

Mineral Industry Surveys

For information, contact:

Kim B. Shedd, Cobalt Commodity Specialist
National Minerals Information Center
Telephone: (703) 648-4974
Email: kshed@usgs.gov

Annie Hwang (Data)
Telephone: (703) 648-7952
Email: ahwang@usgs.gov

Internet: <https://www.usgs.gov/centers/national-minerals-information-center/mineral-industry-surveys>

Text prepared by:

Samantha Ewing, Mineral Commodity Specialist (Cobalt backup)

COBALT IN AUGUST 2023

The amount of cobalt contained in U.S. imports of cobalt metals and chemicals in August 2023 was 26% less than that imported during July 2023. For the first 8 months of 2023, the amount of cobalt contained in imports was 17% less than that imported during the same period in 2022 (table 2). The amount of cobalt contained in U.S. exports of unwrought cobalt and chemicals in August 2023 was 44% less than that exported during July 2023 and during the first 8 months of 2023, the amount exported was essentially unchanged from the amount exported during the same period in 2022 (table 4).

in August 2022. The August 2023 monthly average U.S. spot cobalt price was slightly lower than that in July 2023 and was 29% lower than that in August 2022 (fig. 1, table 1). The following listed prices are for cobalt metal in August, in dollars per pound.

| Type | Price range | Average price |
|----------------------------|-------------|---------------|
| U.S. spot ¹ | 14.75–19.00 | 17.41 |
| LME cash mean ² | 14.84–14.85 | 14.85 |

¹Source: S&P Global Platts Metals Week, minimum 99.8% cobalt cathode.

²London Metal Exchange, mean of the cash buyer and cash seller price, minimum 99.8% cobalt briquettes, cathode, coarse grain powder, or rounds (converted from dollars per metric ton and rounded to the nearest cent).

Prices and Stocks

During the past 2 years, London Metal Exchange (LME) cobalt stocks have generally trended downward and remained unchanged from June through August 2023. Monthly average cobalt prices trended up into the second quarter of 2022 then decreased through the first half of 2023, reaching lows in June 2023 not seen in the past two years. Prices showed signs of increasing in July. In August, the LME cash mean price was unchanged from that in July 2023 and was 33% lower than that

Industry News

Electra Battery Materials Corp. (Canada) paused construction and commissioning of its northern Ontario cobalt refinery citing supply chain delays and inflationary costs. Construction would be delayed until Electra could secure an additional \$59.3 million from government and industry stakeholders. Electra acquired

