



2017–2018 Minerals Yearbook

POLAND

THE MINERAL INDUSTRY OF POLAND

By Joanna Asha Goclawska

Note: In this chapter, information for 2017 is followed by information for 2018.

In 2017, Poland's economy was the 9th largest in Europe and the 21st largest in the world in terms of the gross domestic product (GDP). Poland's real GDP increased by 4.9%. The nominal GDP was \$526.3 billion.¹ The country was estimated to be the world's second-ranked producer of rhenium, fourth-ranked producer of silver, seventh-ranked producer of helium and selenium (excluding the United States selenium production), and ninth-ranked producer of feldspar and peat. In Europe, Poland was ranked second in the production of bituminous coal and third in the production of lignite. Other commodities, such as lime, nitrogen (ammonia), salt, industrial sand and gravel, and sulfur, were also produced in significant quantities (Central Statistical Office of Poland, 2018, p. 760; Anderson, 2019; Bennett, 2019; Brioche, 2019; Peterson, 2019; Polyak, 2019; Tanner, 2019; World Bank, The, 2019a, b).

Minerals in the National Economy

Mining and quarrying accounted for \$8.3 billion, or 15.7% of the total GDP, and construction accounted for \$32.1 billion, or 6.1%. The 2017 total sold production of the industrial sector was valued at \$375 billion. Of this amount, the manufacture of metal products accounted for \$28.6 billion (7.6%); coke and refined petroleum products, \$16.8 billion (4.5%); base metals, \$14.5 billion (3.9%); nonmetallic mineral products, \$14.3 billion (3.8%); and mining and quarrying, \$13.7 billion (3.6%), including the mining of coal, \$6.5 billion (1.7%). In 2017, the number of people employed in the Polish mining and quarrying sector decreased to 138,200 from 139,800 in 2016 (Central Statistical Office of Poland, 2018, p. 242, 508, 509, 702, 703, 879).

Government Policies and Programs

Mining activities in Poland are regulated primarily by the Geological and Mining Law (GML) of June 9, 2011, which came into force on January 1, 2012. This law defines the terms and conditions for undertaking, pursuing, and concluding geologic activities; mining; nonreservoir storage; and waste storage in the subsurface. It also specifies the requirements for the protection of mineral deposits. The State Treasury owns certain types of mineral deposits, irrespective of their location (that is, whether on private or public lands). An act of July 2014 amending the GML came into force on January 1, 2015, with secondary legislation taking effect in May 2015. The amendments include changes in the obligatory qualification procedures, increased royalty fees, and allowance for an integrated license that covers exploration, appraisal, and

¹Where necessary, values have been converted from Polish zlotys (PLN) to U.S. dollars (US\$) at an average exchange rate of PLN3.779=US\$1.00 for 2017.

production of hydrocarbons. An act of May 2017 came into force on July 25, 2017, as a new amendment to the GML. The amendment applies the provisions of the European Parliament's directive of June 12, 2013, on increasing the safety of offshore oil and gas extraction. It also simplifies mining companies' reporting requirements (Library of Congress, 2013; Palukiewicz, 2017; Polish Geological Institute-National Research Institute, 2017, p. 17; Min-guide, 2019).

Other relevant laws and policy documents include the Environmental Protection Law of April 27, 2001; the Act on Reserves of Crude Oil, Petroleum Products and Natural Gas of February 16, 2007; the Energy Policy of Poland until 2030 of November 10, 2009; the Act on Tax on Extraction of Certain Minerals of March 2, 2012; and the Regulation of the Minister of the Environment on the Registration on Mining Areas and Closed Underground Disposal of Carbon Dioxide of 2014 (Rutkowska-Subocz, 2012; Library of Congress, 2013; Min-guide, 2019).

Production

In 2017, significant increases were reported in the production of ferroalloys (unspecified), by 98%; salt (rock), 40%; molding sand and magnesite (concentrate), 31% each; magnesite (ore), 30%; cold-rolled steel products, 21%; quartzite (refractory), 20%; rhenium (Re content of ammonium perrhenate), 17%; raw steel, 15%; steel pipe products (cold formed and hollow sections), 13%; caustic soda (96% NaOH), 12%; mined gypsum (rock) and hot-rolled steel products, 11% each; and pig iron, 10%. Significant decreases were reported in the production of platinum (refinery), by 78%; palladium (refinery), 77%; lead content in lead-zinc ore, 25%; synthetic gypsum, 20%; mined zinc (Zn content), 18%; mined gypsum (anhydrite), 17%; lime-sand brick production sand, 16%; dolomite and ferrosilicon, 15% each; refined copper (secondary, Cu content), 13%; and smelter copper (secondary, Cu content), 12%. Data on mineral production are in table 1.

