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2019 Minerals Yearbook

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The Mineral Industry of Sweden

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Sweden is part of the Fennoscandian Shield, an area of crystalline and metamorphic rocks that hosts a variety of mineral deposits and is an important metallic mining district of the European Union (EU). The country's mineral resources and mineral reserves are located in the three primary metallogenic regions: the Bothnia-Skelleftea region characterized by base-metal and gold deposits; the Norrbotten region characterized by copper, gold, and iron deposits; and the Bergslagen region characterized by copper, gold, iron, lead, and zinc deposits. In addition to these regions, minerals are also found in Sweden's Dalsland, Norrland, and Smaland regions (Geological Survey of Sweden, 2020b; 2020c, p. 31; 2020d).

In 2019, Sweden was world's third-ranked producer of peat and refined tellurium, accounting for 9% and 8%, respectively, of the world's production. In the EU, Sweden accounted for 91% of the EU's iron ore production and was also the leading producer of lead and zinc, the second-ranked producer of silver, and the fourth-ranked producer of copper and gold (Geological Survey of Sweden, 2020c, p. 26; Anderson, 2021; Brioche, 2021).

Minerals in the National Economy

In 2019, Sweden's real gross domestic product (GDP) increased by 1.3%. The nominal GDP was $530.8 billion. Mining accounted for $860.8 million[1] (SEK8.14 billion) or approximately 0.16% of Sweden's GDP. The number of people employed in the Swedish mining and minerals industry increased by 5% to 7,324 in 2019 from 6,996 in 2018. Expenditures on mineral exploration increased by 22% to $101.0 million. The most significant amount of this expense went to base metals and gold, and 31% was spent on iron ore. Most of the explorations took place in Vasterbotten County, followed by Norrbotten County. Boliden Mineral AB (Boliden), Luossavaara-Kiirunavaara AB (LKAB), and Zinkgruvan Mining AB accounted for 87% of the total exploration expenses in Sweden. At the end of 2019, there were 586 exploration permits compared with 623 in 2018, of which 97 new permits were granted compared with 152 granted in 2018, and 45 permits were extended compared with 86 extended in 2018. Also in 2019, 2 processing concessions were granted, for a total of 168 valid processing concessions at the end of the year. In 2019, Sweden had 12 active mines, and all of them were metal mines (Geological Survey of Sweden, 2020c, p. 34, 54, 59; Tradingeconomics.com, 2020; World Bank, The, 2020).

In 2019, the sales of metals produced from mines in Sweden increased to $4.86 billion. Total sales of industrial minerals and peat were estimated to be $5.67 billion, which was a 14% increase compared with sales in 2018 and an 80% increase compared with sales in 2015. The sales resulted in increased profit, as the production costs stayed about the same; compared with 2018, the total profit in the mining sector (mined metals, industrial minerals, and peat) in 2019 increased by 40% to $1.5 billion (Geological Survey of Sweden, 2020a; 2020c, p. 80, 81).

In 2019, the value of Sweden's mineral commodity exports stayed approximately the same as in 2018 at $12.7 billion. The leading exported mineral commodities were, in terms of value, precious metals, followed by iron and steel, and metallic ores. Imports of mineral commodities increased in value by 3% compared with those in 2018 and accounted for approximately 75% of the total export value of mineral commodities. The leading imported mineral commodity was, in terms of value, aluminum, followed by nickel, iron and steel, copper ore, lime, kaolin clay, phosphorus, fertilizers, cement, molybdenum, coal, coke, and peat (Geological Survey of Sweden, 2020c, p. 78, 79).

Government Policies and Programs

The Swedish Minerals Act of 1991 (No. 45), which came into force on July 1, 1992, is the main law in Sweden that regulates the mineral industry and sets procedures for acquiring exploration and mining permits. The Mining Inspectorate of Sweden, which is a unit of the Geological Survey of Sweden, is responsible for issuing permits for exploration and mining. The inspectorate is headed by the Chief Mining Inspector, who makes decisions on matters related to the Swedish Minerals Act. The extraction of minerals also must be in accordance with the environmental requirements of the Swedish Environmental Code of 1998 (No. 808) and the Swedish Planning and Building Act of 2010 (No. 900). The Swedish Government's goal is to strengthen Sweden's position as the EU's leading mining country, which is expressed in the country's minerals strategy, titled "Sweden's Minerals Strategy—For Sustainable Use of Sweden's Mineral Resources That Creates Growth Throughout the Country" (Swedish Ministry of Enterprise, Energy and Communications, 2013; Mining Inspectorate of Sweden, 2020a, b).

