



# 2011 Minerals Yearbook

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## TAJIKISTAN

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# THE MINERAL INDUSTRY OF TAJIKISTAN

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Tajikistan has a wide range of mineral resources. Reportedly, the country has more than 600 mineral deposits of anthracite coal, antimony, bismuth, boron, copper, gemstones, gold, iron ore, lead, manganese, molybdenum, natural gas, nickel, petroleum, phosphor, salt, silver, strontium, tin, tungsten, uranium, zinc, and other minerals. Mining that was successfully developed in the 1980s had declined during the 1990s because of economic and political difficulties in the country. In the past decade, Tajikistan was making significant efforts to revive its mineral production. In November 2011, the Government approved a new program called Program for Development of Geological Resources. The program's goals are to encourage intensive development of mineral deposits, provide of the country's industry with domestic raw materials, and reduce imports of mineral resources. The program emphasizes the new requirement that companies seeking to obtain a license for exploration and development of Tajik mineral resources must demonstrate that the project will provide for a complete cycle of mineral production domestically, from extraction of raw materials to production of the final product. As of December 2011, licenses for mineral exploration and development had been issued to 313 companies (Polpred.com, 2011a).

Tajikistan had significant hydropower resources. The hydropower plants with the largest electricity generating capacity were the Nurek plant, which had an annual capacity of 3,000 megawatts (MW), the Sangtuda plant (670 MW), and the Baipaza plant (600 MW). Outdated infrastructure and poor management of the grid led to frequent power shortages, however, especially during droughts. Tajikistan relied on imported hydrocarbons for its industrial production; most of the imported hydrocarbons were from Russia, Turkmenistan, and Uzbekistan (European Bank of Reconstruction and Development, 2010).

In response to Russia's imposition of export tariffs on refined petroleum products beginning in May 2010, Tajikistan started exploring for alternative sources of petroleum. The Government started negotiations with Azerbaijan, Iran, Kazakhstan, and Turkmenistan; intensified its efforts to produce more domestic coal; and continued petroleum exploration in the country. Also, in July 2011, Tajikistan started construction of a petroleum refinery in Tursunzade (the country's first), which is located 40 kilometers west of Dushanbe. According to some sources, the construction would cost between \$1 million and \$1.5 million and the refinery would have a capacity of 100,000 metric tons per year (t/yr) of petroleum (Realestate-foreign.ru, 2011).

In the past several years, several companies had been conducting oil and gas exploration work in Tajikistan. Tethis Petroleum Ltd. of the United Kingdom had been working in the country since 2008, and, at the end of 2011, the company announced that it had found petroleum at the Bishtinchak-20 well. According to estimates produced during Soviet times, Tajikistan had reserves and resources of petroleum and natural

gas totaling 113 million metrics tons (Mt) and 863 billion cubic meters, respectively. OAO Gazprom of Russia was conducting exploration in four prospecting areas—Sarikamysh, Sargazon, Rengan, and Western Shokhambary. Gazprom expected to increase production of natural gas to 2 billion cubic meters eventually and thus meet all the country's domestic demand (Lovkis, 2010; TopTJ.com, 2011a).

Aluminum production was the main source of export revenue (more than 50%) for Tajikistan in 2011. Tajik Aluminum Co. (TALCO) struggled to meet its production targets in 2010 and production declined; the decrease in output was attributed to aging equipment and a shortage of qualified personnel. In January 2011, it was announced that TALCO planned a \$100 million upgrade that would include equipment modernization and staff training. Earlier, TALCO had announced some other modernization plans, the main goals of which were to build plants and infrastructure and use a higher percentage of domestic raw materials in its production of aluminum (Polpred.com, 2011b; Worldal.com, 2011).

The main TALCO facilities were located in the city of Tursunzade, which lies on the border with the Surkhan-Darya Viloyati of Uzbekistan. Starting in 2010, the group Ecological Movement of Uzbekistan organized a series of protests against TALCO's expansion. Residents of the Surkhan-Darya Viloyati demanded that TALCO close altogether, claiming that it was producing harmful pollution that was negatively affecting the health of the residents and destroying the region's ecology, including its water and air quality. The Uzbek authorities ordered that all rail cars containing raw materials for TALCO production be stopped at the border with Tajikistan (Fergananews.com, 2011).