Structure of the Mineral Industry

The mineral industry in Poland was composed mostly of privately owned companies. The Polish Government owned a small number of mineral producers, including Polska Grupa Gornicza S.A., KWK Kazimierz-Juliusz Sp. z o.o., and Poludniowy Koncern Weglowy S.A.; the Government also owned shares in Polskie Gornictwo Naftowe i Gazownictwo (PGNiG) (a 71.9% stake), PGE Polish Energy Group Plc. (57.4%), Jastrzebska Spolka Weglowa S.A. (55%), Grupa LOTOS S.A. (53.2%), ENEA S.A. (51.5%), KGHM Polska Miedz S.A. (KGHM) (31.8%), and Polski Koncern Naftowy Orlen S.A. (PKN Orlen S.A.) (27.5%). A total of 2,248 entities were active in the mining and quarrying

sector in 2017. Of this number, 2,164 had fewer than 100 employees and together accounted for \$1.28 billion of the sold production (9.38% of the total sold production in mining and quarrying), and 12 had more than 1,000 employees and accounted for \$10.92 billion of the sold production (79.91% of the total sold production in mining and quarrying). Table 2 is a list of major mineral industry facilities (table 2; Central Statistical Office of Poland, 2018, p. 511).

Mineral Trade

In 2017, Poland's total exports were valued at \$231.6 billion compared with \$205.0 billion in 2016. The total value of exported mineral raw materials increased by 15% to \$13.3 billion compared with that of 2016. In terms of value, the major mineral exports were bituminous coal and coal derivatives (22.3% of the total value of mineral exports), crude petroleum and petroleum products (17.1%), raw materials and products of copper metallurgy (14.6%), aluminum (6.4%), iron and ferroalloys (6.3%), precious metals excluding silver (5.1%), and silver (5%). Poland's leading export trade partners in minerals were Germany (which received 23.7% of Poland's total mineral exports, by value), Czechia (11.6%), the Netherlands (5.9%), the United Kingdom (5.8%), and China (5.2%) (Central Statistical Office of Poland, 2018, p. 564; Polish Geological Institute, 2018c).

Poland's total imports were valued at \$231.0 billion compared with \$200.7 billion in 2016. The total value of imported mineral products increased by 28.3% and amounted to \$24.3 billion. In terms of value, the major mineral imports were crude petroleum and petroleum products (56.4% of the total value of mineral imports), aluminum (7.8%), bituminous coal and coal derivatives (6.8%), iron and ferroalloys (5.7%), and raw materials and products of copper metallurgy (3.6%). Poland's leading mineral import partners were Russia (which provided 44.3% of Poland's mineral imports, by value), Germany (10.3%), Norway (3.7%), Kazakhstan (3.6%), and Czechia (2.9%) (Central Statistical Office of Poland, 2018, p. 564; Polish Geological Institute, 2018c).

Poland's exports to the United States were valued at \$7.1 billion in 2017 compared with \$6.0 billion in 2016. Of this total, iron and steel products accounted for \$81.5 million; tin, \$13.6 million; other nonferrous metals, \$13.1 million; petroleum products, \$8.8 million; stone, sand, and cement, \$7.9 million; bauxite and aluminum, \$7.2 million; fuel oil, \$6.5 million; and copper, \$4.7 million. Imports from the United States were valued at \$4.5 billion compared with \$3.6 billion in 2016. Of this total, metallurgical-grade coal accounted for \$115.9 million; iron and steel products, \$56.7 million; fuel oil, \$36.4 million; crude petroleum, \$32.4 million; natural gas, \$14.6 million; nonmetallic minerals, \$12.4 million; aluminum and alumina, \$6.4 million; and copper, \$1.8 million (U.S. Census Bureau, 2018a, b).

Commodity Review

Metals

Copper.—KGHM was Poland's only copper producer and one of the leading producers in the world. In January 2017,

the inauguration of the new flash furnace and electric furnace installation system took place at KGHM's Glogow I copper smelter and refinery. The shaft furnace copper concentrate smelting technology was replaced with the world's largest and most advanced flash furnace. This advanced technology was used in only two other places in the world. The new investment increased KGHM's capacity to recover valuable byproduct minerals while decreasing the environmental effects and the costs of copper processing, and it was expected to enhance the sustainability of production at Glogow I for another 40 years (KGHM Polska Miedz S.A., 2017; Polyak, 2019).

Iron and Steel.—In 2017, pig iron production increased by 10.2% to about 5.2 million metric tons (Mt). The production of raw steel totaled 10.5 Mt, which was an increase of 15.1% compared with that of 2016. Of this amount nonalloy, alloy, and corrosion-resistant steels accounted for 90%, 10%, and 0.01%, respectively. The average production capacity utilization rate in the Polish steel industry was 82%. Poland's share in the European Union's (EU's) total steel production was 6.1% in 2017 compared with 5.6% in 2016. Poland's apparent consumption of finished steel products increased for the fourth year in a row to a record 13.5 Mt (table 1; Polish Steel Association, 2018, p. 3, 48, 49).

ArcelorMittal Poland S.A. was the leading steel producer in Poland and accounted for about 70% of the country's steel production capacity. In October, the company announced that it had implemented a new steel grade that would be used in various types of construction and would require precise laser cutting in the form of cut sheets. The new grade of steel was produced through a thermomechanical rolling process in the modern hot-rolling mill in Krakow (ArcelorMittal Poland S.A., 2017).

Rhenium.—Poland produced 10,930 kilograms (kg) of rhenium, which was an increase of 17.4% compared with 2016 production. KGHM Polska Miedz S.A., through its subsidiary KGHM Metraco S.A., was the only producer of rhenium in Poland and the only European producer of metallic rhenium and ammonium perrhenate from its own resources. KGHM was the second-ranked producer of rhenium in the world, accounting for 19% of the world's production. Rhenium was produced as a byproduct of the copper smelting process (KGHM Polska Miedz S.A., 2018, p. 120; Polyak, 2019).

