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The Mineral Industry of Ukraine

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Ukraine was among the world's leading producers of a number of minerals. It was one of the world's top 4 producers of gallium, the 3d-ranked producer of rutile (11.8% of world output), the 5th-ranked producer of titanium sponge (4.8% of world output), the 6th-ranked producer of ilmenite (6.0% of world output), the 7th-ranked producer of iron ore (2.8% of world output), the 8th-ranked producer of manganese ore (2.3% of world output), the 9th-ranked producer of pig iron (1.9% of world output), the 10th-ranked producer of raw steel (1.4% of world output), and the 11th-ranked producer of bentonite (1.3% of world output) and peat (2.0% of world output). The country had significant coal and uranium resources, which were underutilized, but depended on imported petroleum and natural gas (Apodaca, 2017; Bedinger, 2017a, b; Corathers, 2017; Fenton, 2017; Flanagan, 2017; Jaskula, 2017; Tuck, 2017).

In 2015, mineral production in Ukraine continued to decrease throughout the economy in the wake of the political developments of 2014. In late February 2014, the President of Russia ordered the invasion of Ukraine's Crimea Peninsula, stating that the action was needed to protect ethnic Russians living there. Two weeks later, in March, a local referendum was held in Crimea regarding the integration of Crimea into the Russian Federation. The referendum was not recognized by the Governments of Ukraine, the United States, and the European Union, nor by the United Nations General Assembly. After the referendum, the Government of Ukraine asserted that Crimea continued to be a part of Ukraine. In addition, parts of eastern Ukraine did not recognize the new Government of Ukraine and formed their own separatist republics with their own administration. This action resulted in armed conflicts with the Government that continued throughout 2015. In September 2014, the representatives of Ukraine, Russia, and the separatist republics signed a cease-fire agreement, but intermittent fighting continued in 2015 (U.S. Central Intelligence Agency, 2016).

Minerals in the National Economy

In 2015, Ukraine's real gross domestic product (GDP) decreased by 9.9% compared with that of 2014.[1] The nominal GDP in 2015 amounted to $90.8 billion. [2] During the year, overall annual industrial output was reduced by 13.4% compared with that in 2014; mining and quarrying production decreased by 14.5%, of which coal and lignite production decreased by 38.1%; oil and gas extraction decreased by 6.2%; and mining of metal ores decreased by 5.0%. Production of the entire manufacturing sector decreased by 13.1%. Within the manufacturing sector, the manufacture of metal products, except machinery and equipment, decreased by 16.4%; the manufacture of coke and refined petroleum products decreased by 21.9%; and the manufacture of chemicals and chemical products decreased by 15.9%. The share of industrial production in the GDP was 26.4%. The State Statistics Committee of Ukraine reported that, in 2014, the share of mining and quarrying in the country's industrial production was 10.8% and the share of manufacturing was 64.1%. The share of metallurgical production in overall industrial production was 15.7%; the share of chemical and chemical products manufacturing was 3.8%; and the share of coke and refined petroleum manufacturing was 3.4% (State Statistics Service of Ukraine, 2016a, b; U.S. Central Intelligence Agency, 2016).

Government Policies and Programs

In April 2015, the Government introduced a new program for reforming and modernizing the coal industry. The Government planned to attract investment, modernize production, increase output, and expand the customer base. In addition, 14% of the operating coal mines would be put on care-and-maintenance status, and another 17% would be closed. The Government stated that it would provide retraining and jobs for the workers who lose their jobs because of the mine closures. In 2014, the majority of coal mines operated at a loss and Government subsidies to coal mines in Ukraine totaled 9.4 billion hryvnias (about $430 million) (Mineral.ru, 2015a; Yarosh, 2015d).

In July, the Ministry of Energy and Coal published a list of 36 coal mines that the Government planned to offer to investors. The list included 23 mines located in Donbass and 13 mines located within the Lviv-Volyn coal basin. All mines on the list specialized in producing thermal coal and were relatively small in terms of reserves and annual production. In 2013 and 2014, most of the mines on the list decreased production, although 13 mines increased their production. The Government retained international financial consulting companies to gage the potential interest of investors and then develop legal terms of privatization. The Government did not specify when it expected to complete privatization of the 36 mines (Mineral.ru, 2015a; Yarosh, 2015d).