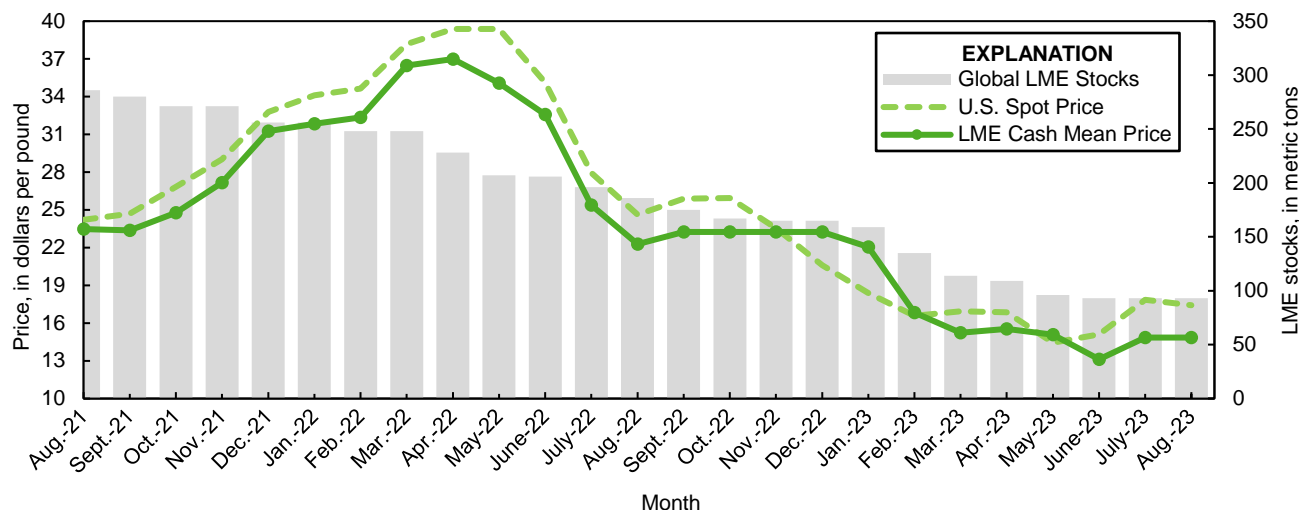


Figure 1. Global LME cobalt stocks, average U.S. spot cobalt prices, and average LME cash mean cobalt prices for August 2021 through August 2023. Sources: S&P Global Platts Metals Week and London Metal Exchange.

the refinery in 2017 and worked to update the facility to process cobalt hydroxide feed and produce 5,000 metric tons per year (t/yr) of cobalt in cobalt sulfate for the lithium-ion battery industry. Equipment was purchased to increase production to 6,500 t/yr in the future. Electra secured long-term cobalt hydroxide feed supply agreements with Glencore AG and China Molybdenum Co., Ltd., in 2021 (Dufour, 2023; Electra Battery Materials Corp. 2023a, p. 5, 12, 17–18).

While refinery progress was paused, Electra continued to prioritize recycling of shredded lithium-ion battery scrap, or black mass, and evaluate opportunities to use black mass as supplemental refinery feedstock. Electra worked to commercialize a hydrometallurgical process to recover cobalt, copper, graphite, lithium and nickel from black mass. In December 2022, Electra launched a black mass recycling demonstration plant co-located at the refinery site, and in 2023, produced a nickel-cobalt mixed hydroxide precipitate from black mass (Dufour, 2023; Electra Battery Materials Corp. 2022, 2023a, p.13; 2023b).

References Cited

- Dufour, Aya, 2023, Construction at North America's only cobalt refinery slows down amid rising costs: CBC News [Ottawa, Ontario, Canada], August 23. (Accessed October 4, 2023, at <https://www.cbc.ca/news/canada/sudbury/grade-facility-cobalt-ontario-recycling-electric-vehicle-battery-1.6943912>.)
- Electra Battery Materials Corp., 2022, Electra launches battery materials recycling demonstration plant at its Ontario refinery complex: Toronto, Ontario, Canada, Electra Battery Materials Corp. news release, December 22. (Accessed October 4, 2023, at <https://electrabmc.com/electra-launches-battery-materials-recycling-demonstration-plant-at-its-ontario-refinery-complex/>.)
- Electra Battery Materials Corp., 2023a, Annual information form—For the fiscal year ended December 31, 2022: Toronto, Ontario, Canada, Electra Battery Materials Corp., April 4, 61 p. (Accessed October 4, 2023, at <https://electrabmc.com/wp-content/uploads/2023/04/ELBM-AIF-2022.pdf>.)
- Electra Battery Materials Corp., 2023b, Electra makes first customer shipment of recycled nickel-cobalt produced at its refinery complex: Toronto, Ontario, Canada, Electra Battery Materials Corp. news release, July 17. (Accessed October 4, 2023, at <https://electrabmc.com/electra-makes-first-customer-shipment-of-recycled-nickel-cobalt-produced-at-its-refinery-complex/>.)

List services and web feed subscribers are the first to receive notification of USGS minerals information publications and data releases. For information on how to subscribe, go to <https://www.usgs.gov/centers/national-minerals-information-center/minerals-information-publication-list-services>.