Industrial Minerals

Cement.—The production of hydraulic cement increased by 9.3% to 17.3 Mt from 15.8 Mt in 2016. CEMEX Polska Sp. z o.o. (CEMEX), a subsidiary of CEMEX S.A.B. de C.V., estimated that the country's total cement consumption increased to 17 Mt in 2017 from the reported 16.3 Mt in 2016. CEMEX operated 2 cement plants, each with a production capacity of 3 million metric tons per year (Mt/yr), as well as 41 concrete plants and 7 aggregate quarries (table 1; CEMEX S.A.B. de C.V., 2018, p. 83; Polish Cement Association, 2018).

Mineral Fuels

Coal.—Overall coal production had been decreasing since 2011 owing to the country's push towards cleaner energy. In 2017, bituminous coal (or hard coal) production decreased by 7.1% to 53.5 Mt from 57.6 Mt in 2016. Poland's reserves of bituminous

coal were 60,496 Mt, which was an increase of more than 3.3% compared with the estimate in 2016. A total of 158 bituminous coal deposits were documented in the country, of which 50 deposits were being mined and together contained resources of 22,497 Mt, or 37.2% of the total estimated resources. In 2017, a new coal deposit was documented, Rydultowy 1, which added 1,158 Mt of new resources. Poland remained one of the top coal producers in Europe (table 1; Polish Geological Institute, 2018d).

The production of lignite (or brown coal) increased by 1.5% to 61.2 Mt from 60.2 Mt, with the majority, 27.8 Mt, derived from the Belchatow deposit. The reserves of lignite were reported as 23,385 Mt, which was a decrease of 66 Mt compared with that of 2016. A total of 91 lignite deposits were documented in the country, of which 8 deposits were being mined and together contained resources of 1,276 Mt, or 5.5% of the total estimated economic resources of lignite (table 1; Polish Geological Institute, 2018a).

In February 2016, Polska Grupa Górnictwa S.A. (PGG) was established. On April 26, 2016, the company bought Kompania Węglowa S.A.'s coal mines, merging 11 mines into 5. On April 1, 2017, Katowicki Holding Węglowy S.A., which owned four mines, merged with PGG and started operations under the name Ruch KHW. PGG, which had the largest bituminous coal resources in the EU, produced approximately 30 Mt/yr of coal, and projected that its coal production would be approximately 27 Mt/yr closer to 2030 owing to the anticipated decline in demand for coal in the energy sector (Polska Grupa Górnictwa, 2016, p. 3; 2019; Puls Biznesu, 2016; Rogala, 2017).

Natural Gas and Petroleum.—In 2017, Poland documented 86 oilfields, including 64 that were in operation. The country's total reserves of crude petroleum and condensate amounted to 23.6 Mt [about 175.0 million barrels (Mbbl)]. Crude petroleum production in Poland was 996,000 metric tons (t) (about 7.4 Mbbl), and consumption was 25.1 Mt (about 196.5 Mbbl) compared with 1.0 Mt (about 7.4 Mbbl) and 25.8 Mt (about 191.2 Mbbl), respectively, in 2016, indicating an import dependency of approximately 96%. Imports of crude petroleum during the year were 24.7 Mt (about 183.1 Mbbl), and exports were approximately 220,000 t (about 1.6 Mbbl) (Central Statistical Office of Poland, 2018, p. 102, 512, 520; Polish Geological Institute, 2018b).

In 2017, estimated reserves of natural gas decreased by 2.75 billion cubic meters to 119 billion cubic meters. Resources at fields in operation were estimated to be 94.48 billion cubic meters and accounted for 79% of the total resources. As of the end of 2017, three new natural gas fields were documented, and the Government had issued 11 licenses for underground natural gas, crude petroleum, and liquid fuel storage facilities (table 1; Polish Geological Institute, 2018e).

PGNiG was the leading hydrocarbon exploration and production company in Poland. In 2017, the company's production of crude petroleum, condensate, and natural gas liquids (NGLs) was 1.3 Mt, and natural gas production was 4.5 billion cubic meters. The company owned 54 oilfields and gasfields in Poland and conducted mining activities in three countries, including Poland. One of the key elements of the PGNiG Group Strategy for 2017–2022 (which was part of the company's operation plan) was the extension of its upstream business to outside of Poland. To secure direct gas imports

from Norway to Poland, the Polish, Norwegian, and Danish transmission system operators were planning to construct a gas pipeline system by 2022 (Polski Koncern Naftowy Orlen, S.A., 2017; Polskie Górnictwo Naftowe i Gazownictwo S.A., 2018a).

