



2014 Minerals Yearbook

UKRAINE

THE MINERAL INDUSTRY OF UKRAINE

By Elena Safirova

Ukraine was among the world's leading producers of a number of minerals. It was one of the world's top four producers of gallium; the third-ranked producer of rutile (13.4% of world output, exclusive of U.S. production); the fifth-ranked producer of titanium sponge (3.7% of world output, exclusive of U.S. production); the seventh-ranked producer of iron ore (2.0% of world output) and manganese ore (2.4% of world output); and the ninth-ranked producer of steel (1.6% of world output), ilmenite (4.5% of world output), and pig iron (2.1% of world output). The country had significant coal and uranium resources but depended on imported petroleum and natural gas (Bedinger, 2016a, b; Corathers, 2016; Fenton, 2016; Jaskula, 2016; Tuck, 2016).

In 2014, several political developments in Ukraine affected the economy of the country, including its mineral industry. In late February, the President of Russia ordered the invasion of Ukraine's Crimea Peninsula, claiming that the action was needed to protect ethnic Russians living there. Two weeks later, in March, a referendum was held regarding the integration of Crimea into the Russian Federation. The referendum was not recognized by the Governments of Ukraine, the United States, the European Union countries, and the United Nations General Assembly. After the referendum, the Ukrainian Government asserted that Crimea continued to be a part of Ukraine. In addition, parts of eastern Ukraine did not recognize the new Ukrainian Government and formed their own separatist republics with their own administration. This action resulted in armed conflicts with the Ukrainian Government that continued throughout most of 2014. In September 2014, the representatives of Russia, Ukraine, and the separatist republics signed a cease-fire agreement, but the agreement largely failed to stop the fighting (U.S. Central Intelligence Agency, 2016).

Minerals in the National Economy

In 2014, Ukraine's real gross domestic product (GDP) decreased by 6.8% compared with that of 2013.¹ The nominal GDP in 2014 amounted to \$130.8 billion.² During the year, overall annual industrial output was reduced by 10.1% compared with that of 2013; production of mining and quarrying decreased by 13.7%, of which coal and lignite production decreased by 30.5%, oil and gas extraction decreased by 1.7%, and mining of metal ores decreased by 6.6%. Production of the manufacturing sector decreased by 9.3%. Within the manufacturing sector, the manufacture of basic metals decreased by 14.7%; fabricated metal products, except machinery and equipment, decreased by 13.9%; coke and refined petroleum

products decreased by 21.3%; chemicals and chemical products decreased by 14.2%; and cement, lime, and plaster decreased by 7.7% (State Statistics Service of Ukraine, 2015a, b).

The State Statistics Committee of Ukraine reported that the share of mining and quarrying in the country's GDP was 10.7% in 2014, and the share of manufacturing was 63.4%. The share of industrial production in the GDP was 25.5%. The share of metallurgical production in overall industrial production was 16.9%; the share of chemical and chemical products manufacturing was 3.5%; and the share of coke and refined petroleum manufacturing was 3.4% (State Statistics Service of Ukraine, 2015a, b).

Government Policies and Programs

In April 2014, the Verkhovna Rada (the Parliament) supported the bill proposed by the Government to increase royalty payments for coking coal, iron ore, natural gas, and petroleum. The new royalty rates were to be valid through the end of 2014 and to be reconsidered at yearend. For natural gas extraction, the rates varied by depth of extraction and by the use of the resource. For nonresidential use, the rate for a depth of extraction of less than 5 kilometers was increased to 55% from 28% and for a depth of extraction of more than 5 kilometers, to 28% from 15%. For residential use, the rates remained unchanged at 20% of the value for a depth of extraction of less than 5 kilometers and 14% of the value if the depth of extraction exceeded 5 kilometers (Delo.ua, 2014a).

The royalty rates for petroleum and gas condensate production extracted from depths of less than 5 kilometers were increased to 45% from 39% for petroleum and to 45% from 42% for gas condensate. The rates for petroleum and gas condensate extracted from depths of more than 5 kilometers were increased from 18% to 21%. Also, the Government changed the structure of payments for iron ore and coking coal mining. Prior to April 2014, iron ore producers paid 3.64 hryvnias (\$0.30) per mined ton of ore. After the change, the producers would pay 5% of the value of the marketable product, which in this case was iron ore concentrate. As a result, the effective increase in the rental payment would be equivalent to about 3.5 times. The rate for coking coal extraction was increased to 1.5% of its value from 0.4% (Delo.ua, 2014a; Grechko, 2014).

The increases in royalty rates, in addition to the 1.5% military tax imposed on wages, were expected to increase the Government's tax collection. The increase in tax rates for oil and gas was expected to add 4.8 billion hryvnias (about \$400 million) to Government revenues, and the military tax on wages would add 2.9 billion hryvnias (about \$240 million). Some independent observers, however, expressed concerns about economic disincentives for the production of natural resources that might result from the rate increases (Delo.ua, 2014a).

¹The data in this report do not include the territory of the Autonomous Republic of Crimea, the city of Sevastopol, and parts of the zone of anti-terrorist operation.

²Where necessary, values have been converted from Ukrainian hryvnia (UAH) to U.S. dollars (US\$) at an annual average exchange rate of UAH11.977=US\$1.00 for 2014.

