



2008 Minerals Yearbook

CAMEROON AND CAPE VERDE

THE MINERAL INDUSTRIES OF CAMEROON AND CAPE VERDE

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CAMEROON

Cameroon has significant mineral resources of bauxite, cobalt, iron ore, nickel, and uranium. Mining of these resources, however, was limited. Other mineral deposits included cassiterite, marble, mica, lignite, rutile, and tantalite. Considerable development of the country's mining infrastructure would be required to exploit these resources.

All mineral resources belong to the state. Prospecting, exploration, and mining activities for any mineral deposit are regulated by permit. The Ministère de l'Eau et de l'Énergie (Ministry of Water and Energy) is responsible for the administration of the mineral industry in accordance with the Mining Law of 2001 and the Petroleum Code of 2000.

In 2008, the following five companies had active exploration programs: African Aura Resources Ltd. of the United Kingdom (gold), Geovic Cameroon plc of Canada (cobalt-manganese-nickel), Hydromine Inc. of the United States (iron ore), Mega Uranium Ltd. of Canada (uranium), and Sundance Resources Ltd. of Australia (iron ore). In 2008, the Government began planning for a new port, a hydroelectric plant, and railway projects (U.S. Department of State, 2008).

The mining sector had not been a priority of the Government in the past; however, that appeared to be changing in 2008. The Government was attracting new investors that it hoped would invest \$10 billion in the mineral sector during the next few years. The Government revised its Mining Law of 2001 which, starting in 2008, would give investors new incentives, such as a 5-year tax break and free transfer of capital out of the country (Musa, 2008a).

Production

In 2008, the petroleum sector continued to be the most significant segment of Cameroon's mineral industry, and petroleum products were the main export items. Other mineral commodities produced in the country were aluminum (from alumina imported from Guinea), cement, and sand. Small-scale artisanal miners recovered diamond throughout the country. Gold was also recovered by small-scale artisanal miners in the eastern and northern parts of the country from alluvial and elluvial deposits. A variety of industrial minerals and other construction materials, such as aggregates, gypsum, and stone, were also produced for local consumption.

Structure of the Mineral Industry

The mineral industry of Cameroon was modest in size and mostly privately owned. The major mineral producers were Cimenteries du Cameroun (cement), Société Nationale de

Raffinage (SoNaRa) (petroleum), and Compagnie Camerounaise de l'Aluminium (aluminium). SoNaRa was 66% owned by the Government and the remaining interest was owned by several petroleum companies. Table 2 is a list of the major mineral industry facilities.

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—Three companies—Dubai Aluminum Co. Ltd. of the United Arab Emirates, Hindalco Industries of India, and Hydromine Inc. of the United States—signed a joint-venture agreement to develop a bauxite and alumina complex and a railway line that would link the complex to the Port of Douala. Cameroon Alumina Ltd. (CAL) would be the operating company to exploit the 1.2-billion-metric-ton (Gt) bauxite deposit near Ngaoundere.

The plant was expected to start up in the next 2 to 5 years at a cost of \$5 to \$6 million and would process the ore from the bauxite deposits at Minim-Martap and Ngaoundal in Adamawa Province. The Government stated that Cameroon had estimated bauxite reserves of about 1.2 Gt. Major infrastructure works would be required by the Government, including construction of 1,000 kilometers (km) of road to link the Minim-Martap and the Ngaoundal deposits to the coast (Musa, 2008b).

Whinnen Resources Ltd. of Australia announced that it had acquired an 85% interest in the 9,160-square-kilometer (km²) Fongo Tongo property as part of its acquisition of the Yekani Mining Co. (Cameroun) S.A. of South Africa. The remaining 15% interest was held by local investors. The project was estimated to have probable reserves of 34 million metric tons (Mt) of bauxite at a grade of 47% aluminum trioxide (Al₂O₃). The project is located 14 km northwest of Dschang and was considered to be a high-grade deposit relative to other deposits around the world (Mukumbira, 2008).