Production

In 2019, the most significant mineral commodity production increases included that of iron ore (Fe content), which increased by 24%; dolomite, 20%; and ferrochromium, 17%. The most significant production decreases were for clay (kaolin), which decreased by 62%; peat (fuel use), 31%; hydraulic cement, an estimated 15%; limestone (dimension), 12%; smelter copper (primary), 11%; and refined copper (primary and secondary) and silver (mine, Ag content), 10% each. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Swedish mineral industry consisted mostly of privately owned companies. The Government owned 100% of the shares

[1]Where necessary, values have been converted from Swedish Krona (SEK) to U.S. dollars (US$) at the annual average exchange rate of SEK9.457=US$1.00 for 2019.

in major mining operator LKAB, which was the leading iron ore producer in Europe. Boliden was Sweden's leading privately owned mineral producer, in terms of the value of production. Boliden produced copper, gold, lead, and silver, along with sulfuric acid and several other metals as byproducts. Its main operations in Sweden were the Aitik Mine, mines in the Boliden area (the Kankberg, the Kristineberg, and the Renstrom Mines), the Garpenberg Mine, and the smelter and refinery at Ronnskar. Zinkgruvan Mining AB, which was a subsidiary of a Canadian base-metals mining company (Lundin Mining Corp.), owned the Zinkgruvan Mine located in south-central Sweden. Zinkgruvan Mining produced copper, lead, silver, and zinc. Cementa AB, which was a subsidiary of HeidelbergCement Group of Germany, was the only cement producer in Sweden. The company had three plants located at Degerhamn, Skovde, and Slite; the cement plant in Degerhamn was shut down in April owing to stricter environmental regulations. Nordkalk AB, which was a subsidiary of the Rettig Group of Finland, was an international producer of concentrated calcite, dolomite, limestone, quicklime, slaked lime, and wollastonite. In Sweden, Nordkalk had five limestone quarries located at Ignaberga, Koping, Orsa, Storugns, and Uddagarden. Table 2 is a list of major mineral industry facilities (Boliden Mineral AB, 2020, p. 19; HeidelbergCement Group, 2020a, p. 29; 2020b; Lundin Mining Corp., 2020b; Luossavaara-Kiirunavaara Group, 2020; Nordkalk Corp., 2020).

Commodity Review

Metals

Copper.—In 2019, copper production (concentrate, Cu content) in Sweden totaled 98,600 metric tons (t), which was a decrease of 7% compared with that in 2018. The Aitik Mine was the country's leading copper mine. The mine also produced gold and silver. The production of copper at the Aitik Mine decreased to approximately 91,000 t in 2019 from approximately 99,000 t in 2018. Milled volumes increased to 40.7 million metric tons (Mt) from 38.5 Mt in 2018, which was attributed to improved crusher availability; however, the ore grade decreased to 0.25% copper from 0.29% copper. In 2019, Boliden continued with expansion projects to increase ore production at the Aitik Mine. Production was expected to increase by 25% to 45 million metric tons per year (Mt/yr) starting in 2020. Regarding Boliden's mines located in Vasterbotten (in the Boliden area), the company reported production increases at the Kankberg, the Kristineberg, and the Renstrom underground mines, and a production decrease at the Maurliden open pit mine, which was depleted and closed at the beginning of the year. Overall, copper production from mines in the Boliden area decreased to approximately 4,000 t in 2019 from approximately 5,000 t in 2018. Copper production at Lundin's Zinkgruvan Mine increased to 2,906 t in 2019 from 1,386 t in 2018 owing to higher grades and metal recoveries in 2019 (Boliden Mineral AB, 2020, p. 19, 20, 45, 107, 113; Lundin Mining Corp., 2020a, p. 1, 12).

Gold.—Mandalay Resources Corp. of Canada (Mandalay) acquired the Bjorkdal gold operation in 2014, which included a combined underground mine and open pit located in northern Sweden. In July 2019, Mandalay completed the transition, suspending the open pit operation and operating only the underground mine. During the year, approximately 69% of the plant feed was delivered from the underground mine, 18% from the open pit, and 13% was from the low-grade stockpile. The total mill feed amounted to 1.29 Mt at an average grade of 1.43 grams per metric ton gold. The gold recovery averaged 88%, and production was 1,602 kilograms (kg) of gold in concentrate. For 2020, Mandalay expected to increase the underground mine's production to 1 Mt of ore. Boliden's production of gold totaled 6,370 kg in 2019 compared with 6,444 kg in 2018. Gold production at the Aitik Mine and the Garpenberg Mine were 3,063 kg and 514 kg, respectively, whereas gold production from the mines in the Boliden area was 2,793 kg (Boliden Mineral AB, 2020, p. 112–114; Mandalay Resources Corp., 2020a; 2020b, p. 1–1).