Production

Production of most mineral commodities decreased in 2014. The output of manganese metal decreased by 82%; salt, by 57%; sulfuric acid, by 53%; anthracite coal, by 47%; and nitrogen, by 43%. The output of several other mineral commodities also decreased significantly, including limestone, which decreased by 38%; zircon concentrate, by an estimated 34%; ilmenite concentrate, by an estimated 33%; rutile concentrate, by an estimated 32%; feldspar and marketable coal, by 29% each; and ferrosilicon, by 26%. On the other hand, output of kaolinitic clays increased by 46%; kaolin, by 21%; and ferromanganese and silicomanganese, by 16% each. These and other production data are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

The total value of Ukraine's exports of goods and services decreased to about \$64.1 billion in 2014 from \$74.8 billion (revised) in 2013; exports of goods only decreased to \$53.9 billion in 2014 from \$62.3 billion (revised) in 2013. The value of total exports was equal to about 49% of Ukraine's GDP in 2014. Ukraine's leading export category in terms of value was ferrous metals, and in 2014, exports of ferrous metals were valued at \$12.9 billion and made up 23.9% of the total value of all exports of goods; exports of cinder, ores, and slag were valued at \$3.5 billion and made up 6.4% of the total value of commodity exports. Another \$2.0 billion (3.7% of the total value of exports) was contributed by exports of mineral fuels and petroleum products. The value of exports of mineral products and metals made up about 39.6% of the value of total commodity exports. The main export partners of Ukraine were Russia (which received 18.2% of Ukraine's commodity exports); Turkey (6.6%); Egypt (5.3%); China (5.0%); Poland (4.9%); Italy (4.6%); and India (3.4%) (State Statistics Service of Ukraine, 2015c).

The total value of Ukraine's imports of goods and services was about \$60.8 billion in 2014 and \$83.3 billion (revised) in 2013. The total value of Ukraine's imports of goods only was \$54.4 billion in 2014 and \$75.8 billion (revised) in 2013. The leading imported commodities were mineral fuels and refined petroleum products, which made up about 27.8% of the value of total commodity imports in 2014. The country's main import partners in 2014 were Russia (which supplied 23.3% of Ukraine's imports); China and Germany (9.9% each); Belarus (7.3%); Poland (5.6%); and the United States (3.5%) (State Statistics Service of Ukraine, 2015c).

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—The Nikolaevskiy alumina plant was the only producer of alumina in Ukraine and one of the leading nonferrous metal plants in Europe. The plant was owned by United Company RUSAL (RUSAL) of Russia

and was the second leading alumina-producing facility owned by the company. In 2014, the plant produced 1,457,000 metric tons (t) of alumina, which was a 2.4% decrease compared with the 2013 output. In addition to alumina, the plant produced aluminum hydrate and gallium, which were both exported and sold domestically. In 2014, the plant paid 339.6 million hryvnias (\$28.3 million) in various taxes. During the past 15 years, the plant invested tens of millions of hryvnias (millions of U.S. dollars) in the social programs of the Mikolayivskaya Oblast', and provided jobs for more than 2,000 contractors. According to the company's reports, in the past 5 years the plant reduced energy consumption by 20% without reducing the plant's output. In 2015, the company planned to increase alumina production to 1.7 million metric tons per year (Mt/yr) (Korrespondent.net, 2015).

Another RUSAL asset in Ukraine was being nationalized. In October 2014, the Supreme Economic Court of Ukraine decided to return 68% of the shares of the Zaporozhye Aluminum Complex (ZAIK) to the Government. The company stated that it planned to appeal. The reason for the decision was allegedly RUSAL's nonfulfillment of investment obligations. The October decision was the third court decision to return ZAIK to the Government. In 2010, RUSAL broke an agreement concerning the refinancing of an old \$75.5 million debt that ZAIK incurred before RUSAL became its owner. In April 2011, RUSAL stopped production of primary aluminum at ZAIK; the decision was motivated by the cancellation of discounted electricity rates that ZAIK had access to previously. In March 2014, the Dneprovskaya Environmental Public Prosecutor's Office was conducting an investigation related to air emissions from a thermal plant operated by ZAIK. According to the company, RUSAL had a complete set of relevant documents and permits to operate the thermal plant and was pursuing the matter in the courts (Ecoindustry.ru, 2014; United Company RUSAL, 2015).

As of the beginning of 2014, the only product produced at ZAIK was aluminum wire rods (an intermediate product, which is usually used for aluminum cable production). ZAIK had the capacity to produce 20,000 metric tons per year (t/yr) of wire rods. The company noted that production of wire rods was dependent on intermittent demand. In 2013, ZAIK produced 17,000 t of wire rods, but the demand in 2014 was significantly reduced. In August 2014, RUSAL announced that it had stopped producing wire rods at ZAIK because, during the past several years, the cost of producing wire rods at ZAIK had increased three times and was exceeding the cost of producing rods at other RUSAL plants. As a result, by the end of 2014, ZAIK did not produce any products. It was not clear, however, if the Government would be able to find investors who would be able to make ZAIK profitable (Metaltorg.ru, 2014a, b; Minprom.ua, 2014b).

