



2011 Minerals Yearbook

POLAND

THE MINERAL INDUSTRY OF POLAND

By Mark Brininstool

Poland had significant mineral reserves of several mineral commodities and also had mineral processing facilities with significant production capacity. In 2011, Poland was estimated to be the world's 4th ranked producer of rhenium, the 6th ranked producer of silver, and the 11th ranked producer of mined copper. Industrial minerals, such as aggregates, feldspar, salt, and sulfur, were also produced in significant quantities. For mineral fuels, Poland was ranked as one of the world's 10 leading producers of coal, but it was dependent on imports to meet domestic demand for oil and natural gas. Although Poland produced a relatively wide range of mineral commodities, the value of production was concentrated in only a few minerals commodities. In 2009 (the latest year for which data were available), bituminous coal, cement, and copper accounted for an estimated 66% of the value of mineral production (Galos, Ney, and Smakowski, 2010, p. 11; Apodaca, 2012; Brooks, 2012; Edelstein, 2012; Kostick, 2012; Polyak, 2012; Tanner, 2012; World Coal Association, 2012).

Minerals in the National Economy

In 2011, Poland's real gross domestic product (GDP) increased by 4.3% compared with the GDP in 2010. Mining and quarrying accounted for about 2.6% of the total GDP. In 2009 (the latest year for which data were available), the total value of mineral commodity production was estimated to be \$16.8 billion,¹ which was a 23% decrease compared with that of 2008 but only a 0.2% decrease using reported Polish zloty values of PLN52.4 billion in 2009 and PLN52.5 billion in 2008. The mineral industry in Poland maintained its value in 2009, but the Polish zloty depreciated significantly, so examining the value of mineral commodity production in terms of foreign currencies could create the impression that there was a significant decrease in the value of production. Bituminous coal, copper, and cement made up about 41%, 17%, and 9% respectively, of the value of Poland's mineral commodity production. Mineral fuels accounted for 54% of the total value of mineral commodity production (bituminous coal production accounted for 76% of the value of mineral fuels production); metals, 23% (copper production accounted for 72% of the value of metals production); and industrial minerals, 23% (cement production accounted for 37% of the value of industrial minerals production) (Ney and Smakowski, 2009, p. xi; Galos, Ney, and Smakowski, 2010, p. 11, 13; Central Statistical Office of Poland, 2012b; Dmochowska, 2012, p. 478).

Government Policies and Programs

Mining activities in 2011 were regulated by the Polish Geological and Mining Law of February 4, 1994, but on

¹Where necessary, values have been converted from Polish zlotys (PLN) to U.S. dollars (US\$) at an annual average exchange rate of PLN3.12=US\$1.00 for 2009.

January 1, 2012, the new Polish Geological and Mining Law of June 9, 2011, took the place of the older law. The trade, distribution, and storage of gaseous fuels are regulated by the Act on Reserves of Crude Oil, Petroleum Products and Natural Gas dated February 16, 2007, and the Polish Energy Law of April 10, 1997. The Government's Privatisation Programme for the Years 2008–2011 included important mining and energy companies, which are discussed in the Structure of the Mineral Industry section below (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2009, p. 41–43).

In November, the Government of Poland announced that it planned to place a new tax on copper and silver extraction. The Minister of Finance said that the new law would impose a tax of PLN130 (\$37.57) per metric ton of copper extracted when the price of copper is below PLN13,000 (\$3,757) per metric ton, and if the copper price rises above PLN52,000 (\$15,000) per metric ton, the tax could increase to a maximum of PLN32,000 (\$9,250) per metric ton. At any copper price between PLN13,000 and PLN52,000, the tax would be derived from a formula based on the average copper price. The draft bill of the proposal stated that the new tax would take effect on March 1, 2012, if it is passed by the Government. The new tax targeted copper and silver producer KGHM Polska Miedz S.A. (KGHM), and the company's stock price dropped by 35% in the month after the announcement of the new tax was made (Dow Jones News GmbH, 2011).

Production

Production of fire clay increased by 66%; ferrosilicon, by 37%; marketable quartzite, by 36%; rhenium content of ammonium perchlorate, by 29%; cement, by 20%; cadmium, by 17%; refined zinc, by 16%; sulfur, by an estimated 14%; hot-rolled steel products and lime, by 13% each; brown coal and lignite and peat, by 11% each; crude steel, by 10%; pig iron, by 9%; and silver metal, by an estimated 9%. Mine output of zinc decreased by an estimated 32%; output of aluminum decreased by an estimated 13%; crude petroleum, by 10%; gold metal, by 9%; and mine output of lead, by an estimated 8% (table 1).

Structure of the Mineral Industry

The vast majority of companies in the mineral industry in Poland were privately owned. The Polish Government (through ownership of shares by the Polish Ministry of Treasury) also owned shares in a small number of significant producers of mineral products but was attempting to privatize many of these holdings. One of the Government's holdings was a 31.79% stake in Poland's sole copper producer, KGHM. No other shareholders owned more than 5% of the company's shares. The Government also owned 100% of Zakłady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A., which was Poland's only producer of lead and zinc ore and the leading producer of refined zinc.

In September, the Ministry of Treasury posted an invitation for bids for the purchase of 86.92% of ZGH Boleslaw's shares (Ministry of Treasury of the Republic of Poland, 2011a; KGHM Polska Miedz S.A., 2012, p. 143).

