleum company that is in charge of the exploration for and the development and production of petroleum (Ministry of Lands and Natural Resources, 2011).

Mineral Trade

The Ministry of Trade and Industry (MOTI), through the Ghana Export Promotion Authority (GEPA) is responsible for the facilitation, development, and promotion of Ghanaian exports. In 2009 (the latest year for which data were available), Ghana was the United States' 96th ranked goods trading partner, and goods traded between the two countries were valued at about \$831 million. Ghana was the United States' 79th ranked goods export market and the 114th ranked supplier of imported goods. The U.S. trade surplus with Ghana was \$581 million in 2009, which represented a 50.4% increase from that of 2008. Ghana's exports were dominated by gold and cocoa, which accounted for about 41% and 24% of total exports, respectively. Ghana's exports to the United States were valued at \$273 million in 2010 compared with about \$135 million in

2009 and \$222 million in 2008; \$24 million of this export value was from petroleum products; \$18.2 million, gold; \$5 million, miscellaneous nonferrous metals (not described); and only \$4,000, gem-quality rough diamond. Total imports from the United States were valued at about \$983 million in 2010 compared with about \$716 million in 2009 and \$608 million in 2008. This included nearly \$281 million for petroleum products; \$69.4 million for excavating machinery; \$59.8 million for drilling and oilfield equipment; and \$662,000 for specialized mining equipment. Ghana was a member of the World Trade Organization and the Economic Community of West African States (U.S. Census Bureau, 2010a, b; Office of the United States Trade Representative, 2010; African Economic Outlook, 2011, p. 10).

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—In February, Bosai Minerals Group Co. Ltd. of China acquired Rio Tinto Alcan Inc.'s 80% interest in Ghana Bauxite Company Ltd. (GBCL). GBCL was the company that operated the Awaso Mine, which was Ghana's only bauxite operation. Later in the year, Bosai signed a memorandum of understanding with the Government to invest more than \$1.2 billion in the construction and development of a new alumina refinery, which will process refractory-grade bauxite. The refinery was expected to be completed by 2014. In addition to the construction of the refinery, Bosai planned to increase its bauxite production capacity to 1.5 million metric tons per year (Mt/yr) by 2011. Bauxite production in 2010 was reported to be 512,000 t. An exploration campaign for Awaso was also to be carried out by the company in collaboration with the Sichuan Metallurgical Geology Bureau. The Government of Ghana continued to hold the remaining 20% interest in the Awaso Mine (Bosai Minerals Group Co. Ltd, 2010; Mingle, 2010; Rio Tinto Alcan Inc., 2010).

Ghana's only aluminum smelter, which was located in Tema, continued to remain closed throughout the year. In 2008, the Government had become the sole owner of the smelter when it acquired Pittsburg-based Alcoa Inc.'s 10% stake in Volta Aluminum Company Ltd. (VALCO) for \$2 million. Before the Government's purchase, the smelter had been struggling with fluctuating operating levels, mostly owing to restricted power allocations from the Volta River Authority hydroelectric plant because of low water levels in the Volta River. Then, in 2009, the Government announced that although favorable rainfall patterns in 2008 and 2009 had seen the water level at the Akosombo Dam rise, it was unable to reopen the smelter owing to the effects of the global financial crisis on the price and demand for aluminum worldwide. The Government, however, announced that VALCO, which operated the smelter, was in negotiations with various power utility companies concerning the necessary power requirements and relevant tariff regime that would be incurred in restarting the smelter. The Government announced that it expected the smelter to be operational by 2011 following the conclusion of negotiations with these power companies (Kpodo, 2010).

Gold.—Adamus Resources Ltd. of Australia, through its subsidiary Adamus Resources Limited (Ghana), was in the process of completing the development of a new gold mine in the Nzema East municipal district. The mine, which was to be located about 280 kilometers (km) west of the capital city of Accra, was expected to pour its first gold in 2011. Adamus envisioned an average annual production rate of 3,100 kg (reported as 100,000 troy ounces) during the mine's first 5 years of operation. The mine, which would be developed as an open pit mine, would include a conventional carbon-in-leach plant with the capacity to process 2.1 Mt/yr of ore and was expected to have a mine life of at least 10 years. Measured and indicated resources were reported to be 30.2 Mt at a grade of 1.78 grams per metric ton (g/t) gold, and inferred resources were reported to be 6.98 Mt at a grade of 1.62 g/t gold (Adamus Resources Ltd., 2011, p. 4–7).

