



# 2010 Minerals Yearbook

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CAMEROON AND CAPE VERDE [ADVANCE RELEASE]

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# THE MINERAL INDUSTRIES OF CAMEROON AND CAPE VERDE

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## CAMEROON

Cameroon has resources of bauxite and other minerals, including deposits of cassiterite, cobalt, gold, iron ore, lignite, nickel, petroleum, and uranium. The main mineral commodities produced included aluminum, cement, petroleum, and pozzolana. The development of a viable mineral industry continued to be delayed in 2010 owing to inadequate infrastructure, insufficient electrical power, and a lack of financing. Cameroon also had hydropower potential that remained undeveloped (MBendi Information Services (Pty) Ltd., 2010b).

All Cameroon's mineral resources belong to the Government. Prospecting, exploration and development activities for any mineral deposit are regulated by permit. In 2010, the Ministère de l'Industrie, des Mines et du Développement Technologique [Ministry of Industry, Mines and Technological Development] was responsible for the issuance of mineral exploration licenses (Ministère de l'Industrie, des Mines et du Développement Technologique, 2010).

The agency responsible for the oversight of the mineral resource sector was the Institute for Geological and Mining Research (IRGM) of the Ministry of Industries, Mines and Technological Development, as specified in the revised Mining Code of 2001 and the Petroleum Code of 2000. The revised Mining Code provides investors with such incentives as a 5-year tax break and free transfer of capital out of the country (Ministère de l'Industrie, des Mines et du Développement Technologique, 2010).

IRGM was responsible for all geologic and mining activities, including conducting geologic exploration programs and mechanized drilling operations, overseeing the mining of mineral deposits, and preventing unauthorized exploitation of mines and quarries. From 2004 through 2010, 87 exploration and 4 exploitation licenses had been granted (GIS.mapsofworld.com, 2010).

## Production

In 2010, petroleum exports accounted for about 50% of the value of Cameroon's exports. Other mineral commodities produced in the country were aluminum (from alumina imported from Guinea), cement, and sand. Small-scale artisanal mine operations recovered small amounts of diamond throughout the country. Gold was also produced by small-scale artisanal miners in the eastern and northern parts of the country from alluvial and elluvial deposits. A variety of industrial minerals were also produced mainly for domestic consumption. The southeast region had a few mineral deposits, mainly gold, that could possibly have future commercial production potential (MBendi Information Services (Pty) Ltd., 2010b). Data on mineral production are in table 1.

## Structure of the Mineral Industry

The mineral production facilities in Cameroon were modest and mostly privately owned. The significant private companies were the Société Compagnie Camérounaise de l'Aluminium (Alucam), which produced aluminum, and the Cimentaries du Cameroon, which produced cement. The Société Nationale de Raffinage (SoNoRa), which produced petroleum, was 66% owned by the Government. Table 2 is a list of the major mineral industry facilities.

## Commodity Review

### Metals

**Aluminum.**—The Movement of French Entrepreneurs (MEDEF) announced that it might invest in the aluminum smelter owned by Alucam which, as did other industrial units in Cameroon, had an acute energy deficit. The company entered into a 30-year contract to secure electric power from AES-Sonel, the Cameroon affiliate of AES Corp. of the United States. AES-Sonel, which was the only electric power supplier in Cameroon, was to increase Alucam's electricity supply to 250 megawatts (MW) by 2015 (Tumanjong, 2010b).

**Cobalt.**—Geovic Cameroon plc (GeoCam) which was a 60%-owned subsidiary of Geovic Mining Corp. of the United States had mining licenses for seven near-surface cobalt and nickel deposits in Cameroon. They were the Kondong, the Mada, the Messea, the Nkamouna, the North Mang, the Rapedjombo, and the South Mang deposits (Geovic Mining Corp., 2010a).

Nkamouna's estimated proven and probable reserves were 54.7 million metric tons (Mt) at average estimated grades of 0.25% cobalt. The mineral resources at Nkamouna were estimated to yield 11.7 Mt of concentrate grading 0.74% cobalt (Geovic Mining Corp., 2010b).

**Gold.**—Cameroon had numerous artisanal workings, but primary gold deposits had not been discovered by modern exploration methods. Gold production was from alluvial and elluvial deposits. Work carried out by the Bureau de Recherches et Géologiques et Minières (BRGM), however, suggests that gold mineralization is related to the volcano-sedimentary belts characteristic of the Birimian Belt in Burkina Faso, Mali, and Niger. Aureus Mining Inc. had received positive results from its Batouri project, which is located in southeastern Cameroon—Sampling of 122 pits in the Kimbele-Dem trend and 50 pits in the Mongonam-Dimako trend established that gold was present within quartz veins and that lower grades of gold were present in altered wall rock (Aureus Mining Inc., 2011).