Grupa LOTOS S.A. (LOTOS) was the second-ranked producer of mineral fuels in Poland. Its share in the domestic mineral fuel market increased by 2.1% to 31.6% in 2017, and domestic sales increased by 19% compared with that of 2016. In 2017, the company's average production of crude petroleum and natural gas in Poland amounted to 4,900 barrels per day and proved and probable reserves were 45.2 Mbbl. LOTOS' main investment in 2017, the Effective Refining Project, aimed to upgrade its refinery through the construction of an advanced delayed coking unit, which would enable deeper crude-petroleum processing. By the end of the year, 90% of the project had been completed (Grupa LOTOS S.A., 2018, p. 6, 12, 23, 44).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

Minerals in the National Economy

In 2018, Poland's real GDP increased by 5.1%. The nominal GDP was \$585.5 billion.² The value added of the mining and quarrying sector accounted for \$8.7 billion, which was 1.5% of the total GDP, and the construction sector accounted for \$39.4 billion, or 6.7% of the total GDP. The 2018 total sold production of the industrial sector was valued at \$420.9 billion. Of this amount, the mining of coal accounted for \$7.0 billion (or 1.7%); the manufacture of metal products, \$32.6 billion (7.8%); coke and refined petroleum products, \$23.6 billion (5.6%); nonmetallic mineral products, \$16.8 billion (4.0%); and base metals, \$13.6 billion (3.9%). The mining and quarrying sector accounted for \$14.9 billion (3.5%). In 2018, the number of people employed in the Polish mining and quarrying sector increased to 138,600 from 138,200 in 2017 (Central Statistical Office of Poland, 2019, p. 242, 504, 505, 697, 698; World Bank, The, 2019b).

The total value of exported mineral products in 2018 increased to \$15.3 billion, or by 9.77% compared with that of 2017. The leading minerals exported were, in terms of value, bituminous coal and coal derivatives (21.1% of the total value of mineral exports), crude petroleum and petroleum products (20.3%), raw materials and products of copper metallurgy (13.3%), aluminum (6.6%), and precious metals (4.6%). Poland's major mineral export trade partners were Germany (which received 23.2% of Poland's total mineral exports, by value), Czechia (11.1%), the Netherlands (7.8%), and the United Kingdom (5.7%). The total value of imported mineral products increased by 23.6% to \$31.4 billion. The leading mineral products imported were, in terms of value, crude petroleum and petroleum products (60.4% of the total value of mineral imports), bituminous coal and coal derivatives (7.9%), aluminum (7.1%), iron and ferroalloys (4.8%), and raw materials and products of copper metallurgy (2.6%). Poland's major mineral import trade partners were Russia (which provided 44.7% of Poland's mineral imports, by value),

²Where necessary, values have been converted from Polish zlotys (PLN) to U.S. dollars (US\$) at an annual average exchange rate of PLN3.613=US\$1.00 for 2018.

Germany (8.3%), Kazakhstan (5.6%), Norway (3.6%), and Saudi Arabia (3.4%) (Polish Geological Institute, 2019c).

On August 29, 2018, the Act of June 15, 2018, came into force as a new amendment to the GML. The amendment implements new principles regarding the “priority right,” water injection into rock mass, and noble gases, and regarding simplification of the joint operating agreements for mining operations. It also clarifies the grounds for refusing to grant a concession and for concession withdrawal, and introduces a new procedure known as the “open door procedure” for granting hydrocarbon concessions (Palukiewicz, 2018).

Production

In 2018, significant increases were reported in the production of the following mineral commodities: quartzite (refractory), 78%; lime (hydrated and quicklime), 41%; aluminum (secondary), 36%; diatomite, 16%; mined gypsum (anhydrite), 13%; and cold-rolled steel products, 10%. Significant decreases were reported in the production of feldspar, 22%; ferroalloys (other, unspecified), an estimated 19%; rhenium (ammonium perrhenate, Re content), 17%; refined copper (secondary, Cu content), 15%; salt (rock) and zinc (smelter, primary), 14% each; and selenium (Se content), 10%.

Commodity Review

In 2018, KGHM processed 31.8 Mt of ore at an average copper content of 1.49%, producing 452,034 t of copper, compared with 32.8 Mt of ore with an average copper content of 1.5% processed in 2017. From April 8 until June 25, a maintenance shutdown of the concentrate smelting installation took place at KGHM’s Glogow II copper smelter and refinery. Production of rhenium, a byproduct of the copper smelting process, decreased by 17% to 9,090 kg in 2018 from 10,930 kg in 2017, and silver decreased by 2.4% (or by 29 t) and amounted to 1,189 t (table 1; KGHM Polska Miedz S.A., 2019, p. 169, 170; Polish Geological Institute, 2019a, p. 63).

In 2018, Poland documented 86 oilfields, including 59 that were in operation (the new field at Krobilewko was added to the active fields total). The total reserves of crude petroleum and condensate amounted to 23.96 Mt (177.7 Mbbl). Crude petroleum production in Poland was 1.01 Mt (7.5 Mbbl), and consumption was 27.0 Mt (200.3 Mbbl) compared with 996,000 t (7.4 Mbbl) and 25.14 Mt (186.5 Mbbl), respectively, in 2018, indicating an import dependency of approximately 96% (Central Statistical Office of Poland, 2019, p. 516; Polish Geological Institute, 2019b).

