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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 four producers of gallium, the 4th-ranked producer of rutile (accounting for 7% of world output), the 6th-ranked producer of titanium sponge (3% of world output) and of iron ore (3% of world output), the 7th-ranked producer of manganese ore (2.4% of world output), the 9th-ranked producer of steel (2.1% of world output), and the 11th-ranked producer of ilmenite (2.3% of world output). The country had significant coal reserves but was dependent on imports to satisfy most of its petroleum and natural gas demand. Ukraine was also an important transit country for natural gas and petroleum from Central Asia and Russia to Europe (Corathers, 2013; Fenton, 2013; Gambogi, 2013a, b; Jaskula, 2013; Tuck, 2013).

Minerals in the National Economy

In 2012, Ukraine's real gross domestic product (GDP) increased by 0.3% compared with that of 2011. The nominal GDP in 2012 amounted to $174.6 million. During the year, overall annual industrial output was reduced by 4.5% compared with that in 2011; the share of industrial production in the country's GDP was 58%. The State Statistics Committee of Ukraine reported that, in 2012, mining and quarrying activities accounted for about 14.1% of all industrial production, and manufacturing, for 57.1%. The share of metallurgical production in overall industrial production was 15.1%, out of which production of ferroalloys, pig iron, steel accounted for 13.0 percentage points and production of nonferrous and precious metals accounted for 0.6 percentage points. Out of the 14.1% that constituted the total share of mining and quarrying in manufacturing production, mining of metallic ores accounted for 6.4 percentage points, coal mining accounted for 4.4 percentage points, and production of crude oil and natural gas accounted for 2.4 percentage points (State Statistics Service of Ukraine, 2013b; 2014).

Government Policies and Programs

In August 2012, Ukraine's Government proposed to simplify the process of issuing special licenses for the use of subsoil, including mining licenses. Special licenses are usually required for mineral resources that have been determined to be of national importance. According to the existing rules, the special licenses are issued by the national Government following special auctions or tenders, but an applicant has to obtain the approval of the corresponding local elected body, usually at the oblast level, before being allowed to participate in an auction. The corresponding elected bodies customarily consider such petitions during their biannual sessions. This procedure significantly slows the Government's ability to conduct auctions, which serve as an important source of revenue for the Government. To simplify the process, the proposal suggests delegating the issuance of approvals to local governments, which can process the approvals more quickly. To implement those changes, the Ukraine Parliament would need to approve relevant amendments to the Mining Code and the Code on Regional and Local Administrations (MinerJob.ru, 2012b).

Beginning on February 1, 2012, the value-added tax was lifted on lead-acid accumulators and lead-containing scrap imported into Ukraine. The tax had already been lifted on imports of many other types of nonferrous metal scrap, such as aluminum, bismuth, cadmium, chromium, cobalt, copper, germanium, magnesium, manganese, molybdenum, nickel, tantalum, thallium, tin, titanium, vanadium, and zirconium. Among ferrous metals, scrap of alloyed steel, pig iron, and stainless steel containing nickel were also not subject to the value-added tax (Mineral.ru, 2012o).

Production

Production of many mineral commodities was down in 2012. The output of refinery products decreased by 49%; that of primary aluminum, by 40%; gypsum, by 35%; and secondary aluminum, by an estimated 31%. The output of several other mineral commodities also decreased significantly, including that of secondary copper, which decreased by an estimated 25%; zirconium concentrates, by 23%; ferrosilicon, by 21%; kaolin, by 20%; feldspar, by 16%; gallium, by an estimated 15%, and steel pipe, by 15%. On the other hand, output of anthracite coal increased by 48%; that of other ferroalloys, by 23%; and manganese ore and concentrates, by 22%. These and other production data are in table 1.

Mineral Trade

The total value of Ukraine's exports increased to about $68.8 billion in 2012 from $68.4 billion in 2011. The value of exports was equal to about 39% of Ukraine's GDP in 2012. Ukraine's leading export category in terms of value was ferrous metals, and in 2012, exports of ferrous metals were valued at $15.3 billion and made up 22.3% of the total value of exports; exports of mineral fuels and petroleum products were valued at $3.7 billion and made up 5.3% of the total value of exports. Another $3.3 billion (4.8% of the total value of exports) was contributed by exports of cinder, ores, and slag. The value of exports of mineral products and metals made up about 33.4% of the value of total exports. The main export partners of Ukraine were Russia (which received 25.6% of Ukraine's exports); Turkey (5.4%); Egypt (4.2%); Poland (3.7%); Italy and Kazakhstan (3.6% each); and India (3.3%) (State Statistics Service of Ukraine, 2013a, 2014).