TABLE 1
REPORTED LME¹ STOCKS
OF COBALT METAL, END OF PERIOD²

(Metric tons, contained cobalt)

| Period | U.S. warehouse | Non-U.S. warehouse | Total |
|-----------|-------------------|-----------------------|-------|
| 2022: | | | |
| August | 39 | 147 | 186 |
| September | 34 | 141 | 175 |
| October | 34 | 133 | 167 |
| November | 34 | 131 | 165 |
| December | 34 | 131 | 165 |
| 2023: | | | |
| January | 34 | 125 | 159 |
| February | 34 | 101 | 135 |
| March | 34 | 80 | 114 |
| April | 34 | 75 | 109 |
| May | 34 | 62 | 96 |
| June | 34 | 59 | 93 |
| July | 34 | 59 | 93 |
| August | 34 | 59 | 93 |

¹London Metal Exchange.

²U.S. Government National Defense Stockpile inventory statistics are no longer available.

TABLE 2
U.S. IMPORTS FOR CONSUMPTION OF COBALT, BY COUNTRY OR LOCALITY¹

| Period and country or locality of origin | Metals ² | | Oxides and hydroxides | | Salts and compounds ³ | | Total cobalt content for the period ⁴ (metric tons) | Cobalt content, year to date ^{4,5} (metric tons) |
|---|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---|---|
| | Gross weight (metric tons) | Value ⁶ (thousands) | Gross weight (metric tons) | Value ⁶ (thousands) | Gross weight (metric tons) | Value ⁶ (thousands) | | |
| 2022: | | | | | | | | |
| August | 530 | \$36,900 | 134 | \$6,130 | 153 | \$2,010 | 671 | 7,440 |
| September | 578 | 34,600 | 200 | 7,120 | 310 | 4,410 | 827 | 8,260 |
| October | 579 | 29,600 | 117 | 5,030 | 200 | 2,550 | 725 | 8,990 |
| November | 571 | 29,100 | 109 | 4,990 | 260 | 2,810 | 721 | 9,710 |
| December | 678 | 34,400 | 100 | 3,400 | 197 | 1,700 | 805 | 10,500 |
| January–August | 4,800 | 330,000 | 1,390 | 68,600 | 5,930 | 38,800 | 7,440 | XX |
| January–December | 7,200 | 458,000 | 1,920 | 89,100 | 6,900 | 50,200 | 10,500 | XX |
| 2023: | | | | | | | | |
| January | 593 | 27,700 | 184 | 6,160 | 262 | 3,760 | 803 | 803 |
| February | 559 | 26,200 | 94 | 3,220 | 243 | 1,870 | 694 | 1,500 |
| March | 838 | 33,000 | 287 | 7,220 | 226 | 2,940 | 1,120 | 2,610 |
| April | 670 | 25,100 | 96 | 2,630 | 170 | 1,700 | 790 | 3,400 |
| May | 671 | 25,500 | 20 | 489 | 96 | 878 | 712 | 4,120 |
| June | 562 | 20,000 | 135 | 3,020 | 170 | 2,060 | 717 | 4,830 |
| July | 641 | 24,000 | 110 | 2,810 | 147 | 1,630 | 770 | 5,600 |
| August: | | | | | | | | |
| Australia | -- | -- | -- | -- | -- | -- | -- | 14 |
| Belgium | 6 | 217 | -- | -- | (7) | 2 | 6 | 48 |
| Brazil | -- | -- | -- | -- | 19 | 74 | 5 | 74 |
| Canada | 79 | 3,540 | -- | -- | -- | -- | 79 | 1,110 |
| China | 1 | 6 | 3 | 69 | -- | -- | 3 | 87 |
| Finland | 5 | 195 | 102 | 2,300 | 165 | 1,560 | 130 | 1,000 |
| France | -- | -- | -- | -- | -- | -- | -- | 6 |
| Germany | 3 | 182 | -- | -- | -- | -- | 3 | 89 |
| Japan | 61 | 2,050 | -- | -- | -- | -- | 61 | 938 |
| Madagascar | 21 | 637 | -- | -- | -- | -- | 21 | 523 |
| Mexico | 1 | 31 | -- | -- | -- | -- | 1 | 17 |
| Morocco | 40 | 1,240 | -- | -- | -- | -- | 40 | 138 |
| Netherlands | -- | -- | 14 | 267 | -- | -- | 10 | 17 |
| Norway | 202 | 6,410 | -- | -- | -- | -- | 202 | 1,720 |
| Russia | -- | -- | -- | -- | -- | -- | -- | 50 |
| South Africa | -- | -- | -- | -- | -- | -- | -- | 89 |
| Taiwan | -- | -- | -- | -- | 3 | 32 | 1 | 64 |
| Turkey | -- | -- | -- | -- | -- | -- | -- | 7 |
| United Kingdom | 4 | 356 | (7) | 8 | -- | -- | 4 | 147 |
| Zambia | 5 | 156 | -- | -- | -- | -- | 5 | 17 |
| Other | -- | -- | 1 | 41 | 4 | 60 | 2 | 11 |
| Total | 426 | 15,000 | 120 | 2,690 | 191 | 1,730 | 572 | 6,180 |
| January–August | 4,960 | 197,000 | 1,050 | 28,200 | 1,500 | 16,600 | 6,180 | XX |