**Iron Ore.**—African Aura Mining Ltd. of the United Kingdom reported that it had intersected significant widths of

hematite- and magnetite-banded iron formation mineralization at its Nkout project in southern Cameroon. The drilling phase would entail 4,200 meters (m) of drilling for resource definition purposes. Results were expected to be available in early 2011. The project was located within 30 kilometers (km) of the proposed rail line that would link Sundance Resources Ltd. of Australia's Mbalam iron ore project to the proposed Port of Lolabe. Africa Aura also owned the Akom Hills and the Ngoa iron ore projects (de Bruyn, 2010).

Legend Mining Ltd. of Australia announced that preliminary data from its aeromagnetic survey of the Ngovayang area had identified the occurrence of itabirite (magnetite-bearing metasediments) on a larger scale than previous information had indicated and confirmed the iron ore prospectivity of the Ngovayang project. The aeromagnetic images showed internal banding within the metasediments host package, which indicates the presence of magnetite within specific horizons. These magnetic units can be correlated with itabirite previously mapped by the BRGM; however, the magnetic units are more widespread than previously thought. The Ngovayang project is located near rail and road networks to and from the port city of Douala, which could greatly assist the exploration phase of the work and facilitate the startup of production (Legend Mining Ltd., 2010).

Sundance continued with efforts to exploit iron ore at its \$2.5 billion Mbalam iron ore project. The company announced that it had received environmental approval for the project from the Government. Sundance planned to complete its definitive feasibility study and begin project construction in 2011. The project had an estimated indicated and inferred resource of direct-shipping hematite ore of 415 Mt grading 61.6% iron. The resource could support a mine with a capacity of 35 million metric tons per year (Mt/yr) for more than 25 years (Swanepoel, 2010).

Sundance and CRCC China-Africa Construction Ltd. announced that they had signed a memorandum of understanding (MOU) to establish the scope, cost, and program for construction of the rail line to the Port of Lolabe. The line would be sufficient to support planned output of 35 Mt/yr of iron ore from Sundance's proposed mines in Cameroon and the Republic of the Congo [Congo (Brazzaville)]. The MOU includes a recognition that the rail project will be integral with the mine project itself and the proposed Lolabe Port development project (Sundance Resources Ltd., 2010).

### **Industrial Minerals**

**Diamond.**—Diamond was recovered throughout the country by artisanal miners. Annual production was estimated to be about 12,000 carats per year.

C&K Mining Inc. of the Republic of Korea and the Government signed a contract agreement for the Mobilong Mine in southeastern Cameroon. The agreement set out the duties and obligations of both parties and was an intermediate step to obtaining a license. The Government indicated that it and C&K Mining had discovered gem-quality and industrial diamond at Mobilong and that the estimated probable reserves were 736 million carats. Initial production was projected to start with

alluvial mining with an output of about 50,000 carats per year, but output was expected to increase to about 800,000 carats per year when full mining production is reached. The mine, if developed, could make Cameroon a significant diamond exporter (Musa, 2010).

### **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. Cameroon was the fifth ranked petroleum producing country in the sub-Saharan region. The petroleum sector continued to be the most significant segment of Cameroon's mineral industry (MBendi Information Services (Pty) Ltd., 2010a).

According to state-owned National Hydrocarbons Corp., the Government planned to issue exploration licenses for the Bakassi peninsula and the Mamfe basin. The Bakassi peninsula covers an area of approximately 1,000 square kilometers (km<sup>2</sup>) and was believed to contain natural gas and petroleum reserves; the Mamfe basin had attracted the attention of oil companies since 2009 because of preliminary exploration results there (Tumanjong, 2010a).

Bowleven Oil & Gas plc announced the commencement of drilling operations on the Etinde permit offshore Cameroon. The IE-3 appraisal well in Block MLHP-7 in the Rio del Rey basin was the first well in a series of wells to be drilled. The objective of the well was to further appraise and confirm the commerciality of the existing IE gas condensate field. Cameroon has two main hydrocarbon provinces—the Rio de Rey basin in the west and the Douala basin in the south. The two are separated by a volcanic terrain. Most of the country's known commercial reserves are located in the Rio del Rey basin (OilVoice, 2010).

