*The information and statistics set out in this section and other sections of this document were extracted from official government publications and other publicly available sources as well as from the independent industry report prepared by Frost & Sullivan (the "**Frost & Sullivan Report**")*. The Company engaged Frost & Sullivan to prepare the Frost & Sullivan Report in connection with the [**REDACTED**]. The information from official government sources has not been independently verified by us, any of the Joint Sponsors, [**REDACTED**] any of their respective directors and advisers, or any other persons or parties involved in the [**REDACTED**], and no representation is given as to its accuracy. For discussion of risks related to the Group's industry, see "Risk Factors — Risks Relating to Our Business and the Industry in Which We Operate" in this document.

SOURCE OF INFORMATION

We engaged Frost & Sullivan, an independent market research consultant, to conduct an analysis of, and to prepare the Frost & Sullivan Report about, the lithium-ion battery cathode and precursor materials, critical metal resource, and lithium-ion battery recycling market. Frost & Sullivan is an independent global consulting firm founded in 1961 in New York and its services include, among others, industry consulting, market strategic consulting and corporate training. In connection with the market research services provided, we have paid a fee of RMB850,000 to Frost & Sullivan, which we believe to be consistent with market rates.

In compiling and preparing the Frost & Sullivan Report, Frost & Sullivan conducted (i) primary research includes interviewing industry participants, competitors, downstream customers and recognized third-party industry associations; and (ii) secondary research includes reviewing corporate annual reports, databases of relevant official authorities, as well as the exclusive database established by Frost & Sullivan over the past decades. The market projections in the Frost & Sullivan Report are based on the following key assumptions during the forecast period: (i) the social, economic and political conditions in global markets discussed will remain stable during the forecast period, (ii) government policies on global and China lithium-ion battery cathode and precursor materials, critical metal resource, and lithium-ion battery recycling market will remain consistent during the forecast period, and (iii) lithium-ion battery cathode and precursor materials, critical metal resource, and lithium-ion battery recycling market will be driven by the factors which are stated in the Frost & Sullivan Report.

Except as otherwise noted, all the data and forecasts contained in this section are derived from the Frost & Sullivan Report. The commissioned report has been prepared by Frost & Sullivan independently without the influence from the Company or other interested parties. Our Directors confirm that, to the best of their knowledge, after making reasonable inquiries, there is no material and adverse change in the market information since the date of the Frost & Sullivan Report, which may qualify, contradict or have an impact on the information in this section.

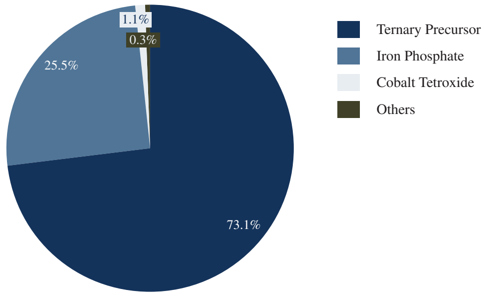
LITHIUM-ION BATTERY CATHODE AND PRECURSOR MATERIALS MARKET ANALYSIS

Definition and Classification of New Energy Materials

New energy materials broadly refer to the key functional materials used in lithium-ion batteries, including cathode materials and their precursors, anode materials, electrolytes, separators and related auxiliary components. Among them, cathode materials are the most critical components, accounting for over 50% of the total value of a battery cell and serving as the critical factor for energy density, cycle life, safety and cost. Cathode materials are produced from precursors through high-temperature solid-state reactions with lithium or sodium. The quality parameters of the precursor including its composition, particle size and impurity level, directly determines the performance and stability of cathode materials. As a result, precursors are the most critical raw materials in the cathode production, accounting for over 50% of the total value of the cathode materials, underscoring their strategic importance within the broader new energy materials value chain.

By primary metal elements, cathode materials are divided into ternary materials (nickel cobalt manganese/nickel cobalt aluminum), lithium cobalt oxide (LCO), and lithium iron phosphate (LFP). Ternary materials and LFP are the mainstream technology routes for EV batteries and energy storage batteries, while LCO with high volumetric energy density dominates 3C electronics batteries. Their precursor materials are ternary precursor, cobalt tetroxide and iron phosphate, respectively. Among these, and in terms of sales revenue, the ternary precursor and cobalt tetroxide products on which the Company focuses accounted for 73.1% and 1.1%, respectively, of the total lithium-ion battery precursor materials market in 2025.

Sales Value of Lithium-ion Battery Precursor Materials Breakdown by Material Types, Global, 2025



Comparison of Mainstream New Energy Battery

Classification	Nickel-based Materials		Cobalt-based Materials	Phosphorus-based Materials
Precursor	Ternary Precursor		Cobalt Tetroxide	Iron Phosphate
Cathode Materials	Nickel cobalt manganese	Nickel cobalt aluminum	LCO	LFP
Chemical Formula	$Li(Ni_XCo_YMn_Z)O_2$	$Li(Ni_XCo_YAl_Z)O_2$	$LiCoO_2$	$LiFePO_4$
Energy Density (Wh/kg)	High		High	Medium
Cycle Life (Times)	Medium		Medium	High
Safety	Medium	Medium	Medium	High
Cost	Medium	Medium	High	Low
Main Application Scenarios	• EV batteries, ESS batteries, low-altitude aircraft batteries, humanoid robot batteries, etc.		• 3C electronics batteries	• EV batteries, ESS batteries

Source: Frost & Sullivan

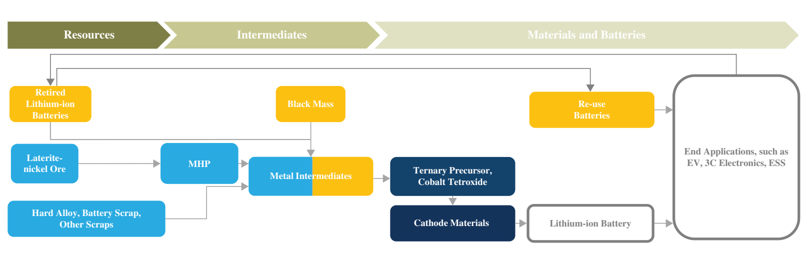
Ternary materials feature high energy density, good low-temperature performance, high charge/discharge rate, and they have become core power solutions for long-range vehicles, low-altitude aircrafts, humanoid robots, super fast charging scenarios, extreme low-temperature scenarios, and solid-state batteries. By nickel content, ternary materials and their precursors are categorized into high-nickel and low-and-mid-nickel. High-nickel cathodes include nickel cobalt manganese or nickel cobalt aluminum 8- and 9-series with above 80 mol% of nickel. Low-and-mid-nickel cathodes include nickel cobalt manganese or nickel cobalt aluminum with less than 80 mol% of nickel.

High-nickel ternary precursors will be the future direction of ternary precursor technologies. At present, ternary materials are moving toward higher nickel content to raise battery energy density, making batteries more compact and suitable for high-performance and emerging applications. However, higher nickel content also brings greater technical challenges, as a higher nickel proportion tends to reduce the structural stability of the material and increase its sensitivity to moisture and oxygen during production and storage, which may compromise the consistency and long-term performance of cathode materials. As mass-production technologies advance, high-nickel ternary batteries are expected to achieve improved performance and further consolidate their role as a core next-generation battery solution.

Value Chain of Cathode and Ternary Precursor Materials

The industry value chain of cathode and precursor materials spans the entire process from upstream recycling and mining, through midstream smelting and refining, to downstream new energy materials manufacturing and end applications. At the upstream stage, raw materials are acquired both from mineral extraction such as laterite nickel ore, and from recycling streams including retired lithium-ion batteries, and hard alloy. Midstream smelting and refining convert these raw materials into intermediates such as MHP, black mass, and other metal intermediates. At the downstream stage, these refined compounds are used as feedstock for the production of ternary precursors, cobalt tetroxide and cathode materials. As the single most valuable component in a battery cell, cathode materials are then integrated into lithium-ion battery manufacturing.