Ferroalloys.—In 2014, according to the Ukrainian Association of Ferroalloys Producers, production increased by 24.7% to 1,088 Mt. In particular, the output of silicomanganese increased by 32.7% to 840,900 t and ferromanganese, by 23.2% to 103,000 t. The production of ferrosilicon decreased by 3.7% to 142,300 t, and the production of manganese metal was reduced by 81.9% to 1,300 t. In 2014, Ukraine increased imports of ferroalloys to 912,465 t, which was an increase of

3.3% compared with those of 2013. In particular, imports of ferrosilicon increased by 7.2% to 462,162 t. In 2014, exports of ferroalloys increased by 40.2% compared with the 977,500 t exported in 2013 and the revenue from their sales increased by 27.2% in 2014 compared with those of 2013 and amounted to \$1.152 billion. Ferrosilicomanganese made up about 70% of total ferroalloys exports; exports increased by 46.7% to 684,500 t. The major export partners for ferroalloys from Ukraine were Turkey, which received 23.2% of all exports by weight, and Russia, 19.4%. The Netherlands increased imports of Ukraine's ferroalloys by about 40% in 2014 compared with those of 2013, and, as a result, received about 12% of all Ukraine's ferroalloys (Business.ua, 2015; Metalbulletin.ru, 2015; Ukrudprom.com, 2015).

In 2014, Ukraine had four ferroalloys plants—the Kramatorskiy, the Nikopol'skiy, the Stakhanovskiy, and the Zaporozhskiy. The latter three plants were controlled by the Privat Group, and significant shares were owned by the EastOne Investment Group. The Nikopol'skiy ferroalloys plant was the largest of the three and produced a total of 669,400 t of ferroalloys in 2014. The Stakhanovskiy ferroalloys plant, which was located in Luhans'ka Oblast', produced 90,800 t of ferroalloys in the first 6 months of 2014, which was a 62% increase compared with the first 6 months of 2013. Between December 2012 and March 2013, the plant was not in operation, reportedly because of the high electricity rates that made its operation unprofitable. In May 2014, there were reports that the Stakhanovskiy ferroalloys plant had stopped operations because the energy supply to the plant was interrupted by a terrorist act. The energy supply was restored within a day and the plant continued operations between May and July 2014. In July, however, the plant stopped operations because of the continuing military actions in the area and did not restart operations in 2014 (Delo.ua, 2014b; Fixygen.ua, 2014; Unian.net, 2014).

In December 2013, the Cabinet of Ministers of Ukraine signed a memorandum of understanding (MOU) with the Nikopol'skiy, the Stakhanovskiy, and the Zaporozhskiy ferroalloys plants and with the Pobuzhskiy ferronickel complex. The MOU allowed the four plants to purchase electricity at discounted prices. Two of the plants—the Stakhanovskiy and the Zaporozhskiy—had received discounted prices in 2013. It was expected that the total discount for the four plants would amount to about 500 million hryvnias (about \$42 million). In exchange for the discounts, the Government demanded that the plants modernize, refuse to buy supplies from and sell products to offshore companies, sell products domestically at the same price as exports, make on-time payments of salaries and taxes, and fulfill mandatory social obligations. The cost of the discount was expected to be covered by increasing electricity rates charged to other industrial consumers (Kommersant.ru, 2013; Podolyanets, 2014).

In December 2014, the Eurasian Economic Commission (EEC), which was an agency of the Eurasian Economic Union, began investigating a price-dumping case against the Ukrainian ferroalloys plants. The premise of the investigation was that the electricity discounts from the Government allowed the ferroalloys plants to export ferroalloys at prices that were lower than the plants' actual costs and would lead to uncompetitive practices. The particular case under consideration was the export

price of ferrosilicomanganese to Russia. At yearend, the results of the investigation were not yet known (Vzglyad, 2015).

Gold.—Lugansk Gold Ltd., which was a subsidiary of Korab Resources of Australia, planned to invest a total of \$50 million in a gold project at the Bobrikovskoye gold sulfide deposit in Luhans'ka Oblast'. In March 2013, the company started a prefeasibility study of the deposit and eventually planned to produce between 1,900 and 2,200 kilograms per year (60,000 and 70,000 troy ounces per year) of gold. The project included construction of a beneficiation plant that would have the capacity to process up to 500,000 t/yr of ore. The preliminary resources of the deposit were estimated to be 63.5 t. In August 2013, Korab updated the Joint Ore Reserves Committee (JORC) Code-compliant reserves of the deposit to 102.6 t of gold and 507 t of silver. The average gold grade of the deposit was 1 gram per metric ton (g/t), and that of silver, 9.4 g/t, and the minimal grades were 0.5 g/t and 5 g/t, respectively. The new resource evaluation was about a 60% increase compared with the previous evaluation, which was done in October 2012. In March 2014, Korab Resources was looking for a company to purchase mine output from the Bobrikovskoye Mine for further processing and extraction of gold. The company had already mined ore that contained about 930 kilograms (30,000 troy ounces) of gold with an average of 3 g/t gold, and about one-fourth of the ore contained 5 g/t gold; the mined ore was being stored at the company's facility adjacent to the Bobrikovskoye Mine. Korab Resources was also open to tolling arrangements for ore processing, especially in the application to ores with higher gold content. It was not known if the mined material had been processed by yearend (Mineral.ru, 2014).

Manganese.—As of 2014, Ukraine had two mining and metallurgical complexes (GOKs) involved in the production of manganese ore. Both complexes were owned by the Privat Group. The leading producer was PAO Ordzhonikidze GOK, which produced about 70% of the total output of manganese mined in the country. The Ordzhonikidze GOK mined manganese using an open pit method and produced manganese concentrates with manganese content of between 26% and 43%. As of 2014, the Ordzhonikidze GOK included seven open pit mines, two beneficiation plants, one beneficiation and agglomeration plant, and large transportation and auxiliary plants (Ubr.ua, 2016b).