Perenco plc of the United Kingdom and the Government signed a production-sharing contract for petroleum exploration in the Elombe Block, which is situated offshore in the Dounde/Kribi-Campo basin, and has a surface area of about 2,400 km<sup>2</sup>. Perenco Cameroon, which was a wholly owned subsidiary of Perenco, had committed to carry out exploration activities for an initial period of 3 years. The work program included the purchase, processing, and interpretation of 300 km<sup>2</sup> of three-dimensional seismic data and the drilling of an exploration well to a minimum depth of 2,000 m, or 200 m of penetration, in the Mundeck Formation. The program could be extended for two additional periods of 2 years each. This was the 16th contract to be signed as part of the implementation of law No. 99/013 of December 22, 1999, to institute the Petroleum Code of 2000 (Perenco plc, 2010).

SoNaRa was proceeding with an upgrade project at its Limbe refinery. Foster Wheeler AG of Switzerland won the overall contract for the upgrade, which includes a revamping of the crude-distillation unit and installation of catalytic-reforming units and vacuum-distillation, together with power generation and utilities work. The Cegelec Group of France would replace SoNaRa's pneumatic control system with numeric controls. The upgrade would enable SoNaRa to process the heavy crude that

Cameroon produces, not just the light grades of crude that it imports (Petroleum Economist, 2010).

**Uranium.**—Mega Uranium Ltd. of Canada had a 92% interest in Mega Uranium Cameroon plc. Two projects being explored were the Kitongo deposit, which was part of a 2,258- km<sup>2</sup> concession, and the Lolodorf deposit, which was part of a 501-km<sup>2</sup> concession. Drill intersections in the Salaki part of the Kitongo deposit included 3.7 m grading 0.13% uranium trioxide, 3.2 m grading 0.11% uranium trioxide, and 2 m grading 0.11% uranium trioxide (Mega Uranium Ltd., 2010).

## Outlook

Interest in exploration for metals and uranium is expected to continue. The Government is expected to continue its efforts to increase interest in offshore and onshore petroleum exploration and to continue with infrastructure development efforts.

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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. All islands except Santa Luzia are inhabited. 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 (U.S. Department of State, 2010).

Petroleo Brasileiro S.A. (Petrobrás) of Brazil and the Government signed an exploration accord for the exploration of petroleum offshore Cape Verde. The accord was a part of a package of measures that included an interdisciplinary study for research of Cape Verde's marine resources. The Government stated that the accord would help the country develop its resources, including natural gas and petroleum (Energia.gr, 2010).

The Government and Martifer Solar S.A. of Portugal opened two photovoltaic plants with a total electricity generating capacity of 7.5 MW. The larger system covered 13 hectares (ha), had a capacity rating of 5 MW, and is located on the main island of Santiago. The smaller system covered 10 ha, had a capacity rating of 2.5 MW, and was located on the island of Sal. The investment cost for both systems was \$36.5 million (NingBo Huasheng Solar Energy Sources Industry Co., Ltd., 2010).

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TABLE 1  
CAMEROON AND CAPE VERDE: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2006	2007	2008	2009	2010
<b>CAMEROON<sup>3</sup></b>					
Aluminum metal, primary	91,000	87,000 <sup>4</sup>	89,700	57,287 <sup>r,4</sup>	59,593 <sup>4</sup>
Cement, hydraulic	1,000,000	1,150,000 <sup>4</sup>	1,000,000	1,000,000	1,100,000
Clay	10,000	10,000	10,000	10,000	10,000
Diamond	carats	12,000	12,000	12,000	12,000
Gold, mine output, Au content <sup>5</sup>	kilograms	2,000	2,000	1,800	1,800
Petroleum:					
Crude	thousand 42-gallon barrels	31,667 <sup>4</sup>	30,364 <sup>4,6</sup>	29,685 <sup>4,6</sup>	28,000
Refinery products	do.	12,000	12,000	12,000	12,000
Pozzolana, ash for cement		600,000	600,000	600,000	600,000
Sand and gravel		600,000	600,000	600,000	600,000
Sapphire	kilograms	1,000	1,000	1,000	1,000
Silica sand		14,000	14,000	14,000	14,000
Stone:					
Limestone		100,000	100,000	100,000	100,000
Marble		500	500	500	500
<b>CAPE VERDE<sup>7</sup></b>					
Cement		160,000	160,000	160,000	160,000
Salt		1,600	1,600	1,600	1,600

<sup>1</sup>Revised. do. Ditto.

<sup>2</sup>Estimated; estimated data are rounded to no more than three significant digits.

<sup>3</sup>Table includes data available through April 30, 2011.

<sup>4</sup>In 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.

<sup>5</sup>Reported figure.

<sup>6</sup>From artisanal mining.

<sup>7</sup>Reported by the U.S. Energy Information Administration.

<sup>8</sup>Cape 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 INDUSTRY IN 2010

(Thousand metric tons unless otherwise specified)

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

do. Ditto.