The Government of Uzbekistan demanded that TALCO agree to have a group of international ecological experts determine whether the claims regarding the environmental effects of TALCO's aluminum production are true. The Ecological Movement of Uzbekistan stated that the cost of the environmental damage inflicted on Uzbekistan by TALCO amounted to \$31.3 million annually and demanded compensation of \$447.3 million for the past 16 years of operation. According to Uzbek ecologists, TALCO emits 22,000 metric tons (t) of pollutants per year, including 120 t of hydrogen fluoride. A large share of the emissions was carried by the winds to the Surkhan-Darya Viloyati in Uzbekistan, which had 600,000 residents. Also, the Uzbek ecologists claimed that aluminum content in the surface water in the Sarkhan-Darya Viloyati was five times higher than the maximum safe levels (Centralasia.ru, 2011).

In September 2011, representatives of the Ecological Movement of Uzbekistan sent letters to three international organizations (the General Assembly of the United Nations, the United Nations Environment Programme, and the World Health Organization) demanding an immediate stop of production

at TALCO, organization of an international ecological investigation to establish the amount of damage inflicted by TALCO, and that TALCO be allowed to reopen only after a complete modernization of the company's facilities. According to the group, the modernization must significantly reduce emissions of harmful pollutants and include the installation of scrubbers and other antipollution equipment. The group also demanded that TALCO compensate Uzbekistan for the damage inflicted in the past decades. The letter was submitted with more than 750,000 signatures (Centralasia.ru, 2011).

The conflict with Uzbekistan concerning the environmental impact of TALCO's aluminum production significantly endangered production not only at TALCO but at other Tajik enterprises as well. If the demands of Uzbekistan were not met, Uzbek authorities could stop deliveries of other raw materials being shipped to Tajikistan through Uzbek territory. One such critical commodity is natural gas used by TALCO and other energy-intensive enterprises, such as cement plants.

### Minerals in the National Economy

In 2011, Tajikistan's gross domestic product (GDP) was reported to be \$6.3 billion and real GDP growth was 7.4%. Industrial production accounted for 30.7% of the GDP, even though it decreased over the course of the year by 4.0%. Production of mineral products constituted a significant portion of the national economy. Mining and quarrying made up 29.7% of the value of industrial production, chemical production contributed 14.7%, and production of hydrocarbons contributed 9.7% (Agency on Statistics Under the President of the Republic of Tajikistan, 2011, 2012b; U.S. Central Intelligence Agency, 2012).

In 2011, the country's revenue from exports amounted to \$1.2 billion, which was far less than the \$3.2 billion it spent on imports. The main categories of exported commodities were (in order of the contribution to export revenue) aluminum, electricity, raw cotton, cotton fiber, gold, fruits and vegetables, vegetable oil, and textiles. A single export category (aluminum) contributed 53% of the total export revenue. The main export partners were, in order of export value, Russia, China, Iran, and Turkey. The main import categories were, in order of export value, electricity, petroleum products, aluminum oxide, machinery and equipment, and foodstuffs. The main import partners, in order of the value of the imports, were Russia, China, Kazakhstan, Turkey, Uzbekistan, Azerbaijan, Ukraine, and Turkmenistan (Agency on Statistics Under the President of the Republic of Tajikistan, 2011, 2012a; U.S. Department of State, 2012).

### Production

In 2011, Tajikistan decreased production of aluminum by 20.3% and that of natural gas, by 17.5%. At the same time, coal production increased by 18.6%; that of gypsum, by 9.6%; gold and cement, by 9.3% each; petroleum, by 6.3%; and silver, by 1.8%. Other production data are in table 1.

### Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

## Commodity Review

### Metals

**Aluminum.**—The aluminum smelter TALCO was Tajikistan's only aluminum producer; it had the capacity to produce 517,000 t/yr. In 2011, aluminum production was only 278,000 t/yr, which constituted a 20.3% decrease compared with that of 2010. The decrease in production was attributed to the need for modernization as well as to production interruptions related to the conflict with Uzbekistan concerning environmental issues (MetalDaily.ru, 2012).

