

# SWEDEN

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Sweden is an industrialized country endowed with such natural resources as extensive forests, rich iron ore deposits, and abundant hydroelectric power. Its economy slackened during the first half of 2001 with an overall growth in gross domestic product (GDP) of 1.4%. Swedish industry, which included metal products manufacturing, contributed 27.9% of GDP. The per capita income for the country was \$26,200. The inflation rate was low and steady at 2.6% (U.S. Department of State, 2002<sup>§</sup>). The Government budget improved to a surplus of 8% of GDP in 2001. Besides iron ore, other significant mineral resources were base metals (copper, lead, and zinc) and industrial minerals (dolomite, feldspar, granite, kaolin, limestone, and quartz).

Poplar Resources Ltd. of Canada investigated the Bottenbacken polymetallic-palladium property. Geophysical surveys were completed, and drilling was expected to begin in August. Dragon Mining NL of Australia completed a bankable feasibility study of its 60% owned Svartliden gold deposit, which is 70 kilometers from Lycksele in the Skelleftea district. Lapland Goldminers AB was investigating gold mineralization at the Faboliden and the Stortjärnshobben prospects in the vicinity of Lycksele (Mining Journal, 2001c).

Outokumpu Steel Oyj and Avesta Sheffield AB merged to form AvestaPolarit Oyj Abp. The company planned to close its Degerfors melting shop and billet-rolling operation by 2003. The plant's production capacity for blooms and billets was 200,000 metric tons per year (t/yr). About 330 out of Degerfors' 700 employees would be laid off in the closure. Degerfors would continue rolling and finishing of stainless quarto plate (Metal Bulletin, 2001j). In the third quarter of 2001, output at the Degerfors meltshop was reduced. Production at the Steckel mill at Avesta also was trimmed because of operating problems.

Billiton Development Far East BV and Billiton Arctic Resources BV entered into an alliance with Lake Resources NL of Australia to explore for iron-oxide-hosted copper/gold and hybrid zinc/lead/silver base-metal deposits in granted tenements in the Norbotten district of northern Sweden. The majority of the planned \$500,000 would be used to explore the Klingersel and Tjamotis tenements. On completion of initial scout drilling on the tenements, Billiton Development and Billiton Arctic might begin a joint venture to earn a 51% interest in the project by funding \$1.4 million of exploration expenditure and earn an additional 19% by a further \$2.2 million for exploration. After that, Lake could decide to participate at 30% to be diluted to a 10% interest loan carried to production or to receive a 3.5% cash operating royalty (Billiton Plc, 2001).

Boliden Metals AB's Rönnskär smelter near Skelleftea in northern Sweden processed imported concentrates and those

supplied from its own mines. It produced primarily copper, gold, lead, silver, and zinc concentrate, which was sold as feed to the Norzink A/S refinery in Norway. A \$1.9 billion expansion program to increase copper capacity by 70% to 240,000 t/yr was completed, and output reached 94% of rated capacity of 240,000 t/yr in April. The smelter derived 50% of its copper concentrates from the Aitik Mine and the rest from Chile and Indonesia. Boliden Metals' base-metal mines produced gold as a byproduct, and a \$9.8 million gold-leaching plant was built at the mill. Production was expected to begin in June 2001 at a rate of 3.2 t/yr (Mining Journal, 2001a).

Svenskt Stal AB (SSAB) was Sweden's largest steel producer. The company planned to build a fifth press-hardening line at its Lulea plant along with some environmental improvement at its Lulea coking operation; press-hardened sheet was used to make bumpers and side impact protection beams for vehicle makers. The investment would total \$23 million, and startup was expected in 2002 (Metal Bulletin, 2001g).

SSAB was expanding its quenched plate output with a new four-high rolling mill that would be able to produce thinner plate and with a second quenching line that would increase capacity by 50% to 750,000 t/yr (Metal Bulletin, 2001i). The four-high mill at its Oxelosund subsidiary was out of production for 3 weeks in August after one of the two main motors was damaged. Oxelosund was expected to lose about 300,000 metric tons of heavy plate production during the shutdown. The rolling mill was running at its maximum capacity of 500,000 t/yr (Metal Bulletin, 2001k).