The reserves of natural gas increased in 2018 by 22.97 billion cubic meters to 142.16 billion cubic meters. Resources at the fields in operation fields were estimated to be 90.56 billion cubic meters and accounted for 64% of the total resources. As of the end of 2018, four new natural gas fields had been documented and the Government had issued 11 licenses for running underground natural gas, crude petroleum, and liquid fuel storage facilities. In 2018, PGNiG discovered a new gas deposit within the Przemysl field, Poland’s largest and longest active gasfield, which had been in production for more than 60 years. The extracted high-quality gas from the field contained

98% to 99% methane and was estimated to produce more than 64 billion cubic meters of gas. The company planned to drill more wells to confirm the estimated reserves. PGNiG also discovered a new gas deposit, the Krolewska Gora-1K borehole in the Budy Glogowskie field in Rzeszow County. The extracted gas from the exploration well had high methane content. The company planned to bring the Krolewska Gora-1K borehole onstream by the end of 2019 and estimated that the new deposit could yield approximately 20 million cubic meters per year of gas. In 2018, high-methane natural gas production in Poland was 2,912 million cubic meters, imports were 14,947 million cubic meters, consumption was 17,182 million cubic meters, and exports were 651 million cubic meters (Polskie Gornictwo Naftowe i Gazownictwo S.A., 2018b, c; Central Statistical Office of Poland, 2019, p. 516; Polish Geological Institute, 2019d).

Outlook

Poland’s economy is expected to continue to grow. The Government will continue to maintain control of a limited number of key mining and energy companies that are essential to the Polish economy and energy security. Coal, copper, and petroleum products are expected to remain the most important mineral products in terms of value. Production of byproducts (mainly lead, precious metals, and rhenium) may increase owing to KGHM’s new capacity to recover byproducts in the copper smelter process. Coal production will remain a significant part of the country’s economy in the near- to mid-term but, in the long-term, production is expected to decline gradually owing to the global push towards clean energy and increasingly strict environmental regulations. In the near future, the petroleum industry will likely face challenges resulting from the introduction of new regulations concerning hydrocarbon production, which may influence petroleum exploration and production. Poland will continue to be dependent on imports of mineral fuels.

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TABLE 1
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2014	2015	2016	2017	2018
METALS					
Aluminum, secondary, metal	14,908	7,577	8,264	8,308	11,320
Cadmium, refinery, primary	628	383	319	309	305
Copper:					
Mine:					
Ore:					
Gross weight	32,613,000	33,187,000	33,620,000	32,780,602	31,804,873
Cu content	473,258	478,727	480,038	466,793	452,034
Concentrates:					
Gross weight	1,843,000	1,860,000	1,867,000	1,834,329	1,762,343
Cu content	421,695	426,196	424,704	419,603	401,696
Smelter:					
Primary	503,111	514,774	446,902 ^r	457,549	461,865
Secondary	72,585	67,624	60,369	53,024	50,001
Refinery:					
Primary	469,100	470,900 ^r	429,000	429,600	423,600
Secondary	107,800	103,400 ^r	106,600	92,400	78,200
Ferroalloys:					
Ferrosilicon	62,878	77,754	77,682	65,732	63,618
Other, unspecified	24,909	460	12,517	24,800	20,000 ^e
Gold, mine, Au content	kilograms	226	431	402	572
Iron and steel:					
Pig iron	4,640,000	4,826,492	4,679,616	5,159,128	4,787,696
Steel:					
Raw steel	8,800,000	9,336,489	9,160,660	10,540,354	10,336,483
Products:					
Cold-rolled	1,640,000	1,705,000	1,818,000 ^r	2,197,071	2,418,680
Hot-rolled	7,985,000	8,345,000	8,793,000	9,771,182	10,106,047
Pipe, cold formed and hollow sections	848,000	784,000	718,000	808,000	850,000 ^e
Lead:					
Mine, Pb content:					
From copper ore	27,110 ^r	29,000 ^r	26,060 ^r	26,000	27,210
From lead-zinc ore	24,000	20,000	17,000	12,706	13,234
Refinery:					
Primary	36,000	40,000	40,000	41,000	40,000
Secondary	112,000	114,000	115,000	119,000	120,000
Platinum-group metals, refinery:					
Palladium	kilograms	25	20	30	7
Platinum	do.	40	40	50	11
Rhenium, ammonium perrhenate, Re content	do.	7,710	9,170	9,310	10,930
Selenium, Se content	do.	89,800	87,000	81,660	73,900
Silver:					
Mine, Ag content	do.	1,384,000 ^r	1,407,000 ^r	1,482,000 ^r	1,490,000
Refinery, metal	do.	1,256,238	1,283,209	1,191,127	1,218,100
Zinc:					
Mine, Zn content		70,000	65,000	61,000	50,000
Smelter, primary		154,000	161,000	123,800	122,900
INDUSTRIAL MINERALS					
Cement:					
Clinker	thousand metric tons	11,866	11,278	12,075	12,997
Hydraulic	do.	15,534	15,206	15,782 ^r	17,254

See footnotes at end of table.