Iron Ore and Iron and Steel.—In 2017, Kaunis Iron AB purchased the iron ore mine in Kaunisvaara (Pajala), Norrbotten County. The mine was previously owned by Northland Resources AB, which had filed for bankruptcy in 2014. In July 2018, Kaunis Iron restarted production at the mine. In 2019, about 1.8 Mt of finished ore (iron ore concentrate containing 68.1% iron) was produced. In July 2019, Kaunis Iron submitted an application to extend mining in the nearby Sahavaara and Palotieva deposits, which at full production capacity would more than double the company's production of iron ore to 5 Mt/yr (Geological Survey of Sweden, 2020c, p. 41; Kaunis Iron AB, 2020a, b).

In 2019, LKAB remained Europe's leading producer of iron ore, and its production represented 80% of all iron ore production in Europe. In Sweden, LKAB produced 24.9 Mt of iron ore (finished ore) in 2019 compared with 26.8 Mt produced in 2018. In 2018, the Gruvberget Mine was closed, and mining continued in the Leveaniemi open pit located south of the community of Svappavaara. LKAB's other mines and processing plants were located in Kiruna and Malmberget, where 19.1 Mt and 9.7 Mt of enriched ore were produced, respectively (Geological Survey of Sweden, 2020c, p. 37, 38; Luossavaara-Kiirunavaara Group, 2020).

Mineral Fuels and Related Materials

Peat.—In 2019, production of fuel peat decreased by 31% compared with that of 2018 to 1.12 Mt (1.28 million cubic meters). The land area used for the extraction of peat in 2019 decreased by 35%, and the number of peat fields in production decreased to 51 from 77 in 2018. The leading fuel-peat-producing counties were Norrbotten County (accounting for 22% of total production), Vasternorrland County (14%), and Kronoberg County (12%). Yearly variations in peat production depend on changes in demand and on weather conditions. The extent of the use of peat depends on the weather and on the fuel supply. The peat harvest during the summer of 2018 benefited from hot and dry weather (Geological Survey of Sweden, 2020c, p. 70; Statistics Sweden, 2020a; 2020b, p. 3).

Outlook

Although mining contributes only a small part of Sweden's GDP, the contribution is expected to increase in the medium

and long terms. Sweden's standing as a significant supplier of iron ore in the EU will be further solidified with the extension of mining in the nearby deposits of the recently reopened iron ore mine in Kaunisvaara. New advanced technologies and the continued increase of expenditures on mineral exploration may result in new discoveries in the country. Significant ore reserves together with established global-standard mining operations and a well-developed mining equipment industry are positive conditions for the likely future growth of the mineral industry.

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TABLE 1

SWEDEN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2015	2016	2017	2018	2019
METALS						
Aluminum, metal, primary		116,000	124,000	123,000	125,000	120,000
Copper:						
Mine, concentrates, Cu content		75,113	79,247	104,594	106,140	98,600
Smelter:						
Primary		137,400	131,500	150,000	152,100 r	135,900
Secondary		61,800	62,200	60,000	65,200 r	60,000
Refinery:						
Primary		144,200	145,100	153,600	157,100	140,900
Secondary		61,800	62,200	65,800	67,300	60,400
Ferroalloys, ferrochromium		90,480	81,900	92,390	101,370 r	118,198
Gold, mine, Au content	kilograms	6,030	6,463	7,858	7,866	7,972
Iron ore, mine, Fe content	thousand metric tons	15,200	16,700	19,700 r	22,200	27,600
Iron and steel:						
Pig iron	do.	2,865	3,078	3,111	3,172	3,200
Steel, raw steel	do.	4,370 e	4,617	4,926	4,654	4,721
Lead:						
Mine, Pb content		79,354	76,066	71,112	64,751	68,635
Refinery:						
Primary		26,200 r	28,400 r	28,300 r	28,900 r	28,500
Secondary		44,800	46,000	50,200	47,200	49,500
Silver:						
Mine, Ag content	kilograms	479,700	515,039	488,135	471,325	423,777
Refinery, metal, primary	do.	539,000	498,686	467,500	443,624	419,926
Tellurium, refinery	do.	33,000	38,680	34,979	44,641	40,953
Zinc, mine, Zn content		246,983	258,264	250,960	234,321	244,703
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	2,840 r	2,840 r	3,020 r	3,200 r	2,720 e
Clay, kaolin	do.	157	180	174	200	77
Feldspar, mine, crude and ground, marketable	do.	21	22	22	28	28 e
Stone:						
Crushed:						
Dolomite	do.	379	344	473	385	461
Limestone	do.	6,715	6,949	6,757	6,649	6,326
Dimension:						
Granite	do.	88	89	115	102	110
Limestone	do.	22	26	30	33	29
MINERAL FUELS AND RELATED MATERIALS						
Peat:						
Fuel use	thousand metric tons	992	1,240	957	1,639	1,124
Horticultural use	do.	1,115	1,476	1,464	1,412	1,399

eEstimated. rRevised. do. Ditto.