Value Chain of Cathode and Ternary Precursor Materials

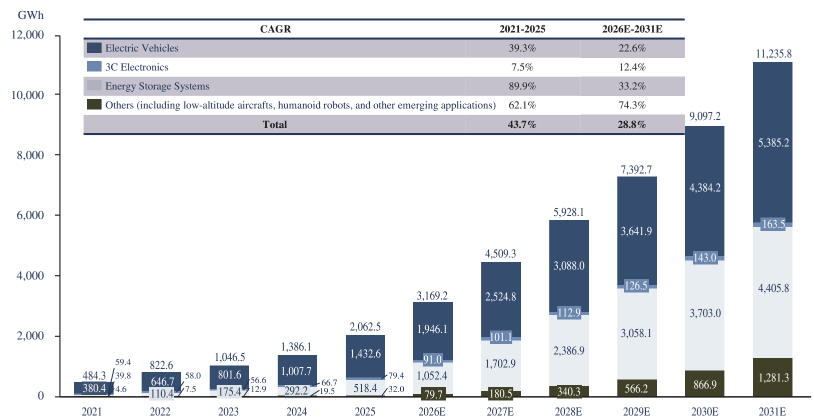


Source: Frost & Sullivan

Global Lithium-ion Battery Shipments

As the primary downstream application for cathode materials, lithium-ion batteries have seen surge in shipments with the accelerated penetration of new energy applications. The global shipment of lithium-ion batteries grew rapidly from 484.3 GWh in 2021 to 2,062.5 GWh in 2025, representing a CAGR of 43.7% from 2021 to 2025. Looking ahead, the global shipment of lithium-ion batteries is expected to reach 11,235.8 GWh by 2031, representing a CAGR of 28.8% from 2026 to 2031. With the continued acceleration of the "electrification, intelligence, and connectivity" trends in the automotive sector, EV sector is expected to remain the dominant driver of lithium-ion battery demand and will continue to expand its leading position in the future. In addition, ESS and other emerging applications are also among the fast-growing downstream sectors.

Lithium-ion Battery Shipments (by Downstream Application), Global, 2021-2031E



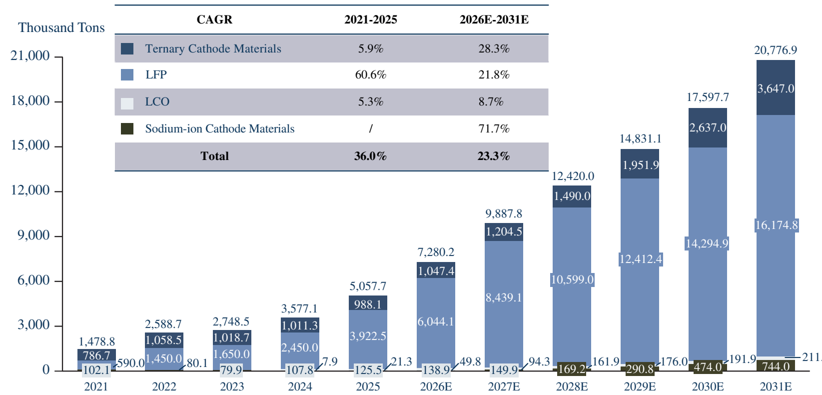
Source: Frost & Sullivan, International Organization of Motor Vehicle Manufacturers

Global Market Size of Cathode Materials for Lithium-ion Batteries

Driven by strong demand for lithium-ion batteries, the global lithium-ion cathode materials market has expanded rapidly. From a structural perspective, lithium-ion battery cathode materials have two major technology routes. The first one is the strategic high-energy-density route represented by ternary cathode materials, which generally have higher average selling price than that of cathode materials in the cost-driven route, such as LFP. Ternary cathode materials will remain competitive with their high energy density, good low-temperature performance, and high charge/discharge rate capability, which are critical for long-range EVs, high-performance EVs, and emerging applications such as low-altitude aircrafts and humanoid robots. Ternary cathode materials, especially high-nickel ternary cathode materials, are poised to become the key focus in the future development. With major battery manufacturers accelerating the advancement of pilot and mass-production lines, as well as supply chain development for solid-state battery technology, solid-state batteries are expected to begin commercialization. Since solid-state electrolytes require cathodes with higher energy density to maximize their performance, the advancement of solid-state batteries will further raise the demand for high-energy-density cathode materials. The second is a cost-driven route represented by LFP and sodium-ion batteries. LFP's energy density constraints will narrow its competitiveness within low- to mid-end EVs and in ESS. Meanwhile, sodium-ion batteries with safety and cost advantages, and better low-temperature performance similar to LFP batteries are emerging as a potential alternative.

Based on the analysis above, the growing demand for cost-driven lithium-ion batteries has had a limited impact on high-energy-density batteries. This is primarily because the two technology routes target different downstream application fields. Cost-driven lithium-ion batteries, represented by LFP and sodium-ion batteries, mainly serve downstream sectors such as ESS and low- to mid-end electric vehicles, whose rapid expansion in recent years has been driven by large-scale commercial deployment and cost advantages. In contrast, high-energy-density batteries are mainly applied in long-range, high-end electric vehicles, electric vehicles with ultra-fast charging as well as emerging high-performance applications such as low-altitude aircrafts and humanoid robots, where energy density, endurance, and power output are critical. As these high-performance and intelligent applications continue to develop, demand for high-energy-density batteries is expected to grow steadily in the long term.

Lithium-ion Battery Cathode Materials Shipments (by Major Cathode Materials), Global, 2021-2031E



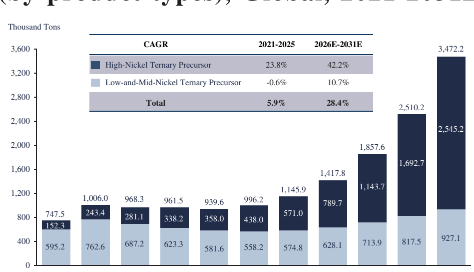
Source: Frost & Sullivan, International Organization of Motor Vehicle Manufacturers

Global Ternary Precursor and Cobalt Tetroxide Market Size

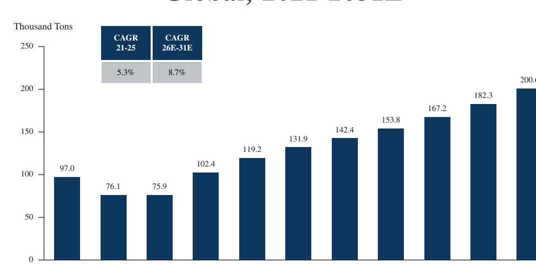
Ternary precursors such as nickel cobalt manganese/nickel cobalt aluminum are critical raw materials for producing ternary cathodes. In recent years, ternary precursors have shifted to high-nickel formulations, including 8- and 9-series, driven by the trend of long-range and high-performance EVs and new demand from emerging applications such as low-altitude aircrafts and humanoid robots, with the penetration rate of high-nickel ternary precursors expected to increase significantly in the coming years. High-nickel ternary precursors are expected to remain the fastest-growing segment within ternary precursors, while low- and mid-nickel ternary precursors are expected to grow at a relatively slower pace.

Cobalt tetroxide is a precursor material for LCO batteries, primarily used in 3C electronics, including smartphones, tablets, and smart wearables. Over the past five years, due to a fall in global demand for 3C electronics in 2022 and 2023, the demand for cobalt tetroxide has grown at a slower pace. In the future, AI applications are expected to accelerate product innovations and replacement cycles in 3C electronics, while the rapid adoption of AI is also raising performance levels of 3C electronics and increasing battery capacity requirements per device, thereby supporting demand for cobalt tetroxide.

Shipment Volume of Ternary Precursors (by product types), Global, 2021-2031E



Shipment Volume of Cobalt Tetroxide, Global, 2021-2031E



Source: Frost & Sullivan, International Organization of Motor Vehicle Manufacturers, International Monetary Fund

Growth Drivers of the Global New Energy Materials Market

Robust growth in downstream industries and emerging applications: The steady expansion of key downstream sectors such as EVs, 3C electronics, and ESS continues to stimulate battery demand. The global passenger EV market is expected to maintain robust growth, with sales volume projected to rise from 22.4 million units in 2025 to 62.6 million units in 2031, representing a CAGR of 18.1% from 2026 to 2031. The global penetration rate of EVs in total PV sales is also forecast to increase from 26.7% in 2025 to nearly 60% by 2031. The expansion of the EV sector will result in higher demand for cathode materials and their precursors. In addition, as vehicles become more intelligent, with continuous performance upgrades and longer driving ranges, the battery capacity requirement per vehicle is rising and therefore creating higher demand for high-energy-density cathode materials and their precursors.

