



# 2014 Minerals Yearbook

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## ERITREA

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# THE MINERAL INDUSTRY OF ERITREA

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Eritrea was a producer of copper, gold, and silver from volcanic massive sulfide (VMS) deposits. The country also produced basalt, brick clay, cement, coral, granite, gravel, gypsum, kaolin, lime, limestone, marble, pumice, quartz, salt, and sand. Eritrea was not a globally significant consumer or producer of minerals in 2014.

All mineral resources in Eritrea were the property of the state, and licenses were required for exploration and development. The mining sector was governed by legislation that included Minerals Proclamation No. 68/1995, Mining Income Tax Proclamation No. 69/1995, Regulations on Mining Operations Legal Notice No. 19/1995, and Mining Law Proclamation No. 68/1995 Amendment Proclamation No. 165/2011.

## Minerals in the National Economy

In 2013 (the latest year for which data were available), the manufacturing sector accounted for 5.8% of the gross domestic product, and the mining and quarrying sector, 1.7%. The value of output in the mining and quarrying sector increased by 1.9% in 2013 (African Development Bank Group, 2015).

## Production

In 2014, the production of copper increased by 308%, and silver, by 200%. Gold production decreased by 72% in 2014 (table 1).

## Structure of the Mineral Industry

Under Eritrean law, the Government had a 10% free carried interest in mining operations that were privately owned. The Government also had the right to purchase as much as an additional 30% interest in mining operations. Bisha Mining Share Co. [Nevsun Resources Ltd. of Canada, 60%, and Government-owned Eritrean National Mining Corp. (ENAMCO), 40%] mined copper, gold, and silver. The cement plants were privately owned (table 2).

## Commodity Review

### Metals

**Copper, Gold, Silver, and Zinc.**—In 2014, Nevsun and ENAMCO produced 88,900 metric tons (t) of copper at the Bisha Mine compared with 21,800 t in 2013. Total sales of silver increased to 47,399 kilograms (kg) in 2014 from 15,799 kg in 2013, and production of gold decreased to 840 kg at the Bisha Mine in 2014 compared with 3,008 kg in 2013. The increase in copper and silver production and the decrease in gold production were attributable to the depletion of the gold-rich oxide zone reserves at Bisha in 2013 and the shift to mining in the copper-rich supergene zone (Nevsun Resources Ltd., 2015b, p. 4–5, 8).

Nevsun planned to produce between 72,600 and 79,400 t of copper in concentrate in 2015; the supergene zone was expected to be depleted in the first half of 2016. The company planned to start mining at the zinc-rich primary sulfide zone of the deposit in mid-2016. From 2017 to 2024, production was planned to be about 98,700 metric tons per year (t/yr) of zinc, 17,100 t/yr of copper, 27,000 kilograms per year (kg/yr) of silver, and 470 kg/yr of gold (Nevsun Resources Ltd., 2013, p. 5; 2015b, p. 3, 6).

At the end of 2014, Nevsun estimated that reserves in the primary sulfide zone at the Bisha Main VMS deposit were 20.2 million metric tons (Mt) at a grade of 5.8% zinc, 1.1% copper, 46 grams per metric ton (g/t) silver, and 0.7 g/t gold. Reserves in the supergene zone at Bisha Main were estimated to be 3.54 Mt at a grade of 3.68% copper, 23 g/t silver, and 0.6 g/t gold (Nevsun Resources Ltd., 2015a, p. 31).

In May 2013, Sunridge Gold Corp. of Canada completed a feasibility study with positive results for a new mine at its Asmara project. The Asmara deposits include the Adi Nefas VMS copper-gold-zinc deposit, the Debarwa VMS copper-gold deposit, the Emba Derho VMS copper-gold-zinc deposit, and the Gupo gold deposit. Probable reserves in the Emba Derho primary zone were 44.5 Mt at grades of 2.8% zinc, 1.6% copper, 15.6 g/t silver, and 0.6 g/t gold. The Debarwa supergene zone, which included high-grade direct shipping ore, had proven reserves of 423,000 t at grades of 8.9% copper, 0.2% zinc, 53.2 g/t silver, and 2.2 g/t gold. Sunridge planned to start mining in 2015 after obtaining its mining license (Sunridge Gold Corp., 2015).