Fundia AB (a long-product subsidiary of Rautaruukki Oy of Finland) started a restructuring program that would cause widespread workforce cuts. Fundia Special Bar, which was an engineering steelmaker in Sweden, was cutting 130 jobs at the Smedjebacken steel works and rolling mill and a further 21 jobs at the Boxholm rolling mill. Fundia Reinforcing also would cut its workforce at Halmstad in Sweden (Metal Bulletin, 2001d).

Ovako Steel AB planned to reduce production from June in the face of weaker demand for steel in the bearing and engineering steel sectors. The company was to cut its workforce by 80 and to reduce steel output by 10% at the Hallefors and the Hofors works. Ovako Steel's normal production capacity was 550,000 t/yr of crude steel, 300,000 t/yr of bars, 110,000 t/yr of tubes, and 25,000 t/yr of rolled rings. The company also planned to operate its melting shop on a reduced shift beginning in June in line with lower production rates at its rolling mills. Ovako Steel was owned by SKF, which was thought to have a 40% share of the European market for bearing steel (Metal Bulletin, 2001f).

Job losses and production cutbacks were planned at Sandvik Specialty Steels. Sandvik Group was expected to cut 2,000 jobs by the end of 2002 because of slower sales. About 1,000 workers would be let go in the tool division, and a similar

<sup>§</sup>A reference that includes a section twist (§) is found in the Internet Reference Cited section.

number, in steel and mining combined. In the first 9 months of 2001, the steel subsidiary cut 400 of the 600 to 700 jobs under a 3-year restructuring program of production and sales in Europe (Metal Bulletin, 2001i).

Rautaruukki acquired Helens Stal AB, which was the Swedish flat-product stockholding and service center company. Helens Stal, which was to continue operating under the name of Asva AB, specialized in the distribution and processing of hot- and cold-rolled and galvanized steel, stainless steel, and aluminum. Helens Stal's parent company was Helens Ror, which was the Swedish tube industry holding group that was owned by Benteler AG of Germany (75%) and Rautaruukki (25%) (Metal Bulletin, 2001h).

Inexa signed a dual distribution agreement with HSP of Germany (a subsidiary of Salzgitter AG) and Beltrame Sidermarghera of Italy to take over the sales and marketing of the two companies' production of shipbuilding profiles, mainly bulb flats. Inexa also produced bulb flats at its works in Lulea in northern Sweden. HSP produced heavier bulb flats primarily for shipbuilders in northwestern Europe, and Beltrame served customers in southern Europe with lighter bulb flats. Other European producers of bulb flats included Corus Group and Rautaruukki Profile (Metal Bulletin, 2001e).

Following Inexa's deal, Duroc was to take over Inexa Profil's rail mill at Lulea; Inexa Profil was a unit of Inexa. The sale hinged on Duroc negotiating a long-term agreement for liquid steel supply from SSAB's integrated steel works also at Lulea. Inexa Profil, which had 300 employees, produced 200,000 t/yr, one-half of which was rails, and the rest, billets, bar rounds, and free-cutting steel. Duroc would continue producing all these products. In return for the mill, Inexa's owner would receive a 9% share in Duroc worth \$3.5 million (Metal Bulletin, 2001b). The takeover deal was subsequently called off owing to Duroc's inability to secure a supply contract of liquid steel, and Inexa would continue to operate as before. Duroc, however, planned a second attempt to buy Inexa Profil, which filed for bankruptcy in September. At least two other parties were interested in the takeover (Metal Bulletin, 2001c).