TABLE 1—Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²		2014	2015	2016	2017	2018
INDUSTRIAL MINERALS—Continued						
Clay:						
Bentonite		650	450	1,000	--	560
Fire clay, crude		112,000	116,000	103,000	110,700	119,000
Kaolin:						
Crude		278,000	287,000	299,830	284,650	310,850
Beneficiated		197,000	172,000	176,000	177,051	192,447
Diatomite		590	600	500	500	580
Feldspar		68,910	76,540	88,140	91,200	71,480
Gemstones, quartz and quartz crystal		11,300	14,700	7,600	8,000	8,800
Gypsum:						
Mine:						
Anhydrite	thousand metric tons	147	136	137	114	128
Gypsum rock	do.	905	882	898	994	914
Synthetic	do.	2,800 ^c	2,800 ^c	3,659	2,937	2,985
Lime, hydrated and quicklime	do.	1,817	1,942	1,869	1,904	2,684
Magnesite:						
Ore		116,000	111,077	97,868	127,613	117,478
Concentrate		92,000	96,000	77,920	101,920	102,110
Nitrogen, ammonia, N content	thousand metric tons	2,200	2,200	2,237 ^r	2,367	2,172
Salt:						
Evaporated salt	do.	647	671	647	615	620
Rock	do.	775	650	709	994	853
Other, brine and desalination of mine wastewater	do.	2,705	2,798	2,965	2,989	2,929
Sand and gravel, industrial:						
Filling sand	do.	6,479	6,033	4,949	4,585	4,600 ^c
Foundry sand	do.	1,353	1,103	1,081	1,023	1,030 ^c
Glass sand, marketable	do.	2,071	2,669	2,262	2,472	2,435
Lime-sand brick production sand	do.	923	996	1,045	881	898
Molding sand	do.	1,796	1,633	1,253	1,643	1,512
Soda ash, synthetic, carbonate		1,053,143	1,074,320	1,250,420 ^r	1,280,997	1,239,131
Sodium, compounds, caustic soda, carbonate, 96% NaOH		378,867	397,369	386,385	431,817	405,861
Stone, sand and gravel, construction:						
Sand and gravel, unspecified	thousand metric tons	146,527	167,930	173,175	186,296	197,010
Stone, crushed:						
Dolomite	do.	2,065	3,164	3,364	2,868	3,144
Limestone:						
For lime production	do.	16,561	18,655	17,463	18,091	18,100 ^c
For non-lime end use	do.	35,152	36,522	35,188	35,474	36,284
Quartzite, refractory	do.	83	55	65	78	138
Sulfur, S content:						
Byproduct:						
Metallurgy ^c	do.	260	280	280 ^r	280	280
Natural gas	do.	24	24	25	23	23
Native, frasch	do.	605	628	621	663	617
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	60,815 ^r	60,329 ^r	57,579 ^r	53,494	51,817
Lignite	do.	63,877	63,128	60,246	61,160	58,571
Metallurgical	do.	12,288	12,985	13,204	12,481	12,040
Coke, metallurgical	do.	9,568	9,792	9,718 ^r	9,418	9,493
Gas, manufactured, coke oven	million cubic meters	4,161	4,272	4,254	4,156	4,208
Natural gas	do.	5,764	5,762	5,794 ^r	5,408	5,348
Peat, horticultural and fuel uses		829,000	876,816 ^r	906,954 ^r	955,094	871,988

See footnotes at end of table.

TABLE 1—Continued
POLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²		2014	2015	2016	2017	2018
<u>MINERAL FUELS AND RELATED MATERIALS—Continued</u>						
Petroleum:						
Crude	thousand 42-gallon barrels	7,100	6,900	7,400	7,380	7,492
Refinery	do.	198,000	217,000	215,675 ^r	213,864	225,403

^cEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through October 23, 2019. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, beneficiated barite, cobalt, nickel sulfate, and town gas may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, secondary	Alumetal S.A.	Kety	NA.
Do.	Boryszew S.A. Branch Modern Products Aluminum Skawina (Boryszew Capital Group, 100%)	Skawina	NA.
Do.	Grupa KETY S.A.	Kety	NA.
Do.	Huta Aluminium Konin (Impexmetal S.A., 95.52%)	Konin	NA.
Do.	Nicromet	Bestwinka	NA.
Do.	POLST Sp. z o.o.	Walbrzych	NA.
Cadmium, refined metric tons	Huta Cynku "Miasteczko Śląskie" S.A. (Stalprodukt S.A.)	Miasteczko Śląskie smelter	540.
Cement:			
Aluminous	Gorka Cement Sp. z o.o. (Mapei Group)	Trzebinia	70 clinker, ^c 70 cement. ^c
Portland	Cementownia Krakow Nowa Huta Sp. Z.o.o. (Polska Energetyka Holding SA)	Krakow	300 clinker, ^c 500 cement. ^c
Do.	Cementownia "Odra" S.A. (Miebach Projektgesellschaft GmbH)	Opole	400 clinker, ^c 800 cement. ^c
Do.	Cementownia Warta S.A. (Polen Zement Beteiligungsgesellschaft GmbH)	Dzialoszyn	1,500 clinker, ^c 2,000 cement. ^c
Do.	Cemex Polska Sp. z o.o. (CEMEX S.A.B de C.V., 100%)	Plants at Chelm and Rudniki	2,300 clinker, ^c 6,000 cement. ^c
Do.	Dyckerhoff Polska Sp. z o.o. (Dyckerhoff/Buzzi Unicem SpA)	Nowiny	1,100 clinker, ^c 1,600 cement.
Do.	Gorazdze Cement S.A. (HeidelbergCement AG, 100%)	Gorazdze	4,000 clinker, ^c 6,000 cement.
Do.	Grupa Ozarow S.A. (CRH plc., 100%)	Plants at Ozarow and Rejowiec	2,800 clinker, ^c 3,250 cement. ^c
Do.	Lafarge Cement S.A.	Plants at Malogoszcz and Piechcin	3,000 clinker, ^c 5,700 cement.
Clay:			
Bentonite	Zaklady Gorniczo-Metalowe "Zebiec" S.A.	Starachowice	40. ^c
Kaolin	Grudzen Las Sp. z o.o.	Grudzen Las in Lodz Voivodeship	55. ^c
Do.	KSM "Surmin-Kaolin" S.A.	Nowogrodziec in Lower Silesia	90. ^c
Do.	Tomaszowskie Kopalnie Surowcow Mineralnych "Biala Gora" Sp. z o.o.	Smardzewice, Tomaszowski Voivodeship	30. ^c
Coal:			
Bituminous	Includes: 100% Government owned: Polska Grupa Gornicza S.A. Poludniowy Koncern Weglowy S.A. KWK Kazimierz-Juliusz Sp. z o. o. Jastrzebska Spolka Weglowa S.A. (Government, 55%) Lubelski Węgiel "Bogdanka S.A." (ENEA SA, 66%) SILTECH Sp. z o. o.	Of which:	90,000. ^{c, 2}
			Upper Silesia (8 mines) Upper Silesia (2 mines) Upper Silesia (1 mine) Upper Silesia (5 mines) Bogdanka, east of Leczna, eastern Poland (1 mine) Upper Silesia (1 mine)
Lignite	Includes: Kopalnia Węglu Brunatnego "Konin" w Kleczewie S.A. Kopalnia Węglu Brunatnego "Adamow" S.A. PGE KWB Belchatow S.A. [PGE Polish Energy Group Plc. (Government, 57.39%)] PGE KWB Turow S.A. [PGE Polish Energy Group Plc. (Government, 57.39%)] Sieniawa Brown Coal Mine Ltd.	Of which: Kleczew (4 open pit mines) Turek (3 open pit mines) Belchatow, south of Lodz (2 open pit mines) Bogatynia, at the southwest corner of Poland (1 mine) Sieniawa (1 mine)	95,000. ^{c, 2}

