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Leveraging the London Metal Exchange

Turning Indonesia's Minerals into Premium Low Carbon Assets

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Turning Indonesia's Minerals into Premium Low Carbon Assets

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List of Abbreviations

ART	Agreement on Reciprocal Tariff
ASEAN	Association of Southeast Asian Nations
BKPM	Badan Koordinasi Penanaman Modal (Ministry of Investment and Downstream Industry)
CPAL	Commodity Pricing and Analysis Limited
CRIF Asia	Centrale Rischi Finanziari Asia
Danantara	Daya Anagata Nusantara
EAF	Electric Arc Furnace
ESG	Environmental, Social, and Governance
EU	European Union
EV	Electric Vehicle
GHG	Greenhouse Gases
HPAL	High Pressure Acid Leaching
HPM	Harga Patokan Mineral (Mineral Benchmark Price)
IEA	International Energy Agency
IMF	International Monetary Fund
INA	Indonesia Investment Authority
LME	London Metal Exchange
MDPI	Multidisciplinary Digital Publishing Institute
MHP	Mixed Hydroxide Precipitate
MSP	Mixed Sulfate Precipitate
NEOM	Neo-Mustaqbal
PMI	Purchasing Managers Index
R&D	Research and Development
RKAB	Rencana Kerja dan Anggaran Biaya (Work Plan and Budget Allocation)
RKEF	Rotary Kiln Electric Furnace
SMEs	Small and Medium Enterprises
US	United States
USDFC	US International Development Finance Corporation

Volatile Nickel, and Future of Indonesia' Downstreaming

Indonesia sits at the center of the global critical minerals landscape. The nation holds vast reserves of nickel, copper, and bauxite that are essential for stainless steel, clean energy, electric vehicles, and modern infrastructure. Indonesia's minerals underpin the energy transition and are increasingly strategic in geopolitics[1]. Nickel has been especially important. Over the last decade, Indonesia grew from a peripheral nickel supplier into the world's largest producer of mined nickel and refined products. Much of this growth was driven by a 2020 ban on raw nickel ore exports, which forced investment in domestic refining capacity. By processing ore within the country, Indonesia captured more economic value than it did when exporting unprocessed material[2].

Despite that success, the global nickel market has faced volatility. Prices briefly spiked above historic levels in early 2022 amid supply concerns and strong demand for electric vehicle batteries. Prices then slumped as Indonesia's production expanded faster than demand growth, and output from Indonesian smelters reached global markets. 28 smelters RKEF line in Indonesia stop the production in 2025[3], facing oversupply of feronickel and NPI (Nickel Pig Iron). In late 2025 and early 2026, the Indonesian government again cut production quotas to stabilize prices. