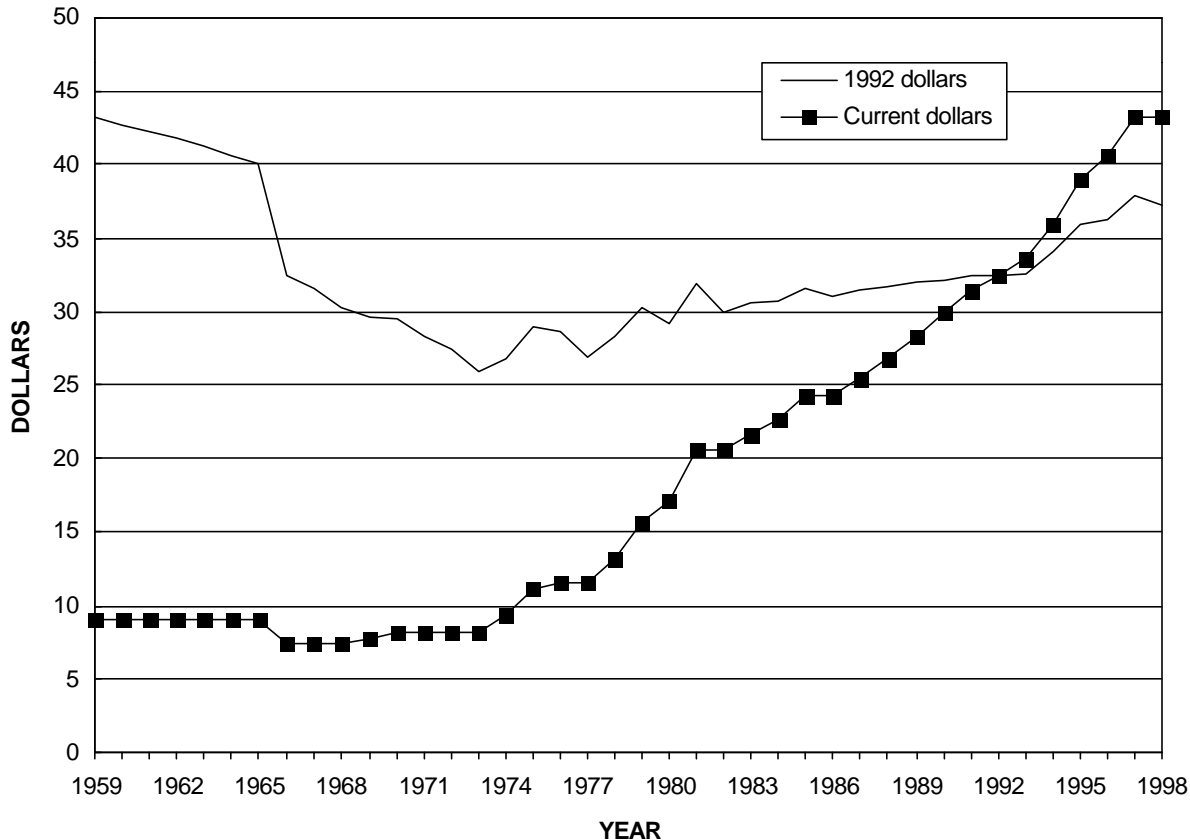


Yearend Average Lithium Price
(Dollars per pound)



Production of lithium minerals was first reported in the United States in 1898. Spodumene and amblygonite from California and South Dakota were exported for conversion to lithium chemicals. It was not until about 1916, during World War I, that lithium chemical production began in the United States (Schaller, 1917). Shortly after that, the United States became the largest producer of lithium minerals and chemicals in the world (Schaller, 1917). Dominant production sites shifted from the original States to North Carolina in 1942 (Broadhurst, 1956, p. 11) and Nevada in 1966 (Skillings Mining Review, 1968). In 1976, the Bureau of Mines reported that the United States provided nearly 80% of the world lithium demand (Quan, 1976). In 1984, lithium carbonate production began in Chile (Foote Prints, 1984). In the past 2 years, lithium carbonate production has shifted from the United States to South America with two new operations coming onstream, a second operation in Chile in 1996 (Minsal S.A., 1996), and a facility in Argentina in 1997

(FMC Corp., 1999, p. 28).

The majority of lithium end uses require lithium as one of its compounds rather than in the metallic form. Although a few lithium chemicals require lithium metal for their production, the metal used to produce the chemicals is produced and converted by the same company and so is not sold and does not enter the market or affect the prices of commercial lithium metal products (Lithium Corporation of America, 1985, p. 4). The changes in lithium metal prices appear to be independent of any significant events. Although lithium metal prices were first reported in trade publications in 1952, demand was very low (Arundale and Mensch, 1952). Small quantities were used as scavengers in the production of low-oxygen copper alloys, but other uses were just beginning to be investigated (Arundale and Mensch, 1952).

From 1952 to 1974, lithium prices remained flat in terms of current dollars; in terms of constant dollars, however, prices decreased. The potential use of lithium in batteries for

electric vehicles was first discussed in the Minerals Yearbook in 1972 (Wininger, 1972). The downward trend in lithium metal prices reversed in 1974. At about the same time, research efforts increased for identifying aluminum lithium alloys for use in aerospace applications. Increased demand for lithium in batteries and alloys resulted in steadily increasing lithium metal prices since that time.

The growth in the demand for lithium metal, however, cannot be quantified. Because lithium has been a small industry with very few major producers, published information on production and markets is hard to find. One estimate places the use of lithium in batteries at 7% of the lithium market of about 2,600 metric tons of contained lithium in the United States in 1996. Lithium required for alloys is less than 2% of consumption (Harben and Edwards, 1997).

The use of lithium in batteries should continue to expand, but not necessarily in the form of lithium metal. The requirement for lithium metal for those batteries may grow more slowly as battery makers search for the optimum battery chemistry, balancing energy density, cost, and safety.

References Cited

Arundale, J.C., and Mensch, F.B., 1952, Lithium, *in* Minerals

Yearbook 1952, v. I: U.S. Bureau of Mines, p. 650-659.
 Broadhurst, S.D., 1956, Lithium resources of North Carolina: North Carolina Department of Conservation and Development Information Circular 15, 37 p.
 FMC Corp., 1999, FMC annual report 1998: FMC Corp., 56 p.
 Foote Prints, 1984, New lithium frontier in Chile: Foote Prints, v. 47, no. 1, p. 2-14.
 Harben, P.W., and Edwards, G.H., 1997, The global lithium industry—A portrait of rapid flux: JOM, v. 49, no. 6, p. 21-22, 68.
 Lithium Corporation of America, 1985, Lithium: Lithium Corporation of America company report, 18 p.
 Minsal S.A., 1996, First lithium carbonate precipitation at Minsal: Santiago, Chile, Minsal S.A. press release, October 30, 1 p.
 Quan, C.K., 1976, Lithium, *in* Minerals Yearbook 1976, v. I: U.S. Bureau of Mines, p. 767-781.
 Schaller, W.T., 1917, Lithium minerals in 1916, *in* Mineral resources of the United States 1916: U.S. Geological Survey, pt. 2, p. 7-17.
 Skillings Mining Review, 1968, Foote Mineral Co.'s lithium operation in Nevada: Skillings Mining Review, v. 57, no. 3, January 20, p. 10.
 Wininger, D.C., 1972, Lithium, *in* Minerals Yearbook 1972, v. I: U.S. Bureau of Mines, p. 1362-1365.

Yearend Average Lithium Price
(Dollars per pound¹)

Year	Price	Year	Price	Year	Price	Year	Price
1952	9.85	1964	9.00	1976	11.60	1988	26.70
1953	11.00	1965	9.00	1977	11.60	1989	28.30
1954	11.00	1966	7.50	1978	13.20	1990	30.00
1955	11.00	1967	7.50	1979	15.65	1991	31.50
1956	11.00	1968	7.50	1980	17.15	1992	32.45
1957	11.00	1969	7.75	1981	20.65	1993	33.60
1958	9.00	1970	8.18	1982	20.65	1994	35.98
1959	9.00	1971	8.18	1983	21.70	1995	39.05
1960	9.00	1972	8.18	1984	22.70	1996	40.60
1961	9.00	1973	8.18	1985	24.20	1997	43.33
1962	9.00	1974	9.38	1986	24.20	1998	43.33
1963	9.00	1975	11.10	1987	25.45		

¹ To convert to dollars per kilogram, divide by 0.454.

Note:

- 1952-57, 98%-pure lithium metal, *in* E&MJ Metal and Mineral Markets.
- 1958-65, 99.5%-pure lithium metal, *in* E&MJ Metal and Mineral Markets.
- 1966-71, Standard or technical grade lithium of at least 99.8% purity, *in* Oil, Paint, and Drug Reporter.
- 1972-77, Standard or technical grade lithium of at least 99.8% purity, *in* Chemical Marketing Reporter.
- 1978-90, Producers average list price for standard or technical grade lithium of at least 99.8% purity.
- 1991-94, Average of producer and published prices for standard or technical grade lithium metal of at least 99.8% purity, *in* Chemical Marketing Reporter.
- 1995-96, Producers' average list price for standard or technical grade lithium of at least 99.8% purity.
- 1997-98, Standard or technical grade lithium of at least 99.8% purity, *in* Chemical Market Reporter.