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Unwrought cobalt, excluding alloys; includes cobalt cathode and cobalt metal powder; may include intermediate products of cobalt metallurgy.

³Includes cobalt acetates, cobalt carbonates, cobalt chlorides, and cobalt sulfates.

⁴Estimated from gross weights.

⁵May include revisions to previously published data.

⁶Customs value.

⁷Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 3
U.S. IMPORTS FOR CONSUMPTION OF ADDITIONAL COBALT MATERIALS, BY COUNTRY OR LOCALITY¹

| Period and country or locality of origin | Unwrought cobalt alloys | | Cobalt waste and scrap | | Wrought cobalt and cobalt articles | |
|---|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---------------------------------------|-----------------------------------|
| | Gross weight (metric tons) | Value ² (thousands) | Gross weight (metric tons) | Value ² (thousands) | Gross weight (metric tons) | Value ² (thousands) |
| 2022: | | | | | | |
| August | 14 | \$867 | 152 | \$2,530 | 27 | \$3,950 |
| September | 35 | 1,780 | 200 | 2,850 | 33 | 4,190 |
| October | 32 | 1,730 | 133 | 2,200 | 42 | 3,790 |
| November | 31 | 1,670 | 117 | 1,710 | 33 | 4,480 |
| December | 39 | 1,970 | 88 | 1,930 | 36 | 4,780 |
| January–August | 170 ^r | 9,870 ^r | 1,200 | 18,000 | 289 ^r | 33,500 ^r |
| January–December | 307 | 17,000 | 1,740 | 26,700 | 433 | 50,700 |
| 2023: | | | | | | |
| January | 61 | 3,180 | 150 | 2,350 | 26 | 3,850 |
| February | 19 | 1,240 | 140 | 2,210 | 36 | 5,740 |
| March | 30 | 1,510 | 146 | 2,220 | 42 | 4,830 |
| April | 18 | 929 | 139 | 1,540 | 38 | 4,450 |
| May | 38 | 1,900 | 148 | 2,350 | 34 | 4,430 |
| June | 34 | 1,680 | 178 | 2,200 | 30 | 4,650 |
| July | 19 | 926 | 131 | 2,330 | 31 | 4,490 |
| August: | | | | | | |
| Belgium | 4 | 166 | 4 | 169 | -- | -- |
| Canada | -- | -- | 15 | 206 | 2 | 825 |
| China | -- | -- | -- | -- | 2 | 436 |
| France | -- | -- | 29 | 734 | 4 | 259 |
| Germany | (3) | 38 | -- | -- | 2 | 631 |
| Ireland | -- | -- | 46 | 131 | (3) | 38 |
| Italy | -- | -- | -- | -- | 9 | 154 |
| Japan | -- | -- | 6 | 128 | 2 | 366 |
| Qatar | -- | -- | 19 | 175 | -- | -- |
| Tunisia | -- | -- | 5 | 68 | (3) | 4 |
| United Kingdom | 17 | 843 | 8 | 172 | 12 | 1,470 |
| Other | -- | -- | 1 | 15 | 1 | 469 |
| Total | 21 | 1,050 | 134 | 1,800 | 33 | 4,650 |
| January–August | 242 | 12,400 | 1,170 | 17,000 | 270 | 37,100 |

