



# 2012 Minerals Yearbook

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## CYPRUS

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# THE MINERAL INDUSTRY OF CYPRUS

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Cyprus is the third largest island in the Mediterranean Sea after the islands of Sicily and Sardinia, and it is located in the northeastern corner of the Mediterranean Sea. The mineral resources of Cyprus<sup>1</sup> included asbestos, clays, copper, gypsum, lime, marble, sand, stone, and umber, which is an iron and manganese oxide. In 2012, the mining sector was small and had only a limited effect on the national economy.

The Geological Survey Department was placed under the auspices of the Ministry of Agriculture, Natural Resources, and Environment in the late 1960s and, in 2012, was responsible for the oversight of the country's mineral exploration programs and for evaluating the country's mineral resources. The Geological Survey Department served as the technical advisor to the Government for all matters related to the country's geology and also undertook research studies on behalf of the Government (Geological Survey Department, 2012a).

The Mines Service of the Ministry of Agriculture, Natural Resources and Environment administered mineral operations under the Mines and Quarries (Regulation) Law, chapter 270, 1959; the Mines and Quarries Regulations, 1958–1979; and the Cyprus Standard and Control of Quality Law 1975 (Ministry of Agriculture, Natural Resources and Environment, 2012).

The gross output of the mining and quarrying sectors in 2011 (the latest year for which data were available) was valued at €79.5 million (\$105.3 million<sup>2</sup>). The output of mining and quarrying value-added products decreased to €46.4 million (\$61.4 million). The number of people employed in the mining and quarrying sector was 534 (Statistical Service of the Republic of Cyprus, 2012).

International trade was important to the economy of Cyprus. The country's lack of energy resources, heavy industry facilities, and the raw materials required for the production of capital goods necessitated the importation of such items. The European Union (EU) and Cyprus's neighbors in the Middle East absorbed the majority of Cyprus's exports and supplied the majority of Cyprus's imports (U.S. Central Intelligence Agency, 2013).

U.S. exports to Cyprus in 2012 totaled \$167 million and included, in order of value, \$6.4 million in fuel oil, \$1.3 million in finished metal shapes, \$1.2 million in iron and steel products, and \$246,000 in petroleum products (U.S. Census Bureau, 2012a). U.S. imports from Cyprus in 2012 totaled \$29 million. These included, in order of value, \$886,000 in sulfur and nonmetallic minerals, \$321,000 in bauxite and aluminum, and \$61,000 in cement, sand, and stone (U.S. Census Bureau, 2012b).

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<sup>1</sup>Unless specifically stated, all data in this chapter are for the Republic of Cyprus in southern Cyprus because data related to areas of northern Cyprus administered by Turkish Cypriots were sparse or unavailable. The two areas have been separated since 1974.

<sup>2</sup>Where necessary, values have been converted from euro area euros (€) to U.S. dollars (US\$) at a rate of €0.71=US\$1.00.

## Production

The Troodos ophiolite complex dominated the central part of the island and constituted the geologic core of Cyprus. Directly associated with the Troodos ophiolite are asbestos, chromite, and massive sulfide mineral deposits. These deposits became exposed as a result of the uplift of the Troodos ophiolite which exposed the ore bodies to the surface, especially the massive sulfide deposit. Production of copper has taken place from these deposits since antiquity (Geological Survey Department, 2012b).

Bentonite, cement, sand and gravel, and stone were the major mineral commodities produced by the mineral industry of Cyprus. Other mineral commodities produced included common clay for brick and cement manufacture, gypsum, ocher, and umber. In 2012, the production of building stone, marble, and refined copper increased whereas that of cement, gypsum, lime, and umber decreased compared with that of 2011 (table 1).

## Structure of the Mineral Industry

Table 2 is a list of the major mineral industry facilities, their locations, and their annual capacities. All facilities were privately owned.