[1]Table includes data available through November 13, 2020. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

[2]In addition to the commodities listed, secondary aluminum, synthetic diamond, manufactured fertilizer, manufactured gas, refined gold, lime, marble, molybdenum, refined petroleum, quartzite, selenium, slate, and steel semimanufactures may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Kubikenborg Aluminium AB (KUBAL) (United Company RUSAL, 100%)	Smelter at Sundsvall	134
Cement		Cementa AB (HeidelbergCement Group, 100%)	Plants at Degerhamn,[1] Skovde, and Slite	2,800
Copper:				
Mine, Cu content		Boliden Mineral AB	Aitik Mine near Gallivare, Boliden Area mines (Kristineberg, Maurliden,[2] and Renstrom), and Garpenberg Mine	105
Do.		Zinkgruvan Mining AB (Lundin Mining Corp., 100%)	Zinkgruvan Mine at Ammeberg	3
Metal		Boliden Mineral AB	Smelter and refinery at Ronnskar	240
Feldspar		Sibelco Nordic AB	Quarries at Forshammar	30
Ferroalloys		Vargon Alloys AB (Yildrim Group, 100%)	Plant at Vargon	255
Gold:				
Mine, Au content	kilograms	Bjorkdalsgruvan AB (Mandalay Resources Corp., 100%)	Bjorkdal underground mine and open pit near Skelleftea	1,600
Do.	do.	Boliden Mineral AB	Aitik Mine near Gallivare, Boliden Area mines (Kankberg, Kristineberg, and Renstrom), and Garpenberg Mine	6,500
Metal	do.	do.	Smelter and refinery at Ronnskar	13,000
Iron ore		Kaunis Iron AB	Kaunisvaara Mine	15,000
Do.		Luossavaara-Kiirunavaara AB (LKAB) (Government, 100%)	Kiruna, Leveaniemi, and Malmberget Mines	50,000
Iron and steel		SSAB AB (Government, 48%)	Steelworks at Borlange, Lulea, and Oxelosund	NA
Lead:				
Mine, Pb content		Boliden Mineral AB	Garpenberg, Kankberg, and Renstrom Mines	45
Do.		Lovisagruvan AB	Lovisa Mine	NA
Do.		Zinkgruvan Mining AB (Lundin Mining Corp., 100%)	Zinkgruvan Mine at Ammeberg	30
Metal		Boliden Mineral AB	Smelter and refinery at Ronnskar	30
Do.		do.	Smelter at Bergsoe	50
Lime		Svenska Minerals AB	Plants at Rattvik and Boda	250
Petroleum, refined	42-gallon barrels per day	AB Nynas Petroleum	Refineries at Gothenburg and Nynashamn	50,000
Do.	do.	Preem AB (Corral Petroleum Holdings AB, 100%)	Refineries at Lysekil and Goteborg	345,000
Do.	do.	St1 Nordic Oy	do.	82,000
Silver:				
Mine, Ag content	kilograms	Boliden Mineral AB	Aitik Mine near Gallivare, Boliden area mines (Kankberg, Kristineberg, and Renstrom), and Garpenberg Mine	410,000
Do.	do.	Zinkgruvan Mining AB (Lundin Mining Corp., 100%)	Zinkgruvan Mine at Ammeberg	77,000
Metal	do.	Boliden Mineral AB	Smelter and refinery at Ronnskar	408,000
Stone:				
Limestone		Kalproduction Storugns AB (Rettig Group, 100%)	Quarries at Gotland Island	3,000
Do.		Nordkalk AB (Nordkalk Corp., 100%)	Quarries at Ignaberga, Koping, Orsa, Storugns, and Uddagarden	3,200
Marble	cubic meters	Borghamnsten AB	Quarry at Askersund	15,000
Tellurium	kilograms	Boliden Mineral AB	Kankberg Mine	45,000
Zinc, mine, Zn content		do.	Boliden area mines (Kankberg, Kristineberg, and Renstrom), and Garpenberg Mine	170
Do.		Lovisagruvan AB	Lovisa Mine	NA
Do.		Zinkgruvan Mining AB (Lundin Mining Corp., 100%)	Zinkgruvan Mine at Ammeberg	80

Do., do. Ditto. NA Not available.

[1]The Degerhamn plant was shut down in April 2019.

[2]The Maurliden Mine was depleted and closed in 2019.