The global 3C electronics market is expected to grow steadily, driven by the recovery of product shipments since 2024 and emerging applications such as AR/VR, as well as the introduction of new technologies and products such as AI smartphones and AI PCs, which raise battery density requirements per device and further drive demand for cathode materials and their precursors. In the energy storage market, the global ESS batteries shipment has grown from 39.8 GWh in 2021 to 518.4 GWh in 2025, and is projected to reach 4,405.8 GWh in 2031, with a CAGR of 33.2% from 2026 to 2031, further driving demand for new energy materials. Emerging applications also further drive demand for new energy materials. Global robot batteries shipments are expected to grow from 13.7 GWh in 2025 to 94.8 GWh in 2031, and global low altitude aircraft battery shipments are expected to grow from 6.6 GWh in 2025 to 140.7 GWh in 2031. Robots and low-altitude aircrafts are becoming new applications for high-performance batteries featured by high energy density and long cycle life, which makes high-nickel ternary batteries and solid-state batteries among the most compatible technology pathways. The rise of demand for next-generation battery solutions accelerates innovations in high-performance cathode materials and advanced material technologies to meet the specific requirements of emerging applications.

Policy support lays a solid foundation for the market development: In China, the *Electric Vehicle Industry Development Plan (2021-2035)* sets development targets for 2035, with a strong focus on breakthroughs in next-generation battery technologies. Solid-state battery R&D is identified as a top priority, while high-nickel ternary cathode materials — owing to their higher energy density and strong compatibility with solid electrolytes are expected to play an important role. Meanwhile, the European Union has introduced the *Net-Zero Industry Act* to accelerate the localization of the battery manufacturing and promote technology innovation.

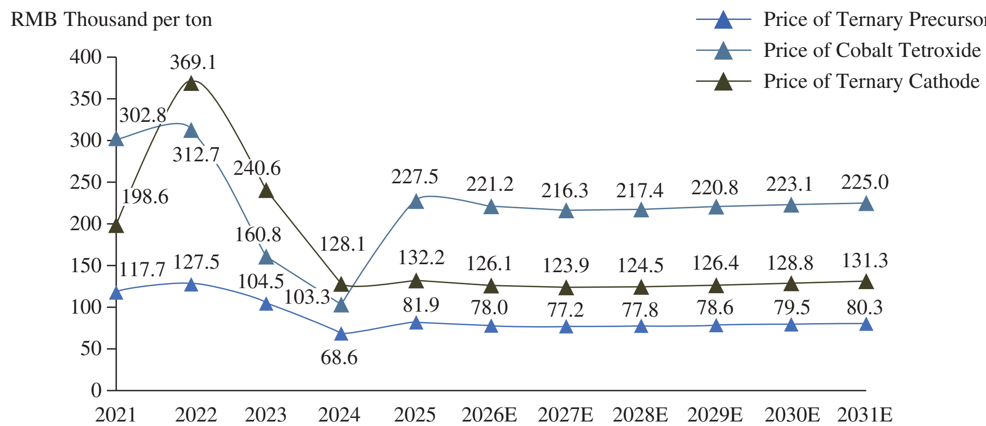
Price Analysis of Ternary Precursors, Cobalt Tetroxide, and Ternary Cathode Materials

The price of ternary precursors is primarily influenced by supply-demand dynamics and fluctuations in upstream raw material prices, particularly nickel and cobalt. Supported by rapid growth in EV battery demand and rising raw material prices, ternary precursor prices increased significantly before declining in recent years due to rapid upstream capacity expansion and a moderation in downstream demand growth. In 2025, ternary precursor prices increased mainly due to higher upstream raw material costs, particularly the rise in cobalt sulphate prices, while the tight supply of certain nickel salts further supported the increase in prices. As demand for ternary batteries continues to grow in line with the expansion of the electric vehicle industry and emerging applications, demand for ternary precursors is expected to remain steady. Meanwhile, the rapid increase in nickel intermediate supply, particularly from HPAL projects in Indonesia, has intensified market competition and exerted downward pressure on prices. Over the forecast period, supported by raw material cost pass-through, product mix upgrades toward higher-nickel grades, and relatively elevated localized manufacturing costs, prices are expected to recover moderately.

From 2021 to 2022, driven by growing demand from the 3C electronics sector and rising cobalt prices, the price of cobalt tetroxide increased. Since then, however, weaker demand in the 3C market has led to a price decline. During the forecast period, the price trend of cobalt tetroxide is expected to be shaped by both recovering demand and easing raw material costs. In 2025, prices of cobalt tetroxide increased significantly, primarily due to the sharp rise in cobalt raw material prices following supply tightening caused by export restrictions in the DRC, while downstream restocking demand further amplified the price increase. Following this short-term peak, prices are expected to decline moderately as cobalt supply normalises and production costs decrease. Thereafter, prices are expected to remain relatively stable.

From 2021 to 2022, the price of ternary cathode materials increased significantly before declining in the following years. Looking ahead, the price is expected to remain stable over the forecast period. The overall price trend is broadly consistent with that of ternary precursors.

Price of Ternary Precursor, Cobalt Tetroxide and Ternary Cathode Materials, Global, 2021-2031E



Source: Frost & Sullivan

The average selling price of the Company's major products, including ternary precursors, cobalt tetroxide, and ternary cathode materials, is highly correlated with production cost as well as the overall supply and demand dynamics of the market. From the cost perspective, product prices move in line with the prices of key raw materials such as nickel and cobalt, which increased from 2021 to 2022 and then declined thereafter. From the supply and demand perspective, driven by the surge in demand for electric vehicles since 2021, the markets for ternary precursors, and ternary cathode materials experienced temporary undersupply, resulting in a significant price increase. Subsequently, as major market participants rapidly expanded production capacity, the market shifted into oversupply, leading to a notable decline in prices. Specifically, global lithium-ion battery manufacturing capacity expanded sharply from 434.2 GWh in 2020 to 1,981.3 GWh in 2022. However, capacity expansion outpaced demand growth during this period, resulting in a slowdown in actual output growth. Consequently, the overall capacity utilization rate declined notably — from approximately 60.5% to around 41.5% — leading to a temporary oversupply in the market, which substantially alleviated the earlier capacity bottleneck and exerted significant downward pressure on product prices. As a result of both lower raw material prices and the easing of capacity constraints, the prices of these products declined significantly after 2022. From the perspective of individual companies, variations in product mix, which in turn lead to differences in contractual arrangements, may result in deviations between specific company's performance and the overall industry trends.

Global Competitive Landscape of the Precursor Materials Market

From the perspective of the overall competitive landscape, the overall new energy materials market is a highly broad concept that encompasses multiple distinct sub-segments. These segments vary significantly in terms of technical characteristics, industrial chains and application scenarios, and therefore are not directly comparable under a unified market ranking framework. As such, there is no industry-recognized methodology or data source that provides consolidated ranking statistics for the overall new energy materials market.

From the perspective of competitive landscape, the global ternary precursor materials market in which the Group primarily operates is highly concentrated, with leading companies holding dominant market shares. In particular, Chinese enterprises, leveraging advantages in technology, resources, scale, cost control and vertical integration, have already built strong competitiveness and secured leading global positions.

From an industry perspective, shipment volume is commonly used as a fair statistical metric in the new energy materials market, mainly because it can exclude the impact of price fluctuations and objectively reflect industry conditions, including competition and overall market dynamics.

Ternary Precursors

In 2025, global ternary precursor shipments are 939.6 thousand tons, and the top three companies together account for 56.0%, indicating a highly concentrated landscape. Among them, the Company's shipments are 149.8 thousand tons, ranking third globally among ternary precursor players, with a market share of 15.9%. From the perspective of sales revenue, global ternary precursor market size is approximately RMB76.9 billion and the top three companies together account for 53.8%, indicating a highly concentrated landscape. Among them, the Company's sales revenue is RMB11.5 billion, ranking third globally among ternary precursor players, with a market share of 15.0%.