In the mineral fuels sector, the Polish Government owned significant shares of Poland's coal producers and oil and gas producers Grupa LOTOS S.A. and Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG). In July, the Government sold a 33.1% stake in coal mining company Jastrzebska Spolka Weglowa S.A. (JSW) in an initial public offering (IPO) on the Warsaw Stock Exchange. The Government also gave company shares to current and former employees, and by the end of 2011, the Government owned 59% of JSW's shares and planned to maintain ownership of at least 50% plus one share of the company for the long term. In July, the Ministry of Treasury of Poland advertised the sale of 85% of the shares of two brown coal and lignite producers: KWB Adamow S.A. and KWB Konin S.A. By the end of 2011, no final decisions had been made about the sale of the two companies. There were also reports that the Government planned to privatize bituminous coal producer Katowicki Holding Weglowy S.A., although no details were available. The Government owned 53.17% of Grupa LOTOS, which owned oil and natural gas and refined petroleum production facilities, and 72.43% of PGNiG, which was the leading producer of oil and natural gas production in Poland (Galos, 2009, p. 22; Grupa LOTOS S.A., 2012, p. 9; Kruk, 2011; Ministry of Treasury of Poland, 2011b; Jastrzebska Spolka Weglowa S.A., 2012, p. 11; Polskie Gornictwo Naftowe i Gazownictwo S.A., 2012, p. 24).

Mineral Trade

Poland is dependent on imports of most mineral commodities for domestic consumption. According to the Mineral and Energy Economy Research Institute at the Polish Academy of Sciences, in 2009 (the latest year for which data were available), the value of the country's mineral commodity imports was \$17.0 million and the value of its mineral commodity exports was \$4.9 million. Mineral fuels accounted for about 83% (\$14.1 million) of the value of mineral commodity imports, and metals accounted for about 75% (\$3.7 million) of the value of mineral commodity exports. In 2009, the total value of all Poland's imports was \$150 billion and the total value of all its exports was \$160 billion (Galos, Ney, and Smakowski, 2010, p. 20; Dmochowska 2011, p. 39).

Complete trade data for mineral commodities were not available for 2011. The trade data that were available from the Central Statistical Office of Poland were slightly inconsistent with the values in the previous paragraph (which were converted from Polish zlotys), but trade data for some important commodities were available. In 2011, crude petroleum imports were valued at about \$18 billion (a 47% increase), and copper and copper alloys exports were valued at about \$2.9 billion (an 18% increase). As in previous years, crude petroleum was the leading import commodity in terms of value, and refined copper was the leading export commodity (Central Statistical Office of Poland, 2011b; 2012a).

Commodity Review

Metals

Copper.—KGHM was the only copper mining and primary copper metal producing firm in Poland. It operated three copper refineries and three mines (the Lubin, the Polkowice-Sieroszowice, and the Rudna Mines) and had reported reserves of about 1.4 billion metric tons (Gt) of ore containing about 25 million metric tons (Mt) of copper. KGHM was a significant world producer of copper and silver, representing about 3% of world output of copper mine and refined copper production and about 5% of world mine production of silver (table 2; Galos, Ney, and Smakowski, 2010, p. 161; KGHM Polska Miedz S.A., 2012, p. 108, 115).

The average copper content of ore extracted by KGHM in Poland decreased to 1.61% in 2011 from 1.64% in 2010. In recent years, copper content of ore has been steadily decreasing and has required the extraction of more ore to maintain current levels of copper mine output. KGHM also utilized increasing amounts of purchased copper scrap, blister, and imported concentrates to maintain refined copper production (KGHM Polska Miedz S.A., 2012, p. 111).

KGHM's development strategy for 2009 through 2018 addressed the company's main challenges of lowering production costs and increasing the company's resource base. By 2011, the cost of production of refined copper at KGHM had more than doubled since 2004. To reduce production costs, KGHM planned to make investments in infrastructure and technology, although no specific projects were listed. The company also planned to expand its resource base and increase the production of copper in concentrate to about 700,000 metric tons per year (t/yr) compared with 426,700 metric tons (t) of copper in concentrate in 2011 by investing in further exploration and mining within Poland and internationally and acquiring other mining companies. KGHM also planned to increase scrap copper processing (KGHM Polska Miedz S.A., 2012, p. 107, 118).

In 2011, KGHM worked towards achieving the development strategy's goal of increasing the company's access to copper raw materials by acquiring foreign production facilities and developing domestic projects. In 2010, KGHM purchased 51% (with options to purchase an additional 29%) of Ajax Mining Inc. of Canada, which was developing the Afton-Ajax copper and gold project in British Columbia, Canada. The project feasibility study that was completed in 2011 projected annual average production of 50,000 t of copper in concentrate and about 3,100 kg of gold in concentrate over a 23-year mine life. The expected startup date for the mine was set at 2015 after about \$795 million of capital expenditure. In December, KGHM signed a binding conditional agreement for the purchase of Quandra FNX Mining Ltd. of Canada. Quandra FNX had mining operations in Canada and Chile and was expected to increase KGHM's own supply of copper by 100,000 t/yr in 2012 and by more than 180,000 t/yr by 2018. Within Poland, the company continued the development of the Glogow Glebokki Przemyslowy deposit, and various exploration projects were undertaken (KGHM Polska Miedz S.A., 2012, p. 119, 125).

Iron and Steel.—Poland had not produced iron ore since 1990 and was dependent on imported iron ore and concentrates for domestic pig iron production. In 2011, Poland imported about 6 Mt of iron ores and concentrates, which was an 8% decrease in imports compared with those of 2010 (6.5 Mt). About 80% of these imports came from Ukraine, and about 14% came from Russia. All the imported iron ore and concentrates were used for pig iron production at ArcelorMittal Poland S.A.’s iron and steel plants at Dabrowa Gornicza and Krakow, which were the only pig iron producers in Poland (Galos, Ney, and Smakowski, 2010, p. 271–273; Central Statistical Office of Poland, 2011b; 2012a).