In 2015, exports of scrap ferrous metals reached the highest level of the past 10 years. In particular, in June, Ukraine exported 230,000 metric tons (t) of ferrous scrap, which was the highest level of monthly exports since November 2004, when Ukraine exported 260,000 t. The geographic profile of exports of ferrous scrap in 2015 remained stable; about 80% of the exported scrap went to Turkey and the rest went to neighboring European countries, primarily Moldova. The owners of Ukraine's metallurgical plants complained to the Government that they had a deficit of scrap metal. To address the issue, in April 2015, the Government issued a decree that set a quota

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

[2] Where necessary, values have been converted from Ukrainian hryvnia (UAH) to U.S. dollars (US$) at an annual average exchange rate of UAH 21.797=US$1.00 for 2015 and UAH11.977=US$1.00 for 2014 and from euro area euros (EUR) to U.S. dollars (US$) at an annual average exchange rate of EUR0.937=US$1.00 for 2015.

on exports of ferrous scrap at 1.25 million metric tons per year (Mt/yr) for 2015. During the summer of 2015, representatives of Ukraine's metallurgical plants initiated the preparation of a bill that would increase the export tariffs on ferrous scrap from 10 euros (about $10.67) per metric ton at the beginning of 2015 to at least 30 euros (about $32.01) per metric ton. At yearend 2015, the Ministry of Economic Development and Trade continued to discuss the appropriate level of the tariff and other economic measures that would both reduce exports of ferrous scrap and stimulate domestic scrap collection (Metalinfo.ru, 2015; Minprom.ua, 2015; Vorontsov, 2015a, b).

In October, the Cabinet of Ministers announced that exports and imports of nonferrous metal scrap no longer needed to be licensed and were to be excluded from the list of commodities subject to licensing and quotas. The commodities included Garth zinc (an alloy of zinc and iron) and the following scrap metals: ferronickel, ferrotitanium, refined copper, copper pipes, secondary aluminum alloys, and unwrought lead. The Government stated that this measure would reduce unneeded regulation and free resources of both the Government and the companies engaged in international trade activities (UAprom.info, 2015).

Production

Production of most mineral commodities decreased in 2015. The output of feldspar decreased by 54%; refinery products, by an estimated 46%; coal, by 39%; ferrosilicon, by 37%; steel pipe, by 35%; and limestone and peat for horticultural use, by 34% each. The output of several other mineral commodities also decreased significantly, including bituminous coal and ilmenite concentrate, which decreased by 22%; gypsum and anhydrite and rutile concentrate, by 18% each; rolled steel and silicomanganese, by 17% each; coke and crude steel, by 16% each; salt, by 15%; lime, by 13%, and crude petroleum and nitrogen, by 10% each. On the other hand, output of manganese metal increased by 677% because the production line at the Zaporozhskiy ferroalloys plant restarted operations in December 2014 after having been idle for several years Production of kaolin increased by 27%; kaolinitic clays, by 12%; bromine, by an estimated 9%; magnesium metal and titanium sponge, by 6.9% each; peat for fuel use, by 6.0%; and uranium, by 5.8%. These and other mineral production data are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2015, the total value of Ukraine's exports of goods and services decreased to about $47.9 billion in 2015 from $64.1 billion in 2014; exports of goods alone decreased to $38.1 billion from $53.9 billion in 2014. The value of total exports was equal to about 42% of Ukraine's GDP. Ukraine's leading export category, in terms of value, was ferrous metals, and in 2015, exports of nonprecious metals were valued at $8.1 billion and made up 21.2% of the total value of all exports of goods; exports of cinder, ores, and slag were valued at $2.2 billion and made up 5.8% of the total value of commodity (goods) exports. Another $488 million (1.3% of the total value of commodity exports) was contributed by exports of mineral fuels and petroleum products. Exports of salt, soil, stones, and sulfur were valued at $395 million (1.0% of the total value of commodity exports). The value of exports of mineral products and metals made up about 32.9% of the total value of commodity exports. The main export partners of Ukraine were Russia, which received 12.7% of Ukraine's commodity exports; Turkey, 7.2%; China, 6.3%; Egypt, 5.4%; Italy and Poland, 5.2% each; India, 3.8%; Germany, 3.4%; and Spain, 2.7% (State Statistics Service of Ukraine, 2016c).

The total value of Ukraine's imports of goods and services was about $43.0 billion in 2015 and $60.8 billion in 2014. The total value of Ukraine's imports of goods alone was $37.5 billion in 2015 and $54.4 billion in 2014. The leading imported commodities were mineral fuels and refined petroleum products, which made up about 29.0% of the value of total commodity imports in 2015. The country's main import partners in 2015 were Russia (which supplied 20.0% of Ukraine's imports); Germany (10.6%); China (10.0%); Poland (6.2%); Belarus (6.0%); Hungary (4.3%); and the United States (3.9%) (State Statistics Service of Ukraine, 2016c).

Commodity Review

Metals

Aluminum, Bauxite and Alumina, and Gallium.—The Nikolayevskiy alumina refinery 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, in terms of output, was the second-largest alumina-producing facility owned by RUSAL; the plant accounted for about a 20% share of RUSAL's total aluminum production. In 2015, the plant produced 1,481,000 t of alumina, which was a 1.6% increase compared with that of 2014. The plant's production capacity was 1.6 Mt/yr of alumina. In addition to alumina, the plant produced aluminum hydrate and gallium, which were exported and also sold domestically. In 2016, RUSAL planned to invest between $5.5 million and $6.0 million in the Nikolayevskiy alumina plant (Koval, 2015; Minprom.ua, 2016).