Boliden AB signed a letter of intent to develop the Storliden zinc/copper deposit in the Skellefte mineral district in northern Sweden with North Atlantic Natural Resources AB (NAN), which owned the deposit. The deposit contained 1.8 million metric tons of ore at a grade of 10.3% zinc, 3.43% copper, 0.25 gram per metric ton (g/t) gold, and 24 g/t silver. Boliden would advance \$5 million to NAN on account of incurred expenditures. NAN would develop and mine Storliden ore, deliver all ore to Boliden, and be responsible for financing the development. Boliden would finance changes required to be made to its milling facilities to accommodate the Storliden ore. The two companies intended to mine and process between 250,000 and 350,000 t/yr of ore. Commercial production was scheduled for 2002 with a mine life of 6 years (Metal Bulletin, 2001a).

The Storliden deposit is a relatively shallow high-grade massive sulfide mineralization hosted by volcanic metasediments. NAN was an exploration joint venture between South Atlantic Resources Ltd. of Canada (38%) and Boliden Mineral AB (38%); the public held the remaining 24%. Boliden mill's average yield was expected to be 25,000 t/yr of zinc in concentrate and 10,000 t/yr of copper in concentrate. The total capital cost of the mine and the mill modifications was estimated to be \$16 million (Mining Journal, 2001b).

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## Major Source of Information

Geological Survey of Sweden  
Mineral Resources Information Office  
Skolgatan 4  
93070 Mala, Sweden

TABLE 1  
SWEDEN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1997	1998	1999 e/	2000 e/	2001 e/
<b>METALS</b>					
Aluminum metal:					
Primary	98,377	95,670	99,340 2/	100,800 2/	101,800 2/
Secondary e/	24,000	25,000	25,000	26,000	26,000
Copper:					
Mine output, Cu content	86,640	73,685	71,200	77,765 r/ 2/	74,269 2/
Metal:					
Smelter:					
Primary e/	95,000	90,000	85,000	95,000	173,000
Secondary e/	33,000	35,000	30,000	35,000	35,000
Total	128,000	125,000	115,000	130,000	208,000
Refined: e/					
Primary	105,000	100,000	95,000	105,000	179,000
Secondary	23,000	25,000	20,000	25,000	25,000
Total	128,000	125,000	115,000	130,000	204,000
Gold:					
Mine output, Au content	6,777 kilograms	5,944	4,400	3,570 r/ 2/	4,986 2/
Metal, primary 3/	10,000 do.	9,000 e/	8,000	8,000	8,000
Iron and steel:					
Iron ore concentrate and pellets:					
Gross weight	21,893 thousand tons	20,930	18,558 2/	20,557 r/ 2/	19,486 2/
Fe content	13,912 do.	12,977	11,506 2/	13,556 r/ 2/	12,811 2/
Metal:					
Pig iron and sponge iron	3,060 do.	3,373	3,212 2/	3,146 2/	3,614 2/
Ferroalloys:					
Ferrochromium	101,842	123,958	131,140 2/	136,000 r/	109,198 2/
Ferrosilicon	22,409	20,356	21,440 2/	20,000	22,000
Total	124,251	144,314	152,580 2/	156,000 r/	131,000
Steel, crude	5,147 thousand tons	5,062	5,075 2/	5,227 2/	5,450 2/
Semimanufactures, rolled	4,545 do.	4,485	4,400	4,500	4,500
Lead:					
Mine output, Pb content	108,600	114,430	116,300 2/	106,584 r/ 2/	85,975 2/
Metal, refined:					
Primary	34,700	40,600	38,000	30,604 r/ 2/	31,322 2/
Secondary	51,500	52,000	48,000	47,255 r/ 2/	44,056 2/
Total	86,200	92,600	86,000	77,859 r/ 2/	75,378 2/
Molybdenum, oxide, roasted, Mo content e/	3,500	3,000	3,000	3,000	3,000
Nickel, metal, secondary e/	100	100	60	50	50
Selenium, elemental, refined e/	20	20	20	20	20
Silver:					
Mine output, Ag content	304,048 kilograms	299,051	284,100 2/	328,737 r/ 2/	306,029 2/
Metal, primary e/ 3/	300,000 do.	250,000	250,000	250,000	250,000
Zinc, mine output, Zn content	155,400	164,711	174,400 2/	176,788 r/ 2/	156,334 2/
<b>INDUSTRIAL MINERALS</b>					
Cement, hydraulic	2,253 thousand tons	2,252 r/	2,298 r/ 2/	2,651 r/ 2/	2,600 2/
Clays, kaolin e/	450 do.	450	450	-- r/ 2/	-- 2/
Feldspar, salable, crude and ground	50,000	45,000	45,000	35,000 r/ 2/	40,450 2/
Fertilizer, manufactured: e/					
Nitrogenous	400 thousand tons	400	400	400	400
Phosphatic	10 do.	10	10	10	10
Mixed	300 do.	300	300	300	300
Graphite	1,470	3,011	4,500	5,108 r/ 2/	963 2/
Lime e/	550 r/ thousand tons	600 r/	500	550	550
Quartz and quartzite e/	500 do.	500	500	500	600
Stone: e/					
Dimension:					
Mostly unfinished	150 thousand tons	150	150	160	160
Granite	100 do.	100	100	130 r/ 2/	128 2/
Limestone	5 do.	5	5	32 r/ 2/	28 2/
Slate	20 do.	20	20	11 r/ 2/	16 2/
Other	10 do.	10	10	8 r/ 2/	5 2/