Crude steel production increased by 10% as domestic steel consumption and exports increased. According to the Polish Steel Association, Poland’s apparent consumption of finished steel products in 2011 reached 11.03 Mt, which was about an 11% increase compared with that of 2010, and it was predicted to increase by 2.5% to 3.5% in 2012 mainly owing to infrastructure investments expected to be made by the Polish Government. Poland exported 4.9 Mt of steel products and imported 7.9 Mt of steel products; both trade figures were an increase of 15% compared with that of 2010. Crude steel production capacity utilization increased to about 70%, and employment in the steel industry increased by 0.6% compared with that of 2010 to 25,630 persons (Polish Steel Association, 2011, p. 18, 21–23, 24).

In 2011, Cognor S.A. took over steel producers Ferrostal Labedy Sp. z o.o. and Huta Stali Jakosciowych S.A. from Zlomrex S.A. In 2011, Ferrostal Labedy produced 348,596 t of crude steel, and Huta Stali Jakosciowych produced 186,012 t (Cognor S.A., 2012, p. 13).

Rhenium.—KGHM Ecoren S.A. was the only European producer of ammonium perrhenate (APR) and metallic rhenium from its own sources. In 2011, KGHM Ecoren was responsible for about 10% of total world production of rhenium contained in APR. In 2010, KGHM Ecoren began production of marketable quantities of metallic pellets containing 99.95% rhenium, which is an important additive in superalloys used in the production of jet engines and catalysts. The plant could produce up to 3.5 t/yr of rhenium pellets. In Poland, rhenium was extracted from sulfuric acid waste from copper processing; copper deposits controlled by KGHM contained on average 0.6 parts per million rhenium (Galos, Ney, and Smakowski, 2010, p. 403; KGHM Ecoren S.A., 2010; Polyak, 2012).

Mineral Fuels

Coal.—As of the end of 2009, Poland had bituminous coal reserves of about 16.6 Gt and was the leading producer of bituminous coal in the European Union (EU) and one of the 10 leading producers in the world. Attempting to expand reserves was expected to be challenging owing to environmental concerns, difficult geologic conditions, and the low quality of the coal. Poland was the world’s 7th ranked producer of brown coal and lignite, and as of the end of 2009, reserves were about 14.9 Gt. Coal was Poland’s major mineral fuel, and in 2010 (the latest year for which data were available), coal and lignite accounted for 87% of electricity production, and bituminous

coal and lignite made up 65% and 17%, respectively, of Poland’s energy balance (Galos, Ney, and Smakowski, 2010, p. 253, 303; Central Statistical Office of Poland, 2011a, p. 48, 58–59; European Association for Coal and Lignite, 2012; World Coal Association, 2012).

Given its lack of significant petroleum and natural gas resources, the Government of Poland considered coal to be one of the most important components of the country’s energy security and sought to promote “the efficient and effective management of coal deposits.” The Energy Policy of Poland Until 2030 (released in 2009) emphasized the importance of coal and predicted that it would remain the most important domestically produced mineral fuel for the foreseeable future. The report forecast that, in 2010, electricity generated from bituminous coal and lignite would make up 53% and 35%, respectively, of total electricity generation, and that by 2030, electricity from these sources would make up 36% and 21%, respectively, of total electricity generation. The report also estimated that bituminous coal and lignite would make up 31% and 8%, respectively, of Poland’s primary energy demand in 2030. To ensure that the coal and lignite resources of Poland would be used efficiently, the Government planned to increase geologic research in coal and lignite, abolish legal barriers to the development of coal and lignite deposits, include coal deposits in land development plans to ensure that access to coal and lignite deposits would not be blocked, and adopt other measures to encourage future coal and lignite production (Ministry of Economy of the Republic of Poland, 2009a, p. 9–10; 2009b, p. 15–16).

The use of coal as a cheap source of fuel to generate significant amounts of electricity in Poland through 2030 could be inhibited by EU regulations that require reductions in carbon dioxide emissions. Reducing the use of coal as a cheap source of energy would be difficult economically, and the Polish Government was opposed to many of the EU’s plans to restrict carbon dioxide emissions. Poland was included in a list of countries that was allowed to distribute free carbon emission credits to power stations in decreasing amounts from 2013 until 2020, when no free carbon credits were to be issued. The EU program allowed the free carbon credits to be issued to powerplants that were “physically initiated” by the end of 2008. The EU later clarified that this meant that visible construction work must have begun before the end of 2008 or a construction contract must have been signed. Environmental activists argued that some of the powerplant construction projects for which Poland hoped to receive free carbon credits did not meet these criteria and that the number of free credits issued to Poland should be reduced. By the end of 2011, the European Commission had not made a final decision on the number of free carbon credits to grant Poland (Harrison, 2011).

Natural Gas and Petroleum.—In 2011, Poland produced about 5.8 billion cubic meters of natural gas and 4.6 million barrels (Mbbbl) of crude oil but was dependent on imports for the majority of its supplies. About 1.1 Mbbbl of crude petroleum and about 16.1 million cubic meters of gas were produced by LOTOS Petrobaltic S.A. in the Baltic Sea Shelf; the remaining oil and gas were produced on the Polish mainland. In 2011, Poland imported about 167 Mbbbl of crude oil, of which 92%

was from Russia. Official trade statistics from the Government of Poland for natural gas imports were not available, but PGNiG imported about 10.9 billion cubic meters of natural gas, of which 85.53% came from Russia. In 2009 (the latest year for which data were available), PGNiG accounted for about 97% of all natural gas imports into Poland (table 1; Galos, Ney, and Smakowski, 2010, p. 214; Central Statistical Office of Poland, 2012a; Grupa LOTOS S.A., 2012, p. 39, 70; Polskie Gornictwo Naftowe i Gazownictwo S.A., 2012, p. 47).

