



2014 Minerals Yearbook

CYPRUS

THE MINERAL INDUSTRY OF CYPRUS

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Cyprus is a moderately developed country that is strategically located in the eastern Mediterranean region between southern Europe, the Middle East, and North Africa. The third largest island in the Mediterranean Sea, Cyprus is situated 75 kilometers (km) south of Turkey, 105 km west of Syria, and 380 km north of Egypt. Only copper cathodes and industrial minerals used in construction, such as sand and stone, were produced in 2014. The production of other minerals, such as asbestos fibers, chromite, copper, gold, and iron pyrites, largely ceased after the political division of the island in 1974. The mineral resources of Cyprus¹ include asbestos, bentonite, copper, crushed limestone (known locally as havara), gypsum, lime, marble, sand and gravel, and umber, which is a pigment that contains iron oxide. The island accounted for almost 1% of world bentonite production in 2014. The mining and quarrying sector as a whole accounted for less than 1% of national economic output. The rate of decrease in mineral output slowed to 11% in 2014 after the economic crisis of the Spring of 2013 sharply reduced business investment in all sectors. There was increased exploration for metals (such as copper, gold, and zinc), industrial minerals, and mineral fuels (particularly natural gas) offshore (Ministry of Agriculture, Natural Resources, and Environment, 2005, p. 28, 29; Embassy of the Republic of Cyprus, 2014; Mines Service, 2015a, b, f, g, i; Statistical Service, 2015g; Flanagan, 2016, p. 51).

Cyprus had no measured resources of mineral fuels; however, there was ongoing offshore exploration in the country's Exclusive Economic Zone (EEZ) in the Mediterranean Sea. Natural gas deposits were identified at the Aphrodite gasfield offshore southern Cyprus in 2011. Following the Aphrodite discovery, four foreign companies obtained licenses in 2012 and 2013 for offshore hydrocarbon exploration in the Cyprus EEZ, which is located in the Levant Basin province of the eastern Mediterranean Sea. Exploration and appraisal drillings were undertaken in other EEZ blocks in 2013 and 2014, with further activity expected in 2015 to ascertain total natural gas and petroleum reserves offshore (U.S. Energy Information Administration, 2013, p. 6; 2014; Kouppas and others, 2015, p. 64).

The island is subdivided into four geologic zones: the Keryneia Terrane range in northern Cyprus, the Circum Troodos plain in the east and south, the Mamonnia Terrane complex in the southwest, and the Troodos Terrane chain in the center. The Troodos Ophiolite complex contains the bulk of the island's ore deposits, such as asbestos, chromite, copper, gold, iron pyrites, and silver. The Keryneia range contains dolomites, limestones, and marbles. The Circum Troodos sedimentary succession

consists of bentonitic clays, cherts, limestones, and marls (van der Meer, 1996; Geological Survey Department, 2014).

Minerals in the National Economy

In 2014, Cyprus's real gross domestic product (GDP) decreased by 2.5% compared with a 5.9% decrease in 2013 owing to the banking and subsequent economic crisis. The nominal GDP was \$23.2 billion in 2014, which was down from \$24.1 billion (revised) in 2013. The decrease in the rate of contraction of the economy was mainly owing to an increase in private consumption, which had sharply decreased in 2013. Net exports made a negative contribution to growth owing to an increase in imports, which also had decreased in 2013. Construction also contributed negatively to growth on the supply side (European Commission, 2015b, p. 90; International Monetary Fund, 2015, p. 5; Statistical Service, 2015g; World Bank, The, 2015).