Another asset in Ukraine, the Zaporozhskiy aluminum complex (ZAlK), which had been owned previously by RUSAL, was nationalized by the Government. In June 2015, the General Prosecutor's office of Ukraine announced the return of the controlling block of shares in ZAlK (68.01%) to the Fund of the Government Property of Ukraine (FGPU). RUSAL continued to remain a holder of about a 30% interest in the plant. The Supreme Economic Court of Ukraine had made the decision earlier, in October 2014, to return the shares of ZAlK to the Government. In June 2015, RUSAL appealed to the decision to the European Court of Human Rights (ECHR). At yearend, it was not known whether the appeal was successful (Minprom.ua, 2014; Mineral.ru, 2015b; Liga.net, 2016).

The reason for the nationalization decision was allegedly RUSAL's nonfulfillment of its investment obligations.

In August 2014, RUSAL announced that it had stopped producing wire rods (the only output at the time) at ZAlK because, during the past several years, the cost of producing wire rods at ZAlK had increased threefold and was exceeding the costs of producing rods at other RUSAL plants. As a result, ZAlK did not produce any products in 2015. It was not clear, however, whether the Government would be able to find investors or otherwise organize production to make the ZAlK plant profitable (Metaltorg.ru, 2014a, b; Yarosh, 2015a; Vedomosti.ru, 2016).

Ferroalloys.—In 2015, production of ferroalloys in Ukraine decreased by 17.4% to 990,900 t. In particular, the production of ferrosilicon decreased by 36.6% to 90,200 t; silicomanganese, by 16.9% to 698,400 t; and ferromanganese, by 14.8% to 87,700 t. In December 2014, the Zaporozhskiy ferroalloys plant restarted production of manganese metal and, in 2015, the plant produced 10,100 t (Liga.net, 2017).

In 2015, Ukraine's exports of ferroalloys decreased by 16.9% compared with that of 2014 to about 811,900 t and the revenues from ferroalloy exports decreased by 25.1% to about $863.9 million. The major recipients of ferroalloy exports were, in terms of the value of the exports, the Netherlands (which received 19.8% of Ukraine's ferroalloys exports), Turkey (17.4%), and Russia (13.8%). In 2015, Ukraine imported about 43,100 t of ferroalloys, which was a 59.6% decrease compared with that of 2014, and the value of the imports decreased by 54.8% to about $100.9 million. The leading exporters of ferroalloys to Ukraine were, in terms of the value of the exports, Russia (which supplied 28.1%), and Brazil and India (11.8% each) (Interfax-Ukraina, 2016c).

In 2015, Ukraine had three ferroalloy plants—the Nikopol'skiy ferroalloys plant, the Stakhanovskiy ferroalloys plant, and the Zaporozhskiy ferroalloys plant; the Nikopol'skiy plant was the largest of the three. All three plants were controlled by the PrivatBank Group, and significant shares were owned by the EastOne Investment Group. The Stakhanovskiy ferroalloys plant stopped production in July 2014 because of the military operations in eastern Ukraine, and it continued to be idle throughout 2015 (Ubr.ua, 2016).

Iron and Steel.—In 2015, Ukraine's production of crude steel decreased by 16.2% to about 22.9 million metric tons (Mt); pig iron, by 11.8% to about 21.8 Mt; rolled steel, by 16.8% to about 12.0 Mt; and steel pipe, by 35% to about 1.0 Mt. A significant number of furnaces remained idle. As of January 2016, out of the total of 30 blast furnaces, only 22, or 73%, were operational; out of 9 open-hearth furnaces, 7, or 78%, were operational; and out of 21 basic oxygen furnaces, 15, or 71%, were operational. The underutilization of capacity was a result of military operations in Donets'ka and Luhans'ka Oblasts'; the Alchevskiy and the Donetskiy electrometallurgical plants were affected the most (Ukrrudprom.com, 2015; Delo.ua, 2016).

Metallurgical plants continued to have difficulties with provision of raw materials. In 2015, Ukraine's metallurgical plants received 25.9 Mt of domestic iron ore raw materials and 1.9 Mt of imported raw materials. Shipments of both domestic and imported raw materials decreased in 2015 and constituted 82% and 71% of the amount received in 2014, respectively. In 2015, shipments of domestic coking coal for metallurgical production amounted to 5.3 Mt, which was a 39% reduction compared with the amount received in 2014, and shipments of imported coking coal were 10.7 Mt, which was a 6% increase compared with the amount received in 2014. Metallurgical plants received 9.7 Mt of domestically produced metallurgical coke, which was a 12% reduction compared with that of 2014, and 1.3 Mt of imported metallurgical coke, which was a 12% reduction compared with that of 2014. The metallurgical coke was imported from China, Poland, and Russia (Metallurgprom.org, 2016).

