



2016 Minerals Yearbook

SWEDEN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF SWEDEN

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Sweden, a country located on the Scandinavian Peninsula and bordered by Norway on the west and Finland to the east, is part of an area of crystalline and metamorphic rocks called the Fennoscandian Shield, which hosts a variety of mineral deposits. The three primary ore regions in Sweden are the Norrbotten region, which is characterized by iron ore, copper, and gold deposits; the Bothnia-Skelleftea region, which is characterized by base metals and gold; and the Bergslagen region, which hosts copper, gold, iron ore, lead, and zinc. In 2016, Sweden was the leading iron ore producer of the European Union (EU) and a leading producer of copper, gold, lead, silver, and zinc. In 2016, Sweden was estimated to be the world's second-ranked producer of refined tellurium, accounting for 9.5% of the world's refinery production (Swedish Trade and Invest Council, 2014; Geological Survey of Norway, 2016; Anderson, 2018).

Minerals in the National Economy

Sweden hosts a wide range of mineral deposits owing to the complex geology of the Fennoscandian Shield. These include chromium, copper-zinc, banded iron, platinum-palladium, orogenic gold, pegmatite-hosted lithium and tantalum, porphyry-type copper-gold, vanadium, and volcanogenic-hosted nickel deposits. Other types of deposits found in the Fennoscandian Shield are Kiruna-type iron ore deposits and alum shale-hosted uranium-molybdenum-vanadium deposits (Eilu, 2011).

In 2016, Sweden's real gross domestic product (GDP) increased to \$514 billion, or by 3.2% compared with that of 2015. More than 250 mines and mining districts had been in operation in Sweden during the course of the 20th century. In 2016, there were 17 mines in production, of which 15 were metal mines and 2 were clay mines. Ore production, including iron and nonferrous ores, increased by 3% to 75 million metric tons (Mt) for the year. In 2016, the Swedish mineral industry employed approximately 6,700 people, which was a 3% decrease from the number employed in 2015 (Geological Survey of Sweden, 2017; Mining Inspectorate of Sweden, 2018a; Swedbank, 2018, p. 28; World Bank, The, 2018).

Government Policies and Programs

The Swedish Minerals Act of 1991 (No. 45) is the main law in Sweden that regulates the mining industry and sets the procedures for acquiring exploration permits and 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 (Mining Inspectorate of Sweden, 2018b).

Production

In 2016, the production of horticultural and fuel peat increased by 31% and 25% respectively; tellurium by 15%; iron ore, by 8%; gold, by 8%; and silver, by 7%. Production of feldspar decreased by 24%, and that of ferrochromium, by 13%. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2016, the Swedish mineral industry was composed mostly of privately owned companies. State-owned Luossavaara-Kiirunavaara AB (LKAB) was Europe's leading iron ore producer. Boliden AB (Boliden), a privately owned mining and mineral-processing company, produced copper, gold, lead, nickel, silver, and zinc. Boliden's main mines were the Aitik Mine, which produced copper, and the Garpenberg Mine, which produced copper, gold, lead, silver, and zinc. Boliden also operated a copper smelter and refinery at Ronnskar in northeastern Sweden. Lundin Mining Corp. of Canada managed the Zinkgruvan Mine located in south-central Sweden. The company produced lead, silver, and zinc (Boliden AB, 2018; LKAB Group, 2018; Lundin Mining Corp., 2018).

Cementa AB, which was a subsidiary of HeidelbergCement AG of Germany, was the sole producer of cement in Sweden. The company had three plants located in southern Sweden at Degerhamn, Skovde, and Slite. Nordkalk AB, which was a wholly owned subsidiary of Rettig Group of Finland, produced crushed and ground limestone, concentrated calcite, dolomite, quicklime, slaked lime (calcium hydroxide), and wollastonite. As of 2016, Nordkalk had five quarries in Sweden located in Ignaberga, Koping, Orsa, Storugns, and Uddagarden (HeidelbergCement AG, 2018; Nordkalk Corp., 2018).

Commodity Review

Metals

Iron Ore.—As of 2016, LKAB was the leading iron ore producer in the EU, mining approximately 78% of all iron ore within the EU. LKAB's mines and processing plants were all located inside the Arctic Circle in Kiruna, Malmberget, and Svappavaara. Iron ore production amounted to 26.9 Mt in 2016, which was an increase of 9% from that of 2015. After several years of environmental litigation, the Mertainen Mine (one of LKAB's three mines in Svappavaara) was granted permission to operate and start production. In December 2016, however, LKAB indicated that the mine would not begin production until market circumstances change (Bäckblom, 2014; LKAB Group, 2016, 2017).