Most sectors of the economy, including the mineral sector, contracted at a lower rate than they did in 2013, while industrial output stopped decreasing. The gross value added (in constant dollars) by the mining and quarrying sector was 15.7 million euros (EUR) (\$20 million²) in 2014, which was a decrease of 11.7% compared with the gross value added of EUR17.8 million (\$22.7 million) (revised) in 2013. The gross value added by the manufacturing sector, which included the manufacture of various minerals, decreased by 1.6% to EUR723.7 million (\$923.1 million) in 2014 from EUR738.2 million (\$942.8 million) (revised) in 2013. The share of mining and quarrying as a percentage of the country's total value added decreased to 0.12% in 2014 from 0.13% (revised) in 2013, whereas that of manufacturing remained at 5.3% (Statistical Service, 2015e, g).

In 2013 (the latest year for which comprehensive data were available), the gross value added (in current dollars) by the manufacturing sector amounted to EUR832 million (\$1.06 billion). Within the manufacturing sector, the value added by the manufacture of fabricated metal products, except machinery and equipment, was EUR73.1 million (\$93.4 million), or 8.8% of the total gross value added by the sector; the manufacture of other nonmetallic mineral products was EUR70.7 million (\$90.3 million) or 8.5% of the sector total; the manufacture of base metals, EUR24.4 million (\$31.2 million) or 2.9%; and the manufacture of chemicals and chemical products, EUR22.9 million (\$29.2 million) or 2.8% (Statistical Service, 2015f).

Total industry employment decreased by about 10% to 32,908 workers in 2013 (the latest year for which data were available) from 36,485 workers in 2012. Mining and quarrying, together

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

²Where necessary, values have been converted from euro area euros (EUR) to U.S. dollars (US\$) at an average exchange rate of EUR0.784=US\$1.00 for 2014 and EUR0.783=US\$1.00 for 2013.

with electricity generation and distribution, employed 2,747 workers in 2013 (the latest year for which data were available), which was a decrease of 7% from the 2,892 workers employed in the two sectors in 2012. Manufacturing employed 28,506 workers, which was down by about 11% from the 31,933 workers employed in 2012. Within the manufacturing sector, the manufacture of fabricated metal products except machinery and equipment employed 3,388 workers (which was down from 4,061 in 2012); the manufacture of other nonmetallic mineral products, 2,118 workers (down from 2,562 in 2012); the manufacture of chemicals and chemical products, 670 workers (down from 749); and the manufacture of base metals, 316 workers (down from 365) (Statistical Service, 2015f).

Government Policies and Programs

The Mines Service of the Ministry of Agriculture, Natural Resources, and Environment is the regulatory authority for mines and quarries in Cyprus. It administers the Mines and Quarries (Regulation) law No. 5 of 1965, as amended by law No. 88(l) of 1995, No. 132(l) of 2001, and No. 63(l) of 2003, and the Explosive Substances Law and Regulations. The Mines Service is responsible for issuing prospecting permits, quarry licenses, and mining leases; examining environmental studies submitted to assess the environmental impact of extraction activities; supervising health and safety in mines and quarries; controlling the importation, storage, sale, and use of explosive substances and ammunitions; and collecting royalty and fee payments. The Service also advises the Government on technical subjects related to the minerals of Cyprus (Mines Service, 2015d, e, k).

Mineral fuels exploration and extraction activities in Cyprus are governed by the Hydrocarbon Prospection, Exploration and Exploitation Law No. 4(l)/2007 of 2007, as amended by laws No. 126(l)/2013 of 2013 and No. 29(l)/2014 of 2014, and the Hydrocarbon Regulations of 2007 and 2009 (No. 51/2007 and No. 113/2009). The law and the two regulations implement European Commission Directive 94/22/EC of May 30, 1994 on the conditions for granting authorization for hydrocarbon prospecting, exploration, and production. The Ministry of Energy, Industry, Commerce, and Tourism (MCIT) grants entities mineral rights for the development of natural gas and petroleum reserves through three separate authorizations for upstream activities. A prospecting license is valid for up to 1 year. An exploration license does not exceed 3 years but can be renewed up to two times. An exploitation license is valid for up to 25 years and can be renewed for another 10 years. The MCIT issues Model Production-Sharing Contracts (MPSC) for contracted areas that specify minimum work obligations, development and production plans, and fiscal provisions regarding payments of royalties and formulas for the cost of recovery and profit sharing between the Government and the private contracting party (Antoniou, 2014; Kouppas and others, 2015, p. 64).