Ranking and Market Share of Ternary Precursor Suppliers (by Shipments), Global, 2025

Ranking	Company Name	Shipments	Market Share
		(thousand tons)	*(%)*
1.	Company A	214.2	22.8
2.	Company B	162.5	17.3
3.	**The Company**	**149.8**	**15.9**
4.	Company C	108.4	11.5
5.	Company D	58.3	6.2
	Others	246.4	26.2
Total . .		939.6	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) Company A is a listed company, founded in 2014 and headquartered in Guizhou, China. It focuses on new energy materials and metal products, with operations covering precursor materials, nickel and cobalt intermediates, and lithium-ion battery recycling. The company has multiple large-scale production bases across China and Southeast Asia, with annual output exceeding 200 thousand metal tons of nickel and cobalt products.

(2) Company B is a subsidiary of a listed company, founded in 2005 and headquartered in Guangdong, China. It focuses on lithium-ion battery recycling and materials regeneration, operating a closed-loop industrial chain that integrates waste battery collection, dismantling, metal extraction and precursor production. The company has several large-scale recycling and refining bases in China, and plays a strategic role within its parent group's new energy materials business.

(3) Company C is a listed company, founded in 2002 and headquartered in Zhejiang, China. It focuses on new energy lithium-ion battery materials, notably nickel, cobalt, and lithium products, with a complete value chain from mining and refining to precursor manufacturing and recycling. It is among the largest integrated producers in the cobalt and nickel chemical materials market globally.

(4) Company D is a subsidiary of Company F, founded in 2003 and headquartered in Gansu, China. It focuses on the production and sales of cobalt salts and nickel salts, serving as an important upstream supplier for precursor and cathode material manufacturers. The company has established production bases in Gansu and other regions and operates under its parent group's non-ferrous metal processing and chemical materials business.

Ranking and Market Share of Ternary Precursor Suppliers (by Sales Revenue), Global, 2025

Ranking	Company Name	Sales Revenue	Market Share
		(RMB billion)	*(%)*
1.	Company A	16.7	21.7
2.	Company B	13.2	17.2
3.	**The Company**	**11.5**	**15.0**
4.	Company C	4.5	5.8
5.	Company D	4.1	5.3
	Others	26.9	35.0
Total . .		76.9	100.0

Source: Frost & Sullivan, Companies' Annual Report

The high-nickel ternary precursor market is more concentrated due to its higher barrier in technology, manufacturing and product quality control, with the top three companies together accounting for 81.3% of the market share. Among them, the Company's shipments are 105.0 thousand tons, ranking second globally among high-nickel ternary precursor players with a market share of 29.3%.

Ranking and Market Share of High-Nickel Ternary Precursor Suppliers (by Shipments), Global, 2025

Ranking	Company Name	Shipments	Market Share
		(thousand tons)	*(%)*
1.	Company A	127.5	35.6
2.	**The Company**	**105.0**	**29.3**
3.	Company C	58.6	16.4
4.	Company B	32.8	9.2
5.	Company D	6.9	1.9
	Others	27.2	7.6
Total . .		358.0	100.0

Source: Frost & Sullivan, Companies' Annual Report

Note:

(1) High-nickel ternary precursors refer to ternary precursors of 8-series and 9-series.

Cobalt Tetroxide

In 2025, global cobalt tetroxide shipments are 119.2 thousand tons, with the top three companies together accounting for 68.2% of the market share, indicating a highly concentrated market landscape. Among them, the Company's shipments in 2025 are 29.0 thousand tons, ranking as the world's second-largest cobalt tetroxide supplier, with a market share of 24.3%. From the perspective of sales revenue, global cobalt tetroxide market size is approximately RMB19.0 billion and the top three companies together account for 62.7%, indicating a highly concentrated landscape. Among them, the Company's sales revenue is RMB5.5 billion, ranking first globally among cobalt tetroxide players, with a market share of 29.0%.

Ranking and Market Share of Cobalt Tetroxide Suppliers (by Shipments), Global, 2025

Ranking	Company Name	Shipments	Market Share
		(thousand tons)	*(%)*
1.	Company A	35.5	29.8
2.	**The Company**	**29.0**	**24.3**
3.	Company C	16.8	14.1
4.	Company E	16.2	13.6
5.	Company F	11.5	9.6
	Others	10.2	8.6
Total . .		119.2	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) Company E is a listed company, founded in 1997 and headquartered in Fujian, China. It focuses on tungsten and molybdenum, including mining, smelting and processing, as well as new energy materials. The company is among the largest tungsten producers in China, with an integrated industrial chain and multiple production bases nationwide.

(2) Company F is a state-owned enterprise, founded in 1959 and headquartered in Gansu, China. It focuses on non-ferrous metal mining, smelting and chemical material processing, with operations covering nickel, cobalt and copper production. The company operates through multiple subsidiaries, including a listed platform engaged in international resource development and trading, and is among the world's major producers of nickel and cobalt.

Ranking and Market Share of Cobalt Tetroxide Suppliers (by Sales Revenue), Global, 2025

Ranking	Company Name	Sales Revenue	Market Share
		(RMB billion)	*(%)*
1.	**The Company**	**5.5**	**29.0**
2.	Company A	4.4	23.2
3.	Company C	2.0	10.5
4.	Company E	1.8	9.5
5.	Company F	1.2	6.3
	Others	4.1	21.5
Total . .		19.0	100.0

Ternary Cathode Material

The global ternary cathode material market features a relatively concentrated competitive landscape. In 2025, global shipments are 988.1 thousand tons, and the top five companies together account for 58.8% of total market share.

Ranking and Market Share of Ternary Cathode Material Suppliers (by Shipments), Global, 2025

Ranking	Company Name	Shipments	Market Share
		(thousand tons)	*(%)*
1	Company P	193.0	19.5
2	Company Q	105.4	10.7
3	Company O	102.3	10.4
4	Company B	92.7	9.4
5	Company R	87.3	8.8
	Others	407.4	41.2
Total . .		988.1	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) The Company ranks among the top 15 in this market, accounting for a market share of 2.7% with a shipment volume of 26.6 thousand tons.

(2) Company O is a listed company, founded in 2014 and headquartered in Zhejiang, China. It focuses on the research, development and production of lithium-ion battery materials, with major products including ternary precursor materials and related advanced materials. The company has established production facilities in multiple regions in China and operates an integrated business model covering R&D, manufacturing and sales, serving as an important supplier to lithium-ion battery manufacturers and new energy enterprises.

(3) Company P is a subsidiary of Company F, founded in 2006 and headquartered in Jiangsu, China. It focuses on the development and production of cathode materials for lithium-ion batteries, including ternary cathode materials, lithium manganese oxide and LFP. The company has established large-scale production facilities in China and provides key cathode materials to major battery manufacturers, supporting applications in consumer electronics, energy storage and electric vehicles.

(4) Company Q is a subsidiary of Company C, founded in 2002 and headquartered in Tianjin, China. It focuses on the development and manufacturing of lithium-ion battery cathode materials, with major products covering ternary cathode materials and LCO. The company has developed comprehensive capabilities spanning product R&D, large-scale manufacturing and quality control, operates multiple production bases in China, and is one of the core cathode material suppliers within Company C's new energy materials business.

(5) Company R is a listed company founded in 2002 and headquartered in Hunan, China. It focuses on the R&D, production and sales of lithium-ion battery cathode materials. Its major products include ternary cathode materials, lithium iron phosphate cathode materials and lithium cobalt oxide cathode materials. The company has developed an integrated business layout covering product development, large-scale manufacturing, quality control and market supply, and serves a wide range of downstream applications in electric vehicles, energy storage and consumer electronics.