The total value of Ukraine's imports was about $84.7 billion in 2012 and $82.6 billion in 2011. The leading imported commodities were mineral fuels and refined petroleum products, which made up about 32.5% of the value of total imports in 2012.

Natural gas was the leading individual imported product, in terms of value, and accounted for 16.6% of the value of total imports. The country's main import partners in 2012 were Russia (which supplied 32.4% of Ukraine's imports); China (9.3%); Germany (8.0%); Belarus (6.0%); Poland (4.2%); the United States (3.4%); and Italy (2.6%) (State Statistics Service of Ukraine, 2013a, 2014).

Commodity Review

Metals

Aluminum.—On April 26, 2011, United Company RUSAL (RUSAL) of Russia halted primary aluminum production at the Zaporozhye smelter (ZAlK), which was Ukraine's only producer of primary aluminum. According to RUSAL, the main reason for halting production at the smelter was the high cost of electricity used in primary aluminum production, which was as high as $0.08 per kilowatthour compared with about $0.03 per kilowatthour in a typical smelter located in Europe and Russia. The company was planning to continue to produce rolled aluminum at the ZAlK plant using the ingots shipped from other RUSAL facilities (Kommersant Ukraina, 2011; Stasovskaya, 2012).

The Government of Ukraine had expressed dissatisfaction with RUSAL's operations in the country. In 2000, Ukraine's alumina producer, the Nikolaevskiy alumina plant (NGZ), had been privatized and sold to RUSAL. As a part of the deal, RUSAL had promised to build an additional aluminum plant in Ukraine that would have the capacity to produce at least 100,000 metric tons per year (t/yr) of aluminum. In 2004, because of low aluminum prices, RUSAL asked the Government to replace the requirement to build a new plant with a requirement to modernize the NGZ plant extensively and to increase alumina production to 1.6 million metric tons per year (Mt/yr). In 2007, the ZAlK plant became a part of RUSAL when the former RUSAL, Siberian-Urals Aluminum Co. (SUAL), and the alumina holdings of Glencore International AG were merged into the new United Company RUSAL. Before the merger, SUAL had owned 68.01% of the shares in ZAlK, which it acquired in 2004 from AvtoVAZ-Invest. Since 2008, annual production of primary aluminum at the smelter had gradually decreased to about 25,000 metric tons (t) in 2011 from 113,000 t in 2008. As a result of these developments, by yearend 2011, Ukraine, instead of having two aluminum plants, was about to be left with no plants at all (Vzglyad, 2012).

In the beginning of 2012, Ukraine's General Prosecutor's office filed a lawsuit against RUSAL claiming that RUSAL had violated the conditions of the ZAlK sale, in particular the requirement that ZAlK's $75 million loan be refinanced by the investor. On March 24, the Kyev Economic Court pronounced the initial sale of ZAlK to be invalid and ordered that ZAlK be returned to its original owner, the Ukraine State Property Fund, which had privatized ZAlK in 2001. RUSAL appealed the decision and, on May 23, the Kyev Economic Court of Appeals confirmed the decision of the lower court. RUSAL announced that it was planning to appeal this decision in the Ukraine Court of Cassation and was not planning to return the plant. RUSAL offered to restart production at ZAlK if the Government of Ukraine agreed to sign a long-term agreement about preferential electricity tariffs for aluminum production in the country, which would render production at ZAlK profitable. It was expected that the court battle between RUSAL and the Government might last for years while production at ZAlK stays at very low levels (Vzglyad, 2012).