Production

In 2014, there was great variation in the changes observed in Cyprus's production of mineral commodities, with a number of minerals showing significant increases or decreases in output.

Production increased for marble, granules, and chippings by 129% compared with that of 2013; crushed limestone (known locally as havara), by 111%; marl, by 30%; clinker and clays for cement manufacture, by 29% each; and crude gypsum, by 10%. Production of umber and ocher for cement production decreased by 64%; calcined gypsum, by 30%; clays for brick and tile manufacture, by 19%; refined copper, by 15%; hydraulic cement, by 14%; building stone, by 13%; and bentonite and sand and gravel, by 11% each. No natural gas or petroleum were produced onshore or offshore (table 1).

Mining and quarrying output decreased by 12% in 2014 compared with its level in 2013. The manufacture of nonmetallic mineral products decreased by 12.4% and the manufacture of base metals and fabricated metal products, by 10.6%. The manufacture of refined petroleum products, chemicals, and chemical products increased by 6.6% in 2014 (Statistical Service, 2015d).

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.

Mineral Trade

Cyprus's imports continued to exceed its exports by a wide margin, and the trade deficit increased by 11.1% to EUR3.69 billion (\$4.71 billion) in 2014. The ratio of exports to imports decreased to 0.281 from 0.333 in 2013. Total exports decreased by 10.6% to EUR1.44 billion (\$1.84 billion) in 2014, whereas total imports increased by 6.2% to EUR5.13 billion (\$6.54 billion). Fuels and lubricants continued to be the second-ranked category of Cyprus's imports, accounting for 23.9% of all imports, which was down from 28.1% in 2013. Among exports, industrial products of mineral origin accounted for 3.7% of total exports, down from 4.5% in 2013. Mineral commodities accounted for only 0.8% of Cyprus's exports compared with 0.9% in 2013 (Statistical Service, 2015a, b).

The major exported mineral commodities of Cyprus were bentonite, building stone, cement, clinker, copper, gypsum, lime, plasters, and umber and ocher. Exports of copper cathodes decreased by 15% to 3,088 metric tons (t) in 2014 from 3,631 t in 2013, while exports of cement decreased by 21% to 268,098 t in 2014 from 339,374 t in 2013. Exports of clinker, which is a new export commodity since 2012, were 1.1 million metric tons (Mt) in 2014, which was up significantly from the 807,041 t exported in 2013 and 23,363 t in 2012, in part owing to decreasing domestic demand. Gypsum exports were estimated to be 170,000 t; bentonite, 150,000 t; umber and ocher, 6,000 t; and building stone, 3,000 t (Mines Service, 2015b, f, i; Statistical Service, 2015h).

Cyprus was almost entirely dependent on mineral fuel imports to meet its energy needs. In 2013 (the latest year for which data were available), about 95.5% of the country's energy supply was provided by petroleum products, which were 100% imported. Solar energy accounted for the remaining 4.5%. As a result, Cyprus's energy trade deficit, which was equal to 7.5% of the GDP, was the second highest deficit among the 28 member

states of the European Union (EU) after Malta (European Commission, 2013, p. 154; 2015c, p. 93, 94).

Other EU member states continued to account for the bulk of Cyprus's trade, commanding a 70.5% share of its imports and a 41.7% share of its exports. Cyprus's principal trading partners included Greece (which received 15.2% of Cyprus's exports), the United Kingdom (9.4%), Israel (5.4%), the United States (3.3%), China (2.7%), Germany (2.5%), and Egypt (2.4%) for exports. Its main sources of imports were Greece (which provided 23.5% of Cyprus's imports), Israel (9.5%), the United Kingdom (7.3%), Italy (7.1%), Germany (6.9%), the Netherlands (5.7%), and France (5.5%) (Statistical Service, 2015c).

