

SULFUR

(Data in thousand metric tons of sulfur content unless otherwise noted)

Domestic Production and Use: In 2019, recovered elemental sulfur and byproduct sulfuric acid were produced at 95 operations in 27 States. Total shipments were valued at about \$440 million. Elemental sulfur production was estimated to be 8.2 million tons; Louisiana and Texas accounted for about 55% of domestic production. Elemental sulfur was recovered, in descending order of tonnage, at petroleum refineries, natural-gas-processing plants, and coking plants by 35 companies at 90 plants in 26 States. Byproduct sulfuric acid, representing about 7% of production of sulfur in all forms, was recovered at five nonferrous-metal smelters in four States by four companies. Domestic elemental sulfur provided 62% of domestic consumption, and byproduct acid accounted for about 6%. The remaining 32% of sulfur consumed was provided by imported sulfur and sulfuric acid. About 90% of sulfur consumed was in the form of sulfuric acid.

Salient Statistics—United States:	2015	2016	2017	2018	2019^e
Production:					
Recovered elemental	8,890	9,070	9,070	9,010	8,200
Other forms	646	673	575	670	620
Total (rounded)	9,540	9,740	9,640	9,680	8,800
Shipments, all forms	9,560	9,750	9,700	9,690	8,800
Imports for consumption:					
Recovered, elemental ^e	2,240	1,820	1,850	2,230	2,000
Sulfuric acid, sulfur content	1,160	1,050	954	997	980
Exports:					
Recovered, elemental	1,850	2,060	2,340	2,390	2,300
Sulfuric acid, sulfur content	58	59	80	112	70
Consumption, apparent, all forms ¹	11,000	10,500	10,000	10,400	9,400
Price, reported average value, dollars per ton of elemental sulfur, f.o.b., mine and (or) plant	87.62	37.88	46.40	70.00	50.00
Stocks, producer, yearend	138	144	124	122	110
Employment, mine and (or) plant, number	2,600	2,500	2,400	2,400	2,400
Net import reliance ² as a percentage of apparent consumption	14	7	4	7	7

Recycling: Typically, between 2.5 million and 5 million tons of spent sulfuric acid is reclaimed from petroleum refining and chemical processes during any given year.

Import Sources (2015–18): Elemental: Canada, 77%; Russia, 10%; Kazakhstan, 5%; Mexico, 3%; and other, 5%. Sulfuric acid: Canada, 63%; Mexico, 19%; and other, 18%. Total sulfur imports: Canada, 72%; Mexico 9%; Russia, 7%; Kazakhstan, 3%; and other, 9%.

Tariff: Item	Number	Normal Trade Relations 12–31–19
Sulfur, crude or unrefined	2503.00.0010	Free.
Sulfur, all kinds, other	2503.00.0090	Free.
Sulfur, sublimed or precipitated	2802.00.0000	Free.
Sulfuric acid	2807.00.0000	Free.

Depletion Allowance: 22% (Domestic and foreign).

Government Stockpile: None.

Events, Trends, and Issues: Total U.S. sulfur production in 2019 was estimated to have decreased by 9% from that of 2018 and shipments also decreased by 9% from those of 2018. Domestic production of elemental sulfur from petroleum refineries and recovery from natural gas operations decreased by 9%. A decline in refinery operating utilization and processing of more sweet crude oil likely lead to decreased production. Domestically, refinery sulfur production is expected to remain relatively constant as well as byproduct sulfuric acid, unless one or more of the remaining nonferrous-metal smelters close.

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Domestic phosphate rock consumption in 2019 was estimated to be slightly lower than that in 2018, which resulted in decreased consumption of sulfur to process the phosphate rock into phosphate fertilizers.

World sulfur production was about the same as it was in 2018 but is likely to steadily increase for the foreseeable future. New sulfur demand associated with phosphate fertilizer projects is expected in west Asia and Africa. A major change for 2020 will be the implementation of new international standards limiting sulfur oxide emissions from ships on January 1, 2020. The global sulfur content of marine fuels would be limited to 0.5% sulfur content from 3.5% sulfur content, likely leading to increased sulfur production in North America, Asia, and Europe.

Contract sulfur prices in Tampa, FL, began 2019 at around \$140 per ton. The sulfur price continued to decrease throughout the year and reached about \$46 per ton in early October, the lowest price since 2009. The price decrease was a result of a weak phosphate fertilizer market. Prices for exported sulfur were higher than domestic prices. In the past few years, sulfur prices have been variable, a result of the volatility in the demand for sulfur.

World Production and Reserves:

	Production—All forms		Reserves ³
	2018	2019 ^e	
United States	9,680	8,800	Reserves of sulfur in crude oil, natural gas, and sulfide ores are large. Because most sulfur production is a result of the processing of fossil fuels, supplies should be adequate for the foreseeable future. Because petroleum and sulfide ores can be processed long distances from where they are produced, sulfur production may not be in the country to which the reserves were attributed. For instance, sulfur from Saudi Arabian oil may be recovered at refineries in the United States.
Australia	900	900	
Brazil	500	500	
Canada	5,320	5,300	
Chile	1,500	1,500	
China ⁴	17,400	17,400	
Finland	940	940	
Germany	868	870	
India	3,430	3,400	
Iran	2,200	2,200	
Italy	550	550	
Japan	3,400	3,400	
Kazakhstan	3,510	3,600	
Korea, Republic of	3,080	3,100	
Kuwait	850	900	
Netherlands	520	520	
Poland	1,230	1,230	
Qatar	2,000	2,100	
Russia	7,080	7,100	
Saudi Arabia	6,500	6,600	
United Arab Emirates	3,300	3,400	
Venezuela	700	700	
Other countries	3,930	3,900	
World total (rounded)	79,400	79,000	

World Resources: Resources of elemental sulfur in evaporite and volcanic deposits, and sulfur associated with natural gas, petroleum, tar sands, and metal sulfides, total about 5 billion tons. The sulfur in gypsum and anhydrite is almost limitless, and 600 billion tons of sulfur is contained in coal, oil shale, and shale rich in organic matter. Production from these sources would require development of low-cost methods of extraction. The domestic sulfur resource is about one-fifth of the world total.

Substitutes: Substitutes for sulfur at present or anticipated price levels are not satisfactory; some acids, in certain applications, may be substituted for sulfuric acid, but usually at a higher cost.

^eEstimated.

¹Defined as production + imports – exports + adjustments for industry stock changes.

²Defined as imports – exports + adjustments for industry stock changes.

³See Appendix C for resource and reserve definitions and information concerning data sources.

⁴China sulfur production includes byproduct elemental sulfur recovered from natural gas and petroleum, the estimated sulfur content of byproduct sulfuric acid from metallurgy, and the sulfur content of sulfuric acid from pyrite.