Gold.—Mandalay Resources Corp. of Canada produced gold from the Björkdal operation, which was a combined open pit and underground mine. The total mill feed for the period of January 1 through September 30, 2016, was 971,000 metric tons at an average grade of 1.38 grams per metric ton (g/t) gold. The plant had a capacity of 3,700 metric tons per day (t/d) and had been operating at a production rate of approximately 3,600 t/d. By the end of September 2016, the gold recovery averaged approximately 88.2% and production totaled 1,180 kilograms of gold in concentrate (Mandalay Resources Corp., 2017, p. 2-1).

In 2016, Boliden processed more than 2.1 Mt of ore at an average grade of 1.7 g/t gold, 59.2 g/t silver, and 36.9 g/t tellurium. The Garpenberg Mine produced sulfide ores that contained silver and zinc, along with copper, gold, and lead as byproducts. In 2016, the Garpenberg Mine achieved a milled volume of 2.6 Mt and had proven and probable reserves of 19.7 Mt and 56.7 Mt, respectively, at an average grade of 0.3 g/t gold (Geological Survey of Norway, 2016, p. 274; Boliden AB, 2017, p. 22).

Mineral Fuels and Other Sources of Energy

Peat.—Peatlands cover approximately 15% of Sweden's land area. In 2016, 1.4 million cubic meters of fuel peat was harvested, which was an increase of 27% from that of 2015. Horticultural peat production increased by more than 30% to an estimated 1.6 million cubic meters owing to warm, dry weather. Statistics Sweden indicated that, for the first time since 2008, there was an increase in peat for fuel use. Fuel peat was mainly used in power and heating plants; however, its use had been decreasing because plants using peat were required to buy emission rights to the EU Emission Trading Scheme. As of 2016, there were 79 peat fields in production in Sweden compared with 84 in 2015 (Geological Survey of Sweden, 2017, p. 22; 2018; Statistics Sweden, 2017; Rülcker, 2018).

Outlook

Sweden's GDP growth in 2017 is expected to be 2.4%, driven mostly by gross investment. Although mining contributes only a small part to the country's GDP, the Government has been actively promoting the country's mineral resources. As of 2016, there were a total of 145 deposits in Sweden of national interest, which included deposits of metal ores and industrial minerals; 85 of these deposits had been mapped in detail by the Geological Survey of Sweden to provide a basis for exploration for metal ores and industrial minerals (Ministry of Enterprise, Energy and Communications, 2015; Geological Survey of Sweden, 2017; Swedbank, 2017, p. 10).

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TABLE 1
SWEDEN: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016
METALS					
Aluminum metal, primary	129,000	131,000	113,000	116,000	124,000
Copper:					
Mine production, Cu content	82,422	82,904	79,681	75,600 ^r	79,000
Refinery production:					
Primary	174,000	166,000	177,000	144,200	145,100
Secondary	40,000 ^e	40,000 ^e	40,000 ^e	61,800	62,200
Smelter production:					
Primary	151,000	140,000	150,000	150,000	150,000
Secondary ^e	56,000	59,000	60,000	60,000	60,000
Ferrochromium ^e	39,900	49,000	67,000	90,500	79,100
Gold:					
Mine production, Au content kilograms	6,015	6,530	6,849	6,030	6,500
Refinery production, primary and secondary, metal do.	12,532	12,000 ^e	12,000 ^e	12,000 ^e	12,000 ^e
Iron and steel:					
Pig iron thousand metric tons	2,805	2,896	3,078	2,865	3,078
Raw steel do.	4,330 ^e	4,400 ^e	4,540 ^e	4,370 ^e	4,617
Iron ore, mine production:					
Gross weight do.	26,039	27,300	34,002	29,391	26,900
Fe content (60%) do.	17,186	16,162	21,081	18,222	16,100
Lead:					
Mine production, Pb content	63,551	59,556	70,848	79,354	75,830
Refinery production:					
Primary ^e	62,000	69,000	69,000	71,000	74,000
Secondary ^e	45,000 ^r	45,000	45,000	45,000	46,000
Silver:					
Mine production, Ag content kilograms	309,337	341,346	382,611	479,700	515,039
Refinery production, primary, metal ^e do.	448,000	437,000	440,000	539,000	539,000
Tellurium, refinery production, Te content do.	6,791	24,457	30,917	33,000	38,000
Zinc, mine production, Zn content	188,391	176,578	221,882	246,889	257,335
INDUSTRIAL MINERALS					
Cement, hydraulic ^e thousand metric tons	2,140	2,560	2,500	2,800	2,800
Feldspar, mine production, marketable, crude and ground ^e	27,000	30,000	27,000	21,000 ^r	16,000
Lime ^e thousand metric tons	700	680	650	640	640
Stone, sand, and gravel:					
Stone, crushed:					
Dolomite thousand metric tons	429	445	379	379	370 ^e
Limestone	7,385	7,448	6,791	6,791	6,500 ^e
Stone, dimension:					
Granite thousand metric tons	79	90	88	88	88 ^e
Limestone do.	21	21	22	22	22 ^e
Sandstone do.	629	630	630	630	630 ^e
Other do.	82	82	82	82	82 ^e
Unspecified do.	101	101	100	100	100 ^e
MINERAL FUELS AND RELATED MATERIALS					
Peat:					
Fuel use thousand metric tons	1,626	2,086	1,934 ^r	1,126 ^r	1,407
Horticultural use do.	860 ^r	1,815 ^r	1,512 ^r	1,266 ^r	1,670 ^e
Petroleum, refinery production:					
Distillate fuel oil thousand 42-gallon barrels	59,349	46,976	54,750 ^r	54,700 ^{r,e}	54,700 ^e
Gasoline do.	37,048	28,945	40,880 ^r	40,800 ^{r,e}	40,800 ^e
Jet fuel do.	1,898	1,314	1,971 ^r	1,970 ^{r,e}	1,970 ^e
Liquefied petroleum gas do.	4,490	3,577	4,745 ^r	4,700 ^{r,e}	4,700 ^e
Residual fuel oil do.	32,777	26,609	20,440 ^r	20,400 ^{r,e}	20,400 ^e
Other do.	22,995	22,411	25,915 ^r	25,900 ^{r,e}	25,900 ^e
Total	158,557	129,832	148,701	148,470 ^e	148,470 ^e