In 2014, Cyprus's exports to the United States were valued at \$64.0 million compared with \$43.5 million in 2013. Cyprus's mineral exports included \$1,103,000 in sulfur and nonmetallic minerals. Cyprus's imports from the United States were valued at \$151.7 million in 2014 compared with \$143.2 million in 2013. Cyprus's mineral imports included, in descending order of value, \$4.9 million in fuel oil, \$2.5 million in finished metal shapes, \$1.5 million in iron and steel mill products; \$1.1 million in petroleum products; \$826,000 in chemicals; \$442,000 in copper, and \$299,000 in fertilizers (U.S. Census Bureau, 2015a, b).

Commodity Review

Metals

Copper.—The Skouriotissa Mine, which was operated by Hellenic Copper Mines Ltd., remained the only active copper mine in Cyprus. Thirty-three other copper and gold mines, which are located in the districts of Larnaca, Limassol, Nicosia, and Paphos, and some of which had been active since as early as the 1920s, ceased operations by 1996 and remained inactive. The Skouriotissa Mine produced 99.99% purity copper cathodes by a leaching-solvent extraction-electrowinning process. Hellenic Copper Mines planned to begin mining the copper deposits of Apliki, which is near the town of Kalopanagiotis, in the district of Nicosia in 2015 (Mines Service, 2015a, d, h, i).

EMED Mining Public Ltd. held 10 exploration licenses totaling 32.7 square kilometers (km²) in the Troodos Ophiolite complex. Three licensed areas were found to contain more than 10 Mt of reserves at grades of between 1.0% and 4.5% copper. The Klirou copper-zinc prospect, which is located 20 km southwest of Nicosia, was reported to have inferred resources of 6.6 Mt at a grade of 0.7% copper, as well as associated gold. Contained metal estimates at Klirou were 18,500 t of copper and 53,600 t of zinc. At the end of 2014, EMED was in joint-venture discussions with other mineral exploration companies to proceed to the next stage of the project (EMED Mining Public Ltd., 2007; 2014; 2015, p. 12).

Gold.—BMG Resources Ltd. of Australia continued to explore for gold, silver, copper, cobalt, and zinc in the Troodos Mountains. The company held 15 exploration and reconnaissance licenses covering 122 km² with four project areas: Black Pine, 8 licenses covering 79.3 km²; Kalavassos, 1 license covering 10.2 km²; Kambia, 3 licenses covering 8.7 km²; and Vrechia, 3 licenses covering 23.6 km². During 2014, BMG conducted 911 meters (m) of drilling in the Pevkos Prospect of Black Pine and intersected copper-

gold-nickel-cobalt sulfides. The highest grade sample from drilling was 2 m at 3.00 grams per ton (g/t) gold, 0.33% copper, 3.03% nickel, and 0.16% cobalt from 94 m depth. In 2014, BMG relinquished a number of licenses at the Kambia project following an evaluation of previous reports to focus on developing high-quality drill targets at Kokkinochoma, North Mathiatas, and Pitharachoma. The company also completed 13 drill holes for a total of 1,092 m at the Mala open pit of the Vrechia project in order to confirm copper-zinc grades obtained in past drilling and to determine the presence of gold-silver deposits. Assay results were pending as of yearend 2014 (BMG Resources Ltd., 2015, p. 4–18).

Northern Lion Gold Corp. of Canada suspended its exploration activities in Cyprus in October 2014 after its joint-venture partner, Centerra Gold Inc. of Canada, terminated its option agreement to earn up to 70% interest in a number of the company's exploration permits located in the districts of Larnaca and Paphos. As part of the 2014 drilling program, Centerra drilled a total of 1,659.5 m in 10 holes from June to August, with nine holes in the Mavroyi area and one hole at the Saramas target, but found no sulfides or alteration (MarketWatch, 2014).