## Commodity Review

### Metals

**Copper.**—Copper exploration in Cyprus was centered on the Troodos ophiolite complex. All of Cyprus's copper deposits that had been identified as of 2012 were volcanic-hosted massive sulfide (VMS) deposits that were under shallow cover rocks. EMED Mining Public Ltd. (EMED) was a Cyprus-based mineral development and exploration company that was focused on conducting exploration to justify the commencement of a full feasibility study for the Klirou copper-zinc property, which EMED considered to be a high-priority project. The project is located about 20 kilometers (km) southwest of Nicosia. The Klirou deposit extends from the surface to about 200 meters (m) below the surface and was potentially minable by open pit methods (EMED Mining Public Ltd., 2013).

The only copper mining/processing activity that was operating in 2012 was the Hellenic Copper Mines Ltd.'s operation at Skouriotissa. The Skouriotissa Mine's place in history was that it was thought to be the world's longest producing copper mine, with production dating back to about 4,000 years ago. The majority of the copper produced came from the processing of waste material from previous mining operations by the leaching and solvent extraction-electrowinning method to obtain metal from the low-grade copper waste material. The Skouriotissa facility produced 99.99%-pure copper metal cathodes (Mines Service, 2012).

**Gold.**—Northern Lion Gold Corp. of Canada was continuing to explore for gold in the Troodos complex and announced the

approval of four additional mineral permits, which increased Northern Lion's tenure holdings by about 80 square kilometers. Two of the permits, Kato Lefkara and Pano Lefkara, were 100% owned by Northern Lion whereas the other two, Filousa and Perapedi, were held jointly with SES Sweden AB of Sweden. Initial exploration work on the Kato Lefkara and Pano Lefkara permits revealed surface gold mineralization. A followup core drilling program was planned to evaluate the new permits (Marketwire, 2012).

### **Industrial Minerals**

The sedimentary rocks of Cyprus contain industrial minerals, including aggregates, bentonite, building stone, chalk, clay, gypsum, and limestone. In 2012, quarrying was conducted to obtain materials mainly for domestic use; however, information regarding the ownership, location, and output of most of these facilities was not readily available.

**Cement.**—Vassiliko Cement Works Public Ltd. was a significant producer and distributor of cement and clinker. The company produced several types of cement—ordinary Portland cement, low-alkali sulfate-resistant Portland cement, Portland composite cement, and white low-alkali limestone cement. Vassiliko also had a presence in the ready-mix concrete market and the quarrying sector through its subsidiaries (Vassiliko Cement Works Public Co. Ltd., 2012).

Vassiliko Cement announced that work had commenced on a new 6,000-metric-ton-per-day clinker line. Equipment included a circular blending bed, vertical mills for raw materials, and a kiln system with a five-stage double-string preheater, a calciner bypass, a rotary kiln, and a waste gas treatment plant (International Cement Review, 2012).

**Clay and Shale.**—Peletico Penta Ltd.'s operation consisted of mines at Pentacom and Troulli and a bentonite processing plant at Pentacom. Peletico Penta's plant's production process was redesigned for the production of bentonite bars through a dry compaction process. The activation of the bentonite was achieved without the use of soda and with a parallel decrease in energy demand and use of natural resources. Particles of the byproducts (collected dust) of the mining process were used as raw materials, which resulted in increased productivity and decreased production costs (Eco-Innovation Observatory, 2012).

### **Mineral Fuels**

The energy policy of Cyprus was in line with the energy policy of the EU as a whole. Energy constituted one of the economically significant sectors of the country. The country's energy supply was highly dependent on imported fuels. The main goals of the country's energy policy were to safeguard competition in the marketplace, secure a reliable supply of energy, fulfill the energy demands of the country, and impose the least possible burden on the economy and the environment. The energy policy included promotion of natural gas, petroleum products, and renewable energy (Ministry of Energy, Commerce, Industry and Tourism, 2012).

**Natural Gas and Petroleum.**—The Government announced that 29 companies had made 15 bids for exploratory drilling in

a second round of licensing to exploit offshore natural gas and petroleum deposits. Bids were submitted from 10 joint ventures and 5 companies from 15 countries. A final decision, which would involve 12 of 13 blocks, was expected in 2013.