Cobalt.—Geovic Cameroon plc [GeoCam] (a subsidiary of Geovic Mining Corp. of the United States) had the following seven near-surface cobalt and nickel deposits in Cameroon: the Kondong, the Mada, the Messea, the Nkamouna, the North Mang, the Rapodjombo, and the South Mang. GeoCam was planning to start mining cobalt and nickel at the Nkamouna laterite deposit possibly in late 2010. Nkamouna would be GeoCam's first deposit to be developed. Nkamouna's estimated proven and probable reserves were 54.7 Mt at average grades of 0.25% cobalt and 0.69% nickel. This reserve was expected to yield about 11.7 Mt of concentrates grading 0.74% cobalt and 0.99% nickel. Mining would be by open pit, and processing would be by atmospheric leaching after crushing, washing, and screening to upgrade the ore (Geovic Mining Corp., 2008).

The Mada deposit is an extension of the adjoining Nkamouna deposit and was to be the second of the seven properties to be developed. The purpose of drilling out Mada was to determine if it contains additional high-grade reserves for utilization at the planned Nkamouna processing plant and to provide additional resources to significantly increase production if supported by market conditions. The deposit has very similar geologic properties and ore grades to the Nkamouna deposit and has estimated inferred resources of 145 Mt of cobalt (Market Watch, 2008).

Gold.—African Aura Resources Ltd. of Australia was continuing with license acquisition and exploration in 2008. Exploration included the Batouri project in eastern Cameroon where it reported further high-grade intersections by its diamond drilling program. Twenty-nine drill holes on the Kambe trend intersected 2.7 meters (m) of material grading 65.9 grams per metric ton (g/t) gold and 1.5 m grading 43.3 g/t gold. Kambe is 3.5 km in length and, in places, up to 500-m wide. Results from Kambe in 2008 indicated good correlation between surface geochemical anomalies and potassic alteration as defined by a geophysical survey, and the presence of high-grade gold-bearing quartz veins (MBendi Information Services (Pty) Ltd., 2008a).

Drilling by Africa Aura was also underway at the Dimako prospect. African Aura had core drilled 11 holes of a planned 25-hole drilling program to test the 3.5-km-long Dimako-Mongonam shear zone. Dimako is located 7 km south of Kambe. Drilling had intersected 12.9 g/t for a distance of 2.4 m and 16.4 g/t for a distance of 1.1 m (MBendi Information Services (Pty) Ltd., 2008b).

Iron Ore.—The Government announced that China Harbor Engineering Corp. of China, Rio Tinto plc of the United Kingdom, and Sundance Resources were among the companies shortlisted to build a \$650,000 port in Cameroon. The proposed new port at Grand Batanga near Kribi would be able to take much larger vessels than the main port at Douala. The port at Douala is restricted in the size of the ships it can handle owing to its location on the sediment-filled River Wouri estuary, which requires constant dredging. The Government was aiming to attract investment in its bauxite, cobalt, iron ore, nickel, and uranium deposits in the next few years, and improved infrastructure, including ports, was a key part of the drive. The new port would be linked by road and rail to mining projects under development in the interior (Creamer Media (Pty) Ltd., 2008).

Sundance Resources continued with planning efforts in 2008 to exploit iron ore at its \$2.5 billion Mbalam project. The ore deposit is located near the Gabon border and was expected to produce 35 million metric tons per year (Mt/yr) of iron ore during a period of 20 years. Sundance Resources announced that it had increased its estimated inferred resource to 2.2 Gt of itabirite hematite at 40% iron content at the Mbarga deposit within the Mbalam project. Itabirite hematite was preferred by steel mills for use as direct-reduction-grade feed owing to its very low alumina, phosphorus, and silica content (MBendi Information Services (Pty) Ltd., 2008c).

African Aura was continuing exploration work on the Nkout structure on the Djoum permit. A program of diamond core drilling was to be carried out in 2008 on 3 km of the structure, which was 10-km long and includes reconnaissance drilling

on 10 sites to a depth of 100 m. The aim was to confirm that the average grade of the ore at the surface was between 54% and 65% iron content. The Djoum Block covers an area of 1,000 km² and was owned by Caminex SARL (a wholly owned subsidiary of African Aura) (African Mining Intelligence, 2008).