See footnotes at end of table.

TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Coke	Includes: ArcelorMittal Poland S.A. CARBO-KOKS Sp. z.o.o. ISD Huta Czestochowa Sp. z o.o. Koksownia Przyjazn S.A. Kombinat Koksochemiczny Zabrze S.A. Zaklady Koksownicze "Victoria" S.A. Zaklady Koksownicze "Zdzieszowice" Sp. z o.o. (ArcelorMittal Poland S.A., 100%)		Of which: Upper Silesia (Krakow) Upper Silesia (Bytom) Upper Silesia (Czestochowa) Upper Silesia (Dabrowa Gornicza) Upper Silesia (Cokeries at Jadwiga, Radlin, and Debiensko) Upper Silesia (Walbrzych) Upper Silesia (Zdzieszowice)	10,800. ²
Copper:				
Ore, gross weight (averaged 1.57% Cu)	KGHM Polska Miedz S.A. (Government, 31.79%)		Lubin Mine, Lubin-Glogow District	8,100.
Do.	do.		Polkowice-Sieroszowice Mine, Lubin-Glogow District	12,400.
Do.	do.		Rudna Mine, Lubin-Glogow District	12,700.
Concentrate, gross weight (averaged 23.1% Cu)	do.		Lubin beneficiation plant, Lubin-Glogow District	465.
Do.	do.		Polkowice beneficiation plant, Lubin-Glogow District	450.
Do.	do.		Rudna beneficiation plant, Lubin-Glogow District	700.
Metal, refined	do.		Refineries at Glogow I, Glogow II, and Legnica	540.
Feldspar	Pol-Skal Sp. z o.o.		Karpniki, southwestern region of Jelenia Gora	100.
Do.	Strzeblowskie Kopalnie Surowcow Mineralnych Sp. z o.o.		Sobotka, Lower Silesia, exploiting the Pagorki Zachodnie, Pagorki Wschodnie, and Strzeblow I deposits	50.
Ferroalloys:				
Electric furnace (FeSiMn, FeMn, FeSi)	Huta Laziska S.A.		Laziska Gorne in Upper Silesia	170.
Blast furnace (FeMn)	STALMAG Sp. z o.o.		Ruda Slaska in Upper Silesia	50. ^c
Gold, metal	kg	KGHM Polska Miedz S.A. (Government, 31.79%)	Refinery at Glogow	550.
Gypsum, anhydrite	Includes: Kopalnia Gipsu i Anhydrytu "Nowy Lad" Sp. z o.o. Rigips Polska Stawiany Sp. z o.o. (Saint-Gobain) Zaklady Przemyslu Gipsowego "Dolina Nidy" S.A.		Of which: Lower Silesia, mines at Niwnice and Iwiny Southeastern Poland, Szarkow Southeastern Poland, Gacki	1,400. ²
Helium	million cubic meters	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 71.9%)	Odolanow in western Poland	3.
Lead and zinc:				
Mine output	Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Stalprodukt S.A., 86.92 %)		Mine and concentrator at Olkusz and Pomorzany, Bukowno region	30 lead, ^c 150 zinc.
Metal:				
Pb, refined	"Baterpol" Sp. z o.o. (Impexmetal S.A.)		Refinery at Katowice	20. ^c
Do.	Huta Cynku Miasteczko Slaskie (HCM) S.A.		Refinery at Miasteczko Slaskie	35.
Do.	KGHM Polska Miedz S.A. (Government, 31.79%)		Smelter at Legnica	60.
Do.	Orzel Bialy S.A.		Refinery at Bytom	40. ^c
Zn, refined	Huta Cynku Miasteczko Slaskie (HCM) S.A. [Zaklady Gorniczo-Hutnicze (ZGH), 91%]		Imperial smelter at Miasteczko Slaskie	85.
Do.	Zaklady Gorniczo-Hutnicze (ZGH) "Boleslaw" S.A. (Stalprodukt S.A., 86.92 %)		Refinery at Boleslaw	75.
Do.	Zaklady Metalurgiczny Silesia S.A.		Refinery at Katowice	12.