PAO Marganetskiy GOK mined manganese using predominantly an underground method; 80% of manganese was mined from underground. The Marganetskiy GOK mined the eastern part of the Nikopolmarganets basin. The GOK included two open pit mines, seven underground mines, two beneficiation plants, and auxiliary services. The Marganetskiy GOK was involved in the mining and beneficiation of manganese ores, mining of bentonite, and the production of manganese sulfate dehydrate, in both metallic form and as a solution (Bin.ua, 2015; Ubr.ua, 2016a).

In 2014, the Ordzhonikidze GOK reduced production of manganese agglomerate by 4.2% to 287,000 t but increased production of manganese concentrate by 9.7% to 594,300 t, compared with production in 2013. The Marganetskiy GOK increased production of manganese concentrate by 46.8% to 647,600 t in 2014. According to the Ukrainian Federation of

Metallurgists, average monthly wages at the Ordzhonikidze GOK were 3,820 hryvnias (about \$319), and those at the Marganetskiy GOK were 3,347 hryvnias (about \$279), which was 21% and 31% lower, respectively, than average wages in the mining industry in Ukraine. Neither plant operated during the winter months and both had posted operating losses since at least 2010 (UAProm.info, 2014; Bin.ua, 2015).

Nickel.—The OOO Pobuzhskiy ferronickel complex (PFC) was the only enterprise in Ukraine that had the capacity to produce ferronickel from low-metal-content oxidized nickel ores. The complex was located in the village of Pobuzhskoye in Kirovohrad'ska Oblast' and employed about 35% of the village population. In 2003, the Solway Investment Group of Cyprus acquired PFC and started operations after a long period of inactivity. Since then, Solway had invested about \$130 million in PFC and integrated the complex with other assets it owned, which were located in Guatemala, Indonesia, and Macedonia. The PFC relied on nickel ore imported from Guatemala and Indonesia. In 2014, PFC imported 1,144,579 t of nickel ore and concentrates worth \$76.7 million, which was a 37.6% decrease by volume and a 41.4% decrease by value compared with output in 2013; 84.14% of the shipments, by value, were from Guatemala and the other 15.86% were from Indonesia. It was reported that PFC also tested a shipment of domestic ore in 2014 and suggested that the supplier finalize the properties suitable for the long-term supply of ore (Interfax.ua, 2016; UKRFA.com, 2016).

In 2014, PFC reduced its production of ferronickel by 6.1% to 114,222 t (gross weight) compared with 2013 production. PFC stated that the main reason for the decrease was a limited supply of electricity. In 2014, PFC earned profits of 12.2 million hryvnias (about \$1 million). PFC paid more than 45 million hryvnias (about \$3.75 million) of unified social taxes and about 14 million hryvnias (about \$1.17 million) in labor taxes. The company also invested 214,000 hryvnias (about \$17,880) in the education of its workers. The average monthly wages of PFC employees were 4,000 hryvnias (about \$330), which was reportedly 24% higher than the average wage rate in the country (Semenov, 2014; Finance.ua, 2015).

In 2012–13, a significant portion of PFC's operations were switched from natural gas to coal powder. As a result, PFC's use of natural gas was reduced from 85 million cubic meters in 2013 to 13 million cubic meters in the first 8 months of 2014. In 2013–14, the company invested more than \$15 million in energy efficiency and had three major investment projects at various stages of completion, including setting up a coal powder installation for ore drying, installing new emissions equipment, and improving the process of magnetic separation (Semenov, 2014).

Mineral Fuels and Related Materials

Uranium.—In 2014, Ukraine reduced its production of uranium ore by 3.2% to 957,488 t from 988,757 t in 2013. Uranium ore was mined in Ukraine from underground mines by the state-owned company Vostochnyi GOK, and it was processed into concentrate at the company's hydrometallurgical plant at Zheltye Vody. In 2014, uranium was mined at three

mines—the Ingul'skaya, the Novokonstantinovskaya, and the Smolinskaya. The concentrate was then sent to Russia to be processed by OAO TVEL of Russia into nuclear fuel for use in Ukraine; the remaining nuclear fuel required for Ukraine's nuclear powerplants was purchased from TVEL. Domestic uranium provided about 30% of the total nuclear fuel needed for Ukraine's powerplants. Ukraine imported nuclear fuel for its four nuclear powerplants—the Khmel'nitskaya, the Rovenskaya, the YuzhnoUkrainskaya, and the Zaporozhskaya—from the Czech Republic, Russia, and Sweden. The powerplants had a total of 15 nuclear reactors and a combined design capacity of 13,900 megawatts (MW). In the country's energy balance, nuclear energy had a share of about 20%, but nuclear powerplants produced almost 50% of the country's electricity (Gazeta.ru, 2014; Tyurin, 2014; Unian.net, 2015).

As of 2014, Ukraine had a total of 12 uranium deposits with total resources of between 135,000 and 200,000 t of contained uranium, according to various estimates. About 10 other deposits were considered to be “potentially promising.” Ukraine needed between 2,500 and 3,000 t/yr of uranium to provide enough fuel for its powerplants. The country, however, did not have the facilities to produce nuclear fuel and was dependent on Russia and other countries for such services (Gazeta.ru, 2014; Tyurin, 2014).