AngloGold Ashanti Ltd. of South Africa held 100% ownership in the Iduapriem and the Obuasi gold mines. Iduapriem, which is located about 70 km north of the City of Takoradi, was an open pit mine and included a carbon-in-pulp processing plant. The mine produced 5,754 kg of gold during the year compared with 5,910 kg in 2009. The 3% decrease in production was mainly the result of a two-and-one-half-month suspension of operations early in the year because the company had reached capacity levels at the mine's tailings storage facility. To correct the problem, the company identified an interim location for the storage of tailings and announced plans to build a new tailings storage facility by the first half of 2011. AngloGold Ashanti also planned to evaluate the low-grade mineral resources that lay beneath the Iduapriem Mine's surface operations to determine the feasibility of developing an underground mine. The company expected to increase production at Iduapriem to between 5,800 and 6,200 kg in 2011 (AngloGold Ashanti Ltd., 2011, p. 54, 84–86, 168).

Production at AngloGold Ashanti's Obuasi underground mine decreased by 17% to 9,860 kg from 11,900 kg produced in 2009. The decrease in production was attributed to a decrease in underground recoverable tonnage and the shutdown of the mine's tailings treatment plant, as well as other inefficiencies in the processing of ore. The Obuasi Mine is located in southern Ghana about 60 km south of Kumasi. Production for 2011 was expected to be between 9,400 and 9,700 kg (AngloGold Ashanti Ltd., 2011, p. 86–88).

Gold Fields Ltd. of South Africa held a 71.1% interest in the Damang Mine and in the Tarkwa Mine in joint venture with IAMGOLD Corp. and the Government of Ghana, which held an 18.9% interest and a 10% interest, respectively, in each mine. Production from the Damang Mine, which is located in southwestern Ghana about 360 km west of Accra, increased by 12% during the year to 7,092 kg from a revised 6,314 kg produced in 2009. The increase in production was the result of the processing of higher grade ore and the installation of a new secondary crusher, which helped optimize throughput volumes. The Damang Mine was expected to produce between 6,800 kg and 7,800 kg in 2011 (Gold Fields Ltd., 2011, p. 65, 109; IAMGOLD Corp., 2011, p. 70).

The company's Tarkwa Mine, which is located in southwestern Ghana about 300 km west of Accra, produced a

total of 22,861 kg, which represented an 11% increase from production in 2009. The Tarkwa Mine comprised several open pits, including the North (Tarkwa) and the South (Teberebie) heap-leach operations, and a carbon-in-leach plant. Production for 2011 was expected to be between 22,400 kg and 23,600 kg (Gold Fields Ltd., 2011, p. 108; IAMGOLD Corp., 2011, p. 66).

Production of gold at the Bogoso/Prestea Mine, which was 90% owned by Golden Star Resources Ltd., decreased by about 8% to 5,318 kg compared with 5,787 kg in 2009. The decrease in production was attributed to increased rainfall, which forced the company to process higher quantities of lower grade and lower recovery transitional ore and precluded it from mining new pits containing higher grade ore. Golden Star planned to improve recoveries at the Bogoso/Prestea Mine by the second half of 2011 by mining deeper sulfide ores and by reprocessing tailings from Bogoso. The reprocessing of tailings was expected to add about 1,200 kg of gold to Bogoso/Prestea's production in 2011. Golden Star also owned a 90% interest in the Wassa open pit gold mine through its subsidiary Golden Star (Wassa) Ltd. (GSWL). The Wassa Mine produced 5,721 kg in 2010 compared with 6,962 kg in 2009, which was a nearly 18% decrease in production. The company expected to produce about 5,700 kg from the Wassa Mine in 2011 (Golden Star Resources Ltd., 2011, p. 1–4, 26–27).

