

LITHIUM

(Data in metric tons, lithium content, unless otherwise specified)

Domestic Production and Use: Commercial-scale lithium production in the United States was from a continental brine operation in Nevada. Owing to lower lithium prices in 2024, commercial production from the brine-sourced waste tailings of a Utah-based magnesium producer was idled. Two companies produced a wide range of downstream lithium compounds in the United States from domestic or imported lithium carbonate, lithium chloride, and lithium hydroxide. Domestic production data were withheld to avoid disclosing company proprietary data.

Although lithium uses vary by location, global end uses were estimated as follows: batteries, 87%; ceramics and glass, 5%; lubricating greases, 2%; air treatment, 1%; continuous casting mold flux powders, 1%; medical, 1%; and other uses, 3%. Lithium consumption for batteries increased significantly owing to the use of rechargeable lithium batteries in the growing market for electric vehicles (EVs), portable electronic devices, electric tools, and energy grid storage applications. Lithium minerals were used directly as mineral concentrates in ceramics and glass applications.

Salient Statistics—United States:	2020	2021	2022	2023	2024^e
Production	W	W	W	W	W
Imports for consumption	2,460	2,640	3,260	3,390	3,300
Exports	1,200	1,870	2,440	1,960	1,700
Consumption, apparent ¹	W	W	W	W	W
Price, annual average-real, battery-grade lithium carbonate, dollars per metric ton ²	10,100	14,200	71,100	41,300	14,000
Employment, mine and mill, number	70	70	70	70	70
Net import reliance ³ as a percentage of apparent consumption	>50	>25	>25	>50	>50

Recycling: Construction of lithium battery recycling plants continued throughout 2024. Automobile companies and battery recyclers partnered to supply the automobile industry with a source of battery materials. In October, the U.S. Department of Energy announced \$44.8 million in funding from the U.S. Bipartisan Infrastructure Law for eight projects that will help lower EV battery recycling costs, with the long-term goal of lowering vehicle costs.

Import Sources (2020–23): Chile, 50%; Argentina, 47%; and other, 3%.

Tariff:	Item	Number	Normal Trade Relations 12–31–24
	Lithium oxide and hydroxide	2825.20.0000	3.7% ad valorem.
	Lithium carbonate:		
	U.S. pharmaceutical grade	2836.91.0010	3.7% ad valorem.
	Other	2836.91.0050	3.7% ad valorem.

Depletion Allowance: 22% (domestic), 14% (foreign).

Government Stockpile: Not available.

Events, Trends, and Issues: Excluding U.S. production, worldwide lithium production in 2024 increased by 18% to approximately 240,000 tons from 204,000 tons in 2023 in response to strong demand from the lithium-ion battery market, high lithium prices from 2021 to early 2023, and an increase in global lithium production capacity. Global consumption of lithium in 2024 was estimated to be 220,000 tons, a 29% increase from revised consumption of 170,000 tons in 2023. Concern about a short-term lithium oversupply and weaker-than-expected EV sales worldwide during the first half of 2024 caused the price for lithium to decrease considerably throughout the year. Owing in part to incentives and discounts, EV sales in the third quarter of 2024 saw considerable growth in Canada, China, and the United States.

Spot lithium carbonate prices in China [cost, insurance, and freight (c.i.f.)] decreased from approximately \$14,500 per ton in January to approximately \$9,400 per ton in November. For fixed contracts, the annual average U.S. lithium carbonate price was \$14,000 per ton in 2024, a decrease of 66% from that in 2023. Spot lithium hydroxide prices in China [free on board (f.o.b.)] decreased from approximately \$17,000 per ton in January to approximately \$9,900 per ton in November. Spodumene (6% lithium oxide) prices in Australia (f.o.b.) decreased from approximately \$1,250 per ton in January to approximately \$730 per ton in November.

Four brine operations in Argentina, nine mineral operations in Australia, one mineral tailings operation in Brazil, two mineral operations in Canada, two brine operations Chile, seven mineral and five brine operations in China, and four mineral operations in Zimbabwe accounted for the majority of world lithium production. Additionally, smaller

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operations in Australia, Brazil, China, Namibia, Portugal, and the United States also contributed to world lithium production. Despite many lithium projects being postponed or cancelled in 2024 owing to low prices, significant production capacity expansions occurred in Argentina, Chile, China, and Zimbabwe.

