



# 2011 Minerals Yearbook

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## SWITZERLAND

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# THE MINERAL INDUSTRY OF SWITZERLAND

By Harold R. Newman

Switzerland has only a limited amount of mineral resources; the reserves of metalliferous ore that once were found in Switzerland were mostly depleted, and metal mining remained inactive in 2011. Mining was mostly for industrial minerals used in construction and played only a minor role in Switzerland's economy. Metal processing, which was restricted to secondary aluminum, secondary lead, and steel, and refining, which was mostly restricted to precious metals, depended on imported raw materials or scrap. Switzerland served as a major diamond exchange.

The economic policy of the Government was based on free trade, with low import duties and minimal import quotas. Switzerland relied on imports for most mineral commodities. Although not a member of the European Union (EU), Switzerland was a member of the European Free Trade Association, and trade continued to be of major importance to the economy in 2011 (Federal Department of Foreign Affairs, 2011).

Switzerland was the world's 20th ranked exporter, and it shipped \$308 billion worth of exports in 2011. The principal recipients were Germany (20.2%), the United States (10.3%), Italy (7.7%), France (7.1%), the United Kingdom (4.8%), and China (4.4%). As the world's 18th ranked importer, Switzerland imported \$299 billion worth of goods in 2011. The principal suppliers were Germany (32.4%), Italy (10.4%), France (8.6%), the United States (5%), and the Netherlands (4.4%) (U.S. Central Intelligence Agency, 2012).

In 2011, U.S. exports to Switzerland totaled \$24.4 billion, and U.S. imports from Switzerland totaled \$24.3 billion. U.S. exports to Switzerland included, in order of value, nonmonetary gold (\$12.1 billion), other precious metals (\$512 million), petroleum products (\$170 million), iron and steel products (\$99 million), and alumina and aluminum (\$7 million) (U.S. Census Bureau, 2011a). In 2011, U.S. imports from Switzerland included, in order of value, petroleum products (\$30 million), coal and related fuels (\$19 million), and nuclear fuel materials (\$7 million) (U.S. Census Bureau, 2011b).

## Production

Industrial minerals produced by mining and processing included cement, gypsum, and lime; these were used domestically in construction. The country's rolled aluminum production was mainly for export to the automotive industry, and its salt production was for domestic consumption and export. Estimated crude steel and salt production remained at about the same levels as in 2010. Estimated secondary lead production decreased. Data on mineral production are in table 1.

## Structure of the Mineral Industry

The Swiss mineral industry was owned privately or by regional governments (Cantons). Federal regulatory control of mineral resources is administered by the national Government;

the 26 regional Cantons grant mining and processing licenses and directly operate electricity generating facilities, gas utilities, and water resource facilities. The responsibility for regulating the mineral industry lies with the Federal Council (U.S. Central Intelligence Agency, 2012). Table 2 is a list of major mineral industry facilities including their locations and capacities.

## Commodity Review

### Metals

**Aluminum.**—Novelis Switzerland S.A., which was a subsidiary of Hindalco Industries Ltd. of India, was one of the leading producers of aluminum rolled products in Asia both in terms of production and the technology used, and it was the leading rolled-products producer in Europe. Novelis announced that it would invest \$11.3 million in its aluminum plant at Sierre to help meet growing demand for aluminum sheet. The expansion project would increase the plant's capacity to produce ingots and improve the flow of material through the complex. It would also include the installation of a scrapper used to machine the ingot surfaces prior to hot rolling, as well as ancillary handling equipment and environmental controls. The complex at Sierre had ingot-casting, hot- and cold-rolling, and heat-treatment capability, and modern laser-blanking lines. Novelis's particular specialty was providing flat-rolled products for the automotive sector (Novelis Inc., 2011).

**Copper.**—Schmelzmetall AG was a leading manufacturer of copper-based high-performance alloys in the EU. Schmelzmetall's HOVADUR® alloys were manufactured from raw materials that were smelted and cast in inductively heated vacuum furnaces and further processed into semifinished products and finished parts used in various types of applications, from aerospace components to casting molds (Schmelzmetall AG, 2011).

**Gold.**—Although Switzerland did not mine gold in 2011, it was home to a number of refineries. These included Argor-Heraeus S.A.'s refinery at Mendrisio, Cendres+Métaux S.A.'s refinery at Biel-Bienne, Produits Artistiques de Métaux Précieux S.A.'s (PAMP's) refinery at Castel San Pietro, and Valcambi S.A.'s refinery at Balerna (table 2).

Argor-Heraeus was a leading international gold refiner and bar manufacturer. Its facilities for gold refining and the manufacture of bars and other precious-metal products were located in Mendrisio in southeastern Switzerland. Argor-Heraeus processed precious metals (by refining, melting, assaying, and minting) and made semifinished products. A process of electrolysis was used to refine the gold and silver to a degree of fineness of 999.9 parts per thousand for gold and 999.0 parts per thousand for silver. Platinum-group metals (PGMs) underwent a chemical refining process to attain a degree of fineness of 999.5 parts per thousand (Argor-Heraeus S.A., 2011).