See footnotes at end of table.

TABLE 1—Continued
SWEDEN: PRODUCTION OF MINERAL COMMODITIES¹

^cEstimated. ^rRevised. do. Ditto.

¹Table includes data available through February 22, 2018. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, manufactured fertilizer, manufactured gas, metallurgical coke, molybdenum, secondary aluminum, selenium, slate, steel semimanufactures, sulfur, and synthetic diamond may have been produced in Sweden, but available information was inadequate to make reliable estimates of output.

TABLE 2
SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(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, Skovde, and Slite	3,200
Copper:				
Ore, Cu content		Boliden AB	Mines at Aitik, Garpenberg, Kankberg, Kristineberg, Maurliden, Ostra and Renstrom	NA
Metal		do.	Smelter and refinery at Ronnskar	240
Feldspar		Berglins Malm & Mineral AB (Omya GmbH)	Mines at Beckegruvan, Hojderna, and Limbergsbo	50
Do.		Silbelco Nordic AS	Mines at Forshammar	30
Ferroalloys		Vargon Alloys AB (Yildirim Group, 100%)	Plant at Vargon	255
Gold:				
Mine production, Au content	kilograms	Dragon Mining Ltd.	Svartliden Mine, Skelleftea District	300
Do.	do.	Mandalay Resources Corp.	Björkdal Mine, Skelleftea District	1,200
Do.	do.	Boliden AB	Mines at Aitik, Akerberg, Kankberg, Kristineberg, and Renstrom	4,000
Metal	do.	do.	Smelter and refinery at Ronnskar	15,000
Graphite		Leading Edge Materials Corp.	Woxna graphite project	10
Iron and steel		SSAB AB (Government, 48%)	Steelworks at Lulea and Oxelosund	3,900
Iron ore		Luossavaara-Kiirunavaara AB (LKAB) (Government, 98%)	Mines at Kiruna, Malmberget and Svappavaara	37,000
Kyanite		Svenska Kyanite AB (Svenska Minerals AB, 100%)	Quarry at Halskoberg	10
Lead:				
Mine production, Pb content		Boliden AB	Mines at Garpenberg and Renstrom	100
Do.		Lovisagruvan AB	Lovisa Mine	3
Do.		Lundin Mining Corp.	Zinkgruvan Mine at Ammeberg	20
Metal		Boliden AB	Smelter and refinery at Ronnskar	30
Do.		do.	Smelter at Bergsoe	50
Lime		Svenska Minerals AB	Plants at Rattvik and Boda	250
Limestone		Kalproduction Storguens AB (Rettig Group, 100%)	Mines at Gotland Island	3,000
Do.		Nordkalk AB	Storguens	3,200
Marble	cubic meters	Borghamnsten AB	Quarry at Askersund	15,000
Petroleum, refined	42-gallon barrels per day	Preem AB (Corral Petroleum Holdings AB, 100%)	Refineries at Lysekil and Goteborg	210,000
Do.		St1 Group Oy	do.	82,000
Do.		AB Nynas Petroleum	Refineries at Gothenburg and Nynashamn	50,000
Silver, metal	kilograms	Boliden AB	Smelter and refinery at Ronnskar	408,000
Do.	do.	Lundin Mining Corp.	Zinkgruvan Mine at Ammeberg	25,000
Zinc, mine production		Boliden AB	Mines at Garpenberg, Laisvall, Langdal, and Renstrom	112
Do.		Lovisagruvan AB	Lovisa Mine	3
Do.		Lundin Mining Corp.	Zinkgruvan Mine at Ammeberg	78

Do., do. Ditto. NA Not available.