Production of gold from the Ahafo Mine increased slightly to 16,951 kg from a revised 16,547 kg in 2009. The mine, which was wholly owned by Colorado-based Newmont Mining Corp., is located in Ghana's Brong Ahafo region about 290 km northwest of the capital city of Accra. In addition to the Ahafo Mine, Newmont held a 100% interest in the Akyem project, which is located in Ghana's Eastern region about 180 km northwest of Accra. The mining license for the development of an open pit mine and related infrastructure at Akyem was granted to Newmont in January. The development of a mine at Akyem would require the rehabilitation of a 2.75-km section of the New Abirem to Ahausena road and the upgrade of a power line extending from Nkawkaw to the proposed mine site. Once the mine becomes operational, it was expected to have the capacity to process about 8.5 Mt/yr of ore for a period of 15 years and to produce a total of about 239,000 kg of gold (Newmont Mining Corp., 2010, p. 9–11; 2011, p. 28, 62).

Kinross Gold Corp. of Canada held a 90% interest in the Chirano gold mine, which is located about 100 km from Kumasi in southwestern Ghana. The company acquired the rights to the Chirano Mine after completing its merger with Red Back Mining Inc. in September. The Chirano Mine produced a total of 2,775 kg during the year (Kinross Gold Corp., 2010; 2011, p. 61).

In July, Signature Metals Ltd. of Australia obtained a 13-year mining license extension for the redevelopment of the Konongo Mine. The mine, which was closed in 1997, was scheduled to be reopened by the first quarter of 2011 and to produce about 3,100 kilograms per year of gold. The Konongo Mine is located 200 km northwest of Accra and was 70% owned by Signature Metals and 30% owned by the Government (Avery, 2010; Signature Metals Ltd., 2010a; 2010b, p. 1–4).

Other companies engaged in gold exploration in the country included Arizona-based Sunergy Inc.; Australian companies Adamus Resources Ltd., Azumah Resources Ltd., Castle

Minerals Ltd., Noble Resources Ltd., Perseus Mining Ltd., and Viking Ashanti Ltd.; Canadian companies Keegan Resources Inc., Midlands Minerals Corp., Pelangio Exploration Inc., and PMI Gold Corp.; and Channel Islands [United Kingdom]-registered GoldStone Resources Ltd.

Industrial Minerals

Cement.—Hydraulic cement was produced by Ghana Cement Company Ltd. (GHACEM) from two clinker grinding plants, which were located in Takoradi and Tema. In 2010, GHACEM, which produced cement at full capacity (2.4 Mt/yr) at its two plants, planned to increase the plants' combined production capacity to 3.4 Mt/yr by 2012. This would be achieved by increasing the production capacity at its Tema plant by 1 Mt/yr. The demand for cement in Ghana far exceeded the country's production capacity. Ghana's untapped cement market potential was estimated to be 3 Mt/yr. GHACEM sourced limestone locally for the manufacturing of cement but it imported clinker and gypsum from abroad (World Cement, 2011).

Diamond.—The majority of Ghana's diamond production was from small-scale and artisanal miners who operated in the Bonsa River valley near the town of Tarkwa, and in the Birim River valley between the towns of Akwatia and Oda. Other small diamond occurrences had been reported elsewhere throughout the country. All diamond production in Ghana was from secondary deposits, and there were no known diamondiferous kimberlites in the country. Artisanal and small-scale miners were either galamseys or tributers. Galamseys are unregistered small-scale and artisanal miners that have been licensed by the Minerals Commission to mine on Government-owned land that is either sold or leased to them. Tributers are artisanal miners that have been licensed by Government-owned Ghana Consolidated Diamonds Ltd. to operate on the company's concessions within areas that are not suitable for large-scale production. The total number of people engaged in artisanal and small-scale mining in Ghana was unknown. As of March 2009, the total number of registered artisanal and small-scale miners was 6,420. The Minerals Commission was still in the process of registering these diamond workers (Chirico and others, 2010, p. 4–7, 11–13).

The only formal commercial diamond production in the country was from a placer mine in Akwatia, which until 2007 had been operated by Government-owned Ghana Consolidated Diamonds Ltd. (GCD). GCD was closed in September 2007 reportedly owing to lack of capital, an obsolete plant, and inadequate machinery to sustain production. As of yearend, however, the Government continued with its quest to find a suitable investor to take over GCD's operation. Balaji Ltd., Great Consolidated Diamond Ltd., and Jowac Company Ltd. were the three diamond companies shortlisted by the Government. A decision for the takeover of GCD's operation was to be made in 2011 (Ghana News Agency, 2010).