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Customs value.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 4
U.S. EXPORTS OF COBALT MATERIALS¹

| Period | Unwrought cobalt, powders, matte, waste and scrap ² | | Oxides and hydroxides | | Salts and compounds ³ | | Total cobalt content for the period ⁴ (metric tons) | Cobalt content, year to date ^{4,5} (metric tons) |
|------------------|---|-----------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---|---|
| | Gross weight (metric tons) | Value ⁶ (thousands) | Gross weight (metric tons) | Value ⁶ (thousands) | Gross weight (metric tons) | Value ⁶ (thousands) | | |
| 2022: | | | | | | | | |
| August | 420 | \$12,300 | 7 | \$297 | (7) | \$4 | 425 | 3,450 |
| September | 335 | 11,900 | 7 | 298 | -- | -- | 340 | 3,790 |
| October | 584 | 16,900 | 2 | 64 | -- | -- | 585 | 4,370 |
| November | 525 | 13,800 | 7 | 281 | -- | -- | 530 | 4,900 |
| December | 460 | 13,600 | 1 | 31 | -- | -- | 460 | 5,360 |
| January–August | 3,430 ^r | 112,000 | 26 | 1,100 | 1 | 16 | 3,450 ^r | XX |
| January–December | 5,330 | 169,000 | 43 | 1,770 | 1 | 16 | 5,360 | XX |
| 2023: | | | | | | | | |
| January | 408 | 13,000 | 3 | 114 | (7) | 4 | 411 | 411 |
| February | 327 | 12,500 | 1 | 41 | -- | -- | 328 | 738 |
| March | 535 | 15,300 | 6 | 202 | -- | -- | 539 | 1,280 |
| April | 434 | 15,900 | 12 | 175 | -- | -- | 442 | 1,720 |
| May | 522 | 15,700 | 2 | 88 | -- | -- | 524 | 2,240 |
| June | 318 | 11,300 | 18 | 246 | -- | -- | 331 | 2,570 |
| July | 523 | 14,300 | 13 | 530 | (7) | 4 | 532 | 3,110 |
| August | 299 | 11,100 | (7) | 12 | 1 | 10 | 299 | 3,410 |
| January–August | 3,370 | 109,000 | 55 | 1,410 | 2 | 19 | 3,410 | XX |

¹Revised. XX Not applicable. -- Zero.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³May include other intermediate products of cobalt metallurgy and unwrought cobalt alloys.

⁴Cobalt acetates and cobalt chlorides.

⁵Estimated from gross weights.

⁶May include revisions to previously published data.

⁷Free alongside ship (f.a.s.) value.

⁸Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF WROUGHT COBALT, COBALT ORE,
AND CONCENTRATES¹

| Period | Wrought cobalt and cobalt articles | | Cobalt ore and concentrates | |
|------------------|---------------------------------------|-----------------------------------|----------------------------------|-----------------------------------|
| | Gross weight (metric tons) | Value ² (thousands) | Gross weight (metric tons) | Value ² (thousands) |
| 2022: | | | | |
| August | 115 | \$18,600 | -- | -- |
| September | 182 | 25,400 | (3) | \$8 |
| October | 121 | 17,200 | -- | -- |
| November | 181 | 24,400 | -- | -- |
| December | 182 | 21,000 | -- | -- |
| January–August | 1,210 [†] | 140,000 [†] | (3) | 4 |
| January–December | 1,870 | 228,000 | (3) | 12 |
| 2023: | | | | |
| January | 186 | 27,000 | -- | -- |
| February | 118 | 19,300 | (3) | 4 |
| March | 126 | 18,500 | (3) | 7 |
| April | 157 | 19,700 | 1 | 20 |
| May | 129 | 16,600 | 2 | 60 |
| June | 144 | 18,300 | -- | -- |
| July | 101 | 17,500 | (3) | 3 |
| August | 119 | 16,600 | -- | -- |
| January–August | 1,080 | 154,000 | 3 | 94 |

[†]Revised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Free alongside ship (f.a.s.) value.

³Less than ½ unit.

Source: U.S. Census Bureau.