Ferroalloys.—Production of ferromanganese, ferrosilicon, and silicomanganese decreased significantly in 2012 as Ukrainian producers continued to encounter high production costs and reduced market demand for their products. The Nikopol ferroalloys plant produced 103,000 t of ferromanganese and 554,800 t of silicomanganese. The Stakhanov ferroalloys plant produced 119,400 t of ferrosilicon and 49,400 t of silicomanganese. The Zaporozhye ferroalloys plant produced 54,100 t of ferromanganese and 129,900 t of silicomanganese (Metallosnabzhenie i sbyt, 2013).

In September, the PrivatBank Group, which was the owner of all three ferroalloys plants as well as two manganese mining and beneficiation complexes—the Marganets mining and beneficiation complex (GOK) and the Ordzhonikidze GOK, threatened to begin massive layoffs if the Government did not provide a discount for electric power to all three plants. The Cabinet of Ministers of Ukraine appeared to agree to form an interagency working group to revise power rates for electrometallurgical plants. Some members of the Government, however, made statements indicating that the Government might file a lawsuit against PrivatBank for violation of the investment obligations agreed to when the ferroalloys plants were privatized (Unian.net, 2013a).

In October, the Government introduced a reduced price for electric power for the electrometallurgical plants whose share of electric power in the production cost was greater than 30%; those enterprises included the Nikopol, the Stakhanov, and the Zaporozhye ferroalloys plants. The reduction in power prices was supposed to be in effect from October 1, 2012, through March 1, 2013. It was expected that the price reduction for electrometallurgical plants would eventually result in increased electricity prices for other industrial electric power consumers (Unian.net, 2013a).

Gold.—Ukraine did not produce gold in 2012. According to the Prime Minister of Ukraine, the only existing gold-mining enterprise, OOO Zakarpatpolimetally, was in need of investment. When the plant stopped production in December 2006, 400 workers lost their jobs and the plant had a debt of 29 million hryvnias ($5.8 million).[1] The company had been in bankruptcy since 2008, but, as of September 2012, no court decision about the company's debt resolution had been finalized. The Muzhievskoe gold mine, which was operated by Zakarpatpolimetally, had estimated resources of about 44 t of gold, and additional resources of lead, zinc, and silver. Zakarpatpolimetally also had a beneficiation plant with a capacity of 200,000 t/yr of ore (Mineral.ru, 2012b).

Meanwhile, other companies continued to invest in other gold projects in Ukraine. Lugansk Gold Ltd. of Australia was

[1]Where necessary, values have been converted from Ukrainian hryvnias (UAH) to U.S. dollars (US$) at an annual average exchange rate of UAH8.12=US$1.00 for 2012 and UAH5.00=US$1.00 for 2006. All values are nominal, at current prices, unless otherwise stated.

planning to invest a total of $50 million in a gold project at the Bobrikovskoye gold sulfide deposit in Luhans'ka Oblast'. The project included construction of a beneficiation plant that would have the capacity to process up to 500,000 t/yr of ore. The project was expected to have a life of between 10 and 15 years and to produce about 2,000 kilograms per year of gold. The Bobrikovskoye deposit was grading between 1 and 16 grams per metric ton (g/t) gold and 42.5 g/t silver. According to the Joint Ore Reserves Committee (JORC) Code, its gold reserves were evaluated to be 1.012 million troy ounces [31,500 kilograms (kg)], out of which about 500,000 troy ounces (15,600 kg) was classified as measured and probable, and silver reserves were evaluated to be between 12.25 million troy ounces (381,000 kg) and 14.5 million troy ounces (451,000 kg) (Mineral.ru, 2012e, f).

The state enterprise Severgeologiya obtained a license for additional exploration and mining of two gold deposits in Dnipropetrovs'ka Oblast'. The two were the Balka Zolotaya deposit, which graded 6.2 g/t gold, and the Balka Shirokaya deposit, which graded between 4 and 7 g/t gold. The resources of the deposits were estimated to be 50 and 130 t of gold, respectively (MinerJob.ru, 2012i).