Although Cyprus produced no natural gas or petroleum in 2012, Nobel Energy Inc. of the United States announced that it had discovered a natural gas field in Block 12 that had an estimated reserve of up to 226 billion cubic meters with an estimated value of \$129 billion. Block 12 is located offshore the southeast coast of Cyprus. The discovery was the first of its kind in Cyprus and, if the field is developed, it could possibly supply all the domestic requirements for natural gas for the country (Rigzone, 2012).

### **Outlook**

Domestic infrastructure construction is expected to continue to be the main source of domestic demand for cement, gypsum, sand and gravel, and stone and to be a significant contributor to the national economy. International demand is expected to continue to support Cypriot exports of bentonite, gypsum, ocher, and umber. Natural gas and petroleum exploration is expected to continue.

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TABLE 1  
CYPRUS: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity <sup>2</sup>	2008	2009 <sup>c</sup>	2010	2011 <sup>c</sup>	2012
Cement, hydraulic	1,914	1,481 <sup>3</sup>	1,328	1,207 <sup>3</sup>	1,080
Clays:					
Bentonite metric tons	155,125	152,722 <sup>3</sup>	162,169	160,625 <sup>3</sup>	160,180
Other:					
For brick and tile manufacture	490	480	210	160	120
For cement manufacture	635	400 <sup>3</sup>	445	405 <sup>3</sup>	375
Total	1,125	880	655	565	495
Copper, refined metric tons	2,986	2,380	2,595	3,660	4,328
Gypsum, crude <sup>4</sup> do.	405,500	317,000	333,300	335,000	327,800
Lime, hydrated do.	14,285	12,000 <sup>3</sup>	9,951	9,824 <sup>3</sup>	4,551
Sand and stone:					
Limestone, crushed (Havara)	766	800	800	165	64
Marble, granules and chippings metric tons	550	400	1,195	1,900	3,920
Marl, for cement production	2,595	2,600	1,805	1,640	1,500
Sand and gravel <sup>5</sup>	14,174	11,468 <sup>3</sup>	12,981	11,826 <sup>3</sup>	7,308
Stone, building <sup>6</sup>	71	70	97	84 <sup>r,3</sup>	89
Umber and ocher, for cement metric tons	44,710	43,360 <sup>3</sup>	52,039	61,553 <sup>3</sup>	37,957

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto.

<sup>1</sup>Table includes data available through August 31, 2013.

<sup>2</sup>In addition to the commodities listed, small quantities of the mineral pigments ocher and terra verte are mined intermittently. Mineral production data from areas of northern Cyprus that are administered by Turkish Cypriots, and the production of fertilizers, perlite, and secondary metals from scrap are not included in this table because available information is inadequate to make reliable estimates of output.

<sup>3</sup>Reported figure.

<sup>4</sup>About 4,000 metric tons per year of gypsum was calcined.

<sup>5</sup>Includes crushed aggregate.

<sup>6</sup>Includes crude, semifinished, and worked stone.

TABLE 2  
CYPRUS: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, semimanufactures:	Muskita Aluminum Industries Ltd.	Plant at Limassol	22,000
Cement	Vassiliko Cement Works Public Ltd.	Plant at Vassiliko, 5 quarries in the area	1,200,000
Do.	Cyprus Cement Co. Ltd.	Plant at Moni	400,000
Clay, bentonite	Peletico Penta Ltd.	Mines at Pentakomo and Troulli, plant at Pentakomo	NA
Do.	Hellenic Mining Co.	Nicosia	NA
Do.	Oryktako Ltd.	Mine at Kato Moni and processing plant at Malounda	10,000
Copper, refined	Hellenic Copper Mines Ltd.	Skouriotissa	5,000
Gypsum	Peletico Ltd.	Quarry and processing plant at Aradipou, near Larnaka	NA
Do.	Zeiplast Chemical Industries Ltd.	Near Moni	NA
Perlite	Peletico Ltd.	Expanded perlite facility at Larnaka	NA
Do.	Zeiplast Chemical Industries Ltd.	Expanded perlite facility at Moni	NA
Steel, semimanufactures	B.M.S. Metal Pipes Industries Ltd.	Tube and pipe mill, Paphos	15,000

Do. Ditto. NA Not available.