Industrial Minerals

In 2014, quarrying of deposits of building stone, gypsum, limestone, marble, marl, sandstone, umber and ocher, and other industrial minerals was undertaken across the island. A total of 130 quarries were producing various materials, particularly for use by the construction industry. Of these quarries, about 45 were in the final stages of operation or the reclamation phase following the end of production. Twelve quarrying companies were engaged in the production of limestone aggregates; 10 each, bricks and tiles and diabase aggregates; 8, building stone; 6 each, bentonite and crushed limestone (havra); 3 each, fine aggregates and umber; and 1 each, armor stone, crushed marble, gypsum, and ocher. Nearly all were small-scale producers (Mines Service, 2015a, c, f, i, j).

Cement.—Local sales of cement in Cyprus decreased by 15% to 452,647 t in 2014 compared with 534,960 t in 2013. The country's ongoing economic recession and concomitant contraction in construction activity since 2008 has decreased domestic demand for cement each consecutive year. Sales in 2014 were 77% lower than their peak level in 2008 (International Cement Review, 2015a; Statistical Service, 2015h).

Vassiliko Cement Works Public Co. Ltd., the leading producer and distributor of cement and clinker in Cyprus, reported an increase of about 6% in total revenues for 2014. The company continued to expand its sales in overseas markets, which mitigated the decrease in domestic sales. Vassiliko was estimated to have exported 0.28 Mt of cement and 1.16 Mt of clinker in 2014 (International Cement Review, 2015b, p. 113; Vassiliko Cement Works Public Co. Ltd., 2015, p. 11).

Mineral Fuels

Natural Gas and Petroleum.—Hydrocarbon reserves continued to be assessed offshore of southern Cyprus. As of yearend 2014, exploration licenses had been granted for 6 of 13 blocks in Cyprus's EEZ to energy companies from France, Israel, Italy, the Republic of Korea, and the United States following two licensing rounds that were held in 2007 and 2012 (Deloitte Touche Tohmatsu Ltd., 2015, p. 4; Kouppas and others, 2015, p. 64).

Noble Energy International Ltd. of the United States held an exploration and exploitation license for block 12, which contained the Aphrodite gas field, where it identified natural gas deposits in 2011. In June 2013, the Government signed a memorandum of understanding (MOU) with Noble and its drilling partner companies, Delek Drilling L.P. and Avner Oil & Gas Exploration L.P. of Israel, regarding the construction of a liquefied natural gas (LNG) terminal in Vasiliko to store and to export natural gas from Cyprus. In November 2014, Delek Drilling reported a 12% increase in the previously highest estimate of resources in the Aphrodite field to 130 billion cubic meters of natural gas and 9 million barrels of condensate as a result of drilling at the Aphrodite-2 well (Offshore Magazine, 2014; Kouppas and others, 2015, p. 64).

The Eni-KOGAS consortium (a joint venture of Eni S.p.A. of Italy and KOGAS of the Republic of Korea) held exploration licenses for Blocks 2, 3, and 9 and Total S.A. of France for Blocks 10 and 11 offshore of southern Cyprus. The Government issued MPSCs to Eni-KOGAS in January 2013 and to Total in February 2013. In August 2014, Eni-KOGAS signed a MOU with the Government aimed at investigating areas of cooperation including the onshore LNG terminal. The consortium drilled its first exploratory well in September 2013 and conducted its first appraisal drillings in September 2014. In November, the Government announced that results on natural gas reserves from the well at the Onasagoras field inside Block 9 would be available within the next few months. Eni-KOGAS had plans to drill several exploratory wells in 2015 and 2016. Total was expected to drill its first exploratory well in the first half of 2015 (Cyprus Mail, 2014; Deloitte Touche Tohmatsu Ltd., 2015, p. 4; Kouppas and others, 2015, p. 64).

