



# 2015 Minerals Yearbook

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ARMENIA [ADVANCE RELEASE]

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# THE MINERAL INDUSTRY OF ARMENIA

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Armenia ranked sixth in the world in mine output of molybdenum in 2015 and accounted for 3% of world production (Polyak, 2017). Besides molybdenum, Armenia produced other metallic minerals, such as copper, gold, silver, and zinc, and industrial minerals and mineral products, including cement, diatomite, gypsum, limestone, and perlite. The country also produced aluminum foil from aluminum imported from Russia, and ferromolybdenum, molybdenum metal, and rhenium salts (ammonium perrhenate and potassium perrhenate) from local ores. It also had developed a diamond-cutting industry based on imported diamond. Armenia possesses resources of copper, gold, iron ore, lead, molybdenum, and zinc. It also has resources of industrial minerals used in construction, such as basalt, granite, limestone, marble, and tuff; semiprecious stones, such as agate, jasper, and obsidian; and other nonmetallic minerals, such as bentonite, diatomite, perlite, and zeolites (Polyak, 2017).

In October 2014, Armenia signed a treaty declaring that it was planning to join the Eurasian Economic Union, which was the successor of the Eurasian Customs Union, and, in January 2015, Armenia became a full-fledged member. The Eurasian Customs Union was originally formed in January 2010 as the Customs Union of Belarus, Kazakhstan, and Russia and was the first step in a plan to establish close economic ties between member countries. The Government of Armenia expected that joining the Eurasian Customs Union with Belarus, Kazakhstan, and Russia would reduce the prices that it pays for natural gas and nuclear fuel and provide the Armenian economy with markets for its products and investment capital for its companies (Regnum.ru, 2013; Naberezhnov, 2015).

## Minerals in the National Economy

In 2015, Armenia's real gross domestic product (GDP) increased by 3.1% compared with an increase of 3.9% in 2014. The nominal GDP in 2015 amounted to \$10.6 billion.<sup>1</sup> The share of industrial production in the total GDP was 30.1%, and the share of mining and quarrying in total industrial production was 16.7%. In 2015, mining of metallic ores dominated the mining and quarrying sector, accounting for 97.7% of the value of production in this sector. In 2015, industrial production increased by 5.2% compared with that of 2014; mining and quarrying overall increased by 50.4%; and mining of metallic ores increased by 51.5%. A sharp increase in mineral production took place because a new copper mine at the site of the Teghout copper-molybdenum deposit opened in December 2014. Metallurgical production in 2015, however, decreased by about 15% (National Statistical Service of the Republic of Armenia, 2015, p. 214–285; 2016, p. 7–96; Metaltorg.ru, 2016b; U.S. Central Intelligence Agency, 2016).

<sup>1</sup>Where necessary, values have been converted from Armenian drams (AMD) to U.S. dollars (US\$) at an annual average exchange rate of AMD477.92=US\$1.00 for 2015 and AMD415=US\$1.00 for 2014.

## Production

In 2015, Armenia's estimated production of bentonite clay increased by 100%. Production of copper concentrate increased by an estimated 64%; cut diamond, by 35%; and primary copper, by 18%. Production of caustic soda decreased by 48%, and that of rolled aluminum, by 44%. Production of cadmium decreased by an estimated 24%; zinc concentrate, by an estimated 23%; mined gold and mined silver, by an estimated 22% each; ferromolybdenum, by 15%; gypsum, by 13%; and salt, by 10%. Data on mineral production are in table 1.

## Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

## Mineral Trade

In 2015, Armenia had a significant trade deficit; that is, the country's exports, which were valued at \$1.49 billion, were much lower than the country's imports of \$3.26 billion. Mineral commodities constituted a significant share of the country's export revenue. The main export commodities were cut diamond, energy (electric power), foodstuffs, nonferrous metals, unwrought copper, and other mineral products. In 2015, Armenia increased exports of copper ores and concentrates to 309,200 metric tons (t) from 185,000 t in 2014, and the revenue received for the copper ores and concentrates amounted to \$316.7 million, which was an increase of 34.2%. Mined copper was exported primarily to Bulgaria, China, Georgia, Romania, and Switzerland. In 2015, Armenia increased exports of molybdenum concentrate by 6.6% to 959.7 t; the revenue received, however, decreased by 34.1% to \$8.7 million because of the decrease in world prices. All the molybdenum concentrate produced was exported to the Netherlands. Armenia's exports of zinc concentrate decreased by 1.4% to 14,100 t, whereas the revenue received from exports of zinc concentrate decreased by 13% to \$12 million. In 2015, Armenia exported 2.8 t of dore bars containing more than 70% gold, which was a 22% decrease compared with the tonnage of exports in 2014. Because of the increase in gold prices, however, the revenue from gold exports increased by more than \$15 million, or by 18.2%. Armenia's leading export partner in gold trade was Canada, and Switzerland was a distant second. In 2015, the revenue from ferromolybdenum exports decreased sharply; although the tonnage of the exports decreased by only 14% to 5,600 t, the revenue received decreased by 49% to \$55.5 million because of the decrease in the price of ferromolybdenum. The major recipients of Armenia's ferromolybdenum were the Netherlands, which received \$34.6 million worth of ferromolybdenum, and Germany, \$20.1 million (AnalitikaUA.net, 2016; Hetq.am, 2016; Novostink.ru, 2016; Oganesyanyan, 2016).

The main export partners of Armenia were Russia (which accounted for 15.2% of Armenia's export revenue), China (11.1%), Germany (9.8%), Iraq (8.8%), Georgia (7.8%), Canada (7.5%), Bulgaria (5.3%), the United States (3.7%), Italy (3.3%), and Belgium and the Netherlands (3.2% each) (National Statistical Service of the Republic of Armenia, 2016, p. 114; U.S. Central Intelligence Agency, 2016).

In 2015, Armenia's imports of mineral products included rough diamond, natural gas, and petroleum. The main trade partners for imports were Russia (which provided 29.1%, by value, of Armenia's imports), China (9.7%), Germany (6.2%), Iran (6.1%), Italy (4.6%), Turkey (4.2%), Ukraine (3.8%), and the United States (3.3%) (National Statistical Service of the Republic of Armenia, 2016, p. 114; U.S. Central Intelligence Agency, 2016).

## Commodity Review

### Metals

**Aluminum.**—The ARMENAL aluminum foil rolling mill was one of the leading production facilities in Armenia and the only producer of aluminum foil in the Caucasus and Central Asia regions. ARMENAL was owned by United Company RUSAL of Russia and was a part of RUSAL's packaging division. In 2015, ARMENAL produced 29,653 t of aluminum foil, which was an increase of 1.4% compared with the amount produced in 2014. At the same time, foil production at all RUSAL's plants combined decreased by 4.8% to 89,100 t. The ARMENAL plant was planning to increase production to 33,600 metric tons per year (t/yr) by 2016 and to 40,000 t/yr by 2020. The plant employed about 700 workers at an average monthly wage of 375,000 drams (about \$785), which was an increase of 2.2% from the average wage of the previous year (AnalitikaUA.net, 2016; MetalInfo.ru, 2016; Metaltorg.ru, 2016a).

Aluminum foil from ARMENAL was exported to about 15 countries in Africa, North America, Asia, and Europe; the United States was the leading consumer of ARMENAL's foil. In 2015, ARMENAL exported \$82.8 million worth of aluminum foil, which was a decrease of 6.4% compared with exports in 2014. For the year, ARMENAL's exports to the EU countries increased, whereas exports to the United States decreased. The value of aluminum foil exports to Germany increased to \$18.4 million in 2015 from \$6.8 million in 2014; Poland, to \$13.1 million from \$1.9 million; the Netherlands, to \$5.1 million from \$0; Italy, to \$3.9 million from \$207,000; and France, to \$2.8 million from \$269,000. The value of exports to the United States decreased to \$35.9 million from \$76.4 million and amounted to 43.4% of all aluminum foil exports. In the previous 10 years, foil exports to the United States had accounted for between 75% and 90% of the company's total foil exports. In October 2014, following multiple investigations into possible price dumping, the EU fully restored access to the EU market for Armenia's foil and, as a result, foil exports to the EU increased by 4.5 times in 2015 (MetalInfo.ru, 2016; Metaltorg.ru, 2016a).

**Copper and Molybdenum.**—In the beginning of 2015, Armenia had four enterprises engaged in mining copper and molybdenum—the Agarak copper-molybdenum mining and processing complex (ACMC), Dundee Precious Metals Kapan, the Teghout copper-molybdenum complex, and the Zangezur copper-molybdenum complex (ZCMC) (table 2).