Iron Ore.—In 2015, Ukraine's production of iron ore concentrate decreased by 2.1% to 66.9 Mt. In 2015, exports of iron ore increased by 11.8% to 45.7 Mt, but the revenues from the exports decreased by 37% to about $2.1 billion. Exported iron ore was shipped to China (which received 45.3% of the total, in terms of value), Poland (10.4%), and the Czech Republic (10.2%). Compared with those of 2014, imports of iron ore to Ukraine decreased by 29.8% to about 2.3 Mt, and, in terms of value, by 56.4% to $107 million. Imports of iron ore came almost exclusively from Russia (Enki.ua, 2015; UAprom.info, 2016).

In 2015, Ukraine had eight leading mining and beneficiation complexes (GOKs) working with iron ore. Four of them—the Inguletskiy GOK, the Severnyi, GOK, the Tsentral'nyi GOK, and the Yuzhnyi GOK—were wholly owned by Metinvest. Also, Metinvest owned the Krivorozhskiy and the Zaporozhskiy iron ore complexes. The Poltavskiy and the Yeristovskiy GOKs were owned by Ferrexpo plc, the Sukha Balka GOK was owned by Evraz Group S.A., and ArcelorMittal Kriviy Rih was owned by the ArcelorMittal (Vesti-ukr.com, 2015).

In April 2015, the Government increased rental payments for mining iron ore. As a result, the rental rate per metric ton increased to $3.10 per ton of iron ore concentrate, whereas in the beginning of 2014, the rental rate was only about $1.00 per ton of iron ore concentrate. The Federation of Metallurgists of Ukraine stated that the new rental payments were five times higher than those in Russia and three times higher than those in Kazakhstan. The increase in rental payments coincided with a decrease in the world price for iron ore. In the beginning of 2014, the price of 1 metric ton of iron ore concentrate at China ports was about $130; by April 2015, the price had decreased to less than $50 per metric ton. Analysts in Ukraine stated that, at a price of $50 per metric ton of iron ore concentrate, most of Ukraine's iron ore GOKs were barely breaking even and that any further negative changes in the economy would cause them to have financial losses. All major iron ore companies in Ukraine wrote an open letter to the Government asking that the rental rates be reduced, but as of yearend, it was not known if the Government would take any action (Delo.ua, 2015; Vesti-ukr.com, 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 Pobuzhye in Kirovohrads'ka Oblast' and employed about 35% of the village population. The PFC was owned by Solway Investment Group, which was registered in Cyprus. In 2015, PFC reduced nickel production by 3.5% to about 18,000 t. The total amount

of processed ore was 1.45 Mt, and the amount of ferronickel produced totaled about 92,000 t. The company had originally planned to produce 19,500 t of nickel, but it was unable to produce that amount because of down time resulting from modernization efforts and such problems as intermittent shipments of raw materials, including coal and limestone. In June, PFC was subject to an unsuccessful forcible seizure and lost 50 t of final output. It was not clear what measures the company would take to protect its property to prevent such events from happening in the future (Dostyp.com.ua, 2015; Yarosh, 2015b; Ukrmet.dp.ua, 2016).

In 2015, Ukraine imported 1.46 Mt of nickel ores and concentrates, which was a 27.7% increase compared with nickel imports in 2014. In monetary terms, nickel imports increased by 12.8% to $86.5 million. All nickel raw materials were imported from Guatemala and were not reexported (Interfax-Ukraina, 2016a).

Titanium.—In 2015, the Zaporozhskiy titanium-magnesium complex (ZTMK), which was the only producer of titanium sponge in Europe, increased production of titanium sponge by 7% to 7,700 t from 7,200 t in 2014. In the beginning of the year, the plant expected to increase production by about 30% to 9,400 t. The plant was owned by the Government (51% share) and the DF Group through its subsidiary Tolexis Trading Ltd. (49%). In 2015, the company invested about 67 million hryvnias (about $3 million) in modernization and 35 million hryvnias (about $1.6 million) in improvement of the plant's equipment (Podrobnosti.ua, 2016).

Between September 2004 and September 2014, two titanium mines in Ukraine—the Irshanskiy GOK, which was located in Zhytomyrs'ka Oblast', and the Vol'nogorskiy GOK, which was located in Dnipropetrovs'ka Oblast'—were leased from the FGPU by the DF Group. The titanium ore produced at those complexes was used for titanium dioxide production in Crimea and for titanium sponge production at ZTMK. In June 2014, the FGPU asked the DF Group to prepare to return the property to the Government. The Government was dissatisfied with the fact that the DF Group had minimized the plant's contribution to the Government budget. The DF Group intended to use its right to renew the lease, but the FGPU refused, and the DF Group filed complaints. In April 2015, the High Economic Court agreed with the decisions of the lower courts and left the complexes in Government control. The United Mining and Chemical Company (OGHK), which was Government owned, began production at the two complexes in August 2014. The OGHK was also appointed to represent the Government's share in ZTMK (Interfax-Ukraina, 2015; Unian.net, 2015).