Outlook

Cyprus's economy is forecasted to return to a low rate of positive growth in 2015. Mining and quarrying output is expected to continue to decrease, though at a lower rate, as the contraction of the construction sector and the concomitant decrease in demand for industrial minerals on the island slows down. Copper cathode production is expected to increase with the beginning of mining of deposits at a second site by Hellenic Copper Mines. The exploration of copper and gold deposits by BMG Resources, which was the only active mineral exploration company in Cyprus after Northern Lion suspended its program in late 2014, is at an early stage of development and is not expected to increase metal production in the near future. The ongoing offshore hydrocarbon exploration has the potential to turn Cyprus into a medium-sized mineral fuels producer and exporter. The country's total offshore reserves may be

insufficient to make onshore LNG processing and exporting economically feasible as envisioned by the Government as part of its new comprehensive energy strategy to reduce dependence on petroleum imports. Instead, natural gas pipelines may have to be built to other countries, such as Egypt, Greece, Israel, or Turkey (Hadjicostis, 2014; Smith, 2014; European Commission, 2015a, p. 15, 19; International Monetary Fund, 2015, p. 31; Kouppas and others, 2015, p. 63, 64).

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TABLE 1
CYPRUS: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014
METALS					
Copper, refined metric tons	2,595	3,660	4,328	3,631	3,088
Iron oxide pigments, umber and ocher do.	4,125	3,219	3,394	4,016	3,793
INDUSTRIAL MINERALS					
Cement:					
Hydraulic	1,329	1,207	1,026	855	735
Clinker	1,036 ^r	1,037 ^r	953 ^r	1,418 ^r	1,826
Umer and ocher metric tons	52,039	61,553	37,957	57,294	20,743
Clays:					
Bentonite do.	162,969	160,625	160,180	158,386	140,174
Other:					
For brick and tile manufacture	210	160	120	78	63
For cement manufacture	445	405	375	582	749
Total	655	565	495	660	812
Gypsum:					
Crude metric tons	333,000	335,000	327,800	315,000	347,600
Calcined do.	4,100	4,877	4,523	3,679	2,561
Total do.	337,100	339,877	332,323	318,679	350,161
Lime, hydrated do.	9,915	9,824	4,551	3,730	3,462
Sand and stone:					
Limestone, crushed (havara and filling materials) do.	250	165	64	18	38
Marble, granules and chippings	1,195	1,900	3,920	900	2,060
Marl	1,805	1,640	1,500	2,363	3,068
Sand and gravel ³	12,981	11,826	7,308	4,561	4,039
Stone, building ⁴	128	84	89	8	9

^rRevised do. Ditto.

¹Table includes data available through August 20, 2015.

²Mineral production 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 because available information is inadequate to make reliable estimates of output.

³Includes crushed aggregate.

⁴Includes crude, semifinished, and worked stone.

TABLE 2
CYPRUS: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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 Co. Ltd. (Church of Cyprus, 26%; Italcementi Group, 25%; Cyprus Cement Public Co. Ltd., 25%)	Plant at Vasiliko, 5 quarries in the area	2,400,000
Do.	Cyprus Cement Public Co. Ltd.	Plant at Moni	430,000
Clay, bentonite	Peletico Penta Ltd.	Mines at Pentakomo and Troulli, plant at Pentakomo	NA
Do.	Drapia Mining Co.	Mines at Drapia, Monagroulli, and Parsata	NA
Do.	Oryktako Ltd.	Mine at Kato Moni and processing plant at Malounda	10,000
Copper, refined	Hellenic Copper Mines Ltd.	Skouriotissa	8,000
Gypsum	Peletico Ltd.	Quarry and processing plant at Aradipou, near Larnaca	NA
Do.	Zeiplast Chemical Industries Ltd.	Near Moni	NA
Perlite	Peletico Ltd.	Expanded perlite facility at Larnaca	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.