In December 2014, ZAO Teghout opened a new mine at the site of the Teghout copper-molybdenum deposit. The total cost of mine construction was \$350 million, of which \$283 million was provided by a loan from ZAO VTB Bank of Russia. The company expected to mine and process 7 million metric tons (Mt) of ore during 2015, and then to increase mining and processing to 7.5 Mt in 2016 and 9 Mt in 2017; by 2020, the company expected to mine and process between 12 million and 14 million metric tons per year (Mt/yr) of ore. In the first 10 years of operation, the company planned to produce an average of 64,000 t/yr of copper concentrate with copper content of 31% and about 760 t/yr of molybdenum concentrate with molybdenum content of 50%. The Teghout deposit is located in Lori Martz, which is in northern Armenia next to the border with Georgia. The resources of the Teghout deposit were estimated to be 450 Mt grading 0.355% copper and 0.022% molybdenum and containing 1.6 Mt of copper and 99,000 t of molybdenum. The deposit is considered to be the second-largest copper deposit in Armenia (after the Kajaran deposit) based on its resources. ZAO Teghout was founded in 2006 and was a part of the Vallex Group. The company planned to export copper and molybdenum concentrates to countries in Europe (Nv.am, 2014; Panorama.am, 2014; Regnum.ru, 2014; Metaltorg.ru, 2015).

In May 2015, the Government of Armenia approved a \$240 million investment program aimed at processing waste material accumulated in tailings at the ZCMC. According to the program, at the first stage of the project, investors would build a processing plant that would have the capacity to process 12.5 Mt/yr of tailings. The tailings, which are located in close proximity to the Artzvanik, the Pkhrut, and the Vokhchi villages, began to accumulate as early as the 1940s, and by 2015, had reached about 300 Mt; they were continuing to accumulate at a rate of between 18 and 20 Mt/yr. According to preliminary calculations, 80 Mt of tailings can yield 10,000 t of refined copper, between 3,000 and 4,000 t of iron, 250,000 t of elemental sulfur, 170 t of tellurium, 3,600 kilograms of gold, 142 t of silver, and some other metals. At the second stage of the project (planned to start in 2019), the investors would build a facility with a 10,000-t/yr capacity for the production of composite materials from the nonmetallic components of the tailings. In addition, the program would create between 1,500 and 1,800 jobs and return about 400 hectares of land to agricultural use. According to the Government, the country had about 18 sites containing about 1.5 billion metric tons of metallic mineral tailings. Consequently, the ZCMC processing plant would have enough raw materials to supply its operations for the next 30 or 40 years (Ecoindustry.ru, 2015; MinerJob.ru, 2015).

### Industrial Minerals

**Cement.**—In 2015, Armenia produced 417,000 t of cement, which was a 2.3% decrease compared with the 427,000 t produced in 2014. In 2014, Armenia exported 73,000 t of cement, which was a significant decrease compared with the 112,200 t exported in 2013. Experts suggest that a possible reason behind decreases is that a new cement plant was recently opened by HeidelbergCement AG in neighboring Georgia, and thus Georgia did not need to import as much cement (Bizzzone.info, 2015).

In 2015, Armenia had two cement plants—the Hrazdan Cement plant, which used to be called ZAO Mika Cement during the period between 2001 and 2014, and the ZAO Ararat Cement plant. Both plants were closed-stock companies and, in the past decade, produced cement in amounts well below their capacities because of low levels of construction activity in Armenia. Hrazdan Cement was located in the city of Hrazdan and began producing cement in 1970. Hrazdan Cement had two cement production lines and the capacity to produce up to 1.2 Mt/yr of portland cement of 10 different types and 1 Mt/yr of clinker (CemCom.ru, 2015; MاستeraBetona.ru, 2015; Arka.am, 2016).

In the beginning of 2014, the owners of Mika Cement went bankrupt and the shares of the company were retained by VTB Bank (Armenia). VTB Bank agreed to provide the plant with a \$4.6 million loan to restart production, return to production of about 200,000 t/yr of cement, and retain 470 jobs for the city. In July 2014, the plant resumed operations and eventually paid off most of its debts to its workers. As of October 2015, however, the total debt of the plant had reached 508 million drams (about \$1.06 million). In 2015, Hrazdan Cement produced only about 75,000 t of cement because of the low demand for cement in the region (Badalyan, 2016).