In November 2015, the Government Service for Geology and Subsoil ordered Velta LLC, which was mining the Birzulovskoye deposits in Kirovohrads'ka Oblast', to stop its operations. The company was asked to obtain permits for development of additional reserves and for location of solid production waste. Prior to the conflict with the Government Service for Geology and Subsoil, Velta planned to produce about 200,000 t of ilmenite in 2016, which would be about three times more than it produced in 2015. By yearend, it was not clear when Velta would be able to restart production (Yarosh, 2015c).

Industrial Minerals

Cement.—In 2015, Ukraine's cement production decreased by 1.4% compared with cement output in 2014 to about 8.5 Mt; the production capacity utilization rate was 58.3%. The cement plants located in western Ukraine significantly increased their production levels, the plants in eastern Ukraine decreased their production levels, and plants in central Ukraine held their production at about the same level. PAO Ivano-Frankovsktsement increased its production by 40.8% to 2.01 Mt, and Nikolayevtsement increased its production by 5.0%. PAO Evrosement-Ukraina, which was located in Balakleya in Kharkivs'ka Oblast', and PAO Kramators'kiy Tsementnyi Zavod PUSHKA, which was located in Donets'ka Oblast', decreased production by 40% in 2015. Construction activity in the country decreased by 14.9%, which led to reduced domestic demand for cement and a decrease in the price of cement. The central part of the country (mostly the regions of Kiev and Kyiv) was the leading cement-consuming area in the country (Innotek.com.ua, 2015; Ukrcement.com.ua, 2016).

In 2015, 4.7% of cement output was exported, which was an increase compared with that of 2014, when only 1.5% of cement production was exported. The imports of cement in 2015 decreased by 42% owing to devaluation of the hryvnia and a supplemental 5% import tax on cement that was introduced in February 2015. The primary import partners for cement were Belarus, France, Germany, Poland, and Slovakia; in 2015, imports from France and Slovakia increased, whereas those from Turkey decreased (Ukrcement.com.ua, 2016).

Mineral Fuels

Coal.—In 2015, Ukraine's coal production decreased by 38.8% compared with that of 2014 to about 39.8 Mt; coking coal, by 49.8% to about 8.2 Mt; and thermal coal, by 35.3% to about 31.6 Mt. The coal mines managed by the Ministry of Energy and Coal Industry reduced production by 62.0% to about 6.7 Mt, of which production of coking coal decreased by 57.6% to about 1.9 Mt, and that of thermal coal, by 63.5% to 4.8 Mt. In 2015, coal mines in Donets'ka Oblast' produced 14.4 Mt, which was a 44.9% decrease compared with that of 2014; Luhans'ka Oblast', 4.3 Mt (a decrease of 75.8%); Dnipropetrovs'ka Oblast, 18.8 Mt (a decrease of 0.4%); Lvivs'ka Oblast', 2.0 Mt (an increase of 9.2%); and Volyns'ka Oblast', 243,000 t (a decrease of 16.5%). The primary reason for the decrease in coal production was the military operations in the Donbass region (Interfax-Ukraina, 2016b).

According to the Ministry of Energy and Coal Industry, of a total of 95 coal mines in eastern Ukraine, only 35 were controlled by the Government. Moreover, the mines under Government control produced lower quality coal and none of them produced anthracite-grade coal. At the same time, one-half of all thermal powerplants (7 of a total of 14) required anthracite coal as a feedstock. In 2015, to cover the shortage of domestic thermal coal, Ukraine imported coal primarily from South Africa and also from Austria, Kazakhstan, Poland, Russia, and the United States. Although world coal prices in 2015 were lower than in previous years, transporting coal from abroad was expensive. For example, the price of anthracite coal

in South Africa was about $57 per metric ton, but the price of a ton delivered to Ukraine was about $80 per metric ton (GordonUA.com, 2015a, b; Korrespondent.net, 2015; Vz.ru, 2015).