PGNiG was Poland's leading producer of oil and gas, accounting for about 76% of crude petroleum production (3.5 Mbbbl) and 74% of natural gas production (4.33 billion cubic meters). The company was also involved in exploration and development work domestically and in Egypt, Libya, Norway, and Pakistan. In 2012, PGNiG expected to begin production of oil and gas at the Skarv/Snadd/Idun field on the Norwegian Continental Shelf and to test production in Pakistan. The company planned to produce 400 million cubic meters per year of natural gas and about 3.7 million barrels per year of crude oil from the Skarv/Snadd/Idun field. Domestically, PGNiG planned to begin production at the Lubiadow-Miedzychod-Grotow (LMG) field near Gorzow Wielkopolski in 2013 and expected that production at the LMG field would double PGNiG's domestic crude petroleum output (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2012, p. 30, 35–39, 43).

Poland was frequently mentioned as a potential future shale gas producer because of estimations of its significant shale gas reserves and its desire to reduce its reliance on Russian natural gas imports. A world assessment of shale gas resources commissioned by the U.S. Energy Information Administration (EIA) and conducted by Advanced Resources International, Inc. identified three basins (the Baltic, the Lublin, and the Podlasie) in Poland as prospective shale gas plays and estimated that they contained 792 trillion cubic feet (22 trillion cubic meters) of shale gas in-place, which included 187 trillion cubic feet (5 trillion cubic meters) of technically recoverable gas. Technically recoverable gas refers to the estimated amount of gas in-place that could actually be recovered using current production technology but it does not take into account economic factors that could affect production. According to the report, Poland accounted for about 31% of Europe's total shale gas in-place and 30% of total technically recoverable shale gas. The assessment's estimated amount of technically recoverable shale gas in Poland is equivalent to about 290 years of domestic consumption at current consumption rates, and indicated that, over the long run, shale gas could have a major effect on Poland's energy security (Galos, Ney, and Smakowski, 2010, p. 215; U.S. Energy Information Administration, 2011, p. 1.5, 7, V–1).

Although Poland may have considerable shale gas production potential, a number of challenges would need to be overcome to recover a significant amount of shale gas in Poland. The major challenges for the shale gas industry include economic considerations and environmental concerns. The advanced drilling techniques and the low rates of shale gas recovery seen in operating shale gas projects in other countries make shale gas an expensive alternative to conventional natural gas resources. Environmental opposition to shale gas production has also

been quite strong in other parts of the world, including in the United States and the EU, and in the future, the Polish shale gas industry could be faced with opposition to its operations. On the other hand, in Poland, the desire to reduce dependence on natural gas imports from Russia and current popular support for shale gas production could produce an environment that is advantageous for shale gas production. It is hard to predict the future of shale gas in Poland, and any accurate estimation of future production would depend on a number of factors and would not be possible until more exploration and test drilling is done.

PGNiG reported that the Ministry of the Environment had awarded more than 100 exploration licenses for shale gas and tight gas deposits to more than 40 entities in recent years. Some of the most significant companies that were conducting exploration activities were Lane Energy Poland Sp. z o.o. (a subsidiary of 3 Legs Resources plc. of the Isle of Man) in partnership with ConocoPhillips Co. of the United States, BNK Petroleum Inc. of Canada, Chevron Corp., Marathon Oil Corp., and Exxon Mobile Corp., each of the United States, Aurelian Oil and Gas plc. of the United Kingdom, San Leon Energy plc. of Ireland, Eni S.p.A. of Italy, and PGNiG (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2012, p. 40).

Outlook

Continuing recovery from the economic crisis and an accompanying increase in domestic demand could lead to increased mineral commodity production, but much of the growth in demand for mineral products could depend on demand by Poland's trade partners, especially those in the EU. Most likely coal and copper will remain the leading mineral products in terms of production value, and dependence on imports of mineral fuels will remain one of Poland's biggest challenges. Also, Government ownership of mineral producing companies is expected to decline as privatization efforts continue.