Mineral Fuels

Petroleum.—In December, Texas-based Anadarko Petroleum Corp. and its joint-venture partners achieved first oil production

from the Jubilee field offshore Ghana. Production capacity at the Jubilee field was reported to be about 45,000 barrels per day (bbl/d) of oil equivalent and was expected to increase to 120,000 bbl/d of oil equivalent in 2011. As of yearend, the partners had completed the installation and commissioning of a production, storage, and offloading vessel and drilled a total of 16 wells. Another well was scheduled to be drilled in 2011. Petroleum from Ghana was sold as high-quality crude petroleum, under the name of Jubilee crude oil, to refineries around the world for the production of diesel, gasoline, and jet fuel. Anadarko and Texas-based Kosmos Energy LLC each held a 23.49% interest in the Jubilee field. The other joint-venture partners were Tullow Oil plc, which held a 34.71% interest; Ghana National Petroleum Corp. (GNPC), which held a 13.75% interest; and Sabre Oil & Gas Holdings Ltd. and E.O. Group Ltd., which held a 2.81% and a 1.75% interest, respectively (Anadarko Petroleum Corp., 2011, p. 8)

Ghana's legislation directly governing the oil and gas sector included the Energy Commission Act, the Environmental Protection Agency Act, the Ghana National Petroleum Corporation Law (PNDC Law 64), the National Petroleum Authority Act, the Oil in Navigable Waters Act, the Petroleum (Exploration and Production Law, 1984 (PNDC Law 84), and the Petroleum Income Tax Law, (P.N.D.C.L 188). Despite having a number of institutions capable of handling matters of public policy in the petroleum sector, there were concerns regarding the suitability of key provisions within the country's drafting of new petroleum legislation, in particular that of the Local Content and Participation Policy Framework, the Petroleum (Exploration and Production) Bill, the Petroleum Regulatory Authority Bill, and the Petroleum Revenue Management Bill, which were under review as of yearend (Ayine, 2010, p. 4–10, 32–36).

Outlook

Following the discovery of petroleum in 2007 and the commencement of petroleum production in 2010, the transition to a petroleum producing and exporting economy would represent an important step in the future development of Ghana's mineral industry. Despite the emerging importance of petroleum to the country's economy, in the short run petroleum is not likely to displace gold as Ghana's leading mineral export earner. Ghana owns shares and carried interest in a number of gold mining companies, which enables the Government to receive significant cash flows from royalties and dividends. In recent years, the country has benefitted from the increase in the demand for gold and in the international price of gold. Despite the importance of gold to the Government's finances, the prospect of a new oil province in the West African transform margin, which is an area that extends nearly 1,500 km along the coast from eastern Ghana to the west of Sierra Leone, is likely in the long run to cause the Government to shift its priorities from the nonfuel mineral sector to the fuel sector (Petroleum Economist, 2009).

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TABLE 1
 GHANA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²		2006	2007 ^e	2008 ^e	2009 ^e	2010
Bauxite, gross weight		886	748 ³	796 ³	490 ^r	512 ³
Cement, hydraulic ^{e,4}		1,800	1,800	1,800	1,800	2,400
Diamond ⁵	thousand carats	973	895	643	376	334
Gold, mine output, Au content	kilograms	69,817 ⁶	72,209 ³	72,980 ^{3,6}	79,883 ^{3,6}	76,332 ^{3,7}
Manganese:						
Ore, processed		1,659	1,173 ³	1,261 ³	1,013 ^{3,r}	1,194 ³
Mn content ^e		580	410	440	350	420
Petroleum refinery products ^e	thousand 42-gallon barrels	16,000	16,000	16,000	16,000	16,000
Salt		123	124	239	250 ^r	250 ^e
Silver, Ag content of exported dore	kilograms	3,142	3,300	3,200	3,928 ³	4,000 ^e
Steel, secondary, rebar ^e		25	--	-- ³	--	--

^eEstimated; estimated data are rounded to no more than three significant digits. ^rRevised. -- Zero.

¹Table includes data available through December 22, 2011.

²In addition to the commodities listed, a variety of crude construction materials (clays, lime, limestone, sand and gravel, and stone) are produced. Output of these commodities is not reported, however, and information is inadequate to make reliable estimates of output.

³Reported figure.

⁴All from imported clinker.