Titanium.—Gilla Inc. of the United States announced that it had two exploration permits for rutile: the Akonolinga rutile project, known under the name of Mfoumou, and the Nanga Eboko rutile project, known as Sele. These properties are located about 100 km east of Yaounde. Extensive testing has been done by the Bureau de Recherches Géologiques et Minières (BRGM). The BRGM reported that its testing indicated an estimated resource of 3 Mt of rutile at a grade of 1%. This potential represents the world's second largest rutile deposit after Sierra Leone's (Marketwire Inc., 2008).

Industrial Minerals

Cement.—The project to build a second cement plant, to be located at Limbe, was formalized in 2008 between the Government and a consortium of companies from the United States and the Republic of Korea. An agreement was reached that defined the obligations of the parties and covered production, marketing, and research. The consortium would be named the AFKO Cement Production Co. The \$82.7 million plant was to have a capacity of 1 Mt/yr and would produce different qualities of cement, including cement for use in marine construction and the building of bridges. Construction of the plant was expected to be completed by January 2010 (Nyuylime, 2008).

Mineral Fuels and Related Materials

Petroleum.—Cameroon's petroleum reserves are located offshore in the Rio del Rey Basin, offshore and onshore in the Douala and the Kribi-Camp Basins, and onshore in the Logone-Birni Basin in the northern part of the country. The country has experienced a fairly steady decline in its domestic petroleum production during the past 20 years. The country has been well explored; however, no new discoveries have been found. As of January 2006, Cameroon had estimated proven petroleum reserves of 400 million barrels, with the majority of reserves located offshore in the Douala Kribi Basin of the Niger Delta. Cameroon's only refinery, which is located in the port city of Limbe, had a capacity to produce 45,000 barrels per day (bbl/d) and was operated by SoNaRa (U.S. Energy Information Administration, 2008).

Addax Petroleum Corp. of Canada signed a production-sharing contract (PSC) with the Government for the Iroko license area in the Gulf of Guinea. Iroko is located 30 km offshore in the Rio del Rey basin where the majority of Cameroon's production is located. Under the PSC, Addax was to undertake a work program valued at \$17.5 million in the first 3 years to acquire three-dimensional seismic data and drill one well in the 15.6-km² license area (Engineering News, 2008).

CityView Corp Ltd. of Australia announced that it planned to buy a 55,000-bbl/d refinery from Tagore Investments S.A. of the United Kingdom and to relocate it to the west coast by the

first quarter of 2010. The refinery was being rebuilt in Houston, Texas. CityView would debt finance most of the \$320 million needed to purchase and relocate it. The refinery was expected to produce 17,370 bbl/d of gasoline, 13,964 bbl/d of kerosene and diesel, 8,772 bbl/d of fuel oil, 4,560 bbl/d of asphalt, 3,784 bbl/d of naphtha, and 1,550 bbl/d of liquid petroleum gas. The capacity of the refinery would be increased to 100,000 bbl/d after relocation. The refinery's location was not decided at the time of the announcement (Izundu, 2008).

Uranium.—Mega Uranium Ltd. of Canada had a 92% interest in Mega Uranium Cameroon plc, which held the following three properties: the Kitongo (which covered an area of 2,578 km²), the Lolodorf (994 km²), and the Teubang (1,082 km²). Limited historical drilling in small portions of the Kitongo and the Lolodorf properties intersected significant uranium mineralization. The uranium mineralization occurs as disseminated uraninite in wide zones of albitized granite and in high-grade veins. Mega commenced a 2,850-m diamond drilling program at Kitongo that consisted of 10 drill holes from five sites along a 300-m length of the Kitongo fault scarp, which marks the contact between the Kitongo granite and metasediments of Middle Proterozoic age. At each of the five sites, the program consists of one horizontal hole of 300- to 350-m length, and one inclined hole at an angle of 45° to a depth of between 250 and 300 m (Thompson Reuters Corp., 2008).