Cendres+Métaux was a small foundry located in Biel-Bienne that produced semifinished and finished products for the dental, electronics, and jewelry industries. Cendres+Métaux specialized in the recovery of gold and other precious metals, including palladium, platinum, and silver. The metals were refined to meet a degree of fineness of 999.9 parts per thousand (Cendres+Métaux S.A., 2012).

PAMP was a leading gold, PGM, and silver refinery based in Castel St. Pietro. In 2011, PAMP handled more than 400 metric tons (t) of gold and produced finished products of different shapes and sizes [MKS (Switzerland) SA, 2011].

Valcambi S.A.'s precious metals refinery was one of the leading such facilities in the world. Valcambi offered a range of services, from assaying, refining through the manufacturing of cast and minted bars, and development of semifinished products (Valcambi S.A., 2011).

**Iron and Steel.**—Scrap steel is a valuable source of material in a country short of raw materials. About 1 million metric tons per year (Mt/yr) of scrap steel was collected in Switzerland from around the world through a network of collection points, scrap processors, and traders. Stahl Gerlafingen AG was a major consumer of this material and operated a modern high-efficiency electric arc furnace (EAF) for melting scrap steel at its plant at Gerlafingen. The company was the leading supplier of reinforced-steel products in Switzerland (Stahl Gerlafingen AG, 2011).

Steel was produced from recycled iron scrap by Swiss Steel AG. The scrap was melted in an 80-t EAF and then transferred to a ladle furnace for alloy and microalloy treatment and adjustment. Steel billets that were 11-meters long by 150-millimeters wide were produced by a continuous casting machine to form steel billets, which were rolled into bars or wire rod (Swiss Steel AG, 2011).

### ***Industrial Minerals***

**Cement.**—Holcim (Schweiz) AG was the leading cement, concrete, and gravel producer in Switzerland and was one of the world's leading suppliers of cement and aggregates, as well as asphalt and ready-mix concrete. Holcim operated seven cement plants and grinding stations and had a production capacity of 4.3 Mt/yr. In 2011, Holcim acquired four ready-mix concrete plants in the Basle area from the Lafarge Group of France (Aggregates Business Europe, 2011).

**Salt.**—Saline de Bex S.A. (Selbex) was active in the extraction and production of salt for the Canton of Vaud. Although most of the salt produced was destined for winter road maintenance, about 6,000 t was for water treatment, 3 t was for human consumption, and about 2.5 t was for animal feed (Saline de Bex S.A., 2011).

### ***Mineral Fuels and Other Sources of Energy***

**Natural Gas.**—Switzerland did not produce natural gas in 2011 but imported natural gas to meet part of its energy requirements. Natural gas sales increased by about 12% in 2010 (the latest year for which data were available) owing to the increased (and more widespread) use of biomethane and natural gas for vehicle fuel. In 2010 (the latest year for which data were

available), the natural gas service station network included 126 stations. The average cost of the biomethane/natural gas at these stations was about 30% less than that of gasoline. This fuel displaced an equivalent amount of 22 million liters of gasoline (NGV Global, 2011).

**Nuclear Energy.**—Switzerland has five nuclear reactors that generated 40% of the country's electricity requirements. An earlier national vote had confirmed nuclear energy as a part of the country's electricity mix, and two new reactors had been planned. In 2011, however, the Government resolved not to replace any reactors and to phase out nuclear power by 2034. This decision was thought to be a reaction to the crisis at Japan's Fukushima-Daiichi nuclear powerplant following the earthquake and tsunami that struck Japan on March 11, 2011. This move would be a total reversal of the 2007 energy policy, which focused on nuclear energy efficiency and renewable resources and called for aging nuclear units to be replaced in the due course of time with new ones. The country was anticipating an energy shortfall of 25 to 30 billion kilowatt-hours by 2035 owing to rising energy consumption and the retirement of older powerplants (World Nuclear News, 2011).

**Petroleum.**—Tamoil (Suisse) S.A.'s Collombey refinery, which was one of two petroleum refineries in Switzerland, is located in the Canton of Valais about 100 kilometers (km) from Geneva. The refinery produced about 2.7 Mt/yr of petroleum products from crude petroleum brought to Collombey from the Port of Genoa, Italy, through a 340-km-long pipeline. Products produced at the refinery included diesel, heating oil (light and heavy), kerosene, liquefied petroleum gas, unleaded 98 octane gasoline, and unleaded 95 octane gasoline. Tamoil had 90 crude petroleum and petroleum products storage tanks with a total (combined) capacity of 795,000 cubic meters [Tamoil (Suisse) S.A., 2011].