⁵Reported by Kimberley Process Certification Scheme.

⁶Excludes artisanal and small-scale mining output.

⁷Excludes artisanal and small-scale output, which in 2010 was reported to be more than 20% of the country's total production.

TABLE 2
GHANA: STRUCTURE OF THE MINERAL INDUSTRY IN 2010

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	thousand metric tons	Volta Aluminum Co. Ltd. (VALCO) (Government, 100%)	Aluminum smelter at Tema (on care and maintenance)	200.
Bauxite	do.	Ghana Bauxite Company Ltd. (GBCL) (Bosai Minerals Group Co. Ltd., 80%, and Government, 20%)	Bauxite mine at Awaso	600.
Cement	do.	Ghana Cement Company Ltd. (GHACEM) (HeidelbergCement AG, 93.1%)	Clinker grinding plant at Takoradi	1,200.
Do.	do.	do.	Clinker grinding plant at Tema	1,200.
Do.	do.	Diamond Cement Ghana Ltd.	Cement plant at Aflao; uses imported clinker	600.
Do.	do.	Savanna Cement Company Ltd. (SAVACEM) and Diamond Cement Ghana Ltd.	Town of Buipe, Central Gonja District	350. ¹
Diamond	thousand carats	Ghana Consolidated Diamonds Ltd. (GCD) (Government, 100%)	Placer mine at Akwatia, Birim Valley	360.
Do.	do.	Artisanal diamond miners	Birim Valley	500 to 900.
Gold	kilograms	AngloGold Ashanti Ltd., 100%	Obuasi surface and underground mine, 60 kilometers south of Kumasi	17,000.
Do.	do.	do.	Iduapriem Mine, 70 kilometers north of Takoradi	8,800.
Do.	do.	Investec Bank, 100%	Bibiani Mine, 250 kilometers northwest of Accra	3,400.
Do.	do.	Golden Star (Bogoso/Pretea) Ltd. (Golden Star Resources Ltd., 90%, and Government, 10%)	Bogoso/Pretea open pit mine, 300 kilometers west of Accra	7,300.
Do.	do.	Golden Star (Wassa) Ltd. (GSWL) (Golden Star Resources Ltd., 90%, and Government, 10%)	Wassa Mine, 30 kilometers northwest of Tarkwa	7,000.
Do.	do.	Gold Fields Ltd., 71.1%; IAMGOLD Corp., 18.9%; Government, 10%	Tarkwa open pit mine and carbon-in-leach and heap-leach plants, 300 kilometers west of Accra	21,800.
Do.	do.	do.	Damang Mine and carbon-in-leach plant, 360 kilometers west of Accra	6,000.
Do.	do.	Newmont Mining Corp., 100%	Ahafo Mine, 290 kilometers northwest of Accra, Brong Ahafo region	17,100.
Do.	do.	Chirano Gold Mine Ltd. (Kinross Gold Corp., 90%, and Government, 10%)	Chirano Mine, 100 kilometers from Kumasi, southwestern Ghana	8,000.
Do.	do.	do.	do.	3,800.
Do.	do.	Artisanal gold miners	Throughout Ghana	4,000 to 8,000.
Limestone and lime	metric tons	Carmeuse Lime Products (Ghana) Ltd. (Carmeuse SA)	Takoradi	NA.
Manganese ore	thousand metric tons	Ghana Manganese Company Ltd. (Ghana International Manganese Co., 90%, and Government, 10%)	Open pit mine at Nsuta-Wassaw Western region	1,500.
Petroleum, crude	thousand barrels	Tullow Oil plc, 34.71%; Anadarko Petroleum Corp., 23.49%; Kosmos Energy LLC, 23.49%; Ghana National Petroleum Corp. (GNPC), 13.75%; Sabre Oil & Gas Holdings Ltd., 2.81%; E.O. Group Ltd., 1.75%	Jubilee oilfield, offshore	16,400.
Petroleum products	do.	Tema Oil Refinery (Government, 100%)	Refinery at Tema	16,425.
Salt	metric tons	Panbros Salt Industry Ltd.	Salt pan at Mendskrom, near Accra	250,000.
Do.	do.	Elmina Salt Producers Association	Artisanal salt pan mining near Elmina	NA.

Do., do. Ditto. NA Not available.

¹Under construction.