Outlook

Ukraine's mining and metallurgy sectors had significant setbacks in the past few years. For example, the country's aluminum production stopped, and it was not clear whether another owner could make production profitable; ferroalloy plants required inexpensive electricity; coal mines were outdated and required significant investments; and iron ore mines were struggling to break even. Going forward, 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 the high energy requirements, a need for new investments, and the often different interests of plant owners and the Government. It remains to be seen whether the Government and the owners of privately owned industrial facilities will be able to reach compromises and whether 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 COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2011	2012	2013	2014	2015
METALS						
Alumina		1,601,000	1,429,000	1,493,500	1,457,000	1,481,000
Aluminum:						
Primary		24,830	14,829	--	--	--
Secondary[e]		130,000	90,000	25,000	--	--
Total[e]		155,000	105,000	25,000	--	--
Copper, metal, secondary[e]		20,000	15,000	15,000	12,000	12,000
Gallium[e]		13	11	13	13	13
Germanium[e]	kilograms	700	700	700	700	650
Iron and steel:						
Iron ore, concentrate:						
Gross weight		80,580,800	81,966,400	70,389,000	68,337,000	66,902,000
Fe content[e]		44,300,000	45,100,000	38,700,000	37,600,000	36,800,000
Metal:						
Pig iron		28,881,100	28,484,000	29,089,000	24,801,000	21,863,000
Ferroalloys, electric furnace:						
Ferromanganese		180,500	163,921	88,626	102,934 [r]	87,700
Ferronickel, gross weight		62,000 [e]	119,652	121,586	98,700 [r]	95,209
Ferrosilicon		150,900	150,265	191,207	142,270 [r]	90,200
Silicomanganese		843,500	823,131	724,892	840,433 [r]	698,400
Other		28,500	22,115	15,908	15,326	19,360
Total		1,270,000 [e]	1,279,084	1,142,219	1,199,663	990,869
Steel:						
Crude	thousand metric tons	35,332	33,511	33,199	27,373	22,935
Finished products:						
Pipe		2,371,800	2,014,000	1,812,980	1,558,000	1,009,000
Rolled		19,511,000	18,457,300	17,782,764	14,350,000	11,945,310
Lead, refined, secondary[e]		13,500	13,700	13,500	13,000	13,000
Magnesium metal[e]		7,400 [r]	9,000 [r]	10,300 [r]	7,200 [r]	7,700
Manganese:						
Marketable ore and concentrate:						
Gross weight		971,500	1,234,007	1,524,696	1,526,218	1,477,200
Mn content[e]		330,000	396,000	515,000	519,000	502,000
Metal		16,100 [e]	14,575	7,200	1,300	10,100
Nickel, ferronickel, Ni content		12,400 [e]	23,900 [e]	24,300 [e]	18,650 [r]	18,000 [e]
Titanium:						
Ilmenite concentrate:						
Gross weight		260,700	246,800	670,000 [e]	450,000 [e]	350,000 [e]
TiO_2 content		153,800	145,640	295,000 [e]	200,000 [e]	155,000 [e]
Rutile concentrate, 95% TiO_2		60,000 [e]	58,000 [e]	162,000 [e]	110,000 [e]	90,000 [e]
Metal, sponge		9,000 [e]	10,300 [e]	9,400 [e]	7,200	7,700 [e]
Zirconium, zircon concentrate		26,000 [e]	20,000 [e]	41,000	27,000 [e]	25,000 [e]
INDUSTRIAL MINERALS						
Bromine[e]		4,100	4,100	4,100	3,200 [r]	3,500
Cement, hydraulic		10,515,300	9,843,000	9,857,000	8,636,000	8,511,000
Clay:						
Bentonite[e]		211,000	219,000	220,000	210,000	210,000
Kaolin	thousand metric tons	1,317	1,218	1,179	1,426	1,815
Kaolinitic clay	do.	575	580	855	2,250 [r]	2,510
Feldspar		179,000	146,000	134,000	95,000	44,000
Graphite[e]		6,000	5,800	5,500	5,000	5,000
Gypsum and anhydrite	thousand metric tons	2,294	2,186	2,175	1,525	1,255
Lime	do.	4,487	4,415	3,892	3,134 [r]	2,717
Limestone	do.	22,800	20,582	18,652	11,564	7,620
Nitrogen, N content of ammonia	do.	3,586 [r]	3,443 [r]	2,888 [r]	2,008 [r]	1,799

See footnotes at of of table.

TABLE 1—Continued
UKRAINE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2011	2012	2013	2014	2015
INDUSTRIAL MINERALS—Continued						
Salt, all types		5,938,000	6,189,446	5,796,000	2,498,000	2,137,000
Soda ash		700,000 e	720,000	720,000 e	600,000 e	600,000 e
Sulfur, native[e]		130,000	120,000	120,000	100,000	100,000
Sulfuric acid		1,537	948 r	906 r	554	507
Vermiculite[e]		60,000	60,000	60,000	50,000	48,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Raw:						
Anthracite	thousand metric tons	14,059	20,763	15,604	8,705 r	--
Bituminous	do.	67,600	64,690	27,953	51,300 r	39,800
Lignite	do.	5,000 e	5,000 e	5,782	5,000 e	-- e
Total	do.	86,700 e	90,500 e	49,339	65,000 e, r	39,800 e
Marketable	do.	62,700	66,700 e	63,600 e	45,230	28,800 e
Coke		19,599,100	18,939,100	17,569,000	13,858,000	11,617,000
Natural gas[3]	thousand cubic meters	19,934,900	20,492,000	21,313,000	20,500,000 r	19,900,000
Peat:						
Fuel use		301,000	446,000	467,000	463,000 r	491,000
Horticultural use		129,000	210,000	131,000	119,000	79,000
Total		430,000	656,000	598,000	582,000 r	570,000
Petroleum:						
Crude and gas condensate[4]	thousand 42-gallon barrels	24,000	24,342	22,348	19,776	17,773
Refinery products[5]	do.	69,000	33,766	27,303	21,980	11,775
Uranium, mine output:						
U content		890 e	960 e	922	926 r	980
U_3O_8 content		1,050 e	1,130 e	1,080	1,083 r	1,146

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through February 1, 2017.

