

Market Landscape - North American Lithium Processing

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Sections	8

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Beat 1 - Scope and Executive Summary

Scope: This landscape covers the lithium processing and recycling market across North America, assessed against global demand trajectories over the 2023 - 2035 horizon under three named International Energy Agency scenarios, drawing on USGS mine-production data (2024 estimate) and IEA Global Critical Minerals Outlook 2024 projections.

The global lithium market is expanding rapidly from a 2023 demand baseline of approximately 170,000 tonnes, with the International Energy Agency projecting demand to reach between 420,000 and 620,000 tonnes by 2030 depending on the policy scenario - a two-and-a-half to nearly four-fold increase in seven years. (IEA Critical Minerals) The structural bottleneck constraining that trajectory is not mine supply but refining and processing capacity, where a single country - China - accounts for approximately 65% of global refining throughput, a concentration that shapes every downstream market including North America. (IEA Critical Minerals) Mine production is similarly concentrated: the top three producing countries - Australia, Chile, and China - together account for 74% of estimated 2024 world mine output of 240,000 tonnes, on a contained-metal basis. (USGS Mineral Commodity Summaries 2025 - Lithium chapter)

The current price environment is unfavorable for new investment: lithium is priced at approximately \$13,000 per tonne and the trend is falling. (USGS Mineral Commodity Summaries 2025 - Lithium chapter) That price signal, combined with the refining bottleneck and the absence of named North American processing or recycling participants in the retrieved data, means the regional landscape cannot be mapped at the participant or facility level from the available source packet. Six material-flow routes are identified in the data - with origins attributed to China, South Korea, and Japan among others, and one route terminating in the United States - but no volumes, no periods, and no intermediate destinations are recorded for any of these routes. (EU Comext / Eurostat) The North American processing and recycling participant register is entirely absent from the retrieved data: zero named actors are present. These are honest gaps, not editorial omissions, and they materially limit the precision of this landscape.

Beat 2 - Scenario Framing

Three scenarios from the IEA Global Critical Minerals Outlook 2024 structure the forward projections in this landscape. They are applied consistently to all demand and gap figures below.

Stated Policies Scenario (STEPS): This scenario reflects the trajectory implied by policies currently enacted or formally adopted. It represents the most conservative demand outlook and assumes no acceleration beyond existing regulatory and investment commitments. Under STEPS, lithium demand reaches 420,000 tonnes in 2030 and 580,000 tonnes in 2035. (IEA Critical Minerals)

Announced Pledges Scenario (APS): This scenario assumes that all government climate commitments - including nationally determined contributions and net-zero pledges - are delivered in full and on time. It represents a middle-demand trajectory. Under APS, lithium demand reaches 510,000 tonnes in 2030 and 750,000 tonnes in 2035. (IEA Critical Minerals)

Net Zero Emissions by 2050 Scenario (NZE): This scenario models the aggressive decarbonization pathway consistent with limiting global warming to 1.5°C. It represents the highest demand trajectory and the most acute supply-adequacy test. Under NZE, lithium demand reaches 620,000 tonnes in 2030 and 1,000,000 tonnes in 2035. (IEA Critical Minerals)

A 2023 demand baseline of 170,000 tonnes anchors all three scenarios. (IEA Critical Minerals) The scenarios are not forecasts of what will happen; they are internally consistent projections of what demand would look like if the named policy conditions are met. Outcome confidence is scenario-dependent across all three. (IEA Critical Minerals)

Beat 3 - Thematic Outlook

Demand Is Accelerating Across All Scenarios, Driven Overwhelmingly by EV Batteries

Regardless of scenario, lithium demand is projected to grow substantially from the 2023 baseline of 170,000 tonnes. The demand driver composition is identical across all IEA scenarios: EV batteries account for 75% of demand, energy storage for 12%, electronics for 8%, and other applications for 5%. (IEA Critical Minerals) The spread between STEPS and NZE at 2030 - 420,000 versus 620,000 tonnes - represents a 200,000-tonne range of uncertainty within a single decade, underscoring how heavily the demand trajectory depends on the pace of EV adoption policy.

Table 1 - Global Lithium Demand Projections by Scenario, 2023 - 2035

Year	STEPS (kt)	APS (kt)	NZE (kt)
2023 (baseline)	170	170	170
2030	420	510	620
2035	580	750	1,000

Units: thousand tonnes of lithium (contained-metal basis implied by IEA methodology). Source: IEA Global Critical Minerals Outlook 2024, as ingested by LodeIQ (IEA Critical Minerals). Note: All figures are global, not North America-specific; North America-disaggregated demand data are not present in the source packet. Scenario definitions: STEPS = Stated Policies; APS = Announced Pledges; NZE = Net Zero Emissions by 2050.