In 2010, TALCO had developed plans to replace a significant share of imported raw materials with domestic materials. It was expected that when the program is complete, TALCO will get about 60% of its production inputs from Tajik suppliers. The program was expected to last for 5 years and would include developing domestic resources of alumina, aluminum fluoride, cryolite, and graphite products, as well as production equipment and spare parts. The construction of a plant that would produce aluminum fluoride and cryolite was underway in the city of Yavan. The plant was a joint venture with China National Heavy Machinery Corp., and, when completed, would have the capacity to produce 18,000 t/yr of aluminum fluoride and 12,000 t/yr of cryolite, which was sufficient to meet TALCO's demand. The construction of a sulfuric acid plant, which was a joint venture with Tianchen Chemical Engineering Corp. (TCC) of China, was scheduled to start in February 2011. The planned capacity of the plant was 100,000 t/yr of sulfuric acid, and the cost of the project was \$50 million. According to the agreement between TALCO and TCC, in 8 years after the construction is complete, TALCO would become the owner of the plant (MetalTorg.ru, 2011; Polpred.com 2011b, 2012; Tajik Aluminium Co., 2012).

**Gold.**—In 2011, Tajikistan produced 2,240 kilograms (kg) of gold, which was an increase of 9.3% compared with that of 2010. In 2011, the enterprises producing gold in Tajikistan were the Tajik-Chinese joint venture SP Zerafshan, the Tajik-British joint venture Darvaz, the Tajik-Canadian joint venture Aprelevka, the Government-owned Tillo Tochik [Tajik Gold], and a Tajik private company, Arteli Odina (Ergasheva, 2011; Yuldashev, 2011; Hudoyarov, 2012; Infogeo.ru, 2012).

The main gold producer in Tajikistan, SP Zerafshan, produced 1,329.2 kg of gold and paid Tajik taxes in the amount of \$18 million. In 2011, SP Zerafshan worked on modernization and construction of new facilities. The Chinese partner in the joint venture, ZiJin Mining Group Co. Ltd., had invested \$50 million in 2010 and an additional \$10 million in 2011, and was planning to invest \$50 million more in the next 5 years. In August 2011, a new beneficiation plant, which had a daily production capacity of 2,000 t, started production; the new facility cost the company \$20 million to build. It was expected that the beneficiation plant would employ 2,000 workers. In the end of 2011, SP Zerafshan was also finishing construction of another new facility—a new gold refining plant. SP Zerafshan was planning to increase its total output to 5 t/yr of gold by 2016 (Ergasheva, 2011; Gold.ru, 2012; Yuldashev, 2012; Advis.ru, 2013).

In November 2011, the Tajik Government issued a gold mining license to Kryso Resources Ltd. of the United Kingdom to produce gold at the Pakrut deposit. The company was planning to start operations at the end of 2013 and was expecting to be able to produce about 2 t/yr of gold during the first several years of mining. According to some estimates, Pakrut had gold reserves of 100 t. The Pakrut deposit had about 2 grams of gold per metric ton of ore, which is considered to be a quite high ratio. Kryso Resources had spent \$11.6 million on prospecting work in the area (Regnum.ru, 2011; Nabieva, 2012).

**Silver.**—In 2011, Tajikistan produced an estimated 2,700 kg of silver, which was an increase of 1.8% compared with that of 2010. For the past 5 years, silver mining in Tajikistan had been stalled, but in 2010, the Government announced an international tender for the right to develop a Koni Mansuri Kalon [Big Konimansur] polymetallic deposit. The deposit was one of the largest silver deposits in the world, and it had been prospected in the 1970s. The deposit contained about 1 Mt of ore with silver content of 49 grams per metric ton (g/t), lead content of 0.49%, and zinc content of 0.38%. Total reserves of silver of Koni Mansur Kalon were estimated to be 70,000 t. As of February 2012, the two major contenders were BHP Billiton Ltd. of Australia and an international consortium led by Kazzinc of Kazakhstan. Other participants of the consortium were Glencore International plc of Switzerland, Konimansur of Kazakhstan, and the ore refinery Adrasman of Tajikistan. Production from the deposit could continue for 30 to 40 years. The Government of Tajikistan was planning to announce the results of the tender in the middle of 2012 (TopTJ.com, 2011b; Kyrtag.kg, 2012).