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

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

[4]Figures were converted to barrels from metric tons, which were reported as follows: 2011—3,297,800; 2012—3,245,000; 2013—3,071,000; 2014— 2,739,000; and 2015—2,461,700.

[5]Figures were converted to barrels from metric tons, which were reported as follows: 2011—8,787,000; 2012—4,300,000; 2013—3,477,000; 2014— 2,800,000; and 2015—1,500,000 (estimated).

TABLE 2
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(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	Nikolayevskiy alumina refinery [United Company RUSAL (RUSAL)]	20 kilometers south of Mykolaiv	1,600,000
Alumina			
Aluminum, primary	Zaporozhskiy aluminum complex (ZAlK) [Government]	do.	114,000
Cement	Four companies:	Locations:	14,600,000 [3]
	Nikolayevtsement	Mykolaiv	
	PAO Evrotsement-Ukraina	Balakleya, Kharkivskaya Oblast'	
	PAO Ivano-Frankovsktsement	Ivano-Frankovs'ka Oblast	
	PAO Kramators'kiy Tsementnyi Zavod PUSHKA	Kramatorsk, Donets'ka Oblast'	
Coal	About 150 active surface and underground mines, including:	About 95% of coal produced in Donets'ka, Dnipropetrovs'ka, and Luhans'ka Oblasts	90,000,000 [3]
	Donbass Fuel and Energy Co. (DTEK) (System Capital Management, 100%):		
	DTEK Pavlogradugol	10 mines in Dnipropetrovs'ka and Donets'ka Oblasts	
	DTEK Komsomolets Donbassa Mine	Kirovskoe, Donets'ka Oblast'	
	DTEK Dobropolyeugol	5 mines near Dobropillya, Donets'ka Oblast'	
	DTEK Sverdlovanthracite	5 coal mines and 3 processing plants in Luhans'ka Oblast'	
	DTEK Rovenkyanthracite	6 mines and 3 processing plants in Luhans'ka Oblast'	
	Krasnoarmeiskaya-Zapadnaya No. 1	1 mine at Krasnoarmeisk, Donets'ka Oblast'	
	JSC Krasnodon Coal Co. (Metinvest B.V.)	7 mines and 2 processing plants in Luhans'ka Oblast'	
	Smaller producers	Donets'ka, Dnipropetrovs'ka, Luhans'ka, Lvivs'ka, and Volyns'ka Oblasts	
Coke	Evraz Group:	Locations in Dnipropetrovs'ka Oblast':	3,000,000
	OAO Dneprkoks coke plant	Dnipropetrovsk	
	OAO Bagliykoks coke plant	Dniprodzerzhinsk	
	OAO Dneprodzerzhinsk coke plant	do.	
Do.	Metinvest B.V.:		
	JSC Avdiivka coke plant	Avdeyevka, Donets'ka Oblast'	4,000,000
Do.	JSC Azovstal Iron and Steel Works	Mariupol, Donets'ka Oblast'	3,200,000
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, Donets'ka Oblast'	390,000
Do.	Yenakievo coke plant	Yenakievo, Donets'ka Oblast'	NA
Do.	OAO Zaporozhkoks (JSC Zaporizhstal, 42%, and Metinvest B.V., 25%)	Zaporizhia	NA
Do.	Makeevka coke plant	Makeevka, Donets'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, Donets'ka Oblast'	440,000
Do.	Kharkov coke plant	Kharkiv	225,000
Ferroalloys:			
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 2015