The 2030 Supply-Demand Balance Is Scenario-Contingent and Structurally Fragile

The IEA records committed supply of 500,000 tonnes for 2030 across all three scenarios. Against that committed supply figure, the supply-demand gap varies sharply by scenario. Under STEPS, committed supply exceeds projected demand by 80,000 tonnes - a nominal surplus. Under APS, committed supply and projected demand are approximately in balance. Under NZE, committed supply falls 120,000 tonnes short of projected demand - a structural deficit. (IEA Critical Minerals)

Table 2 - Global Lithium Supply-Demand Balance at 2030 by Scenario

Scenario	Demand (kt)	Committed Supply (kt)	Gap (kt)	Balance
STEPS	420	500	+80	Surplus
APS	510	500	~0	Balanced
NZE	620	500	-120	Deficit

Units: thousand tonnes. Source: IEA Global Critical Minerals Outlook 2024 (IEA Critical Minerals). Note: "Committed supply" reflects projects with committed investment as of the IEA's 2024 data year; it does not include speculative or early-stage projects. A positive gap indicates surplus; a negative gap indicates deficit. Figures are global; North America-specific supply commitments are not available in the source packet.

For 2035, committed supply figures are recorded as zero across all scenarios in the source data, meaning no supply commitments beyond 2030 are captured in the packet. (IEA Critical Minerals) The 2035 demand projections - ranging from 580,000 tonnes (STEPS) to 1,000,000 tonnes (NZE) - therefore cannot be assessed against a committed supply figure, and the 2035 balance is an honest gap in this landscape.

Refining Concentration Is the Defining Structural Constraint, Not Mine Supply

The primary bottleneck identified by the IEA across all three scenarios is refining capacity, where China holds approximately 65% of global throughput, compounded by brine extraction permitting timelines. (IEA Critical Minerals) This is a processing-layer constraint, not a mine-production constraint - a distinction directly relevant to the North American processing landscape. Mine-production concentration, while significant (top-three countries at 74% of world output), is a

separate and less acute constraint than refining concentration. (USGS Mineral Commodity Summaries 2025 - Lithium chapter)

Table 3 - World Lithium Mine Production by Leading Country, 2024 Estimate

Country	Production (tonnes, contained metal)	Share of World Output*
Australia	88,000	14.0
Chile	49,000	7.5
China	41,000	6.4
Zimbabwe	22,000	3.4
Argentina	18,000	3.0
Top-3 combined	178,000	27.9
World total	240,000	37.8

Share computed over the world mine production total of 240,000 tonnes as reported by USGS. Note: USGS withholds US production data for lithium; the world total therefore excludes US output. Source: USGS Mineral Commodity Summaries 2025 - Lithium chapter. Data year: 2024 estimate.

Material-Flow Routes Into and Through North America Are Identified but Unquantified

Six material-flow routes are present in the source data. Three have named origins - China, South Korea, and Japan - and one has a named destination of the United States. The remaining routes have neither origin nor destination recorded. No route carries a volume figure or a reference period. (EU Comext / Eurostat) The data source for all six routes is EU Comext / Eurostat, which is a European trade-statistics system; its applicability to North American flows is not explained in the packet, and the confidence rating on all six routes is MEDIUM.

Table 4 - Identified Material-Flow Routes, Lithium, North America Context

Route #	Origin	Destination	Volume (tonnes)	Period	Source
1	China	Not recorded	Not recorded	Not recorded	EU Comext / Eurostat
2	South Korea	Not recorded	Not recorded	Not recorded	EU Comext / Eurostat
3	Japan	Not recorded	Not recorded	Not recorded	EU Comext / Eurostat
4	Not recorded	Not recorded	Not recorded	Not recorded	EU Comext / Eurostat
5	Not recorded	Not recorded	Not recorded	Not recorded	EU Comext / Eurostat
6	Not recorded	United States	Not recorded	Not recorded	EU Comext / Eurostat

Source: EU Comext / Eurostat, as ingested by LodeIQ. Confidence: MEDIUM on all routes. Note: No volume or period data are available for any route. The applicability of an EU trade-statistics source to North American flow mapping is not explained in the source packet and represents a data-quality caveat.

Named North American Processing and Recycling Participants Are Absent from the Retrieved Data

The source packet contains zero named participants in North American lithium processing or recycling. No facility names, company names, capacities, ownership structures, or operational statuses are present. This is the most significant gap in the landscape relative to the declared scope. The participant map cannot be drawn from the available data.

Beat 4 - Methodology and Alternative-Scenarios Note

> Methodology and Source Note

> This landscape synthesizes two primary source streams. Global demand projections and supply-demand balance figures derive from the IEA Global Critical Minerals Outlook 2024 (published by the International Energy Agency under CC BY 4.0 license), ingested as scenario-structured records with a data year of 2024 and a truth-audit date of 19 April 2026. Mine-production and concentration figures derive from the USGS Mineral Commodity Summaries 2025, Lithium chapter, reflecting 2024 estimated data. Material-flow route records are attributed to EU Comext / Eurostat; their coverage of North American trade flows is not confirmed in the packet.

> The three IEA scenarios (STEPS, APS, NZE) span a wide demand range and are not probability-weighted in the source data. The STEPS scenario is the most grounded in current policy reality; NZE represents a stretch case requiring policy acceleration well beyond current trajectories. A fourth scenario - a demand-contraction or technology-substitution case - is not present in the source data and cannot be constructed from the packet.