See footnotes at end of table.

TABLE 1--Continued  
 SWEDEN: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1997	1998	1999 e/	2000 e/	2001 e/
<b>INDUSTRIAL MINERALS--Continued</b>					
Stone--Continued: e/					
Crushed:					
Dolomite thousand tons	600	600	600	488 r/ 2/	456 2/
Granite do.	3,500	3,500	3,500	3,500	3,500
Limestone:					
For cement manufacture do.	4,000	4,000	4,000	3,770 r/ 2/	4,070 2/
For lime manufacture do.	1,000	800	800	800	900
For other construction and industrial uses do.	1,800	1,600	1,600	1,800 r/	1,800
Chalk do.	30	30	30	30	70
For agricultural uses do.	400	400	400	450	550
For other uses do.	1,000	1,000	1,000	1,500 r/	1,500
Total do.	8,230	7,830	7,830	8,350 r/ 2/	8,890 2/
Sandstone do.	100	75	75	34 r/ 2/	5 2/
Undifferentiated do.	25,000	25,000	25,000	30,000	30,000
Other do.	500	500	500	580 r/ 2/	371 2/
Sulfur, byproduct:					
From metallurgy do.	71	73	65 2/	91 2/	152 2/
From petroleum do.	64 r/	60 r/	56 r/ 2/	61 r/ 2/	55 2/
Total do.	135 r/	133 r/	121 r/ 2/	152 r/ 2/	207 2/
Talc, soapstone e/	25,000	25,000	25,000	20,000 r/ 2/	15,000 2/
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coke, metallurgical e/ thousand tons	1,200	1,150	1,200	1,200	1,200
Gas, manufactured: e/					
Coke oven gas million cubic meters	500	500	500	500	500
Blast furnace gas do.	3,500	3,500	3,500	3,500	3,500
Peat:					
Agricultural use thousand cubic meters	1,100	670	1,460 2/	1,500	1,400
Fuel do.	2,400	390	2,652 2/	1,372 2/	2,496 2/
Petroleum:					
Refinery products: e/					
Liquefied petroleum gas thousand 42-gallon barrels	3,500	3,000	3,000	3,000	3,500
Naphtha do.	500	500	500	500	500
Gasoline, motor do.	36,932 2/	38,862 2/	38,000	39,000	40,000
Jet fuel do.	1,872 2/	1,288 2/	1,400	1,500	1,500
Kerosene do.	50	50	50	50	50
Distillate fuel oil do.	53,152 2/	56,582 2/	56,000	57,000	57,000
Residual fuel oil do.	35,304 2/	38,508 2/	38,000	39,000	39,000
Other do.	7,714 2/	7,800	7,800	7,800	7,800
Refinery fuel and losses do.	5,000	5,000	5,000	5,000	5,000
Total do.	144,000	152,000	150,000	153,000	154,000

e/ Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. r/ Revised. -- Zero.