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners[1, 2]	Location or deposit names	Annual capacity[e]
Ferroalloys—Continued:				
Ferromanganese, blast furnace		Konstantinovka Iron and Steel Works	Konstyantynivka, Donets'ka Oblast'	NA
Do.		Kramatorskiy ferroalloys plant	Kramatorsk, Donets'ka Oblast'	NA
Ferronickel		Pobuzhskiy ferronickel complex (PFC)	Pobuzhye, Kirovohrads'ka Oblast'	100,000
Ferrosilicon		Stakhanovskiy ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	120,000 [4]
Do.		Zaporozhskiy ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Silicomanganese		Stakhanovskiy ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	50,000 [4]
Do.		Zaporozhskiy ferroalloys plant (PrivatBank Group)	Zaporizhia	250,000
Do.		Nikopol'skiy ferroalloys plant (PrivatBank Group and EastOne Group)	Nikopol	900,000
Gallium		Nikolayevskiy alumina refinery [United Company RUSAL (RUSAL)]	20 kilometers south of Mykolaiv	13
Germanium		Zaporozhskiy titanium-magnesium complex (ZTMK) (Government, 51%, and Tolexis Trading Ltd., 49%)	Zaporizhia	NA
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.		Zaporozhskiy iron ore complex	Eksplutatsionnay Mine in Zaporiz'ka Oblast'	4,500,000
Do.		Tsentral'nyi GOK (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.		Severnyi GOK (Metinvest B.V.)	2 mines in Dnipropetrovs'ka Oblast'	30,000,000
Do.		Inguletskiy GOK (Metinvest B.V.)	Ingulets Mine south of Kryviy Rih	35,000,000
Do.		Yuzhnyi GOK (Metinvest B.V.)	Mine at Kryviy Rih	22,000,000
Do.		ArcelorMittal Kryviy Rih	2 mines at Kryviy Rih	26,600,000
Do.		Poltavskiy GOK (Ferrexpo Plc.)	Gorishne-Plavninskoye and Lavrikovskoye (GPL) Mine 15 kilometers east of Kremenchug	30,000,000
Do.		Yeristovskiy GOK (Ferrexpo Plc.)	Poltavs'ka Oblast'	NA
Do.		Sukha Balka GOK (Evraz Group S.A.)	Kryviy Rih, Dnipropetrovs'ka Oblast'	3,000,000
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 Nikitrtyt	Horlivka, Donets'ka Oblast'	300
Natural gas		Yuzovskoye deposit (Royal Dutch Shell plc)	Kharkivs'ka and Donets'ka Oblasts'	NA
Do.		Olesskoye deposit (Chevron Corp.)	Lvivs'ka and Ivano-Frankivs'ka Oblasts'	NA
Nickel, Ni content in FeNi		OOO Pobuzhskiy Ferronickel Complex (PFC) (Solway Investment Group)	Pobuzhye, Kirovohrads'ka Oblast'	20,000
Petroleum, refined	42-gallon barrels	Kherson oil refining plant	Kherson	NA
Do.	do.	Odessa refinery (OAO Lukoil)	Odessa	23,000,000
Do.	do.	Lisichansk refinery (TNK-BP)	Lisichansk	62,000,000
Do.	do.	Halychyna refinery (Ukraine Oil Co.)	Drohobych, Lvivs'ka Oblast'	28,600,000
Do.	do.	Kremenchug refinery (CJSC Ukrtatnafta)	Kremenchug	150,000,000
Do.	do.	JSC Naftokhimik Prykarpattya	Nadvirna, Ivano-Frankivs'ka Oblast'	18,400,000
Do.	do.	Shebelinka refinery	Shebelinka, Kharkivs'ka Oblast'	NA
Steel, crude		Industrial Union of Donbass Corp. (ISD Corp.): OJSC Alchevskiy Iron and Steel Works	Alchevsk, Luhans'ka Oblast'	5,200,000
Do.		Dneprovskiy Metallurgical Plant “Dzerzhinsky”	Dniprodzerzhinsk	3,850,000

See footnotes at end of table.

TABLE 2—Continued
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners[1, 2]	Location or deposit names	Annual capacity[e]
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 Yenakiyeve 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)	Zaporizhia	4,350,000
Do.		Kramatorskiy Metal Plant “Kuibiysheva”	Kramatorsk, Donets'ka Oblast'	NA
Do.		Donetskstal	Donetsk	NA
Do.		Donetskiy electrometallurgical plant	do.	1,000,000
Do.		Dneprospetsstal	Zaporizhia	918,000
Do.		OOO Elektrostal	Kurakhovo, Donets'ka Oblast'	NA
Do.		JSC Energomashspetsstal (OJSC Atomenergomash)	Kramatorsk, Donets'ka Oblast'	NA
Do.		PJSC Azovelectrostal (JSC Azovmash)	Mariupol, Donets'ka Oblast'	500,000
Titanium:				
Concentrate:				
Ilmenite		Irshanskiy GOK [Government]	Irshansk, 50 kilometers north of	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 [5]
Do.		Volnogorskiy GOK [Government]	Volnogorsk, 70 kilometers west of Dnipropetrovsk	200
Do.		Demurinskiy GOK (Limpeza Ltd., 25%, and VSMPO-Avisma, 75%)	Dnipropetrovs'ka Oblast'	NA
Rutile		do.	do.	65
Sponge		Zaporozhskiy titanium-magnesium complex (ZTMK) (Government, 51%, and Tolexis Trading Ltd., 49%)	Zaporizhia	NA
Ingots		OOO Antares	Kyev	NA
Do.		OOO Fico	do.	NA
Do.		Zaporozhskiy 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)	Ingulskaya 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 2015

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners[1, 2]	Location or deposit names	Annual capacity[e]
Zirconium:			
Concentrate	Volnogorskiy GOK [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

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

[1]Inconsistencies 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.

[2]GOK is the abbreviation for gorno-obogotitelniy kombinat, which translates as "mining and beneficiation complex."

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

[4]The Stakhanovskiy ferroalloys plant stopped operations in the summer of 2014 because of the military operations in the area.

[5]Velta LLC was ordered to stop operations by the Government Service for Geology and Subsoil in November 2015.