> The price figure (\$13,000 per tonne, falling trend) is a point-in-time USGS observation and does not carry a forward projection in the source data. Its interaction with investment incentives for North American processing and recycling capacity is a logical inference the data supports directionally but does not quantify.

> No North America-specific demand, capacity, or participant data were retrieved. The landscape therefore operates at global resolution for quantitative claims and cannot be disaggregated to the regional level without additional data ingestion.

Beat 5 - Balance of Risks

Risks to the outlook are tilted to the downside for North American processing and recycling capacity adequacy.

The concentration of approximately 65% of global lithium refining capacity in China creates a structural dependency that North American actors cannot readily substitute in the near term, given the absence of named domestic processing participants in the retrieved data. (IEA Critical Minerals) The falling price environment - lithium at \$13,000 per tonne on a declining trend - reduces the investment incentive for new processing and recycling capacity precisely when demand projections call for rapid capacity expansion. (USGS Mineral Commodity Summaries 2025 - Lithium chapter) Under the NZE scenario, a global supply deficit of 120,000 tonnes is already projected for 2030 against committed supply, and no committed supply figures exist for 2035 in any scenario, meaning the medium-term balance is structurally open. (IEA Critical Minerals) Brine extraction permitting timelines compound the refining bottleneck by constraining the feedstock pipeline. (IEA Critical Minerals) On the upside, the STEPS scenario projects a nominal global surplus of 80,000 tonnes at 2030, suggesting that if policy ambition remains at current levels and committed projects deliver on schedule, near-term tightness may be less acute than the higher scenarios imply. (IEA Critical Minerals)

Beat 6 - Freshness and Outlook

The quantitative backbone of this landscape rests on USGS Mineral Commodity Summaries 2025 data (2024 estimate year) and IEA Global Critical Minerals Outlook 2024 projections, with a truth-audit date of 19 April 2026. The USGS publication cycle is annual; the IEA outlook is updated annually. Given the pace of lithium market developments - price volatility, policy shifts, and capacity announcements - this landscape should be considered for refresh within six months, or sooner if a significant policy or price event occurs in North America.

The neutral outlook: global lithium demand is on a structurally rising trajectory across all three IEA scenarios, with the pace of increase determined primarily by EV adoption policy; the critical constraint is processing and refining capacity rather than mine supply; and North America's position within that global system - its participant base, its material flows, and its recycling infrastructure - remains uncharacterized at the level of resolution this landscape's declared scope requires, pending ingestion of regional-level data.

Data Limitations and Confidence

The following gaps materially limit this landscape and would need to be closed to raise confidence from LOW to MEDIUM or HIGH:

1. No named North American participants. Zero processing or recycling actors are present in the retrieved data. A participant registry drawing on company disclosures, DOE loan records, state permitting databases, or industry directories would be the single highest-value addition.
2. No quantified material-flow volumes. All six route records carry null volume and null period fields. Quantified trade flow data - ideally from USITC, Statistics Canada, or INEGI - would enable a genuine flow map.
3. No North America-specific demand or capacity figures. All demand projections are global. Regional disaggregation from IEA, BloombergNEF, or a licensed critical-minerals price-assessment or processing-capacity service would be required to assess North American market sizing.
4. No 2035 committed supply figure. The source packet records zero committed supply for 2035 across all scenarios, making the medium-term balance entirely open.
5. EU Comext / Eurostat as the route source. The applicability of a European trade-statistics system to North American lithium flow mapping is unexplained. Substituting or supplementing with USITC or UN Comtrade data would improve route-record reliability.
6. No recycling-specific data. The declared scope includes recycling explicitly; no recycling capacity, throughput, technology, or participant data are present in the packet.
7. Price carries no forward projection. The \$13,000/tonne falling-trend observation is a point-in-time figure; a price-path projection would be needed to assess investment economics for new capacity.

Methodology

This report is a single-pass synthesis over the cited source records as provided in the LodeIQ data packet. No external knowledge, outside databases, or analyst judgment beyond what the packet supports has been introduced. All counts derive from the packet's enumerated records. All shares name their population explicitly. Forward statements use hedged language consistent with scenario-dependent projections.

This report is intelligence, not investment advice. It describes a market state and trajectory; it does not recommend any action, investment, or commercial decision.

Source note: 1 narrative reference to commercial data services not licensed by LodeIQ was replaced with a dataset-class description after composition, per LodeIQ's source-authority policy. Substitutions are deterministic and always disclosed here.

Figures

label	start value	end value	is focus
STEPS	420000	580000	false
APS	510000	750000	false
NZE	620000	1000000	true

Figure 1: Market - demand outlook, 2030 -> 2035

Source: LodeIQ computed rollup over 14 packet records (3 sources: USGS Mineral Commodity Summaries 2025 - Lithium chapter; EU Comext / Eurostat; IEA Critical Minerals).
Computed deterministically by LodeIQ from the report's source packet - Source tier: T3

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