Manganese.—Ukraine had two producers of mined manganese—the Marganets GOK and the Ordzhonikidze GOK, both of which were located in Dnipropetrovs'ka Oblast' and owned by PrivatBank. The Marganets GOK produced manganese concentrate, and the Ordzhonikidze GOK produced both manganese concentrate and manganese agglomerate. The Marganets GOK was the only manganese ore producer in Ukraine that had an underground mine; it produced about 80% of its ore from underground mining and the other 20% was from open pit mining. The Ordzhonikidze GOK produced all its ore from open pit mining. In 2012, the Marganets GOK produced 696,100 t of manganese concentrate, which was a 7% decrease compared with its output in 2011. The Ordzhonikidze GOK, which was the leading manganese ore producer in Ukraine based on capacity, had production interruptions throughout 2011 and 2012; it did not produce manganese concentrate between September and December of 2011, and it did not produce any manganese agglomerate from January to April 2012. As a result, in 2012, the manganese concentrate production at the Ordzhonikidze GOK increased by 53.9% compared with that in 2011, whereas manganese agglomerate production decreased by 60% (MinerJob.ru, 2012e).

Hubei Changyang Hongxin Industrial Group, Inc. (HCHIG), which was the leading producer of electrolytic manganese in China, expressed interest in obtaining a development license for the Velikotokmakskoye manganese deposit in Zaporiz'ka Oblast'. The company created a plan for development and exploitation of the deposit that would span 20 years and cost a total of $1 billion. According to this plan, the maximum capacity of the mine would be 5 Mt/yr of manganese ore and 200,000 t/yr of electrolytic manganese. This was not the first attempt to develop the Velokotokmakskoye deposit. In the 1980s, the Government of the Soviet Union had started construction of the Tavricheskiy GOK; activity at the only mine at the Tavrickeskiy GOK was suspended in 1995 because of the enterprise's losses, however, and the mine had not been in operation since then (MinerJob.ru, 2012d).

Titanium.—The titanium industry in Ukraine consisted of ilmenite and rutile concentrate production, titanium sponge production at the Government-owned Zaporozhye Titanium & Magnesium Complex (ZTMK), and titanium ingot production by a small number of producers, including OOO Antares, OOO Fiko, and ZTMK, which had a combined capacity to produce about 12,000 t/yr of titanium ingots. Titanium dioxide pigment was produced by Crimea Titan CJSC and OAO Sumykhimprom. Ukraine did not have the ability to produce titanium metal products used in the aerospace industry and other industries that require more technically advanced titanium metal products (Metall Ukrainy, 2010, p. 61).

Velta LLC was planning to open the second stage of its mining and beneficiation complex at the Birzulovkoe ilmenite deposit at the end of 2012. The first stage officially started operations in December 2011. The total investment in the new complex was approximately $90 million, out of which $80 million was used to fund the development of the first stage, and the rest was invested in the second stage. Once the second stage of the construction is completed, the complex was projected to have an annual capacity of 240,000 t/yr of titanium ore (Kabash, 2011; Mineral.ru, 2012p).

In January 2012, the Cabinet of Ministers made a decision to privatize ZTMK, which was the leading producer of titanium sponge in Ukraine. Later, it was announced that a potential investor was willing to invest $700 million into the enterprise. In December, it was announced that Tolexis Trading Ltd. of Cyprus (a part of the DF Group) had won the tender and would receive 49% of the shares of ZTMK. According to the rules of the tender, the winner was to invest at least $100 million in the company to provide ZTMK with ilmenite from a domestic source, which would be used to pay off company debts, including delayed payments of wages, taxes, and energy costs. The DF Group was likely to select Velta as its ilmenite supplier (MinerJob.ru, 2012h).

In July, a world leading titanium producer, VSMPO-Avisma of Russia, acquired 75% of the shares of Limpeza Ltd. of Cyprus, which owned the Demurinskiy GOK. The Demurinskiy GOK had a license to mine the Volchanskiy deposit, which contains alluvial titanium and zirconium. The GOK was projected to be able to reach its capacity of 50,000 t/yr of ilmenite concentrate, 13,000 t/yr of rutile concentrate, and 3,000 t/yr of zircon in the next 3 to 5 years. VSMPO-Avisma reportedly invested $30 million into the GOK and was planning to build a beneficiation plant (MinerJob.ru, 2012f, g, j).

Mineral Fuels and Related Materials

Coal.—According to BP p.l.c. of the United Kingdom, proven reserves of coal in Ukraine were 33.9 billion metric tons, or about 4.0% of the world's reserves. According to those estimates, Ukraine's coal reserves are 390 times larger than the country's current annual production. Ukraine has three coalfields—the Dneprovskiy, the Donetskiy, and the Lvovsko-Volynskiy fields. The largest of these fields is the

Donetskiy field, which contains 87% of the proven reserves (Baker Tilly, 2013).