Petroplus Refining Cressier S.A.'s refinery at Cressier was an integrated atmosphere-vacuum distillation visbreaking and thermal cracking refinery with a nameplate capacity of 68,000 barrels per day. Petroplus announced that it was closing the Cressier refinery because of a lack of liquidity. Petroplus said that reopening the plant would depend on economic conditions and the availability of credit. The company was unable to buy crude petroleum when creditors froze about \$1 billion in loans under the company's revolving credit line. Petroplus lost \$415 million during the first three quarters of 2011. The Government stated that the closure would not pose a threat to supply as the country had more than 4 month's worth of petroleum in the strategic reserves (Swissinfo.ch, 2012).

### **Outlook**

The outlook for Switzerland's mineral industry is for little change. Metal mining is not likely to be initiated, and industrial minerals are expected to be produced according to local demand. Limited exploration for natural gas and petroleum is expected to continue.

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TABLE 1  
SWITZERLAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Thousand metric tons unless otherwise specified)

Commodity <sup>3</sup>	2007	2008	2009	2010	2011
METALS					
Aluminum:					
Primary metric tons	25,000	--	--	--	--
Secondary do.	175	50	25	25	25
Iron and steel, metal:					
Crude steel	1,264 <sup>4</sup>	1,257 <sup>4</sup>	984 <sup>4</sup>	1,330 <sup>4</sup>	1,400
Semimanufactures	700	700	600	700	700
Lead, refined, secondary metric tons	9,000	8,000	5,000	5,000	3,000
INDUSTRIAL MINERALS					
Cement, hydraulic	4,000	4,000	4,000	4,000	4,000
Gypsum	300	300	300	300	300
Lime	90	90	80	80	80
Nitrogen, N content of ammonia	30	30	30	30	30
Salt	560	535	435 <sup>4</sup>	500	500
Sulfur, from petroleum refining metric tons	3,000	3,000	3,000	3,000	3,000
MINERAL FUELS AND RELATED MATERIALS					
Petroleum refinery products:					
Liquefied petroleum gas thousand 42-gallon barrels	2,343 <sup>4</sup>	2,774 <sup>r,4</sup>	2,373 <sup>r,4</sup>	2,400	2,400
Gasoline do.	10,880 <sup>4</sup>	11,534 <sup>r,4</sup>	12,045 <sup>r,4</sup>	12,000	12,000
Distillate fuel oil do.	16,203 <sup>4</sup>	17,301 <sup>r,4</sup>	17,739 <sup>r,4</sup>	18,000	18,000
Residual fuel oil do.	3,909 <sup>4</sup>	3,833 <sup>r,4</sup>	2,482 <sup>r,4</sup>	2,500	2,500
Other do.	2,373 <sup>r,4</sup>	2,190 <sup>r,4</sup>	2,373 <sup>r,4</sup>	2,400	2,400
Total do.	35,708 <sup>r,4</sup>	37,632 <sup>r,4</sup>	37,012 <sup>r,4</sup>	37,300	37,300

<sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Table includes data available through July 31, 2012.

<sup>3</sup>In addition to the commodities listed, a variety of crude construction materials (common clay, sand and gravel, and stone) were produced, but output was not reported and available information is inadequate to make estimates of output.

<sup>4</sup>Reported figure.

TABLE 2  
 SWITZERLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Novelis Switzerland S.A. (Hindalco Industries Ltd., 100%)	Plant at Sierre	130
Cement		Holcim (Schweiz) AG (Holcim Group, 100%)	Plants at three locations	4,300
Copper, alloy	metric tons	Schmelzmetall AG	Refinery at Gurtellen	2,400
Gold, refined	kilograms	Argor-Heraeus S.A.	Refinery at Mendrisio	350,000
Do.	do.	Cendres+Métaux S.A.	Refinery at Biel-Bienne	NA
Do.	do.	Metalor Group	Refinery at Neuchatel	270,000
Do.	do.	Produits Artistiques de Métaux Précieux S.A. (MKS Finance SA, 100%)	Refinery at Castel San Pietro	450,000
Do.	do.	Valcambi S.A.	Refinery at Balerna	350,000
Lead, secondary		Metallum Group	Smelter at Pratteln	32
Petroleum, refinery	barrels per day	Tamoil (Suisse) S.A. (Colony Capital LLC, 65%, and Government of Libya, 35%)	Refinery at Collombey	72,000
Do.	do.	Petroplus Refining Cressier S.A. (Petroplus Holdings AG)	Refinery at Cressier	68,000
Platinum-group metals	kilograms	Produits Artistiques de Métaux Précieux S.A. (MKS Finance SA, 100%)	Refinery at Castel San Pietro	30,000
Salt		United Swiss Salt Works (25 Cantons, except Vaud, 100%)	Saline plants at Riburg and Schweizerhalle	500
Do.		Saline de Bex S.A. (Canton of Vaud, 100%)	Saline mine and plant at Bex	50
Steel		Stahl Gerlafingen AG (Schmolz and Bickenbach AG, 100%)	Plant at Gerlafingen	720
Do.		Swiss Steel AG	Plant at Emmenbrucke	300

Do., do. Ditto. NA Not available.