In April 2014, Areva S.A of France expressed its interest in creating a joint venture to develop uranium mines in Ukraine. Areva contacted and visited the Nuclear Fuel State Concern, which was the parent organization of the Vostochnyi GOK. Areva was particularly interested in uranium production using underground in situ leaching, in which it had substantial experience at the Safonovskoye deposit in Mykolaiv'ska Oblast'. The identified resources of the deposit were estimated to be 17 million metric tons. In 2011, Areva had expressed interest in creating a joint venture to produce zirconium in Ukraine, but the negotiations did not result in any projects (Economicheskaya Pravda, 2014; MinerJob.ru, 2014; Minprom.ua, 2014a).

Outlook

Ukraine's mining and metallurgy sectors had significant setbacks during the past few years. Ukrainian aluminum production stopped, and it was not clear if another owner could make production profitable; ferroalloys plants required inexpensive electricity, and coal mines and petroleum refineries were outdated and required significant investments to become competitive.

Ukraine is likely to remain one of the leading world producers of manganese ore, titanium ores, and titanium sponge. Remaining competitive in metallurgy may prove to be difficult because of high energy requirements, the need for new investments, and the often differing interests of plant owners and the Government. It remains to be seen if the Government and the owners of privately owned industrial facilities will be able to reach compromises and if the country will be able to attract new investments to move the mineral and metallurgical industries of the country forward.

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TABLE 1
UKRAINE: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014
METALS					
Alumina	1,534,000	1,601,000	1,429,000	1,493,500	1,457,000
Aluminum:					
Primary	25,000	24,830	14,829	--	--
Secondary ^c	130,000	130,000	90,000	25,000	--
Total ^c	155,000	155,000	105,000	25,000	--
Copper, metal, secondary ^c	20,000	20,000	15,000	15,000	12,000
Gallium ^c	13	13	11	13 ^r	13
Germanium ^c kilograms	700	700	700	700	600
Iron and steel:					
Iron ore, marketable ore and concentrate:					
Gross weight	78,170,700	80,580,800	81,966,400	70,389,000 ^r	68,337,000
Fe content ^c	43,000,000	44,300,000	45,100,000	38,700,000 ^r	37,600,000
Metal:					
Pig iron	27,361,000	28,881,100	28,484,000	29,089,000	24,801,000
Ferroalloys, electric furnace:					
Ferromanganese	280,100	180,500	163,921	88,626	103,000
Feronickel ^c :					
Gross weight	62,000	62,000	119,652 ³	121,586 ³	114,222 ³
Ni content	12,400	12,400	23,900	24,300	20,230 ³
Ferrosilicon	195,500	150,900	150,265	191,207	142,300
Silicomanganese	940,400	843,500	823,131	724,892	840,900
Other	28,500 ^e	28,500 ^e	22,115	15,908	15,326
Total ^c	1,510,000	1,270,000	1,279,084 ³	1,142,219 ³	1,215,748 ³
Steel:					
Crude	33,559,000	35,332,000	33,511,000 ^r	33,199,000	27,373,000
Finished products:					
Rolled	17,549,300	19,511,000	18,457,300	17,782,764	14,350,000
Pipe	1,928,400	2,371,800	2,014,000	1,812,980	1,560,000
Lead, refined, secondary ^c	7,000	13,500	13,700	13,500	13,000
Magnesium metal ^e	2,000	2,000	--	--	--
Manganese, marketable ore and concentrate:					
Gross weight	1,589,300 ⁴	971,500	1,234,007	1,524,696	1,526,218
Mn content ^c	540,000	330,000	396,000	515,000	519,000
Manganese, metal	16,137	16,100 ^e	14,575	7,200	1,300
Titanium ^c :					
Ilmenite concentrate:					
Gross weight	500,000	260,700 ³	246,800 ³	670,000 ^e	450,000
TiO ₂ content	295,000	153,800 ³	145,640 ³	295,000	200,000
Rutile concentrate, 95% TiO ₂	60,000	60,000	58,000	162,000	110,000
Metal, sponge	7,400	9,000	10,300	9,400	7,200 ³
Zirconium, zircon concentrate ^c	30,000	26,000	20,000	41,000 ³	27,000
INDUSTRIAL MINERALS					
Bromine ^c	4,100	4,100	4,100	4,100	--
Cement, hydraulic	9,456,500	10,515,300	9,843,000	9,857,000	8,636,000

See footnotes at end of table.