Barriers to Entry in the Global New Energy Materials Market

The new energy materials industry is characterized by significant **technology barriers**, **resource barriers**, **client barriers**, and **capital barriers**. Technology barriers arise because the product performance, cost control, and quality management of lithium-ion battery materials are closely tied to technology strength. For example, high-nickel ternary precursors require comprehensive expertise in material synthesis, impurity removal, production processes, and safety. Companies that master core synthesis and calcination technologies, as well as upstream and downstream integrated production capabilities, are better positioned to improve product performance and reduce production costs, thereby enhancing competitiveness. Resource barriers arise because raw materials represent the most significant cost component in the industry. Leading enterprises often establish long-term strategic partnerships with upstream suppliers or develop self-owned mines and smelting and refining capacities in resource-rich countries to ensure stable and diversified raw material supply while creating cost advantages. Client barriers arise from the long-term cooperation and credibility established with downstream customers. Industry leaders typically accumulate high-quality client bases and enter into long-term agreements or strategic partnerships, which usually require years of testing and verification and make it difficult for new entrants to acquire customers. Capital barriers arise because the new energy materials industry is highly capital-intensive, requiring significant investments in equipment, production facilities, and ongoing R&D. Enterprises with stronger capital strength are able to expand capacity, sustain R&D investment, and achieve economies of scale, thereby maintaining competitiveness.

ANALYSIS OF THE CRITICAL METAL RESOURCE MARKET

Definition, Classification, and Strategic Importance of Critical Metal Resources

Critical metal resources demonstrate high economic and strategic value, forming the foundation of advanced manufacturing, energy, and information technology sectors. From an industry perspective, critical metal resources span diverse categories: critical new energy metals, including nickel, cobalt, and lithium, underpin new energy materials; other critical metals, including tungsten, indium, and germanium, serve as core materials for high-end manufacturing; bulk metals, including iron, manganese, and copper, provide the basic raw materials for the traditional industrial manufacturing. The strategic value of critical metal resources, particularly critical new energy metals, stems from the intrinsic nature of their "irreplaceable functions" and "unstable supply chains". Nickel and cobalt are core to lithium-ion batteries and underpin the global energy transition, and tungsten is indispensable in high-end manufacturing because of its exceptional hardness and heat resistance.

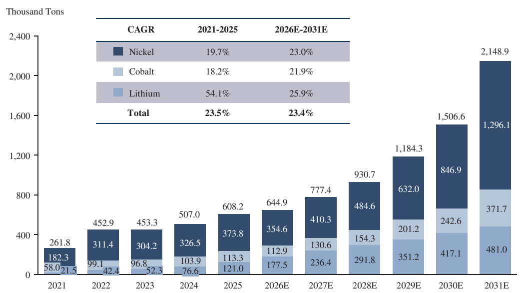
The distribution of nickel, cobalt, and lithium reserves is highly concentrated. China has relatively low reserves of these three key resources: China's nickel, cobalt, and lithium reserves only account for 3.0%, 1.1%, and 6.0% of global reserves, respectively. However, with the rapid development of the new energy industry, the imbalance between domestic supply and demand in these critical new energy metal resources resulted in greater external dependence. Currently, nearly 90% of China's nickel, cobalt, and lithium resources rely on imports, making supply stability more prominent. The battery recycling industry has emerged as a vital supplement to mineral materials. The recycling of critical metals from retired batteries is expected to become an important approach to address resource shortages in the new energy industry in the future. Meanwhile, ensuring self-sufficiency in critical metals has become strategically important to industrial security and resource independence. To address this, countries can optimize resource-allocation policies, and strengthen recycling capability to secure the supply chain for critical metals.

Analysis of Demand for Critical New Energy Metals in the Lithium-ion Battery Sector and Critical Energy Metal Recycling Market

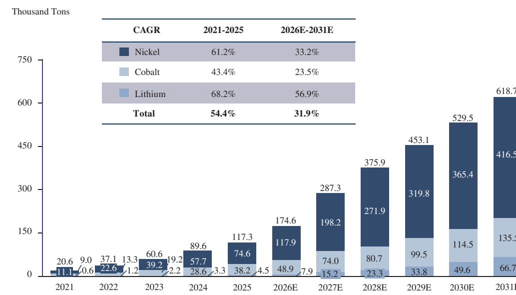
In China's lithium-ion battery sector, demand for critical new energy metals continues to grow alongside the expansion of new energy applications. Nickel, cobalt, and lithium demand are expected to increase significantly in the coming years. At the same time, supported by policies promoting environmental protection and resource stability, the proportion of recycled metals is increasing.

In terms of the critical energy metal recycling volume, China is the world's largest critical energy metal recycling market, accounting for the vast majority of the global market share. Nickel, cobalt, and lithium recycling volumes are expected to increase significantly in the coming years. With the upcoming wave of battery retirements from EVs and other sectors, the increasing recycling volumes provide a critical supply channel for raw materials and foster the circular economy of critical metals.

Demand for Critical New Energy Metals in the Lithium-ion Battery Sector, China, 2021-2031E



Nickel, Cobalt, and Lithium Recycling Volume, China, 2021-2031E



Source: Frost & Sullivan, United States Geological Survey, International Organization of Motor Vehicle Manufacturers

Analysis of Driving Factors in the Critical Energy Metal Recycling Market

Economic Benefits of the Recycled Materials. Heightened price volatility of critical energy metals such as nickel, cobalt, and lithium, combined with the scarcity of critical energy metal resources, has continued to drive up the cost of critical metals, making recycling a cost-effective measure across the value chain. In addition, large-scale retirement waves of batteries provide ample feedstock for the recycling market. Recycled metals can be directly reintegrated into the value chain, for example, regenerated lithium and cobalt can be reused in new energy materials production — thereby underscoring their growing economic value.

Hydrometallurgical Technology Driving Industry Advancement. Under ESG-driven strategies, hydrometallurgy is emerging as the core route for critical metal recycling due to its efficient selective leaching and separation advantages. In nickel, cobalt, and lithium recycling, hydrometallurgy achieves recovery rates of above 95% while lowering energy consumption and processing costs. Compared with pyrometallurgy, hydrometallurgy can process limonite ore and complex and different waste-battery systems, reduces pollution, and delivers higher product purity and consistency, strengthening industry competitiveness in terms of cost advantages and environment compliance.

Policy-Driven Industry Advancement. Policy support continues to empower critical metal recycling. Measures such as the *Guidance on Accelerating the Construction of Waste Recycling Systems* (關於加快構建廢棄物循環利用體系的意見) promote the rollout and optimization of recycling networks (e.g., regional recycling centers), while driving the integration of professional operations with Internet of Things technologies to enable intelligent sorting and online scheduling that help reduce costs. In addition, policies emphasize more stringent requirements on the use of recycled metal content in batteries. For example, under EU battery regulations, by 2031 the minimum level of recycled nickel, cobalt, and lithium content in batteries must reach approximately 16%, 6% and 6%, respectively. Against this backdrop, recycling is trending toward greater scale and high concentration with more large-cap enterprises winning market shares from smaller players. Leading international enterprises also set procurement standards that incorporate requirements on minimum level of recycled nickel, cobalt, and lithium content.

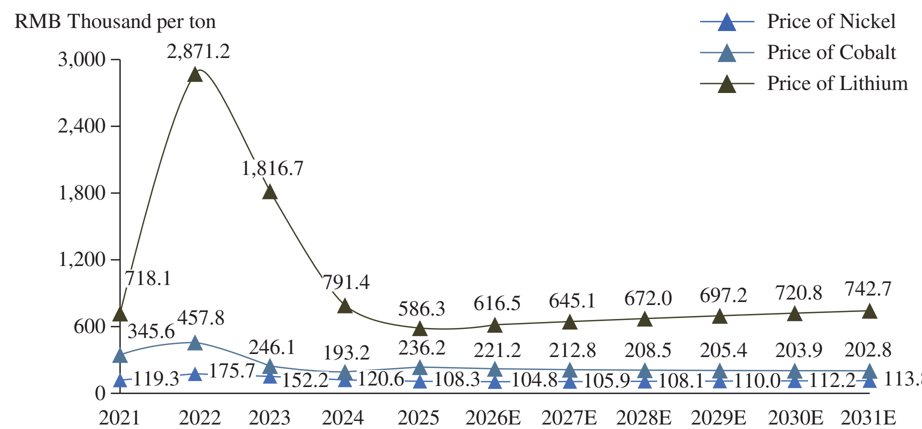
Price Analysis of Critical Energy Metals

Nickel is a critical raw material for ternary precursors. The direct nickel raw materials are typically nickel sulfate, produced either from high-purity nickel or from intermediates such as MHP. The pricing for nickel, metal intermediates, and high-purity nickel is typically set with reference to the LME nickel price, with discount rates that vary by nickel content, and lower nickel content generally carries a larger discount. Accordingly, prices of nickel sulfate, MHP, and nickel matte are closely linked to nickel. From 2021 to 2025, nickel prices increased significantly during the earlier stage of rapid EV battery demand growth and subsequently declined as market supply expanded. From 2026 to 2031, nickel prices are expected to show a mild upward trend, supported by steady demand growth from the electric vehicle and battery materials industries and the gradual stabilisation of global nickel supply.