Africa Aura announced that its 70% owned subsidiary Ridgeway Energy Ltd. had been awarded two licenses that were considered prospective for uranium. The licenses total about 1,992 km². The Ekomedion license, which covers 992 km², is located in west central Cameroon and targets granite-hosted and unconformity-type deposits; the Mbanga license is located in west central Cameroon and targets coarse grained, partially conglomeratic sandstone. Ridgeway stated that it intended to undertake a vehicle-borne radiometric survey across these two licenses to prioritize anomalies for followup exploration (Ridgeway Energy Ltd., 2008).

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CAPE VERDE

Cape Verde is an archipelago of 10 islands and 8 islets located about 600 km off the western coast of Africa. Mining's contribution to the country's economy was very minimal. Most of the country's mineral requirements were imported. Production of mineral commodities was limited mainly to cement and salt for local consumption. Cape Verde was not a producer of mineral fuels in 2008.

TABLE 1
CAMEROON AND CAPE VERDE: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Country and commodity ³	2004	2005	2006	2007	2008
CAMEROON					
Aluminum metal, primary	85,900 ⁴	86,977 ⁴	87,000	89,500 ⁴	91,000
Cement, hydraulic	1,032,438 ^{4,5}	1,000,000	1,000,000	1,150,000 ⁴	1,000,000
Clay	15,734 ⁴	9,811 ⁴	10,000	10,000	10,000
Diamond	carats 12,000	12,000	12,000	12,000	12,000
Gold, mine output, Au content ⁶	kilograms 1,500	1,889 ⁴	2,000	2,000	1,800
Petroleum:					
Crude	thousand 42-gallon barrels 34,675 ⁴	30,100 ^{4,7}	31,667 ⁴	30,364 ^{4,7}	31,000
Refinery products	do. 12,000	12,000	12,000	12,000	12,000
Pozzolana, ash for cement	600,000	600,000	600,000	600,000	600,000
Sand and gravel	601,000	601,000	600,000	600,000	600,000
Sapphire	kilograms 1,000	1,000	1,000	1,000	1,000
Silica sand	14,000	14,000	14,000	14,000	14,000
Stone:					
Limestone	103,000	103,000	100,000	100,000	100,000
Marble	500	500	500	500	500
CAPE VERDE⁸					
Cement	150,000	150,000	160,000	160,000	160,000
Salt	1,600	1,600	1,600	1,600	1,600

do. Ditto.

¹Estimated data are rounded to no more than three significant digits.

²Table includes data available through June 30, 2009.

³In addition to the commodities listed, a variety of industrial minerals and construction materials (aggregate, gypsum, and stone) are produced, and bauxite may be produced but information is inadequate to make reliable estimates of output. The National Institute of Statistics reports salt production to be less than 1 metric ton per year.

⁴Reported figure.

⁵Reported by the National Institute of Statistics of Cameroon.

⁶From artisanal mining.

⁷Reported by the U.S. Energy Information Administration.

⁸Cape Verde also produced clay, gypsum, limestone, and pozzolana, but output is not reported, and available information is inadequate to make reliable estimates of output.

TABLE 2
CAMEROON AND CAPE VERDE: STRUCTURE OF THE MINERAL INDUSTRIES IN 2008

(Thousand metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location	Annual capacity
CAMEROON			
Aluminum	Compagnie Camérounaise de l'Aluminium (Alcan Inc., 46.7%)	Plant at Edea	95
Cement	Cimenteries du Cameroun (Lafarge Group, 57%)	Plant at Bonaberi near Douala	1,200
Diamond	carats Artisanal	Various locations	12,000
Gold	kilograms do.	do.	1,500
Limestone	Cimenteries du Cameroun (Lafarge Group, 57%)	Figuil	275
Petroleum, refinery	barrels per day Société Nationale de Raffinage (SoNaRa) (Government, 66%)	Refinery at Limbe	45,000
Pozzolana	Cimenteries du Cameroun (Lafarge Group, 57%)	Sud-Quest and Littoral Provinces	750
CAPE VERDE			
Cement	metric tons Cimentos de Cabo Verde S.A.	Plant at Santiago	160,000
Salt	do. Artisanal	Various locations	1,600

do., Ditto.