TABLE 1—Continued
UKRAINE: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2010	2011	2012	2013	2014
INDUSTRIAL MINERALS—Continued					
Clays:					
Bentonite ^c	185,000	211,000	219,000 ³	220,000	210,000
Kaolin	1,085	1,317	1,218	1,179 ^r	1,426
Kaolinitic clays	306	575	580	855 ^r	1,248
Feldspar	146,000	179,000	146,000	134,000	95,000
Graphite ^c	6,000	6,000	5,800	5,500	5,000
Gypsum	679,000	676,000	436,200	430,000 ^c	425,000 ^c
Lime	4,220	4,487	4,415	3,892	3,107
Limestone	20,600	22,800	20,582	18,652	11,564
Nitrogen, N content of ammonia ^c	3,400	4,300	4,160	4,237 ³	2,400
Salt	4,908,000	5,938,000	6,189,446	5,796,000	2,498,000
Soda ash	706,700	700,000 ^c	720,000	720,000 ^c	600,000 ^c
Sulfuric acid	1,296	1,537	1,371	1,172 ^r	554
Sulfur, native ^c	130,000	130,000	120,000	120,000	100,000
Vermiculite ^c	60,000	60,000	60,000	60,000	50,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, raw: ^e					
Anthracite	14,000	14,059 ³	20,763 ³	15,604 ^{r,3}	8,338 ³
Bituminous	61,000	67,600 ³	64,690 ³	27,953 ^{r,3}	23,563 ³
Lignite	5,000	5,000	5,000	5,782 ^{r,3}	5,000
Total	80,000	86,700	90,500	49,339 ^{r,3}	36,900
Marketable	54,444 ³	62,700 ³	66,700	63,600	45,230 ³
Coke	18,599,700	19,599,100	18,939,100	17,569,000	13,858,000
Natural gas ⁵	20,458,000	19,934,900	20,492,000 ^r	21,313,000	20,100,000
Peat:					
Fuel use	321,000	301,000	446,000	467,000	457,000
Horticultural use	138,000	129,000	210,000	131,000	119,000
Total	459,000	430,000	656,000	598,000	576,000
Petroleum:					
Crude and gas condensate ⁶	25,400,000	24,000,000	24,342,000	22,348,000	19,776,000
Refinery products ⁷	80,300,000	69,000,000	33,766,000	27,303,000	21,980,000
Uranium, mine output: ^c					
U content	850	890	960	922 ³	892 ³
U ₃ O ₈ content	1,000	1,050	1,130	1,080 ³	1,045 ³

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through February 1, 2016.

²In addition to the commodities listed, other mineral commodities may have been produced, but available information was inadequate to make reliable estimates of output.

³Reported figure.

⁴Includes secondary production.

⁵The data series for natural gas production is based on natural gas production as reported by the State Statistics Service of Ukraine and includes associated petroleum gas production.

⁶Figures were converted to barrels from metric tons, which were reported as follows: 2010—3,493,400; 2011—3,297,800; 2012—3,345,000; 2013—3,071,000 and 2014—2,739,000.

⁷Figures were converted to barrels from metric tons, which were reported as follows: 2010—10,333,000; 2011—8,787,000; 2012—4,300,000; 2013—3,477,000; and 2014—2,800,000.

TABLE 2
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ^{1,2}	Location or deposit names	Annual capacity ^e
Alumina and aluminum:			
Alumina	Nikolaevskiy alumina refinery [United Company RUSAL (RUSAL)]	20 kilometers south of Mykolaiv	1,601,000
Aluminum, primary	Zaporozhye smelter [United Company RUSAL (RUSAL)]	do.	114,000
Coal	About 150 active surface and underground mines, including: Donbass Fuel and Energy Co. (DTEK) (System Capital Management, 100%): DTEK Pavlogradugol DTEK Komsomolets Donbassa Mine DTEK Dobropolyeugol DTEK Sverdlovanthracite DTEK Rovenkyanthracite Krasnoarmeiskaya-Zapadnaya No. 1 JSC Krasnodon Coal Co. (Metinvest B.V.) Smaller producers	About 95% of coal produced in Donetsk, Dnipropetrovs'ka, and Luhans'ka Oblasts' 10 mines in Dnipropetrovs'ka and Donetsk'ka Oblasts' Kirovskoe, Donetsk'ka Oblast' 5 mines near Dobropillya, Donetsk'ka Oblast' 5 coal mines and 3 processing plants in Luhans'ka Oblast' 6 mines and 3 processing plants in Luhans'ka Oblast' 1 mine at Krasnoarmeisk, Donetsk'ka Oblast' 7 mines and 2 processing plants in Luhans'ka Oblast' Donetsk'ka, Dnipropetrovs'ka, Luhans'ka, Lvivs'ka, and Volyns'ka Oblasts'	90,000,000 ³
Coke	Evrast Group: OAO Dneprkoks coke plant OAO Baglykoks coke plant OAO Dneprodzerzhinsk coke plant	Dnipropetrovs'ka Oblast': Dnipropetrovsk Dniprodzerzhinsk do.	3,000,000
Do.	Metinvest B.V.: JSC Avdiivka coke plant	Avdeyevka, Donetsk'ka Oblast'	4,000,000
Do.	JSC Azovstal Iron and Steel Works	Mariupol, Donetsk'ka Oblast'	3,182,000
Do.	OJSC ArcelorMittal Kryviy Rih	Kryviy Rih, Dnipropetrovs'ka Oblast'	3,300,000
Do.	JSC Donetskkoks (Metinvest B.V., 24.5%, and OJSC Ilyich Iron and Steel Works, 12.96%)	Donetsk, Donetsk'ka Oblast'	390,000
Do.	Yenakievo coke plant	Yenakievo, Donetsk'ka Oblast'	NA
Do.	OAO Zaporozhkoks (JSC Zaporizhstal, 42%, and Metinvest B.V., 25%)	Zaporizhia	NA
Do.	Makeevka coke plant	Makeevka, Donetsk'ka Oblast'	NA
Do.	OAO Yasinovskiy coke plant	do.	NA
Do.	OAO Alchevsk coke plant [Industrial Union of Donbass (ISD Corp.)]	Alchevsk, Luhans'ka Oblast'	3,700,000
Do.	Horlivka coke plant	Horlivka, Donetsk'ka Oblast'	440,000
Do.	Kharkov coke plant	Kharkiv	225,000
Ferrous alloys:			
Ferromanganese	Zaporozhskiy ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Do.	Nikopol'skiy ferroalloys plant (PrivatBank Group and EastOne Group)	Nikopol	700,000
Do.	Stakhanovskiy ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	NA

See footnotes at end of table.