The pricing for cobalt intermediates is typically set with reference to the MB cobalt price, subject to applicable discount rates. Cobalt prices increased from 2021 to 2022 and then declined through 2023 and 2024. In 2025, cobalt prices rebounded due to temporary supply tightening, partly influenced by the DRC's temporary export restrictions on cobalt intermediates and related supply chain bottlenecks. From 2026 to 2031, cobalt prices are expected to decline gradually as global cobalt production recovers and supply conditions ease, while downstream demand from the 3C electronics and electric vehicle battery sectors helps maintain market balance.

Lithium is a key upstream raw material for lithium-ion batteries. From 2021 to 2025, lithium prices experienced a sharp surge during the earlier stage of rapid capacity expansion in the electric vehicle and battery materials sectors and later declined significantly following the release of new supply and the easing of short-term market speculation. From 2026 to 2031, lithium prices are expected to remain relatively stable after a brief adjustment, supported by steady demand growth from electric vehicles, energy storage, and consumer electronics applications. As the global lithium supply-demand balance gradually improves and downstream procurement becomes more rational, lithium prices are expected to stabilise.

Price of Nickel, Cobalt and Lithium, Global, 2021-2031E



Source: Frost & Sullivan

Ranking of Critical Energy Metals Recycling Industry

Nickel Recycling

In 2025, nickel recycling volume in China was 74.6 thousand metal tons, with the top three companies together accounting for 71.7% of the market share, indicating a highly concentrated competitive landscape. Among them, based on 2025 recycling volume, the Company ranked as China's largest nickel recycling company, with 25.0 thousand metal tons of recycling volume and a market share of 33.5%.

Ranking and Market Share of Nickel Recycling Enterprises (by recycling volume), China, 2025

Ranking	Company Name	Recycling Volume	Market Share
		(thousand metal tons)	*(%)*
1.	**The Company**	**25.0**	**33.5**
2.	Company C	18.2	24.4
3.	Company B	10.3	13.8
4.	Company G	4.5	6.0
5.	Company H	3.5	4.7
	Others	13.1	17.6
Total . .		74.6	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) Company G is a subsidiary of a listed company, founded in 2008 and headquartered in Jiangxi, China. It focuses on the comprehensive recycling of waste lithium-ion batteries and the recovery of critical metals such as nickel, cobalt and lithium. The company operates several recycling and metal-extraction bases across China, with an annual handling capacity exceeding tens of thousands of tons, and serves as a core enterprise within its parent group's circular economy segment.

(2) Company H is a listed company, founded in 2000 and headquartered in Jiangxi, China. It focuses on lithium resources development and processing, covering spodumene and lithium salt production as well as lithium-ion battery materials manufacturing. The company has a vertically integrated operation spanning upstream mining and downstream lithium compound production, and is among the largest lithium producers in China.

Cobalt Recycling

In 2025, China's cobalt recycling volume was 38.2 thousand metal tons, with the top three companies accounting for a combined market share of 63.1%. Among them, measured by recycling volume in 2025, the Company was the largest cobalt recycling company in China, with a recycling volume of 15.0 thousand metal tons and a market share of 39.3%.

Ranking and Market Share of Cobalt Recycling Enterprises (by recycling volume), China, 2025

Ranking	Company Name	Recycling Volume	Market Share
		(thousand metal tons)	*(%)*
1.	**The Company**	**15.0**	**39.3**
2.	Company C	5.8	15.2
3.	Company B	3.3	8.6
4.	Company G	1.4	3.7
5.	Company H	1.1	2.9
	Others	11.5	30.2
Total . .		38.2	100.0

Source: Frost & Sullivan, Companies' Annual Report

Market Analysis of Other Critical Metals

In addition to critical energy metals, other critical metals such as tungsten, molybdenum, and vanadium are also characterized by scarcity and irreplaceability, with broad applications in hard alloys, electronic components, and high-end equipment manufacturing. They serve as critical fundamental materials for information technology industries. Among them, tungsten is particularly notable for its extremely high melting temperature, hardness, and excellent thermal conductivity. Tungsten plays a pivotal role in hard alloys, cutting tools, and new energy equipment manufacturing. Tungsten demand is showing a growth trend, with China's demand projected to increase from 108.6 thousand metal tons in 2025 to 160.1 thousand metal tons in 2031 with a CAGR of 6.5% from 2026 to 2031. The proportion of recycled tungsten in total supply is expected to rise from 24.7% in 2025 to 42.0% in 2031, making recycling an increasingly important source for tungsten supply. Furthermore, many critical metals often exist in the form of by-products. Through smelting and refining both primary and by-product metals, it can produce the primary metals and recover by-product metals such as indium and germanium.

Ranking of Other Critical Metal Recycling Industry

Tungsten Recycling

In 2025, China's tungsten recycling volume was 27.2 thousand metal tons, with the top three companies accounting for a combined market share of 59.7%. Among them, measured by recycling volume in 2025, the Company was the largest tungsten recycling company in China, with a recycling volume of 7.3 thousand metal tons and a market share of 26.9%.

Ranking and Market Share of Tungsten Recycling Enterprises (by recycling volume), China, 2025

Ranking	Company Name	Recycling Volume	Market Share
		(thousand metal tons)	*(%)*
1.	**The Company**	**7.3**	**26.9**
2.	Company E	4.6	17.0
3.	Company I	4.3	15.9
4.	Company J	1.4	5.0
5.	Company K	1.3	4.7
	Others	8.3	30.5
Total . .		27.2	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) Company I is a listed company, founded in 2000 and headquartered in Hunan, China. It focuses on the exploration, mining and processing of gold and non-ferrous metals, operating both domestic and overseas projects. The company has multiple large-scale mining and smelting bases and is among the major gold producers in China.

(2) Company J is a listed company, established in 1990 and headquartered in Hunan, China. It focuses on the research, development, production, and sales of tungsten products and cemented carbide materials, forming a complete industrial chain covering tungsten mining, smelting, powder production, and deep processing. The company has multiple production bases in China and overseas and has established long-term partnerships with downstream manufacturers in the fields of cutting tools, mining, and new materials.

(3) Company K is a listed company, founded in 2000 and headquartered in Jiangxi, China. It is mainly engaged in the production and sales of tungsten and molybdenum products, with a business scope covering tungsten concentrate processing, smelting, and powder metallurgy. The company has established a comprehensive business model combining resource development and product manufacturing, and its products are widely used in the machinery, electronics, and new energy industries.

Key Barriers to Entry in the Critical Metal Recycling Market

The critical metal recycling market is characterized by significant **technical barriers**, **regulatory barriers**, **capital barriers**, and **channel barriers**. Technical barriers arise because metal resource recycling involves comprehensive utilization and processing as well as front-end technologies related to dismantling and remanufacturing, requiring advanced capabilities in machinery, chemical engineering, industrial automation, and research and development to achieve high-efficiency resource utilization and remain competitive. Regulatory barriers arise as governments have introduced multiple regulatory policies in recent years, requiring enterprises engaged in recycling and utilization activities to obtain specific qualifications and licenses, making it challenging and costly for new entrants to quickly establish the necessary compliance systems. Capital barriers arise because the metal recycling industry requires significant investments in equipment acquisition, factory construction, and operational infrastructure such as waste collection and transportation networks. Channel barriers arise because leading companies often secure feedstock through long-term contracts and dense collection networks while downstream customers impose stringent requirements on recycled-metal purity and delivery stability, making it difficult for new entrants to establish stable supply channels and customer relationships.