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TABLE 1
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011	
METALS						
Aluminum, metal:						
Primary	metric tons	54,468	47,543	--	--	--
Secondary ^{e,3}	do.	21,500	18,000	16,900	16,000	14,000
Total ^e	do.	76,000	65,500	16,900	16,000	14,000
Cadmium, metal, primary	do.	421	603	534	451	526
Copper:						
Ore:						
Gross weight		30,262	29,416	29,700	29,300	29,700
Cu content	metric tons	505,900	482,400	498,960	480,600	479,300
Concentrate:						
Gross weight		1,876	1,866	1,929	1,841	1,875
Cu content	metric tons	452,000	429,400	439,000	425,400	426,700
Metal:						
Smelter: ⁴						
Primary	do.	438,100	438,600	427,800 ^r	452,200 ^r	449,000
Secondary	do.	39,800	43,800	68,800	94,300 ^r	88,700
Total	do.	477,900	482,400	496,600 ^r	546,500 ^r	537,700
Refined, electrolytically, primary and secondary	do.	532,975	526,808	502,491	547,100	571,000
Gold:						
Mine output, Au content of Cu concentrate ^e	kilograms	500	500	500	500	500
Metal	do.	883	902	814	776	704
Iron and steel:						
Pig iron		5,804	4,934	3,095	3,638	3,975
Ferroalloys:						
Blast furnace, ferromanganese	metric tons	2,100	8,500	1,700	1,000 ^r	1,500 ^e
Electric furnace:						
Silicomanganese	do.	15,600	25,100	--	--	-- ^e
Ferrosilicon	do.	58,538	56,031	9,673	53,206	72,668
Other	do.	6,200	2,900	4,200	-- ^r	-- ^e
Total ferroalloys	do.	82,438	92,531	15,573	54,206 ^r	74,200 ^e
Steel, crude:						
From oxygen converters		6,188	5,225	3,235	3,995	4,424
From electric arc furnaces		4,433	4,502	3,893	4,001	4,353
Total		10,621	9,727	7,128	7,996	8,777
Finished steel products:						
Hot rolled		8,011	7,610	6,232	6,658	7,504
Cold rolled		1,482	689	558	835	807
Pipe		401	409	347	384	408
Lead:						
Mine output:						
Pb content of Pb-Zn ore	metric tons	63,700	66,400	51,500	35,800	31,000
Pb content of Cu ore	do.	15,700	21,300	28,900	28,000 ^e	28,000 ^e
Total	do.	79,400	87,700	80,400	63,800 ^e	59,000 ^e
Concentrate, Pb content	do.	47,200	47,900	36,900	23,000 ^r	22,000 ^e
Metal, refined, primary and secondary: ^e						
Primary	do.	37,200	38,000	30,000	29,000 ^r	30,000
Secondary	do.	67,000	70,200	70,400	70,000 ^r	70,000
Total ⁵	do.	104,200	108,200	100,400	99,000 ^r	100,000
Nickel, content of nickel sulfate	do.	400	400	400	400	400
Platinum-group metals, average content of slimes: ^{e,6}						
Palladium	kilograms	15	15	15	15	15
Platinum	do.	25	25	25	25	25
Rhenium:						
Ammonium perrhenate:						
Gross weight	do.	3,500	4,900	3,500	6,709	8,650
Re content of ammonium perrhenate	do.	2,400	3,400	2,400	4,656	6,000
Rhenium metal in pellet form	do.	--	--	--	620	620 ^e

See footnotes at end of table.

TABLE 1—Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011	
METALS—Continued						
Selenium	metric tons	85	82	73	79 ^r	80 ^e
Silver:						
Mine output, Ag content of Cu concentrate	do.	1,199	1,161	1,207	1,181	1,167
Metal	do.	1,244	1,221	1,221	1,175 ^r	1,280 ^e
Zinc:						
Zn content:						
Mine output	do.	136,100	136,300	116,000	95,000 ^{r,e}	65,000
Concentrate output	do.	129,600	132,400	115,500	92,000 ^r	60,000
Metal, refined, including secondary	do.	141,800	142,600	139,100	135,000 ^r	156,000
INDUSTRIAL MINERALS						
Barite, beneficiated	metric tons	--	324	--	--	-- ^e
Cement:						
Clinker		13,168	12,443	10,659	11,768	13,630
Hydraulic		17,120	17,207	15,422	15,812	18,993
Clays and clay products:						
Bentonite:						
Crude	metric tons	1,300	3,000	3,000	2,000 ^r	2,000 ^e
Processed, including imported material	do.	105,943	90,412	81,354	85,981	86,000 ^e
Fire clay, crude		198	169 ^r	115	82	136
Kaolin:						
Crude		319	318	261	250 ^r	250 ^e
Beneficiated		153	155 ^r	136 ^r	125 ^r	125 ^e
Diatomite	metric tons	600	1,000	700	700 ^e	700 ^e
Feldspar:						
Run of mine	do.	497,900	599,100	445,500	445,000 ^e	445,000 ^e
Processed, including imported material	do.	501,800	643,700	478,000	485,000 ^r	485,000 ^e
Gypsum and anhydrite:						
Natural:						
Gypsum rock		1,298	1,283	1,119	1,100 ^{r,e}	1,100 ^e
Anhydrite		194	198	158	100 ^{r,e}	100 ^e
Total		1,492	1,481	1,277	1,179 ^r	1,200 ^e
Synthetic gypsum		1,338	1,596	2,076	2,389 ^r	2,400 ^e
Grand total		2,830	3,077	3,353	3,570 ^{r,e}	3,600 ^e
Lime, hydrated and quicklime		2,143	1,952	1,704	1,799	2,036
Magnesite, concentrate	metric tons	65,000	60,000	47,000	63,000 ^r	60,000 ^e
Nitrogen, N content of ammonia		1,995	1,995	1,697	1,700 ^e	1,700 ^e
Quartz, quartzite, and quartz schist, marketable:						
Quartz and quartz crystal	metric tons	7,000	6,500	5,100	5,600 ^r	6,100
Quartzite, refractory	do.	46,100	72,500	25,700	34,200	46,500
Quartz schist	do.	9,500	7,100	3,500	3,500 ^e	3,500
Salt:						
Rock		591	618	999	1,222 ^r	1,234
Evaporated salt		678	622	299	411	415
Other (brine and desalination of mine waste water)		2,931	2,783	2,533	2,464	2,633
Total		4,200 ^r	4,023 ^r	3,831 ^r	4,097 ^r	4,282
Sand and gravel:						
Aggregates (construction sand and gravel), natural, mine output		139,388	149,312	140,890	140,000 ^e	140,000 ^e
Filling sand ^e	thousand cubic meters	6,200 ^r	5,500 ^r	5,000 ^r	4,900 ^r	5,000
Foundry sand		782	1,244	1,701	1,817	1,800 ^e
Lime-sand brick production sand	thousand cubic meters	905	834	560	560 ^e	560 ^e
Silica sand (glass sand), marketable		2,268	2,398	2,127	2,458	2,570
Sodium compounds, carbonate (soda ash), 98%		1,192	1,190	890	1,010	1,061

See footnotes at end of table.