TABLE 2—Continued
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ^{1,2}	Location or deposit names	Annual capacity ³
Ferroalloys—Continued:			
Ferromanganese, blast furnace	Konstantinovka Iron and Steel Works	Konstantynivka, Donets'ka Oblast'	NA ⁴
Do.	Kramatorskiy ferroalloys plant	Kramatorsk, Donets'ka Oblast'	NA
Ferronicel	Pobuzhskiy ferronicel plant	Pobuzhye, Kirovohrads'ka Oblast'	100,000
Ferrosilicon	Stakhanov ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	120,000
Do.	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Silicomanganese	Stakhanov ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	50,000
Do.	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	250,000
Do.	Nikopol ferroalloys plant (PrivatBank Group and EastOne Group)	Nikopol	900,000
Gallium	Nikolaev alumina refinery [United Company RUSAL (RUSAL)]	20 kilometers south of Mykolaiv	13
Germanium	Zaporozhye titanium-magnesium plant	Zaporizhia	19,000
Graphite	Zavalyevskiy graphite complex	Zavalyevskiy deposit	NA
Iron ore:			
Underground mining	Krivorozhskiy Iron Ore Complex (Metinvest B.V., 50%, and PrivatBank Group, 50%)	4 mines in Kryvorizkiy iron ore basin	7,000,000
Do.	Sukha Balka (Evraz Group)	2 mines in Dnipropetrovs'ka Oblast'	3,100,000
Do.	PJSC ArcelorMittal Kryviy Rih	2 mines at Kryviy Rih	1,500,000
Do.	Zaporozhye Iron Ore Complex	Ekspluatatsionnay Mine in Zaporiz'ka Oblast'	4,500,000
Do.	JSC Central Iron Ore Enrichment Works (Metinvest B.V.)	1 mine in Dnipropetrovs'ka Oblast'	2,200,000
Open pit mining	do.	3 mines in Dnipropetrovs'ka Oblast'	12,000,000
Do.	JSC Northern Iron Ore Enrichment Works (Metinvest B.V.)	2 mines in Dnipropetrovs'ka Oblast'	30,000,000
Do.	JSC Ingulets Iron Ore Enrichment Works (Metinvest B.V.)	Ingulets Mine south of Kryviy Rih	35,000,000
Do.	Yuzhniy GOK (Evraz Holding, 50%, and Smart Holding, 50%)	Mine at Kryviy Rih	22,000,000
Do.	PJSC ArcelorMittal Kryviy Rih	2 mines at Kryviy Rih	26,550,000
Do.	Poltava GOK (Ferrexpo Plc.)	Gorishne-Plavninskoye and Lavrikovskoye (GPL) Mine 15 kilometers east of Kremenchug	30,000,000
Lead, secondary	CJSC Svinets	Kostyantynivka	20,000
Magnesium metal	Magnii concern	Kalush	22,000
Manganese:			
Ore, marketable	Ordzhonikidzevskiy GOK (PrivatBank Group)	Ordzhonikidze	700,000
Do.	PAO Marganetskiy GOK (PrivatBank Group)	Marhanets	NA
Metal	Zaporozhskiy ferroalloys plant (PrivatBank Group)	Zaporizhia	NA
Mercury	OOO Nikitirtyt	Horlivka, Donets'ka Oblast'	300
Natural gas	Yuzovskoye deposit (Royal Dutch Shell plc)	Kharkiv and Donets'ka Oblasts'	NA
Do.	Olesskoye deposit (Chevron Corp.)	Lvivs'ka and Ivano-Frankovs'ka Oblasts'	NA
Nickel, Ni content in ferronicel	Pobuzhskiy GOK (comprises three open pit mines and the Pobuzhskiy ferronicel plant)	Pobuzhye, Kirovohrads'ka Oblast'	20,000
Petroleum, refined	42-gallon barrels	Kherson oil refining plant	NA
Do.	do.	Odessa refinery (OAO Lukoil)	Odessa
Do.	do.	Lisichansk refinery (TNK-BP)	Lisichansk
Do.	do.	Halychyna refinery (Ukraine Oil Co.)	Drohobych, Lvivs'ka Oblast'
Do.	do.	Kremenchug refinery (CJSC Ukratnafta)	Kremenchug
Do.	do.	JSC Naftokhimik Prykarpattya	Nadvirna, Ivano-Frankiv'ska Oblast'
Do.	do.	Shebelinka refinery	Shebelinka, Kharkiv'ska Oblast'
Steel, crude	Industrial Union of Donbass Corp. (ISD Corp.):		
		OJSC Alchevsk Iron and Steel Works	Alchevsk, Luhans'ka Oblast'
Do.		Dneprovskiy Metallurgical Plant "Dzerzhinsky"	Dniprodzerzhinsk

See footnotes at end of table.