**Sodium Compounds (Caustic Soda) and Methanol.**—In 2015, Armenia produced 29 t of caustic soda, which was a 48% decrease compared with production in 2014 and the lowest annual production amount of the past 5 years. The sole producer of caustic soda and other chemicals in Armenia was OOO Nairit. The Nairit chemical plant in Yerevan was built in 1936 and had been the only producer of synthetic (chloroprene) rubber in the Soviet Union. In 2006, the Government sold 90% of the company shares to a consortium called Rhinoville Property Ltd. of the United Kingdom, which reportedly included American, Polish, and Russian companies, and retained a 10% stake in the plant. Rhinoville Property promised to modernize the plant and borrowed \$70 million from the Inter-State Bank of the Commonwealth of Independent States (CIS). By 2010, production was essentially stopped and, in 2014, the Moscow Arbitrage Court awarded \$107 million (\$70 million for the original loan and \$37 million in interest and penalty payments) to the CIS Inter-State Bank. The Government of Armenia agreed to pay the debt to regain the ownership of the plant (Lragir.am, 2015; Petrosyan, 2015).

The Government was hoping to revive production at the Nairit chemical plant and to attract investors from China, Iran, or Russia. According to preliminary estimates, restarting production at Nairit would require between \$200 million and \$300 million. The Government, however, was hoping to revive the plant at a much lower cost, on the order of between \$55 million and \$70 million. In particular, it was noted that natural gas imported from Iran has a lower methane content than the natural gas imported from Russia. If the gas from Iran is used for production of synthetic rubber, the unit cost would be about 20% lower. The Government expected that revitalization of Nairit would increase the country's GDP by between \$110 million and \$120 million. In addition to about 17,000 t/yr of synthetic rubber, the plant, after modernization, would produce 6,000 t/yr of caustic soda, between 2,000 and 2,500 t/yr of hydrochloric acid, and 30,000 cubic meters of methanol.

On the other hand, the World Bank conducted its own study and concluded that modernization of Nairit was uneconomical. The report stated that the plant's assets were technically outdated, which made its products noncompetitive, and that the modernization would require an investment of at least \$250 million. The Government, nevertheless, intended to revive Nairit because completely closing down the plant would carry high financial and social costs (Lragir.am, 2015, 2016).

In January 2015, Nairit's management laid off 2,200 staff at the plant and later hired back about 490 people to keep the plant mothballed. At yearend, it was not clear if the Government was able to find investors or had made any other decisions about the plant's future (Petrosyan, 2015).

## Outlook

In the next few years, Armenia is likely to increase its copper, molybdenum, and rhenium production, partly because of the ramp-up of production at the Teghout Mine. The country's ability to increase production of industrial minerals in the near future would probably depend on many factors, including development of better infrastructure to facilitate exports of those materials. Armenia's economy is expected to receive a boost from lower energy prices and better access to capital markets of Kazakhstan and Russia as a result of joining the Eurasian Economic Union in 2015. The economy could also slow down, however, because of recession trends in the countries of the Eurasian Economic Union.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015	
<b>METALS</b>						
<b>Aluminum:</b>						
Rolled	26	21	18	20	11	
Foil	25,289	26,243	27,700	29,231	29,653	
Cadmium	(3)	43	41	43	33 <sup>e</sup>	
<b>Copper:</b>						
Concentrate, Cu content	33,597	41,220	48,887	41,216	67,600 <sup>e</sup>	
Blister, smelter, primary	8,876	10,075	10,771	9,814	11,601	
Ferromolybdenum	5,525	5,836	6,619	6,528	5,576	
Gold, mine output, Au content	kilograms	2,736	2,896	3,473	3,994	3,100 <sup>e</sup>
<b>Molybdenum:</b>						
Concentrate, Mo content	5,745	6,525	6,900	7,162	6,300 <sup>e</sup>	
Metal	486	675	746	748	748	
Rhenium	kilograms	254	293	298	351	350 <sup>e</sup>
Silver	do.	25,205	22,244	19,458	19,333	15,000 <sup>e</sup>
Steel, rebar	--	--	4,000 <sup>e</sup>	50,000 <sup>e</sup>	50,000 <sup>e</sup>	
Zinc, concentrate, Zn content	8,475	10,700	10,530	9,710	7,500 <sup>e</sup>	
<b>INDUSTRIAL MINERALS</b>						
Cement	thousand metric tons	422	438	431	427	417
Clay, bentonite		835	4,987	15,387	798	1,592
Diamond, cut	carats	65,000	67,000	94,000	60,000	81,000
Gypsum		34,027	30,446	28,679	22,317	19,392
Lime	thousand metric tons	25,053	27,294	28,238	26,167	23,063
Perlite		229	181	53	14	14 <sup>e</sup>
Salt		35,600	38,000	30,800	30,000	27,000
Sodium compounds, caustic soda		63	82	96	56	29
Stone, tuff		95,402	64,224	53,203	54,514	55,000 <sup>e</sup>