TABLE 1—Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity ²	2007	2008	2009	2010	2011	
INDUSTRIAL MINERALS—Continued						
Stone, mine output:						
Dimension stone	2,801 ^r	3,426 ^r	3,836 ^r	4,598 ^r	4,600	
Dolomite	2,232	2,206	1,834	1,821	1,880	
Limestone:						
For lime production	15,581	16,110	14,881	17,588 ^r	17,500 ^e	
For non-lime end use	30,983	30,778	28,883	30,000 ^e	30,000 ^e	
Road stone	141	300	260	260 ^e	260 ^e	
Sulfur:						
Native, Frasch	834	762	263	517	657	
Byproduct:						
From natural gas	23	21	25	25 ^e	25 ^e	
From oil refineries and coking plants	188	201	190	200 ^e	200 ^e	
From metallurgy	304	294	257	260 ^e	260 ^e	
Other	1	1	1	1 ^e	1 ^e	
Total	516	517	473	470 ^e	470 ^e	
Grand total	1,350	1,279	736	990 ^e	1,130 ^e	
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	metric tons	41,100	36,300	27,800	35,000 ^r	35,000 ^e
Coal:						
Bituminous		88,313	84,345	78,064	76,728	76,454
Brown coal and lignite		57,538	59,668	57,108	56,510	62,841
Total		145,851	144,013	135,172	133,238	139,295
Coke		10,383	9,761	7,091	9,738	9,377
Gas:						
Natural	million cubic meters	5,653	5,382	5,537	5,667 ^r	5,825
Manufactured:						
Town gas	do.	10	4	4	4	4 ^e
Coke oven gas	do.	4,409	4,207	3,076	4,239 ^r	4,200 ^e
Total	do.	4,419	4,211	3,080	4,243 ^r	4,200 ^e
Peat, fuel and agricultural		641	632	594	672	746
Petroleum:						
Crude ⁷	thousand 42-gallon barrels	5,350	5,600	5,100	5,100	4,600
Refinery products ^{e,8}	do.	134,000	144,000	150,000	158,000	160,000

^eEstimated; 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 October 5, 2012.

²In addition to the commodities listed, cobalt, which is associated with copper ores, are produced in quantities that so far have not warranted further recovery.

³Based on official Polish Government estimates.

⁴Copper smelter production is based on production at KGHM Polska Miedz S.A. Additional smelter production may have taken place at the Institute of Non-Ferrous Metals at Gliwice, but this production was not marketable and was produced only for research purposes.

⁵Reported figure.

⁶Estimates based on reported platinum- and palladium-bearing final (residual) slimes and their average Pt and Pd content from electrolytic copper refining.

⁷Figures were converted to barrels from production in metric tons, which was reported as the following: 2007—720,603; 2008—754,907; 2009—686,992; 2010—686,487; and 2011—616,704.

⁸Figures were converted to barrels from production in metric tons, which was reported as the following: 2007—18,187,650; 2008—19,631,450; 2009—20,499,407; 2010—21,557,363 (revised); and 2011—21,774,803.

TABLE 2
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, secondary	Aluminium Konin-Impexmetal S.A.	Konin	NA.
Do.	NPA Skawina Sp. z o.o.	Skawina	NA.
Do.	Grupa KETY S.A.	Kety	NA.
Do.	Nicromet	Bestwinka	NA.
Do.	Alumetal S.A.	Kety	NA.
Do.	POLST Sp. z o.o.	Walbrzych	NA.
Barite ²	Przedsiębiorstwo Handlowe Usługowe R&S Spolka z o.o.	Boguszow, Stanislawow deposits near Boguszow-Gorce	NA.
Cadmium, refined	metric tons Huta Cynku "Miasteczko Slaskie" S.A.	Miasteczko Slaskie	500.
Cement	Gorazdze Cement S.A. (Heidelberg Cement AG, 100%)	Chorula	2,800 clinker, ^e 4,100 cement. ^e
Do.	Grupa Ozarow S.A. (CRH plc., 100%)	Plants at Ozarow and Rejowiec	2,800 clinker, ^e 3,250 cement. ^e
Do.	Cemex Polska Sp. z o.o.	Plants at Chelm and Rudniki	2,300 clinker, ^e 3,000 cement. ^e
Do.	Cementownia Warta S.A. (Polen Zement Beteiligungsgesellschaft GmbH)	Dzialoszyn	1,400 clinker, ^e 2,000 cement. ^e
Do.	Lafarge Cement S.A.	Plants at Malogoszcz and Piechcin	3,000 clinker, ^e 4,800 cement.
Do.	Dykerhoff Polska	Sitkowska-Nowiny	1,100 clinker, ^e 1,600 cement.
Do.	Cementownia "Nowa Huta" S.A.	Krakow	300 clinker, ^e 500 cement. ^e
Do.	Cementownia "Odra" S.A.	Opole	400 clinker, ^e 800 cement. ^e
Cement, aluminous	Gorka Cement Sp. z o.o.	Trzebinia	70 clinker, ^e 70 cement. ^e
Coal:			
Bituminous	Includes: 100% Government owned: Kompania Weglowa S.A. Katowicki Holding Weglowy S.A. Poludniowy Koncern Weglowy S.A. KWK Kazimierz-Juliusz Sp. z o. o. Jastrzebska Spolka Weglowa S.A. (Government, 59%) Lubelski Wegiel Bogdanka S.A. SILTECH Sp. z o. o.	Of which: Upper Silesia (16 mines) Upper Silesia (5 mines) Upper Silesia (2 mines) Upper Silesia (1 mine) Upper Silesia (6 mines) Bogdanka, east of Leczna, eastern Poland (1 mine) Upper Silesia (1 mine)	90,000. ^{e,3}
Brown coal and lignite	Includes: PGE KWB Belchatow S.A. [PGE Polish Energy Group Plc. (Government, 69.29%)] PGE KWB Turow S.A. (PGE Polish Energy Group Plc. (Government, 69.29%)] KWB Konin S.A. (Government) KWB Adamow S.A. (Government) KWB Sieniawa Sp. z o.o.	Of which: Belchatow, south of Lodz (2 open pit mines) Bogatynia, at the southwest corner of Poland (1 mine) Konin (4 open pit mines) Turek (3 open pit mines) Sieniawa (1 mine)	75,000. ^{e,3}
Coke	Includes: Zaklady Koksownicze Zdzeszowice (ArcelorMittal Poland S.A., 100%) Zaklady Koksownicze Przyjazn Sp. z o.o. Kombinat Koksowniczy Zabrze S.A. ArcelorMittal Poland S.A. ISD Huta Czestochowa Sp. z o.o. Zaklady Koksownicze "Victoria" S.A. BO-CARBO Sp. z o.o.	Of which: Upper Silesia (Zdzeszowice) Upper Silesia (Dabrowa Gornicze) Upper Silesia (Cokeries at Jadwiga, Radlin, and Debiensko) Upper Silesia (Krakow) Upper Silesia (Czestochowa) Upper Silesia (Walbrzychu) Upper Silesia (Bytom)	9,700. ³