TABLE 2—Continued
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ^{1,2}	Location or deposit names	Annual capacity ^c	
Steel, crude—Continued	OJSC ArcelorMittal Kryviy Rih	Kryviy Rih, Dnipropetrovs'ka Oblast'	7,400,000	
Do.	Metinvest B.V.:			
	JSC Azovstal Iron and Steel Works	Mariupol, Donets'ka Oblast'	6,200,000	
Do.	JSC Yenakiiieve Iron and Steel Works	Yenakievo, Donets'ka Oblast'	2,700,000	
Do.	OJSC Ilyich Iron and Steel Works	Mariupol, Donets'ka Oblast'	6,000,000	
Do.	Dnepropetrovsk Metals Plant “Petrovskovo” (DMZP) (Evraz Group S.A., 96.77%)	Dnipropetrovsk	1,360,000	
Do.	JSC Zaporizhstal (Metinvest B.V., 24.9%) (Mechel OAO) ⁶	Zaporizhia	4,350,000	
Do.	Kramatorskiy Metal Plant “Kuibiyshva”	Kramatorsk, Donets'ka Oblast'	NA	
Do.	Donetskstal	Donetsk	NA	
Do.	Donetsk electrometallurgical plant	do.	1,000,000 ⁶	
Do.	Dneprospeksstal	Zaporizhia	918,000	
Do.	OOO Elektrostal	Kurakhovo, Donets'ka Oblast'	NA	
Do.	JSC Energomashspetsstal (OJSC Atomenergomash)	Kramatorsk, Donets'ka Oblast'	NA	
Do.	PJSC Azovelectrostral (JSC Azovmash)	Mariupol, Donets'ka Oblast'	500,000	
Titanium:				
Concentrate:				
Ilmenite	Irshansk GOK [Leased from the Government by Crimea Titan CJSC (Government, 50% plus one share, and OstChem GmbH, 50% minus one share)]	Irshansk, 50 kilometers north of Zhytomyr	400	
Do.	OOO Valki-Ilmenit (OstChem GmbH, 75%)	do.	70	
Do.	Mezhdurechensk GOK (OstChem GmbH, 75%)	Zhytomyrs'ka Oblast'	84	
Do.	Velta LLC	Korobchino, Novomirgorod district, Kirovograds'ka Oblast'	185 ⁷	
Do.	Volnogorsk state mining-metals complex [Leased from the Government by Crimea Titan CJSC (Ukraine Government, 50% plus one share, and OstChem GmbH, 50% minus one share)]	Volnogorsk, 70 kilometers west of Dnipropetrovsk	200	
Do.	Demurinskiy GOK (Limpeza Ltd. of Cyprus 25%, and VSMPO-Avisma of Russia, 75%)	Dnipropetrovs'ka Oblast'	NA	
Rutile	do.	do.	65	
Sponge	Zaporozhye Titanium & Magnesium Complex (ZTMK) (Government, 51%, and Tolexis Trading Ltd., 49%)	Zaporizhia	NA	
Ingots	OOO Antares	Kyev	NA	
Do.	OOO Fico	do.	NA	
Do.	Zaporozhye Titanium & Magnesium Complex (ZTMK) (Government, 51%, and Tolexis Trading Ltd., 49%)	Zaporizhia	NA	
Titanium dioxide pigment	Crimea Titan CJSC	Crimea	NA	
Do.	OAO Sumykhimprom	Sumy	NA	
Uranium:				
Ore	thousand metric tons	Vostochnyi GOK (Government)	Inguls'kaya Mine at Kirovohrad	450
Do.	do.	do.	Smolinskaya Mine at Smolino	600
Do.	do.	do.	Novokonstantinovskoye deposit in Kirovohrads'ka Oblast'	100
Concentrate	do.	Hydrometallurgical concentration plant at Zheltye Vody	1,000	
Zinc, secondary	Ukrzinc plant	Kostyantynivka	25,000	
Do.	CJSC Svinets	do.	30,000	

See footnotes at end of table.

TABLE 2—Continued
 UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners ^{1,2}	Location or deposit names	Annual capacity ^c
Zirconium:			
Zircon concentrate	Volnogorsk state mining-metals complex [Leased from the Government by Crimea Titan CJSC (Ukraine Government, 50% plus one share, and OstChem GmbH, 50% minus one share)]	Volnogorsk, 70 kilometers west of Dnipropetrovsk	35
Metal and compounds	State Research and Production Enterprise “Zirconium”	Dniprodzerzhinsk	NA

^cEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Inconsistencies in enterprise and location names may appear in this table because both Ukrainian and Russian spellings were used for transliterations. English versions of company names are used as given by official company sources (Web sites, press releases, and so forth). Ukrainian versions of location names are used wherever possible.

²GOK is the abbreviation for gorno-obogotitelnyy kombinat, which translates as “mining and beneficiation complex.”

³Capacity estimates are totals for all enterprises that produce that commodity.

⁴Konstantinovka Iron and Steel Works stopped production of blast furnace ferromanganese in 2008.

⁵The Odessa refinery stopped production in the fourth quarter of 2010. Production could restart in the future if business conditions improve.

⁶In December 2011, Mechel OAO of Russia purchased 100% of the shares of the Donetsk electrometallurgical plant.

⁷Velta LLC began production of ilmenite concentrate in December 2011, but its first deliveries of commercial concentrate were not made until April 2012.