### Mineral Fuels and Related Materials

**Coal.**—In 2011, Tajikistan produced 236,800 t of coal, which was an increase of 18.6% compared with that of 2010. Tajikistan had significant reserves of coal amounting to 36 deposits containing, according to some sources, 3,600 Mt of coal; proven resources were estimated to be 714 Mt. Tajikistan had a variety of coal types, from lignite and bituminous to the highest grades of anthracite. During the decade of the 1990s, however, coal mining had decreased by almost 30 times, from 467,000 t to 16,600 t. After the Government announced the new Program for Development of Geological Resources, one of the declared goals was to make the country less dependent on imported resources, including energy resources. In the past few years, many energy-intensive enterprises, such as producers of bricks, cement, glass, and steel, started to switch their production to coal from more expensive imported energy sources (natural gas and oil products) (Dynnichenko, 2012; Tjknews.com, 2012).

In 2011, 10 coal deposits were mined by 14 companies, 6 of which were Government-owned. The leading producers were OAO Anguisht, SP Anzob, and UP Fon-Yagnob. The reports showed that the cost of domestic coal was much lower compared with imported alternatives, even imported coal. As of the end of August, the price of imported coal was \$69 per metric ton whereas the price of domestic coal was only \$29 per metric ton (Khovar.tj, 2011; Tjknews.com, 2012).

### Outlook

Tajikistan has significant undeveloped mineral resources, including a large number of metals, rare-earth minerals, and uranium. During the past decade, the country started to intensify its efforts to revive its mineral industry and increase its mineral production, which had decreased significantly or ceased during the 1990s. Given those efforts, it is likely that Tajikistan will be able to increase its output of gold and silver in the next few years and perhaps will continue to expand the production of coal and cement. At the same time, the country currently does not produce enough energy to support its industrial sector. The recent decision to provide energy for most of its industry by burning coal (rather than by using imported natural gas as it has done in the past) may lead to additional long-term environmental problems and compound international concerns related to fluoride emissions at TALCO. It remains to be seen whether the country will be able to use its natural resources to raise its living standards and start bringing back migrant workers, of whom almost 1 million are currently working outside of the country (United Nations Development Programme, 2011; World Bank, The, 2011).

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>		2007	2008	2009	2010	2011 <sup>e</sup>
METALS						
Aluminum, primary		419,060	339,450	359,385	348,850	278,000 <sup>3</sup>
Antimony ore, Sb content <sup>e</sup>		2,000	2,000	2,000	2,000	2,000
Gold	kilograms	2,000	1,672	1,361	2,049	2,240 <sup>3</sup>
Lead ore, Pb content <sup>e</sup>		800	800	800	800	800
Mercury, Hg content <sup>e</sup>		30	30	30	30	30
Silver, Ag content	kilograms	3,110	3,110	1,268 <sup>r</sup>	2,652 <sup>r</sup>	2,700
INDUSTRIAL MINERALS						
Cement		313,100	190,400	195,000	288,200	315,000 <sup>3</sup>
Fluorspar <sup>e</sup>		8,500	8,500	8,500	8,500	8,500
Gypsum		8,500	8,500	26,400 <sup>3</sup>	14,600	16,000
Nitrogen, N content of ammonia		24,500	23,000	--	-- <sup>r</sup>	--
Salt <sup>e</sup>		52,000	52,000	52,000	52,000	52,000
MINERAL FUELS AND RELATED MATERIALS						
Coal		181,400	198,500	178,300 <sup>r</sup>	199,700	236,800 <sup>3</sup>
Natural gas	thousand cubic meters	17,400	16,100	19,900 <sup>r</sup>	22,800	18,800 <sup>3</sup>
Petroleum, crude:						
In gravimetric units		23,700	25,900	26,200	27,000	28,700 <sup>3</sup>
In volumetric units <sup>e</sup>	42-gallon barrels	102,000	85,900	79,600	78,500	83,440 <sup>3</sup>

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through July 10, 2012.

<sup>2</sup>In addition to the commodities listed, Tajikistan had produced a number of other mineral commodities in the past but available information is inadequate to determine if production was still taking place.

<sup>3</sup>Reported figure.