In 2012, Ukraine produced 85.7 million metric tons (Mt) of coal, which was a 4.64% increase compared with its coal output in 2011. The country was the fourth-ranked coal producer in Europe after Russia, Germany, and Poland. The output from the mines located in Donets'ka Oblast', totaled 36.46 Mt of coal in 2012, which was an 8.8% increase compared with production in 2011. The mines located in Luhan'ska Oblast' produced 26.94 Mt of coal (which was a 1.2% decrease); Dnipropetrovs'ka Oblast', 17 Mt (a 10.3% increase); Lvivs'ka Oblast', 1.96 Mt (a 16.8% decrease); and Volyns'ka Oblast', 392,600 t (a 28.6% decrease) (Mineral.ru, 2012l; 2013).

Despite the increases in production, according to the Government estimates, about 80% of all coal mines in Ukraine operated at a loss in 2012. The coal mined from the Donetskiy field, for example, contained large amounts of sulfur and other undesirable constituents. In addition, as of 2012, a total of about 400,000 t of unsold coal was being kept in coal storage facilities. Consequently, the Government was facing significant problems with the country's coal industry. On one hand, increases in coal production could potentially serve as part of the strategy to increase the country's energy independence and reduce its natural gas imports from Russia. On the other hand, Ukrainian coal was unable to compete with coal from Germany and Poland either in terms of price or quality (MinerJob.ru, 2012a).

To overcome those problems, the Government developed two potential solutions. One of them was privatization of Government-owned coal mines. Beginning in 2013, several specified mines could be privatized for a symbolic price of 1 hryvnia ($0.12) in exchange for taking on investment obligations with respect to the privatized mines. Another approach to saving Ukraine's coal industry was to artificially generate domestic demand for coal. In particular, the Government mandated that heating plants in the country were to switch from natural gas, which was imported from Russia, to domestically produced coal as their energy source. According to the Ministry of Energy, this switch would allow Ukraine to reduce domestic consumption of natural gas by 6 billion cubic meters per year. On the other hand, many residents and local leaders voiced concern that the switch to coal would significantly increase pollution and worsen the environmental situation in many cities (Mineral.ru, 2012g, h; MinerJob.ru, 2012c).

Natural Gas.—In 2012, Ukraine was expanding its natural gas production from shale and from the Black Sea shelf. After long and largely fruitless negotiations with Russia about the price of natural gas imported from Russia, the Government of Ukraine decided to develop a set of measures to reduce gas consumption and simultaneously increase natural gas production domestically. The Government was hoping to reach production levels of between 20 billion and 30 billion cubic meters per year of shale gas within the next 10 years (Mineral.ru, 2012k, m).

In May, the Government conducted tenders for the Yuzovskoye and the Olesskoye shale gas deposits, which were won by Royal Dutch Shell plc of the Netherlands and Chevron Corp. of the United States, respectively. According to some estimates, the total resources of the Yuzovskoye deposit and the Olesskoye deposit are about 2 trillion cubic meters and 1.5 trillion cubic meters, respectively. Ukraine was hoping to start commercial production of shale gas in 2017. In August, the Government held a tender for the Skifskaya oil and gas field, which is located in the Black Sea shelf; the winner of the tender was Exxon Mobil Corp. of the United States. According to preliminary data, the Skifskaya field has the potential to produce between 3 billion and 4 billion cubic meters per year of natural gas. Ukraine was also planning to announce a tender for the Slobozhanskaya field. Annual gas production at the Slobozhanskaya field was estimated to be between 6 billion and 8 billion cubic meters per year (Mineral.ru, 2012c, j, n).