In 2024, the U.S. Department of Energy announced \$3 billion in funding across 25 projects through the U.S. Bipartisan Infrastructure Law to support new commercial-scale domestic facilities to extract and process lithium and other critical minerals, manufacture key battery components, recycle batteries, support next-generation battery manufacturing, and develop new technologies to increase U.S. lithium reserves.

Lithium supply security has become a priority for technology companies in Asia, Europe, and North America. Strategic alliances and joint ventures among technology companies and exploration companies continued to be established to ensure a reliable, diversified supply of lithium for battery suppliers and vehicle manufacturers. Brine-based lithium sources were in various stages of development or exploration in Argentina, Bolivia, Canada, Chile, China, and the United States; mineral-based lithium sources were in various stages of development or exploration in Australia, Austria, Brazil, Canada, China, Congo (Kinshasa), Czechia, Ethiopia, Finland, France, Germany, Ghana, India, Iran, Kazakhstan, Mali, Namibia, Nigeria, Peru, Portugal, Russia, Rwanda, Serbia, Spain, Thailand, Turkey, the United States, and Zimbabwe; lithium-clay sources were in various stages of development or exploration in Mexico and the United States.

World Mine Production and Reserves: Reserves for Argentina, Australia, Canada, the United States, and Zimbabwe were revised based on company and Government reports.

	Mine production		Reserves ⁴
	2023	2024 ^e	
United States	W	W	1,800,000
Argentina	8,630	18,000	4,000,000
Australia	91,700	88,000	⁵ 7,000,000
Brazil	^e 5,260	10,000	390,000
Canada	^e 3,240	4,300	1,200,000
Chile	41,400	49,000	9,300,000
China	^e 35,700	41,000	3,000,000
Namibia	^e 2,700	2,700	14,000
Portugal	^e 380	380	60,000
Zimbabwe	^e 14,900	22,000	480,000
Other countries ⁶	—	—	<u>2,800,000</u>
World total (rounded)	<u>7204,000</u>	<u>7240,000</u>	<u>30,000,000</u>

World Resources:⁴ Owing to continuing exploration, measured and indicated lithium resources have increased substantially worldwide and total about 115 million tons. Measured and indicated lithium resources in the United States—from continental brines, claystone, geothermal brines, hectorite, oilfield brines, and pegmatites—are 19 million tons. Measured and indicated lithium resources in other countries have been revised to 96 million tons. Resources are distributed as follows: Argentina, 23 million tons; Bolivia, 23 million tons; Chile, 11 million tons; Australia, 8.9 million tons; China, 6.8 million tons; Canada, 5.7 million tons; Germany, 4 million tons; Congo (Kinshasa), 3 million tons; Mexico, 1.7 million tons; Brazil, 1.3 million tons; Czechia, 1.3 million tons; Mali, 1.2 million tons; Serbia, 1.2 million tons; Peru, 1 million tons; Russia, 1 million tons; Zimbabwe, 860,000 tons; Spain, 320,000 tons; Portugal, 270,000 tons; Namibia, 230,000 tons; Ghana, 200,000 tons; Austria, 60,000 tons; Finland, 55,000 tons; and Kazakhstan, 45,000 tons.

Substitutes: Substitution for lithium compounds is possible in batteries, ceramics, greases, and manufactured glass. Examples are calcium, magnesium, mercury, and zinc as anode material in primary batteries; calcium and aluminum soaps as substitutes for stearates in greases; and sodic and potassic fluxes in ceramics and glass manufacture.

^eEstimated. W Withheld to avoid disclosing company proprietary data. — Zero.

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

²Lithium carbonate price assessments for spot and long-term contracts. Source: Benchmark Mineral Intelligence Ltd.

³Defined as imports – exports ± adjustments for industry stock changes.

⁴See Appendix C for resource and reserve definitions and information concerning data sources.

⁵For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 4.8 million tons.

⁶Other countries with reported reserves include Austria, Congo (Kinshasa), Czechia, Finland, Germany, Ghana, Mali, Mexico, Serbia, and Spain.

⁷Excludes U.S. production.