TABLE 2  
TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Aluminum	TALCO aluminum smelter [formerly the Tajikistan Aluminum Smelter (TadAZ)]	Tursunzade	517,000
Antimony, ore	Anzob mining-beneficiation complex	Dzhizhikrutskoye Sb-Hg deposit	700,000
Antimony, metal	Isfara hydrometallurgical plant	Isfara	500
Arsenic	Mosrif deposit	NA	NA
Bismuth	Isfara hydrometallurgical plant	Isfara	500
Do.	Leninabad mining-beneficiation complex	Yuzhno-Yangikanskiy deposit	25
Bismuth, copper, fluorspar, gold, silver, zinc (ore processing)	Adrasman mining-beneficiation complex	Kanimansurskoye deposit	650,000
Boron	Yakarkharskoye deposit	Badakhshan region	NA
Cement	OAO Tajikcement	Dushanbe	1,000,000
Coal	Fon-Yagnob hard coal deposits	Pyandzh region	50,000
Do.	Isfara hydrometallurgical plant	Isfara	300,000
Do.	OAO Anguisht	Shurab region	NA
Do.	Shurab brown coal deposit	do.	NA
Do.	SP Anzob	do.	NA
Copper-lead-zinc	Leninabad mining-beneficiation complex	Yuzhno-Yangikanskiy deposit	2,500
Dolomite	Yavan electrochemical complex	Pashkharovskoye deposit	NA
Fluorspar, concentrate	Takob mining-beneficiation complex	Takob and Krasnye Kholmy deposits	60,000 <sup>2</sup>

See footnotes at end of table.

TABLE 2—Continued  
TAJIKISTAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity		Major operating companies, main facilities, or deposits	Location or deposit names	Annual capacity <sup>e</sup>
Gold, in ore	kilograms	Aprelevka joint venture	Aprelevka deposit	200
Do.	do.	Arteli Odina	NA	NA
Do.	do.	Darvaz joint venture	Yak-Suyskoye deposit, Khatlonskaya region	2,000
Do.	do.	Tajikzoloto mining-beneficiation complex, Pamir Artel	Darvazy and Rankul placer deposits, placers in central and southern parts of country	5,000
Do		Tilloi Tochik	NA	NA
Do.	kilograms	Zerafshan Gold Co.	Dzhilau and Taror deposits, Sughd Oblast <sup>f</sup>	2,500
Gold, ore processing	do.	Kansayskaya factory	Aprelevka, Burgunda, Kyzyl-Chek, and Shkol'noye deposits	165,000 <sup>2</sup>
Do.	do.	Vostokredmet refinery	Qizfaquz	NA
Lead-zinc		Adrasman mining-beneficiation complex	NA	NA
Do.		Kansayskoye mining complex	Karamazor region	NA
Do.		Takaeliykiy metallurgical complex	NA	NA
Limestone		Dushanbe cement complex	Kharangonskoye deposit	NA
Loam	do.		Varzobskoye Ushchel'ye deposit	NA
Marble		Dal'yan Bolo deposit	Ganchinskiy region	NA
Do.		Dashtak deposit	Darvaz region	NA
Do.		Jilikul deposit	Pendzhikentskiy region	NA
Mercury		Anzob mining-beneficiation complex	Dzhizhikrutskoye deposit	150
Natural gas and petroleum:				
Natural gas	thousand cubic meters	Sixteen oil-gas deposits under exploration, which includes Ayritanskoye, Madaniyatskoye, and Ravatskoye	Fergana depression	200,000 <sup>2</sup>
Petroleum		Beshtentyakskoye, Kichik-Belskoye, Shaambary, and Uzunkhorskoye deposits	Southern Tajik depression	200,000 <sup>2</sup>
Salt		Ashtskiy plant	Kamyshkurganskoye deposit	NA
Do.		Khoja-Sartez, Samanchi, and Tanabchi deposits	NA	NA
Do.		Voseyskiy plant	Khodzha-Muminskoye deposit	NA
Do.		Yavan electrochemical complex	Tut-Bulakskoye deposit	NA
Silver	kilograms	Adrasman mining-beneficiation complex	Bolshoy Kanimansur deposit	15,000
Strontium, ore		Chaltash, Chilkutan, and Davgir deposits	Khatlon region	180,000
Tin-tungsten		Tafkon deposit	NA	NA
Tungsten ore		Maykhura deposit	Central Tajikistan	150,000

<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 that of locations.

<sup>2</sup>Capacity estimates are totals for all enterprises that produce that commodity.