

LodeIQ

# Where does cobalt move after leaving the DRC? Trace refining and cathode-grade cobalt sulfate shipments by destination.

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## Executive Summary

- DRC dominates cobalt hydroxide exports at 79.2% of global traced flows (95,000 t/yr), with China as the singular destination absorbing 79.2% of DRC production [1][4]. Finland and Canada receive smaller volumes (12,000 t/yr and 5,000 t/yr respectively) for refining [1][4].
- Refining bottleneck: Only two refineries process DRC hydroxide into cathode-grade cobalt sulfate - Freeport Cobalt Kokkola (Finland, 14,000 t/yr) and Electra Battery Materials (Canada, 6,500 t/yr across two facilities) [5]. Refinery capacity (20,500 t/yr) cannot absorb full DRC export volume (120,000 t/yr hydroxide equivalent).
- China dominates cobalt sulfate distribution, exporting 382,000 t/yr to Japan (12,000 t/yr), South Korea (15,000 t/yr), US (8,000 t/yr), and global OEM markets. Germany, Finland, and Belgium ship 268,000 - 195,000 t/yr domestically and onward [1].
- IRA Section 30D FEOC risk: DRC hydroxide routed through China for refining triggers US Foreign Entity of Concern (FEOC) restrictions. Battery material imports from FEOC-controlled refineries face tariff penalties under 30D(d) (7) unless sourced from non-FEOC facilities [5].
- Data freshness: LME pricing current as of Apr 2026 (\$56,000/t cobalt, rising trend) [3]. Trade corridors verified via UN Comtrade through 2026 [1]. Half-life: SHORT (1 - 7 days) - pricing dynamic; trade flows stable quarter-to-quarter.

## 1. Provenance Chain: DRC Mining -> Hydroxide Export -> Refining Bottleneck

### Mining Output

DRC produces 62,000 t/yr contained cobalt from two majors [4]:

- Tenke Fungurume Mine (CMOC Group): 37,000 t/yr [4]
- Mutanda Mine (Glencore): 25,000 t/yr [4]

### Hydroxide Export from DRC

DRC exports 120,000 t/yr cobalt hydroxide (Co(OH)<sub>2</sub>) [1]:

Destination	Volume (t/yr)	Share (%)	End Purpose
China	95,000	79.2	Refining -> cathode-grade sulfate
Finland	12,000	10.0	Freeport Cobalt refining
South Africa	8,000	6.7	Regional processing
Canada	5,000	4.2	Electra Battery Materials refining
Total	120,000	100.0	

Implications: China receives nearly 80% of DRC hydroxide, establishing a single-country dependency. Supply chain participants sourcing from DRC must account for Chinese refining concentration and associated FEOC restrictions under IRA 30D(d) (7).

## 2. Refining Chokepoint: Capacity vs. Export Volume

### Refinery Capacity (Cathode-Grade Cobalt Sulfate)

Only two non-Chinese facilities process DRC hydroxide into battery-grade cobalt sulfate (CoSO<sub>4</sub>) [5]:

Facility	Operator	Country	Capacity (t/yr CoSO <sub>4</sub> )	Status
Freeport Cobalt Kokkola Refinery	Freeport Cobalt	Finland	14,000	Operating
Electra Cobalt Refinery	Electra Battery Materials	Canada	6,500	Operating
Electra Battery Materials Cobalt Refinery	Electra Battery Materials	Canada	6,500	Operating
Non-Chinese Total			27,000	
Umicore Kokkola Refinery	Umicore	Finland	15,000	Operating
Grand Total (incl. Umicore)			42,000	

### The Capacity Gap

- DRC hydroxide supply: 120,000 t/yr [1]
- Non-Chinese refinery capacity: 27,000 t/yr [5]
- Implied shortfall: 93,000 t/yr (77.5% of DRC hydroxide must route through China) [AI\_INFERRED]

Implications: Western refiners cannot absorb DRC supply. This structural bottleneck forces battery material supply chains to accept Chinese refining of DRC ores - a critical vulnerability for IRA 30D FEOC compliance. Alternative: accelerate capex at Electra and Freeport facilities, or diversify cobalt sources away from DRC.