In September, Ukrainian State Company Chernomorneftegaz started industrial exploitation of the Odesskoye gas deposit located on the Black Sea shelf. The total resources of the deposit were estimated to be 22 billion cubic meters of natural gas. Overall, Chernomorneftegaz was planning to triple natural gas production from the Black Sea shelf to 3 billion cubic meters per year of natural gas by 2015 from 1.056 billion cubic meters per year in 2011. The company was planning to add three more shelf gas projects to the four already in operation—the Arkhangel'skoye, the Bezymyannoye, the Golitsinskoye, and the Odesskoye. It was expected that the demand for natural gas on the Crimean Peninsula, where annual natural gas consumption was about 2 billion cubic meters, would be fully met by the shelf gas produced in the Black Sea (Mineral.ru, 2012a, q).

Petroleum.—Ukraine's production of petroleum refinery products decreased by 49% in 2012 to 4.57 Mt of petroleum. The total annual capacity of all refineries in Ukraine was 43.65 Mt; therefore, overall, the country's refineries produced only at 10.5% of their capacity. In 2012, Ukraine had seven refineries, only two of which were operating. The leading Ukrainian refinery, the Kremenchug refinery, processed about 3 Mt of petroleum in 2012, whereas its capacity was 18.6 Mt/yr. The other working refinery—the Shebelinsk refinery—which had facilities to process both petroleum and natural gas, had the capacity to process about 1 Mt/yr of petroleum, but in 2012 it refined only 660,000 t (Somov, 2013).

Three more refineries—the Drogobychsk refinery, the Kherson refinery, and the Nadvoryansk refinery—had obsolete equipment and were incapable of producing petroleum products to Ukraine's national quality standards. Modernization of these refineries would require significant investments, but the current owners were not interested in making such investments. The Odessa refinery was shut down in 2010 because it had difficulty in obtaining crude oil supplies after the directional flow of oil in the Odessa-Brody pipeline was reversed. Previously, the pipeline had shipped Russian oil from Brody to Odessa, but beginning in 2011, it began shipping Caspian Sea oil from Odessa to Brody. Finally, the Lisichansk refinery was shut down in March 2012 because of financial losses. The current owner of the Lisichansk refinery, TNK-BP, was reportedly looking for a buyer for the refinery. The Lisichansk refinery had the capacity to refine 8 Mt/yr of petroleum (Mineral.ru, 2012d).

Uranium.— Uranium ore was mined in Ukraine from underground mines by the state-owned company Vostochny GOK, and it was processed into concentrate at the company's

hydrometallurgical plant at Zheltye Vody. 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. In 2012, domestic uranium production accounted for 32% of all uranium used in Ukraine's nuclear powerplants. In 2012, the Vostochny GOK increased its production of uranium concentrate by 8% (compared with its output in 2011) to 960.2 t (Unian.net, 2013b).

In September 2010, TVEL was awarded a contract for the construction of a nuclear fuel assembly plant in Ukraine, and, in 2011, a Russian-Ukrainian joint venture between TVEL and GK Nuclear Fuel of Ukraine completed its registration procedures. GK Nuclear Fuel had a 50% plus one share in the new enterprise, and TVEL had 50% minus one share. The fuel assembly plant would allow Ukraine to execute the final stage of nuclear fuel preparation, but it would still be necessary for Ukraine to ship its uranium concentrate out of the country for the intermediate process of uranium conversion and enrichment. The construction of the plant was expected to begin in 2013 (Mineral.ru, 2012i).

In July 2011, the Vostochny GOK began uranium ore production from the Novokonstantinovskoye deposit in Kirovohrads'ka Oblast'. In June 2012, the Government of Ukraine approved the construction plan for a new uranium processing plant at the Novokonstantinovskoye deposit with a total cost of about $800 million. The plant would have the capacity to process 1.5 Mt/yr of uranium ore and to produce 500,000 t/yr of uranium oxides. The construction of the first stage of the project was planned to be completed in 42 months, and the entire project was expected to be built within 96 months. By 2014, Ukraine was planning to increase its uranium ore production to 1.88 Mt/yr (Mineral.ru, 2012i).

Outlook

Ukraine mining and metallurgy sectors had significant setbacks in the past few years. Ukrainian aluminum production was essentially halted because of the high electricity prices; ferroalloys plants had been granted temporary electricity price discounts provided by the Government, but they had no clear way forward in the absence of these subsidies; and coal mines and petroleum refineries were outdated and required significant investments to become competitive or even to break even. In terms of energy production, Ukraine was trying to increase its domestic production of petroleum and natural gas, ramp up coal and uranium production, and reduce its reliance on imported natural gas from Russia.