Market Analysis of Limonite Nickel Ore Smelting

Limonite nickel ore is the most abundant form of nickel resources. However, due to its relatively low nickel content, it has traditionally been difficult to achieve economic extraction through pyrometallurgical processes and has long been regarded as difficult-to-utilize or low-value resources. With the advancement of HPAL technology, limonite ore is increasingly being efficiently utilized. HPAL enables efficient leaching under high temperature and high pressure with sulphuric acid solutions, achieving high recovery rates of nickel, cobalt, and other critical metals. Compared with conventional pyrometallurgical processes, HPAL not only significantly improves the resource utilization rate of low-grade ores, but also provides cost advantages across multiple stages of production. At the raw material level, limonite ore used for HPAL is abundant and lower-cost compared with the high-grade saprolite ore required for pyrometallurgy. At the processing stage, HPAL eliminates the need for high-temperature smelting and reductants, resulting in substantially lower energy consumption and reduced operating cost per tonne of nickel extracted. Moreover, HPAL reduces carbon emissions per unit of nickel output by 5-10 times compared with traditional processes such as RKEF, reflecting both cost and environmental efficiency. As a result, HPAL has become a low-carbon nickel solution under the global sustainability agenda. Therefore, the development of limonite ore not only broadens raw material supply but also enhances the resilience and sustainability of the entire value chain. At the same time, HPAL is highly demanding in terms of process accuracy and operational expertise, creating substantial technology barriers for companies lacking advanced technology and execution capabilities. From a production trend perspective, pyrometallurgical processes, such as RKEF and OESBF, remain the dominant sources of nickel supply. In 2025, nickel smelting by HPAL only accounting for 18.8% of global supply. However, with the continuous commissioning of HPAL capacity, this proportion is expected to increase to 38.4% in 2031.

From the prospective of competitive landscape, the company is a major participant in limonite nickel ore smelting by HPAL. In 2025, the Company ranked third in the global market of MHP production volume by HPAL, with MHP equity production volume of 80.3 thousand metal tons. Leveraging strengths in process know-how, scaled production, and low-carbon operations, the Company has become an important driver of efficient utilization of limonite nickel ore and plays a key role in the global low-carbon transition.

Ranking and Market Share of Enterprises Producing MHP by HPAL (by MHP equity production volume), Global, 2025

Ranking	Company Name	MHP Equity Production Volume	Market Share
		(thousand metal tons)	*(%)*
1.	Company C	141.0	32.5
2.	Company L	99.8	23.0
3.	**The Company**	**80.3**	**18.5**
4	Company M	45.0	10.4
5	Company N	35.0	8.1
	Others	32.5	7.5
Total		433.6	100.0

Source: Frost & Sullivan, Companies' Annual Report

Notes:

(1) "MHP equity production volume" refers to the portion of MHP output attributable to the company based on its equity interests in HPAL projects.

(2) Company L is a listed company, founded in 2009 and headquartered in Zhejiang, China. It focuses on the development and processing of laterite nickel ore resources and the production of nickel intermediates and nickel-related products. The company operates large-scale projects in Indonesia and China, utilising technologies such as HPAL and RKEF, and is one of the key Chinese enterprises participating in the global nickel supply chain.

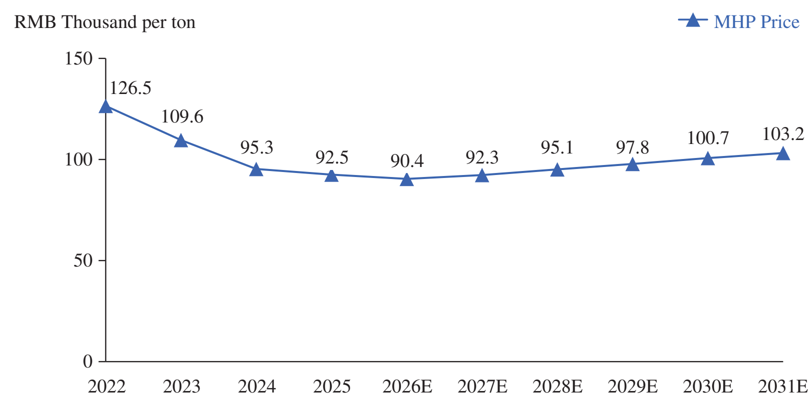
(3) Company M is a private company, founded in 1988 and headquartered in Zhejiang, China. It engages in the development, smelting, and processing of stainless steel and nickel products, with an integrated industrial chain spanning from laterite nickel ore mining to stainless steel production. The company has established large-scale production bases in China and Southeast Asia, actively expanding its presence in Indonesia's nickel resource projects, and has become one of the world's leading stainless steel and nickel producers.

(4) Company N is a foreign company, founded in 1915 and headquartered in Indonesia. It focuses on the mining and processing of laterite nickel ore and the production of nickel intermediates, with operations covering both hydrometallurgical and pyrometallurgical routes. The company owns multiple listed subsidiaries and is one of the major nickel producers in Indonesia contributing to the global supply chain.

Price Analysis of MHP

From 2022 to 2025, MHP prices declined, largely following the downward movement in nickel prices. The decline was mainly driven by the commissioning of new HPAL projects, which increased global MHP supply and intensified market competition. At the same time, improvements in production efficiency and reductions in costs also contributed to the decline in prices. During the forecast period, MHP prices are expected to remain broadly aligned with nickel price trends. As the pace of capacity expansion slows and newly added projects are gradually absorbed by the market, supply pressure is expected to ease. Supported by steady demand from the electric vehicle and battery industries, MHP prices are projected to remain broadly stable initially and then record a mild recovery over the forecast period.

Price of MHP, Global, 2022-2031E



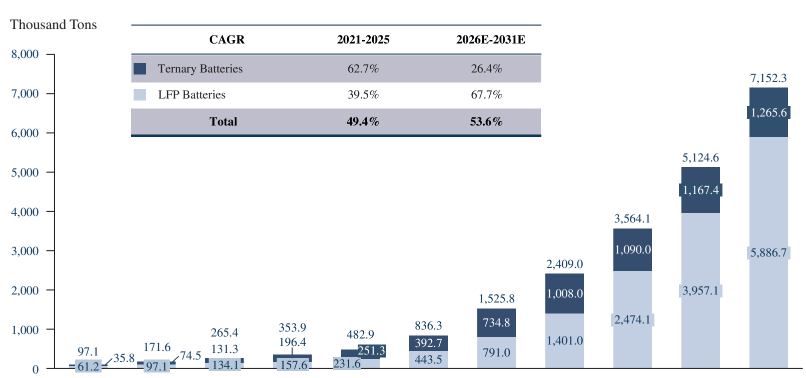
Source: Frost & Sullivan

LITHIUM-ION BATTERY RECYCLING MARKET ANALYSIS

Overview of the EV Battery Retirement Wave and the Lithium-ion Battery Recycling Market

With the rapid growth of the electric vehicles industry, the scale of EV battery usage has continued to expand, and the retirement of EV batteries has gradually become an important trend for industry development and social governance. The wave of EV battery retirements is driven by both the rapid historical growth of EV batteries and battery lifecycle factors. With an average lifespan of 6-8 years, a large number of battery packs are entering retirement. Currently, improper dismantling methods result in low recovery rates of valuable nickel, cobalt, and lithium and pose risks of heavy metal contamination, making professionalized recycling one of the critical solutions. Apart from the EV battery retirement wave, diversified applications such as energy storage systems and 3C electronics are also providing strong incremental potentials for lithium-ion battery recycling. With the rapid expansion of energy storage installations, large-scale energy-storage batteries will enter the retirement cycle in 8-10 years, while 3C electronics products have a large installed base and increasing recycling rates. Looking ahead, the adoption of emerging products is expected to raise consumers' purchase frequency for 3C electronics products and shorten replacement cycles. Accordingly, faster product iterations and shorter replacement cycles across EVs, 3C electronics, and ESS are expanding the base of retired batteries, supporting longer-term and more stable growth in lithium-ion battery recycling and shifting the industry from EV-only recycling toward coverage across major application areas.