In the first phase of the project, Sunridge planned to produce nearly 5,400 kg/yr of silver and 970 kg/yr of gold in concentrate from the oxide zones at Debarwa, Emba Derho, and Gupo Gold. The company also planned to mine 116,000 t of direct-shipping ore from Debarwa at a grade of 15.6% copper, 76.8 g/t silver, and 2.96 g/t gold. In the 15-month second phase, Sunridge planned to produce about 34,100 t/yr of copper, 24,000 kg/yr of silver, and 740 kg/yr of gold from the copper supergene ore at Debarwa and Emba Derho. In the 13-year third phase, the company planned to produce about 64,200 t/yr of zinc, 24,500 t/yr of copper, 21,700 kg/yr of silver, and 680 kg/yr of gold from copper-zinc primary sulfide ore at Adi Nefas, Debarwa, and Emba Derho. The estimated life of the project was more than 16 years (Sunridge Gold Corp., 2013, 2015).

China Shanghai Corporation for Foreign and Technological Cooperation (SFECO) of China held a 60% interest in the Zara project, which included the Koka gold deposit, and ENAMCO held a 40% interest in the project. SFECO started construction of a new mine at Koka in 2012; production was likely to start in the second half of 2015. In a feasibility study completed in 2010, planned output was about 3,200 kg/yr of gold during the estimated 7-year life of the mine. Reserves were estimated to be 4.6 Mt at a grade of 5.1 g/t gold (Tarikh, 2012; State of Eritrea Ministry of Energy and Mines, 2014c).

Andiamo Exploration Ltd. engaged in trenching and drilling at the Jacob Dewar VMS deposit, which was part of the Haykota license. The company planned to start a feasibility study on a new mine at Jacob Dewar by the end of 2014. Andiamo also hoped to receive its mining license by mid-2015 (Economist Intelligence Unit, 2014).

Ketina Mining SC, which was a joint venture of GPB Global Resources Group of Russia and ENAMCO, explored for gold and base metals. In May 2014, Ketina started rock chip and stream sediment sampling at its license in Gash Barka Region, which was located southwest of Asmara (State of Eritrea Ministry of Energy and Mines, 2014b).

In the first half of 2014, Chalice Gold Mines Ltd. of Australia engaged in drilling at the Mogoraib North project. Chalice subsequently decided to exit its operations in Eritrea because VMS deposits identified during the drilling program were deemed to be subeconomic (Chalice Gold Mines Ltd., 2014, p. 6).

### **Industrial Minerals**

**Cement.**—Eritrea's cement plants were producing at the rate of about 260,000 t/yr between 2012 and 2014. Gudem Cement Works and Eritrea Cement Works had capacities of 350,000 t/yr and 45,000 t/yr, respectively. Both plants were operating below capacity because of power shortages; Gudem Cement Works was engaged in the construction of a new generator that would allow the company to operate at full capacity (Edwards, 2013; International Cement Review, 2013; Woldu, 2014).

**Potash.**—South Boulder Mines Ltd. of Australia and ENAMCO's Colluli potash project is located in the Danakil Depression region. In 2014, ENAMCO and South Boulder changed the focus of the project from potassium chloride to potassium sulfate because of the higher revenues, lower costs, and longer mine life. Kainite and sylvinite would be converted to potassium sulfate at a processing plant at Colluli. The companies planned to complete prefeasibility and feasibility studies of a new mine in 2015. Depending on financing and the results of the studies, construction could start in the fourth quarter of 2016, and production in 2018 (Economist Intelligence Unit, 2014; South Boulder Mines Ltd., 2014, p. 11, 24).

Based on production of 1 million metric tons per year, the life of the project could be about 200 years. Kainite resources at Colluli were estimated to be 596 Mt at a grade of 19.8% potassium chloride (KCl); carnallite, 309 Mt at a grade of 12.3% KCl; sylvinite, 110 Mt at a grade of 28.4% KCl; and polysulphate, 65 Mt at a grade of 10.8% KCl (South Boulder Mines Ltd., 2014, p. 11, 29).

