

## SODA ASH

(Data in thousand metric tons unless otherwise noted)

**Domestic Production and Use:** The total value of domestic natural soda ash (sodium carbonate) produced in 2018 was estimated to be about \$1.8 billion.<sup>1</sup> U.S. production of 12 million tons was equal to that of the previous year but about 900,000 tons higher than production in 2012. The U.S. soda ash industry comprised four companies in Wyoming operating five plants and one company in California with one plant. The five producing companies have a combined annual nameplate capacity of 13.9 million tons (15.3 million short tons). Borax, salt, and sodium sulfate were produced as coproducts of sodium carbonate production in California. Chemical caustic soda, sodium bicarbonate, and sodium sulfite were manufactured as coproducts at several of the Wyoming soda ash plants. Sodium bicarbonate was produced at an operation in Colorado using soda ash feedstock shipped from the company's Wyoming facility.

Based on 2018 quarterly reports, the estimated distribution of soda ash by end use was glass, 48%; chemicals, 30%; distributors, 6%; miscellaneous uses, 6%; soap and detergents, 5%; flue gas desulfurization, 3%; pulp and paper, 1%; and water treatment, 1%.

<b>Salient Statistics—United States:</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018<sup>e</sup></b>
Production <sup>2</sup>	11,700	11,600	11,800	12,000	12,000
Imports for consumption	39	40	35	19	16
Exports	6,670	6,400	6,760	6,990	6,900
Consumption:					
Apparent <sup>3</sup>	5,100	5,200	5,010	5,040	5,100
Reported	5,170	4,990	5,120	4,910	4,900
Price:					
Average sales value (natural source):					
f.o.b. mine or plant, dollars per metric ton	148.67	155.30	149.83	146.26	149.00
f.o.b. mine or plant, dollars per short ton	134.87	140.88	135.92	132.68	135.00
Stocks, producer, yearend	271	285	336	293	300
Employment, mine and plant, number <sup>e</sup>	2,500	2,500	2,500	2,600	2,600
Net import reliance <sup>4</sup> as a percentage of apparent consumption	E	E	E	E	E

**Recycling:** No soda ash was recycled by producers; however, glass container producers use cullet glass, thereby reducing soda ash consumption.

**Import Sources (2014–17):** Germany, 48%; Italy, 16%; United Kingdom, 13%; Mexico, 7%; and other, 16%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations</b>
Disodium carbonate	2836.20.0000	<b>12–31–18</b> 1.2% ad val.

**Depletion Allowance:** Natural, 14% (Domestic and foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** Relatively low production costs and lower environmental impacts provide natural soda ash producers some advantage over producers of synthetic soda ash. The production of synthetic soda ash normally consumes more energy and releases more carbon dioxide than that of natural soda ash. In recent years, U.S. producers of natural soda ash were able to expand their markets when several synthetic soda ash plants were closed or idled around the world.

Soda ash production in Turkey rose in 2018 when a 2.5-million-ton-per-year plant opened all of its production lines after several months of operational delays. Total production capacity in Turkey is estimated to be between 4 million and 5 million tons and soda ash shipments, especially for export, are expected to increase significantly over the next few years.

Three groups dominate production and have become the world's leading suppliers of soda ash—American National Soda Ash Corp., which represented three of the five domestic producers in 2018; multiple producers in China; and Solvay S.A. of Belgium. The United States likely will remain competitive with producers in China for markets elsewhere in Asia. Asia and South America remain the most likely areas for increased soda ash consumption in the near future. U.S. producers expect modest growth in production and exports through 2020.

### **World Production and Reserves:**

	<b>Mine production</b>		<b>Reserves<sup>5, 6</sup></b>
	<b><u>2017</u></b>	<b><u>2018<sup>e</sup></u></b>	
Natural:			
United States	12,000	12,000	723,000,000
Botswana	227	230	400,000
Ethiopia	8	8	NA
Kenya	310	320	7,000
Turkey	2,000	2,200	840,000
Other countries	<u>NA</u>	<u>NA</u>	<u>280,000</u>
World total, natural (rounded)	14,500	15,000	25,000,000
World total, synthetic (rounded)	39,500	40,000	XX
World total (rounded)	54,000	55,000	XX

**World Resources:** Natural soda ash is obtained from trona and sodium carbonate-rich brines. The world's largest deposit of trona is in the Green River Basin of Wyoming. About 47 billion tons of identified soda ash resources could be recovered from the 56 billion tons of bedded trona and the 47 billion tons of interbedded or intermixed trona and halite, which are in beds more than 1.2 meters thick. Underground room-and-pillar mining, using conventional and continuous mining, is the primary method of mining Wyoming trona ore. This method has an average 45% mining recovery, whereas average recovery from solution mining is 30%. Improved solution-mining techniques, such as horizontal drilling to establish communication between well pairs, could increase this extraction rate and enable companies to develop some of the deeper trona beds. Wyoming trona resources are being depleted at the rate of about 15 million tons per year (8.3 million tons of soda ash). Searles Lake and Owens Lake in California contain an estimated 815 million tons of soda ash reserves. At least 95 natural sodium carbonate deposits have been identified in the world, only some of which have been quantified. Although soda ash can be manufactured from salt and limestone, both of which are practically inexhaustible, synthetic soda ash is costlier to produce and generates environmental wastes.

**Substitutes:** Caustic soda can be substituted for soda ash in certain uses, particularly in the pulp and paper, water treatment, and certain chemical sectors. Soda ash, soda liquors, or trona can be used as feedstock to manufacture chemical caustic soda, which is an alternative to electrolytic caustic soda.

<sup>e</sup>Estimated. E Net exporter. NA Not available. XX Not applicable.

<sup>1</sup>Does not include values for soda liquors and mine waters.

<sup>2</sup>Natural only.

<sup>3</sup>Defined as production + imports – exports + adjustments for industry stock changes.

<sup>4</sup>Defined as imports – exports + adjustments for industry stock changes.

<sup>5</sup>The reported quantities are sodium carbonate only. About 1.8 tons of trona yields 1 ton of sodium carbonate.

<sup>6</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>7</sup>From trona, nahcolite, and dawsonite deposits.