1/ Table includes data available through August 13, 2002.

2/ Reported figure.

3/ Includes only that recovered from indigenous ores excluding scrap.

TABLE 2  
SWEDEN: STRUCTURE OF THE MINERAL INDUSTRY IN 2001

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Granges AB (Glencore International AG, 100%)	Sundsvall smelter at Kubikenborg	100
Cement		Cementa AB (Scancem, 100%)	Plants at Degerhamn, Skövde, and Slite	3,400
Copper:				
Ore, copper content		Boliden Mineral AB	Mines at Aitik, Garpenberg, Kankberg, Kristineberg, Langdal, Petiknas, and Renstrom	68
Do.		Outokumpu Oyj	Mines at Viscaria (closed) and Pahtohavare	22
Metal		Boliden Metals AB	Smelter and refinery at Rönnskär	240
Feldspar		Berglings Malm & Mineral AB (Omya GmbH)	Mines at Beckegruvan, Højderna, and Limbergsbo	50
Do.		Forshammar Mineral AB (Omya GmbH)	Mines at Limberget and Riddarhyttan	30
Do.		Larsbo Kalk AB (Omya GmbH)	Mines at Glanshamar and Larsbo	20
Ferroalloys		Vargon Alloys AB	Plant at Vargon	175
Gold:				
Ore, gold content	kilograms	William Resources Inc.	Björgdal Mine at Skellefta	3,000
Do.	do.	Boliden Mineral AB	Mines at Aitik, Akerberg, Kankberg, Kristineberg, Langdal, Petiknas, and Renstrom	2,000
Metal		Boliden Metals AB	Smelter and refinery at Rönnskär	9
Graphite		Woxna Graphite AB (Tricorona Mineral AB, 100%)	Mine and plant at Kringeltjärn, Woxna	20
Iron ore		Luossavaara-Kiirunavaara AB (Government, 98%)	Mines at Kiruna and Malmberget	28,500
Iron and steel		Svenskt Stal AB (Government, 48%)	Steelworks at Borlänge, Luleå, and Oxelosund	3,500
Kyanite		Svenska Kyanite AB (Svenska Mineral AB, 100%)	Quarry at Halskoberg	10
Lead:				
Ore, lead content		Boliden Mineral AB	Mines at Garpenberg, Laisvall, Langdal, Petiknas, and Renström	110
Do.		North Mining Svenska AB	Zinkgruvan Mine at Ammeberg	20
Metal		Boliden Metals AB	Smelter and refinery at Rönnskär	115
Lime		Euroc Mineral AB	Plants at Limham, Koping, and Storugns	250
Do.		Svenska Mineral AB	Plants at Rattvik and Boda	250
Limestone		Kalproduction Storugns AB (Nordkalk AB, 100%)	Mines at Gotland Island	3000
Marble	cubic meters	Borghamnsten AB	Quarry at Askersund	15000
Petroleum, refined	barrels per day	Skandinaviska Raffinaderi AB	Refinery at Lysekil	210,000
Do.		BP Raffinaderi AB	Refinery at Goteborg	100,000
Do.		Shell Raffinaderi AB	do.	82,000
Do.		AB Nynas Petroleum	Refineries at Goteborg, Malmo, and Nynashamn	54,000
Silver, metal	kilograms	Boliden Metals AB	Smelter and refinery at Rönnskär	300,000
Do.	do.	North Mining Svenska AB	Zinkgruvan Mine at Ammeberg	25,000
Zinc, ore, zinc content		Boliden Mineral AB	Mines at Garpenberg, Laisvall, Langdal, and Renstrom	112
Do.		Zinkgruvan Mining AB (North Ltd., 100%)	Zinkgruvan Mine at Ammeberg	60