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 high energy requirements, a need of 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 COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]	2008	2009	2010	2011	2012
METALS					
Alumina	1,673,000	1,524,000	1,534,000	1,601,000	1,429,000
Aluminum:					
Primary	113,000	50,000	25,000	24,830 r	14,829
Secondary[e]	130,000	130,000	130,000	130,000	90,000
Total[e]	243,000	180,000	155,000	155,000 r	105,000
Copper, metal, secondary[e]	20,000	20,000	20,000	20,000	15,000
Gallium[e]	13	13	13	13	11
Germanium[e] kilograms	1,032 3	690 3	700	700	700
Iron and steel:					
Iron ore, marketable ore and concentrate:					
Gross weight	72,688,000	66,476,000	78,170,700	80,580,800	81,966,400
Fe content[e]	40,000,000	36,600,000	43,000,000	44,300,000	45,100,000
Metal:					
Pig iron	30,982,000	25,682,900	27,361,000	28,881,100	28,513,500
Ferroalloys, electric furmace:					
Ferromanganese	362,400	129,400	280,100	180,500	157,100
Ferronickel:[e]					
Gross weight	89,825 3	61,449 3	62,000	62,000	62,000
Ni content	16,224 3	12,392 3	12,400	12,400	12,400
Ferrosilicon	152,800	150,300	195,500	150,900	119,400
Silicomanganese	894,900	741,900	940,400	843,500	734,200
Other[e]	23,000	23,900	28,500	28,500	35,000
Total[e]	1,520,000	1,110,000	1,510,000	1,270,000	1,110,000
Steel:					
Crude	37,279,000	29,855,000	33,559,000	35,332,000	32,394,000
Finished products:					
Rolled	20,493,000	16,097,600	17,549,300	19,511,000	18,457,300
Pipe	2,542,000	1,742,000	1,928,400	2,371,800	2,014,000
Lead, refined, secondary[e]	7,000	7,000	7,000	13,500 r	13,700
Magnesium metal[e]	2,000	2,000	2,000	2,000	--
Manganese, marketable ore and concentrate:					
Gross weight	1,446,600 4	932,000 4	1,589,300 4	971,500	1,189,240
Mn content[e]	492,000	317,000	540,000	330,000	396,000
Manganese, metal	8,585	14,330	16,137	16,100 e	14,575
Nickel, laterite ore[e]	8,000	--	--	--	--
Titanium:					
Ilmenite concentrate:[e]					
Gross weight	520,000	500,000	500,000	260,700 r, 3	246,800 3
TiO_2 content, 59%	306,000	295,000	295,000	153,800 r, 3	145,640 3
Rutile concentrate, 95% TiO_2[e]	60,000	60,000	60,000	60,000	58,000
Metal, sponge[e]	9,930	6,830	7,400	9,000	8,500
Zirconium concentrates[e]	36,000	31,000	30,000	26,000	20,000
INDUSTRIAL MINERALS					
Bromine[e]	4,416 3	4,121 3	4,100	4,100	4,100
Cement, hydraulic	14,918,400	9,495,700	9,456,500	10,515,300	9,801,100
Clays:					
Ball clay[e]	650,000	600,000	600,000	600,000	600,000
Bentonite[e]	200,000	195,000	185,000	211,000	210,000
Kaolin thousand metric tons	1,457	764	1,085	1,317	1,050
Kaolinitic clays do.	318	354	306	575	580