See footnotes at end of table.

TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Lime	Includes: 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. Zaklady Przemyslu Wapienniczego (ZPW) Trzuskawica S.A. (CRH plc, 100%)		Of which:	2,200. ^{e,2}
Natural gas	million cubic meters	LOTOS Petrobaltic S.A. [Grupa LOTOS S.A. (Government, 53.20%)]	Baltic Sea Shelf	20. ^c
Do.	do.	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 71.9%)	Gasfields in southeastern Poland in the Carpathian Mountains, the Carpathian Foothills, and the Polish Lowlands	4,600. ^c
Nitrogen, ammonia (NH ₃)	Includes: Azoty-Adipol S.A. (former Chorzow plant) Zaklady Azotowe "Anwil Wloclawek" S.A. Zaklady Azotowe "Kedzierzyn" S.A. Zaklady Azotowe "Pulawy" S.A. Zaklady Azotowe S.A. w Tarnowie Zaklady Chemieczne "Police"		Of which:	2,600. ^{e,2}
Petroleum:				
Crude	thousand 42-gallon barrels	LOTOS Petrobaltic S.A. [Grupa LOTOS S.A. (Government, 53.20%)]	Baltic Sea Shelf	1,700. ^c
Do.	do.	Polskie Gornictwo Naftowe i Gazownictwo S.A. (PGNiG) (Government, 70.8%)	Oilfields in southeastern and western Poland with about 75% of production from the Barnowko-Mostno-Buszewo field near Debno	6,000. ^c
Refined	do.	ORLEN Poludnie S.A. [PKN Orlen S.A. (Government, 27.52%)]	Jedlicze and Trzebinia refineries in southern Poland	4,000.
Do.	do.	Petrochimia-Plock [PKN Orlen S.A. (Government, 27.52%)]	Plock in central Poland	119,000.
Do.	do.	Rafineria Gdanska S.A. (Grupa LOTOS S.A.) (Government, 53.20%)	Gdansk in northern Poland	77,000. ^c
Rhenium:				
Ammonium perrhenate, Re content	kilograms	KGHM Metraco S.A. [KGHM Polska Miedz S.A. (Government, 31.79%)]	Lubin	15,000. ^c
Metal	do.	do.	do.	3,500.
Salt:				
Brine	Includes: Inowroclawskie Kopalnie Soli Solino S.A. Kopalnia Soli "Wieliczka" S.A.		Of which: Mines at Gora and Mogilno in central Poland Wieliczka in southern Poland, near Krakow, mining deposits at Barycz and Wieliczka	5,000. ^{e,2}
Rock salt	KGHM Polska Miedz S.A. (Government, 31.79%)		Sieroszowice in southwestern Poland	NA.
Do.	Kopalnia Soli "Klodawa" S.A.		Klodawa in central Poland	NA.
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	1,200.
Do.	do.	Institute of Non-Ferrous Metals	Gliwice	30. ^c

See footnotes at end of table.

TABLE 2—Continued
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2018¹

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Steel, raw	ArcelorMittal S.A., of which:		
	ArcelorMittal Warszawa Sp. z o.o.	Steelworks in Warsaw (former Huta "Lucchini-Warszawa" Sp. z o.o.)	8,000.
	ArcelorMittal Poland S.A.	Steelworks at Dabrowa Gornicza (former Huta Katowice S.A.)	
	do.	Steelworks at Krakow (former Huta Sendzimir S.A.)	
Do.	Celsa Huta Ostrowiec S.A. (Celsa Group)	Steelworks at Ostrowiec-Swietokrzyski	800. ^c
Do.	CMC Zawiercie S.A. (Commercial Metals Co.)	Steelworks at Zawiercie	1,200.
Do.	Ferrostal Labedy Sp. z o.o. (Cognor S.A.)	Steelworks at Gliwice	375.
Do.	Huta Batory Sp. z o.o. (Alchemia S.A., 100%)	Steelworks at Chorzow	150. ^c
Do.	Huta Stali Jakosciowych S.A. (Cognor S.A.)	Steelworks at Stalowa Wola	261.
Do.	ISD Huta Czestochowa S.A. (Industrial Union of Donbass Corp.)	Steelworks at Czestochowa	800. ^c
Sulfur	P.P. Kopalnie i Zaklady Chemiczne Siarki "Siarkopol"	Osiek deposit at Grzybow	800.

^aEstimated. 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 2018, which was prepared and published by the Division of Mineral Policy, Mineral and Energy Economy Research Institute of the Polish Academy of Sciences.

²Annual capacity listed is total for all deposits, mines, or companies that produce the commodity.