

SULFUR

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

Domestic Production and Use: In 2009, elemental sulfur and byproduct sulfuric acid were produced at 114 operations in 29 States and the U.S. Virgin Islands. Total shipments were valued at nearly \$100 million. Elemental sulfur production was 9.0 million tons; Louisiana and Texas accounted for about 45% of domestic production. Elemental sulfur was recovered, in descending order of tonnage, at petroleum refineries, natural-gas-processing plants, and coking plants by 40 companies at 107 plants in 26 States and the U.S. Virgin Islands. Byproduct sulfuric acid, representing about 8% of production of sulfur in all forms, was recovered at seven nonferrous smelters in five States by six companies. Domestic elemental sulfur provided 74% of domestic consumption, and byproduct acid accounted for 7%. The remaining 19% of sulfur consumed was provided by imported sulfur and sulfuric acid. About 90% of sulfur consumed was in the form of sulfuric acid. Agricultural chemicals (primarily fertilizers) composed about 62% of identified sulfur demand; petroleum refining, 26%; and metal mining, 5%. Other uses, accounting for 7% of demand, were widespread because a multitude of industrial products required sulfur in one form or another during some stage of their manufacture.

Salient Statistics—United States:	2005	2006	2007	2008	2009^e
Production:					
Recovered elemental	8,790	8,390	8,280	8,690	9,000
Other forms	711	674	817	753	810
Total (rounded)	9,500	9,050	9,100	9,450	9,800
Shipments, all forms	9,480	8,960	9,130	9,430	9,700
Imports for consumption:					
Recovered, elemental ^e	2,820	2,950	2,930	3,000	1,600
Sulfuric acid, sulfur content	877	793	851	1,140	460
Exports:					
Recovered, elemental	684	635	922	952	1,500
Sulfuric acid, sulfur content	110	79	110	86	80
Consumption, apparent, all forms	12,400	12,000	11,900	12,500	10,200
Price, reported average value, dollars per ton					
of elemental sulfur, f.o.b., mine and/or plant	30.88	32.85	36.29	262.32	10.00
Stocks, producer, yearend	160	221	187	211	300
Employment, mine and/or plant, number	2,700	2,600	2,600	2,600	2,600
Net import reliance ¹ as a percentage of					
apparent consumption	24	25	23	25	4

Recycling: Typically, between 3 million and 5 million tons of spent sulfuric acid is reclaimed from petroleum refining and chemical processes during any given year.

Import Sources (2005-08): Elemental: Canada, 71%; Mexico, 14%; Venezuela, 13%; and other, 2%. Sulfuric acid: Canada, 77%; Mexico, 10%; India, 3%, and other, 10%. Total sulfur imports: Canada, 73%; Mexico, 13%; Venezuela, 10%; and other, 4%.

Tariff: Item	Number	Normal Trade Relations 12-31-09
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 and shipments increased compared with those of 2008. Domestic production of elemental sulfur from petroleum refineries increased, and recovery from natural gas operations decreased. Although the sulfur content of imported crude petroleum processed at U.S. refineries was lower than expected, fewer refineries experienced production interruptions than had been the case in recent years, and one large refinery operated at capacity throughout the year after several years of limited production. These factors contributed to the expanded sulfur production. Domestically, refinery sulfur production is expected to continue to increase, sulfur from natural gas processing is expected to decline over time, and byproduct sulfuric acid is expected to remain relatively stable, unless one or more of the remaining nonferrous smelters close.

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World sulfur production increased slightly and is likely to steadily increase for the foreseeable future. Significantly increased production is expected from sulfur recovery at liquefied natural gas operations in the Middle East and expanded oil sands operations in Canada, unless the downturn in the world economy limits investments in those areas.

After elemental sulfur prices reached record highs during 2008, prices collapsed early in 2009 as demand plummeted and the global economy faltered. In August 2008, contract sulfur prices in Tampa, FL, reached about \$600 per ton and remained at that level throughout September. By the end of November, however, the Tampa price had declined to less than \$150 per ton, and in January 2009, prices were reported to be \$0 per ton. The Tampa price recovered to about \$30 per ton by the end of 2009. Export prices were higher than domestic prices, so exports were higher than they had been for many years. Sulfur prices were expected to increase more as the global economy improved but will probably never again achieve the levels seen in 2008.

Domestic phosphate rock consumption was lower in 2009 than in 2008, which resulted in decreased demand for sulfur to process the phosphate rock into phosphate fertilizers. The global economic slowdown contributed to the decreased demand for fertilizers.

World Production and Reserves:

	Production—All forms		Reserves ²
	2008	2009 ^e	
United States	9,450	9,800	Previously published reserves data are outdated and inadequate for this tabulation because of changes in the world sulfur industry. For this reason, specific country data have been omitted from this report. 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 for which the reserves were attributed. For instance, sulfur from Saudi Arabian oil may be recovered at refineries in the United States.
Australia	938	940	
Canada	9,280	9,300	
Chile	1,570	1,600	
China	8,610	8,500	
Finland	615	615	
France	1,310	1,300	
Germany	2,310	2,400	
India	1,170	1,200	
Iran	1,570	1,570	
Italy	740	740	
Japan	3,270	3,300	
Kazakhstan	2,800	3,000	
Korea, Republic of	1,850	1,900	
Kuwait	700	700	
Mexico	1,740	1,750	
Netherlands	530	530	
Poland	1,280	1,200	
Russia	7,170	7,200	
Saudi Arabia	3,160	3,200	
South Africa	569	600	
Spain	601	600	
United Arab Emirates	1,950	1,950	
Uzbekistan	520	520	
Venezuela	800	800	
Other countries	5,100	5,100	
World total (rounded)	69,600	70,300	

World Resources: Resources of elemental sulfur in evaporite and volcanic deposits and sulfur associated with natural gas, petroleum, tar sands, and metal sulfides amount to about 5 billion tons. The sulfur in gypsum and anhydrite is almost limitless, and some 600 billion tons of sulfur is contained in coal, oil shale, and shale rich in organic matter, but low-cost methods have not been developed to recover sulfur from these sources. 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.

^eEstimated.

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

²See [Appendix C for definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).