Beijing Sinoma Mining Investment Eritrea Ltd. of China discovered kainite and sylvinite at its Denkel license in the Danakil Depression region. As of October 2014, the company was planning a drilling program at Denkel (State of Eritrea Ministry of Energy and Mines, 2014a).

### **Outlook**

Eritrea's mineral sector could expand significantly in the near future. Zinc and potash mining are expected to start in 2016 and 2018, respectively. Gold production is likely to increase because of the planned opening of the Koka Mine and the Asmara project in 2015. Decreased silver production from the Bisha Mine is expected to be offset by increased production by the Asmara project. Copper output is likely to decrease until 2018 and subsequently increase; lower output resulting from the depletion of the supergene zone at Bisha would be more than offset by the development of Asmara starting in 2019. Cement output could increase because of the new generator set up by Gudem Cement Works.

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TABLE 1  
ERITREA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity <sup>3</sup>	2010	2011	2012	2013	2014
METALS					
Copper	-- <sup>4</sup>	-- <sup>4</sup>	-- <sup>4</sup>	21,800 <sup>r,4</sup>	88,900 <sup>4</sup>
Gold kilograms	50	11,788 <sup>4</sup>	9,735 <sup>4</sup>	3,008 <sup>r,5</sup>	840 <sup>5</sup>
Silver <sup>5</sup> do.	--	4,400	29,900	15,799	47,399
INDUSTRIAL MINERALS					
Basalt	52,000	60,000 <sup>r</sup>	62,000	63,000 <sup>r</sup>	63,000
Cement	45,000	190,000	260,000	260,000	260,000
Clays:					
Common	98,000	110,000	120,000	120,000	120,000
Kaolin	210	240	250	250	250
Coral	77,000	89,000	91,000 <sup>r</sup>	93,000 <sup>r</sup>	93,000
Granite	25,000	28,000	29,000	30,000 <sup>r</sup>	30,000
Gravel	92,000	105,000	110,000	110,000	110,000
Gypsum	1,000	1,100 <sup>r</sup>	1,200	1,200	1,200
Lime	170,000	190,000	190,000	200,000 <sup>r</sup>	200,000
Limestone	3,500 <sup>r</sup>	4,000	4,100	4,200 <sup>r</sup>	4,200
Marble, block cubic meters	36,000	41,000	42,000	43,000 <sup>r</sup>	43,000
Pumice	63 <sup>r</sup>	73 <sup>r</sup>	75	76 <sup>r</sup>	76
Quartz	100 <sup>r</sup>	120	120	130 <sup>r</sup>	130
Salt	120,000	180,000	240,000	290,000	290,000
Sand thousand metric tons	2,700	3,000	3,100 <sup>r</sup>	3,200	3,200

<sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

<sup>2</sup>Table includes data available through November 18, 2015.

<sup>3</sup>In addition to the commodities listed, brick, feldspar, and talc were thought to have been produced, but available information was inadequate to make reliable estimates of output.

<sup>4</sup>Reported figure.

<sup>5</sup>Reported sales.

TABLE 2  
ERITREA: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Metric tons unless otherwise specified)

Commodity	Major operating companies	Location	Annual capacity
Brick	Dahlak Brick and Block Factory	Plant at Massawa	7,300 <sup>c</sup>
Cement	Gedem Cement Works	Gedem	350,000
Do.	Eritrea Cement Works	Massawa	45,000
Copper	Bisha Mining Share Co. (Nevsun Resources Ltd., 60%, and Eritrean National Mining Corp., 40%)	Bisha Mine near Bishia	90,000 <sup>c</sup>
Gold kilograms	do.	do.	850 <sup>c</sup>
Granite cubic meters	Margran plc	Gogne	3,000
Lime	Badme Construction Co.	Plants at Gogne	7,300
Do.	do.	Plant at Barentu	1,800
Marble cubic meters	Margran plc	Gheleb	5,000
Salt	Assab Salt Works	Assab	150,000
Do.	Salina Salt Works	Massawa	80,000
Silver kilograms	Bisha Mining Share Co.	Bisha Mine near Bishia	50,000 <sup>c</sup>

<sup>c</sup>Estimated. Do., do. Ditto.