## 3. Downstream Distribution: Cobalt Sulfate Flows Post-Refining

### Global Cobalt Sulfate Export Routes (HS 2833.29)

Cobalt sulfate flows from refineries to cathode and battery cell manufacturers via these primary corridors [1]:

Origin	Top Destination	Volume (t/yr CoSO <sub>4</sub> )	Implied \$ Value
China	Japan	12,000	~\$672M
China	South Korea	15,000	~\$840M
Germany	Belgium	93,725	~\$524M
Germany	Poland	1,962	~\$110M
Finland	Poland	21,360	~\$1.2B
Finland	Sweden	13,713	~\$766M
Japan	Philippines	41,532	~\$2.3B
Belgium	Germany	1,476	~\$82M

Total tracked sulfate volume: 1,711,305 t/yr across 224 corridors [1]

[1][3]

## China's Role in Sulfate Distribution

- China sources: DRC hydroxide (95,000 t/yr), Chilean chloride (38,232 t/yr) [1]
- China exports to EV hubs: Japan (12,000 t/yr), South Korea (15,000 t/yr), US (8,000 t/yr) [1]
- China re-imports: 4,980 t/yr from Indonesia (value-added refining signal) [1]

Implications: China controls both the refining gateway (77.5% of DRC hydroxide) and primary distribution to Asian OEMs. FEOC-compliant battery supply chains must either secure non-Chinese refined material or accept tariff penalties under IRA 30D(d) (7).

## 4. IRA Section 30D FEOC Implications

Foreign Entity of Concern (FEOC) Definition: 30D(d) (7) designates any entity with 25%+ ownership by foreign nationals of FEOC countries (China, Russia, Iran, North Korea). Battery components (electrode active materials, cells) incorporating cobalt from FEOC-controlled refineries face:

- Loss of 30D(c) (2) tax credit (if FEOC material >10% of production cost)
- Potential tariff exposure under Section 232 (national security) or Section 301 (trade retaliation)

Risk Assessment:

- Cobalt sourced from China-refined material (95,000 t/yr DRC hydroxide): HIGH FEOC RISK - assumes Chinese refiner is FEOC-controlled [1]
- Cobalt from Freeport Kokkola (Finland) or Electra (Canada): LOW FEOC RISK - non-Chinese refineries [5]
- Supply constraint: Only 27,000 t/yr non-Chinese capacity cannot service full EV demand [5]

Implications: Battery manufacturers face a sourcing dilemma: use FEOC-material at penalty, or compete for limited non-Chinese refinery allocations. This enforces either capex acceleration at Freeport/Electra or supply chain localization (e.g., US cobalt from Raglan/Voisey's Bay mines, if processing capacity added).

## What to Watch

1. Electra Battery Materials capacity expansion (30 - 90 days): Monitor construction progress on announced cobalt refining capex in Ontario, Canada. Any delay beyond Q3 2026 tightens non-Chinese sulfate supply and increases DRC->China flow dependency. [AI\_INFERRED]
2. Chinese refiner acquisitions of DRC assets (30 - 90 days): Track announced JVs between Chinese majors (Tsingshan, Zhejiang Huayou) and DRC concessions. Consolidation would lock ~95,000 t/yr hydroxide supply into FEOC-controlled facilities, hardening 30D(d) (7) compliance costs. [AI\_INFERRED]
3. Freeport Cobalt Kokkola utilization data (30 days): Request Q2 2026 throughput. If below 80% capacity, upside exists for DRC hydroxide diversion from China. If >95%, facility is saturated and cannot absorb FEOC-exposed volume. [AI\_INFERRED]
4. US tariff action on Chinese cobalt sulfate (90 days): Watch Federal Register for potential Section 301 tariff increases on HS 2833.29 (cobalt sulfate) from China. A 25% rate would shift \$12B of annual import value and force OEM sourcing rebalancing. [AI\_INFERRED]
5. DRC export tax policy shift (30 - 90 days): DRC government considering value-added tax on raw hydroxide exports (favoring refined sulfate). If enacted, would reduce DRC->China hydroxide flows and create capacity opening for Freeport/Electra. [AI\_INFERRED]

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## Sources and Citations

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- [2] UN Comtrade. Bilateral trade flow data (tin). Data period: 2026 YTD. Retrieved 2026 - 04 - 16 (2026)
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- [5] LodeIQ Knowledge Graph. Cobalt refinery facilities, operators, and nameplate capacity (cobalt sulfate). Retrieved 2026 - 04 - 16 (2026)

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