EV Battery Retirement Volume, China, 2021-2031E



Source: Frost & Sullivan, International Organization of Motor Vehicle Manufacturers

In addition, the field of lithium-ion battery recycling also shows the following driving factors:

Higher economic value of ternary battery recycling strengthens industry growth momentum. Compared with LFP batteries, ternary batteries offer significantly higher recycling value due to the presence of critical energy metals such as nickel, cobalt, etc. The recovery of these strategic metals not only raises the unit economic return of battery recycling, but also makes large-scale recycling more cost-effective. This stronger economic incentive encourages recycling companies to expand capacity, and adopt more advanced dismantling and extraction technologies. At the same time, the circulation of high-value metals through recycling helps relieve supply shortages, stabilize raw material costs and reduce reliance on external sources.

Advances in recycling technology expand material recycling and improve economic benefits for the industry. With continuous improvements in recycling technologies, the scope of materials that can be economically recovered from EV batteries is no longer limited to critical energy metals such as nickel and cobalt. Materials including phosphorus, iron, and graphite, which previously had not been extensively recycled, are increasingly being extracted and reused through more advanced recycling technologies. The expansion of recoverable material categories not only improves overall resource utilization efficiency, but also enhances the economic returns of recycling.

Re-using provides batteries with prolonged economic potential. Owing to slower capacity degradation characteristic, LFP batteries typically demonstrate a longer operational lifecycle. Even after more than 3,500 cycles, LFP batteries still have relatively high capacity, therefore, many retired batteries can be reused in energy-storage peak shaving, telecom base stations, UPS, and low-speed vehicles. Compared with direct dismantling and recycling, re-using offers higher economic value. The scale of re-use of LFP batteries has already expanded from 4.2 GWh in 2021 to 14.5 GWh in 2025 with a CAGR of 36.6%, and is projected to further reach 211.2 GWh by 2031 with a CAGR of 54.2% from 2026 to 2031.

Favorable industry tailwinds to accelerate battery recycling expansion. Globally, regulatory frameworks are utilized to shape the development of the battery recycling industry. In Europe, the *EU Batteries Regulation* requires a threshold proportion of recycled raw materials for battery manufacturing, compelling manufacturers to secure supply from recycling channels. In the United States, EV subsidies are granted to enterprises adopting recycled critical minerals, incentivising producers to integrate recycled materials into their supply chains.

Development Trends of the Lithium-ion Battery Recycling Market

Advances in dismantling technologies are continuously enhancing recycling efficiency. In the lithium-ion battery recycling market, dismantling technology represents a core breakthrough for improving recovery efficiency. Systems combining visual recognition with multi-sensor fusion are becoming widely adopted, enabling automated, non-destructive dismantling of battery packs across multiple models and overcoming the pain points of traditional processes. Meanwhile, innovations in dismantling processes combining physical swelling with chemical dissolution have enabled efficient separation of adhesives.

The digitalization and network expansion of recycling channels. Leading recycling companies are extending recycling sites from major cities to counties and communities, expanding recycling coverage. Leveraging the EPR system, automakers and recycling companies are deepening cooperation through long-term agreements, thereby ensuring compliant and stable feedstock supply.

The standardization and diversification of applications of re-using are driving the growth of lithium-ion battery recycling. Re-using has become a key industry focus, showing clear trend toward standardization, scenario diversification, and scaled deployment. At the technical level, the maturity of rapid testing and flexible reassembly systems has significantly enhanced the efficiency of sorting and repurposing retired batteries, laying the foundation for large-scale application. On the application side, re-using is expanding from pilot demonstrations to diversified scenarios, particularly in areas such as distributed solar-storage integration, low-speed vehicles, and backup power system.

Ranking of Lithium-ion Battery Recycling Industry

From an industry perspective, disclosure of production volume and production capacity is not usually applicable to the lithium-ion battery and end-of-life vehicle recycling business segment, as such metrics are not commonly used in industry practice. This is because recycled outputs can be directed into multiple downstream applications and therefore are not suitable for a consistent or comparable measurement based on production volume or capacity. As a result, recycling volume is generally regarded as a fair and representative basis for comparison among market participants.

In 2025, the competitive landscape of China's lithium-ion battery recycling industry has remained relatively stable. The Company, as a leading enterprise in China's lithium-ion battery recycling industry, ranked first in the China's market in terms of recycling volume in 2025.

Ranking of Lithium-ion Battery Recycling Enterprises (by recycling volume), China, 2025

Ranking	Company Name	Recycling Volume	Market Share
		(thousand tons)	*(%)*
1.	**The Company**	**52.6**	**10.9**
2.	Company B	38.6	8.0
3.	Company C	32.5	6.7
4.	Company G	16.8	3.5
5.	Company H	13.2	2.7
	Others	329.2	68.2
Total . .		482.9	100.0

Source: Frost & Sullivan, Companies' Annual Report

Note:

(1) The recycling volume of lithium-ion batteries only includes recycling batteries from third-party.

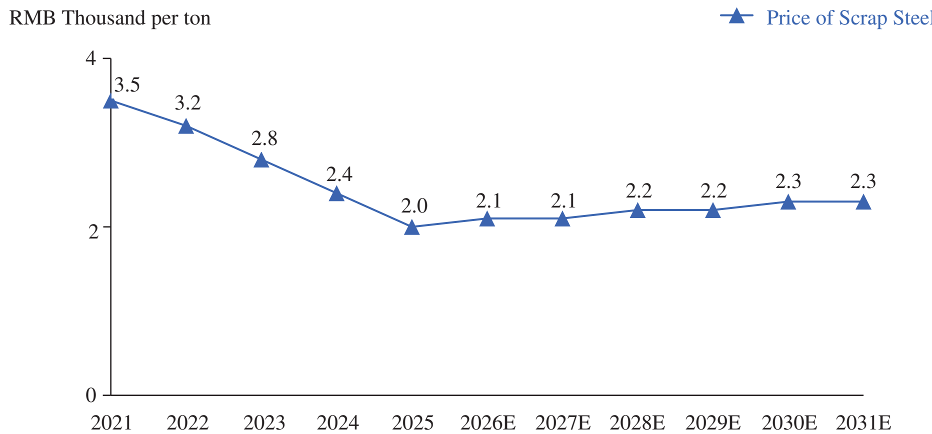
Barriers to Entry in the Lithium-ion Battery Recycling Market

The lithium-ion battery recycling market is characterized by significant **technology barriers**, **qualification barriers**, and **channel barriers**. Technology barriers arise from patent exclusivity and stringent quality control requirements. Leading players hold core patents in sorting and hydrometallurgical refining, creating de-facto patent barriers that constrain new entrants. They can achieve SoH (state of health) assessment errors of below 1% for re-use and recovery rates of above 98% for nickel, cobalt, and manganese in material recovery, while efficient pack dismantling and adhesive removal technologies are critical for improving recycling efficiency and cost control. Qualification barriers arise from strict regulatory requirements and environmental compliance costs. Companies must apply to be included on the MIIT's Compliance List for the Comprehensive Utilization of Retired EV Batteries and obtain a Hazardous Waste Operation Permit, with an assessment cycle typically lasting 6-12 months, while production processes must comply with environmental policies governing emissions and pollutant control during recycling. Channel barriers arise because both upstream and downstream of the supply chain are dominated by leading enterprises. On the raw material side, leading companies have established nationwide recycling networks that secure stable supplies of retired batteries, while on the demand side major customers such as China Tower and energy storage companies tend to prioritize procurement from leading suppliers, making it difficult for new entrants to establish stable supply and sales channels.

Price Analysis of Scrap Steel

From 2021 to 2025, the price of scrap steel decreased significantly from RMB3.5 thousand per ton to RMB2.0 thousand per ton. Thereafter, the price is expected to stabilize and edge up slightly over the forecast period, rising from RMB2.1 thousand per ton in 2026 to RMB2.3 thousand per ton by 2031.

Price of Scrap Steel Global, 2021-2031E



Source: Frost & Sullivan, International Organization of Motor Vehicle Manufacturers