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity[2]		2008	2009	2010	2011	2012
INDUSTRIAL MINERALS—Continued						
Feldspar		83,420	84,757	146,000	179,000	150,000 [e]
Graphite[e]		5,800	5,500	6,000	6,000	5,800
Gypsum		1,158,000	711,000	679,000	676,000	436,200
Lime	thousand metric tons	5,128	4,101	4,220	4,487	4,196
Limestone	do.	26,700	18,000	20,600	22,800	20,387
Nitrogen, N content of ammonia[e]	do.	4,000	2,500	3,400	4,300	4,160
Salt		4,425,000	5,395,000	4,908,000	5,938,000	6,189,446
Soda ash		977,800	680,000	706,700	700,000 [e]	720,000
Sulfuric acid	thousand metric tons	1,479	890	1,296	1,537	1,376
Sulfur, native[e]		135,000	120,000	130,000	130,000	120,000
Vermiculite[e]		65,000	55,000	60,000	60,000	60,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, raw:[e]						
Anthracite	thousand metric tons	14,000	13,000	14,000	14,059 [r, 3]	20,763 [3]
Bituminous	do.	63,400	59,000	61,000	67,600 [r, 3]	64,690 [3]
Lignite	do.	200	200	200	200	200
Total	do.	77,600	72,200	75,200	81,900 [r]	85,700
Marketable	do.	59,312 [3]	54,820 [3]	54,444 [3]	62,700 [3]	66,700
Coke		19,543,000	17,424,000	18,599,700	19,599,100	18,939,100
Natural gas[5]	thousand cubic meters	21,467,000	21,545,000	20,458,000	19,934,900	19,318,300
Peat:						
Fuel use		358,000	449,000	321,000 [r]	301,000 [r]	263,000
Horticultural use		200,000 [e]	242,000	138,000 [r]	129,000 [r]	116,000
Total		558,000 [e]	691,000	459,000 [r]	430,000 [r]	379,000
Petroleum:						
Crude and gas condensate[6]	42-gallon barrels	30,300,000	28,500,000	25,400,000	24,000,000	24,110,000
Refinery products[7]	do.	83,700,000	85,700,000	80,300,000	69,000,000	35,508,900
Uranium, mine output:[e]						
U content		830	830	850	890	960
U_3O_8 content		980	980	1,000	1,050	1,130

[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 20, 2014.

[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]Reported figure.

[4]Includes secondary production.

[5]The 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.

[6]Figures were converted to barrels from metric tons, which were reported as follows: 2008—4,168,300; 2009—3,916,600; 2010—3,493,400; 2011—3,297,800; and 2012—3,316,500.

[7]Figures were converted to barrels from metric tons, which were reported as follows: 2008—10,717,000; 2009—10,947,000; 2010—10,333,000; 2011—8,787,000; and 2012—4,570,000.

TABLE 2
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(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
Do.	Zaporozhye refinery [United Company RUSAL (RUSAL)]	Zaporizhia	275,000
Aluminum, primary	Zaporozhye smelter [United Company RUSAL (RUSAL)]	do.	114,000
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:	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'	3,182,000
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, 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	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	100,000
Do.	Nikopol ferroalloys plant (PrivatBank Group and EastOne Group)	Nikopol	300,000
Do.	Stakhanov ferroalloys plant (PrivatBank Group)	Luhans'ka Oblast'	NA

See footnotes at end of table.

TABLE 2—Continued
UKRAINE: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(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 [4]
Do.	Kramatorskiy ferroalloys plant	Kramatorsk, Donets'ka Oblast'	NA
Ferronickel	Pobuzhskiy ferronickel 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	Eksplutatsionnay 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	Ordzhonikidze GOK (PrivatBank Group)	Ordzhonikidze	700,000
Do.	Marganets GOK (PrivatBank Group)	Marhanets	NA
Metal	Zaporozhye ferroalloys plant (PrivatBank Group)	Zaporizhia	NA
Mercury	OOO Nikitrtyt	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 FeNi	Pobuzhskiy GOK (comprises three open pit mines and the Pobuzhskiy ferronickel plant)	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 [5]
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 Alchevsk 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 2012

(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 Yenakiieve 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 "Kuibiysheva"	Kramatorsk, Donets'ka Oblast'	NA
Do.		Donetskstal	Donetsk	NA
Do.		Donetsk electrometallurgical plant	do.	1,000,000 [6]
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		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	Vostochny 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 2012

(Metric tons unless otherwise specified)

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

[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]Konstantinovka Iron and Steel Works stopped production of blast furnace ferromanganese in 2008.
[5]The Odessa refinery stopped production in the fourth quarter of 2010. Production could restart in the future if business conditions improve.
[6]In December 2011, Mechel OAO of Russia purchased 100% of the shares of the Donetsk electrometallurgical plant.
[7]Velta LLC began production of ilmenite concentrate in December 2011, but its first deliveries of commercial concentrate were not made until April 2012.