See footnotes at end of table.

TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011¹

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Copper:				
Ore, gross weight (averaged 1.61% Cu)		KGHM Polska Miedz S.A. (Government, 31.79%)	Lubin Mine, Lubin-Glogow District	7,000.
Do.		do.	Polkowice-Sierszowice Mine, Lubin-Glogow District	11,000.
Do.		do.	Rudna Mine, Lubin-Glogow District	12,000.
Concentrate, gross weight (averaged 22.8% Cu)		KGHM Polska Miedz S.A. (Government, 31.79%)	Lubin beneficiation plant, Lubin-Glogow District	500.
Do.		do.	Polkowice beneficiation plant, Lubin-Glogow District	600.
Do.		do.	Rudna beneficiation plant, Lubin-Glogow District	1,050.
Metal, refined		do.	Refineries at Glogow I, Glogow II, and Legnica	540.
Feldspar		Strzeblowskie Kopalnie Surowcow Mineralnych Sp. z o.o.	Sobotka, Lower Silesia, exploiting the Pagorki Zachodnie, Pagorki Wschodnie, and Strzeblow I deposits	500.
Do.		Pol-Skal Sp. z o.o.	Karpniki, southwestern region of Jelenia Gora	100.
Ferroalloys:				
Electric furnace (FeSiMn, FeMn, FeSi)		Huta Laziska S.A.	Upper Silesia at Laziska Gorne	120. ^e
Blast furnace (FeMn)		STALMAG Sp. z o.o.	Upper Silesia at Ruda Slaska	50. ^e
Gold, metal	kilograms	KGHM Polska Miedz S.A. (Government, 31.79%)	Refinery at Glogow	1,700. ^e
Gypsum and anhydrite		Includes: Zaklady Przemyslu Gipsowego "Dolina Nidy" S.A. Rigips Polska Stawiany Sp. z o.o. Kopalnia Gipsu i Anhydrytu "Nowy Lad" Sp. z o.o.	Of which: Southeastern Poland, Gacki Southeastern Poland, Szarbkow Lower Silesia, mines at Niwnice and Iwiny	1,400. ³
Helium	million cubic meters	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 84.75%)	Western Poland, Odolanow	3.
Kaolin, crude and washed		KSM "Surmin-Kaolin" S.A.	Lower Silesia, Nowogrodziec	90. ^e
Do.		Grudzen Las Sp. z o.o.	Grudzen Las, in Lodz Voivodeship	55. ^e
Do.		Tomaszowskie Kopalnie Surowcow Mineralnych "Biala Gora" Sp. z o.o.	Smardzewice, Tomaszowski Voivodeship	30. ^e
Lead-zinc:				
Mine output		Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Government, 100%)	Mine and concentrator at Olkusz and Pomorzany, Bukowno region	30 lead, ^e 110 zinc. ^e
Metal:				
Pb, refined		Huta Cynku Miasteczko Slaskie (HCM) S.A.	Refinery at Miasteczko Slaskie	35.
Do.		"Baterpol" Sp. z o.o. (Impexmetal S.A.)	Refinery at Katowice	30.
Do.		Orzel Bialy S.A.	Refinery at Bytom	40.
Do.		KGHM Polska Miedz S.A. (Government, 31.79%)	Smelter at Legnica	35.
Zn, refined		Huta Cynku Miasteczko Slaskie (HCM) S.A.	Imperial smelter at Miasteczko Slaskie	85.
Do.		Zaklady Metalurgiczny Silesia S.A.	Refinery at Katowice	12.
Do.		Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Government, 100%)	Refinery at Boleslaw	75.
Lime		Includes: Zaklady Przemyslu Wapienniczego (ZPW) Trzuskawica S.A. (CRH plc, 100%) Lhoist Group: Lhoist Opolwap S.A. Lhoist Bukowa Sp. z o.o. Zaklad Wapienniczy Wojcieszow Sp. z o.o. Zaklady Wapiennicze Lhoist Sp. z o.o.	Of which: Plants in Sitkowka-Nowiny and Bielawy Tarnow Opolski, Opole County Bukowa, 90 kilometers north of Krakow Wojcieszow Gorazdze	2,200. ^{e,3}

See footnotes at end of table.

TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011¹

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas	million cubic meters	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.41%)	Gasfields in southeastern Poland in the Carpathians, Mountains, the Carpathian Foothills, and the Polish Lowlands	4,300. ^e
Do.	do.	FX Energy, Inc.	Western Poland	70. ^e
Do.	do.	LOTOS Petrobaltic S.A. [Grupa LOTOS S.A. (Government, 53.19%)]	Baltic Sea Shelf	30. ^e
Nitrogen:				
Ammonia (NH ₃)		Includes: Zakłady Azotowe "Pulawy" S.A. Zakłady Azotowe "Kedzierzyn" S.A. Zakłady Azotowe "Anwil Wloclawek" S.A. Zakłady Azotowe S.A. w Tarnowie Azoty-Adipol S.A. (former Chorzow plant) Zakłady Chemiczne "Police"	Of which: Pulawy in eastern Poland Kedzierzyn in Upper Silesia Wloclawek in central Poland Tarnow in southern Poland Chorzow in Upper Silesia Police in northwestern Poland	2,600. ^{e,3}
Petroleum:				
Crude	thousand 42-gallon barrels	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.41%)	Oilfields in southeastern and western Poland with about 75% of production from the Barnowko-Mostno-Buszewo field near Debno	4,000. ^e
Do.	do.	LOTOS Petrobaltic S.A. [Grupa LOTOS S.A. (Government, 53.19%)]	Baltic Sea Shelf	1,500. ^e
Do.	do.	FX Energy, Inc.	Western Poland	70. ^e
Refined		Petrochimia-Plock (PNK Orlen S.A.)	Plock in central Poland	115,000.
Do.		Rafineria "Gdansk" (Grupa LOTOS S.A.)	Gdansk in northern Poland	50,000.
Do.		Rafineria "Trzebinia" (PNK Orlen S.A.)	Trzebinia in southern Poland	3,000.
Do.		Rafineria "Jedlicze" (PNK Orlen S.A.)	Jedlicze in southern Poland	1,000.
Rhenium:				
Rhenium content of ammonium perrenate	kilograms	KGHM Ecoren S.A. [KGHM Polska Miedz S.A. (Government, 31.79%)]	Lubin	6,000.
Rhenium metal	do.	do.	do.	3,500.
Salt:				
Brine		Inowroclawskie Kopalnie Soli Solino S.A. Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 72.94%) Kopalnia Soli "Wieliczka" S.A.	Mines at Gora and Mogilno in central Poland Mine at Mogilno in central Poland Wieliczka in southern Poland, near Krakow, mining deposits at Barycz and Wieliczka	5,000. ^{e,3}
Rock salt		Kopalnia Soli "Klodawa" S.A. KGHM Polska Miedz S.A. (Government, 31.79%)	Klodawa in central Poland Siersoszowice in southwestern Poland	
Desalination of mine waste water		Zakład Odsalania Wod Dolowych "Debiensko" Sp. z o.o.	Czerwionka-Leszczyny, west of Debiensko	
Selenium	metric tons	KGHM Polska Miedz S.A. (Government, 31.79%)	Refinery at Glogow	90.
Silver, refined	do.	do.	Precious metals plant at the Glogow smelter	1,400.
Do.	do.	Institute of Non-ferrous Metals	Gliwice	30. ^e
Steel, crude		ArcelorMittal S.A., of which: ArcelorMittal Poland S.A. do. ArcelorMittal Warszawa Sp. z o.o.	Steelworks at Dobrowa Gornicza (former Huta Katowice S.A.) Steelworks at Krakow (former Huta Sendzimir S.A.) Steelworks in Warsaw (former Huta "Lucchini-Warszawa" Sp. z o.o.)	8,000.
Do.		CMC Zawiercie S.A. (Commercial Metals Co.)	Steelworks at Zawiercie	1,900.
Do.		ISD Huta Czestochowa S.A. (Industrial Union of Donbass Corp.)	Steelworks at Czestochowa	1,000.
Do.		Celsa Huta Ostrowiec S.A. (Celsa Group)	Steelworks at Ostrowiec-Swietokrzyski	1,000. ^e

See footnotes at end of table.

TABLE 2—Continued
 POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, crude—Continued	Ferrostal Labedy Sp. z o.o. (Cognor S.A.)	Steelworks at Gliwice	375.
Do.	Huta Stali Jakosciowych S.A. (Cognor S.A.)	Steelworks at Stalowa Wola	261.
Do.	Huta Batory Sp. z o.o. (Alchemia S.A.)	Steelworks at Chorzow	150. ^e
Sulfur	P.P. Kopalnie i Zaklady Chemiczne Siarki "Siarkopol"	Osiek deposit at Grzybow	800.

^eEstimated. Do., do., Ditto. NA Not available.

¹The data presented in this table were compiled, in large measure, from information provided in the Minerals Yearbook of Poland (Bilans Gospodarki Surowcami Mineralnymi w Polsce Na Tle Gospodarki Swiatowej 2009), which was prepared and published by the Department of Mineral and Energy Policy, Mineral and Energy Economy Research Centre of the Academy of Science of Poland, Ministry of Environmental Protection, Natural Resources, and Forestry.

²The production of barite at the "Boguszow" barite mine was stopped in 1997 because of large-scale area flooding; production of barite since 1997 has been through the processing of old flotation tailings.

³Annual capacity listed is total for all deposits, mines, or companies that produce the commodity.