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through July 20, 2016.

<sup>2</sup>In addition to the commodities listed, Armenia may have produced barite, diatomite, and limestone, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Less than ½ unit.

TABLE 2  
ARMENIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit name	Annual capacity <sup>e</sup>
Aluminum, rolled and foil		ARMENAL (formerly Kanaker aluminum plant) (United Company RUSAL)	Kanaker	28,000
Cement		Ararat Cement Factory CJSC	Ararat region	1,200
Do.	thousand metric tons	Hrazdan Cement	Hrazdan	1,200
<b>Copper:</b>				
Mine output, Cu content		Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	NA
Do.		Dundee Precious Metals Kapan (Dundee Precious Metals Inc.)	Kapan	NA
Do.		Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	
Do.		ZAO Teghout (Vallex Group)	Lori Martz	30,000
Blister		ZAO Armenian Copper Programme (ACP) (Vallex Group)	Alaverdi	15,000
Diamond, cut stones		Aghavni diamond-cutting works <sup>2</sup>	Nor Geghi	NA
Do.		Amma group diamond-cutting works <sup>2</sup>	Artashat	NA
Do.		Andranik-Dashk diamond-cutting works	Nor Hachyn	NA
Do.		Arevakn diamond producing plant	do.	NA
Do.		Diamond Company of Armenia (DCA)	Yerevan	NA
Do.		Diamond Tech	Talin	NA
Do.		Lori diamond-cutting works	Nor Hachyn	NA
Do.		Lusampor <sup>2</sup>	Melik'gyugh	NA
Do.		Punji diamond-cutting works <sup>2</sup>	Yerevan	NA
Do.		Sapphire diamond-cutting works	Nor Hachyn	NA
Do.		Shoghakan gem-cutting plant	do.	120
Gold	kilograms	Ararat Gold Recovery Co. (AGRC) [GeoProMining, Ltd. (GPM)]	Sotk (Zod)	NA
Do.	do.	Dundee Precious Metals Kapan (DPMK) (Dundee Precious Metals Inc.)	Shahumian (Kapan) deposit	NA
<b>Molybdenum:</b>				
Mine output, Mo content		Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	2,000
Do.		Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	20,000
Do.		ZAO Teghout (Vallex Group)	Lori Martz	NA
Metal, ferromolybdenum		Armenian Molybdenum Production LLC (AMP) (Cronimet Mining GmbH, 51%, and Armenian residents, 49%)	Yerevan	3,600
Do.		OAO Yerevan Pure Iron Plant	do.	NA
Perlite	thousand metric tons	OAO Aragats Perlit	Aragats deposit	1,100
Rhenium		Agarak copper-molybdenum mining and processing complex (ACMC) [GeoProMining, Ltd. (GPM)]	Agarak	NA
Do.		Zangezur copper-molybdenum complex (ZCMC) [Cronimet Mining GmbH, 60%; OAO Yerevan Pure Iron Plant, 15%; Armenian Molybdenum Production LLC (AMP), 12.5%; Zangezur Mining LLC, 12.5%]	Kajaran	NA
Sodium compounds, caustic soda		OOO Nairit (Government)	Yerevan	100
Steel, rebar		Armenian Steel Casting Enterprise (ASCE) Group	Charentsavan	NA
Zinc, mine output, Zn content		Dundee Precious Metals Kapan (Dundee Precious Metals Inc.)	Kapan	NA

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Many location names have changed since the breakup of the Soviet Union. Many enterprises, however, are still named or commonly referred to based on the former location name, which accounts for discrepancies in the names of enterprises and the names of locations.

<sup>2</sup>Current existence of enterprise cannot be confirmed.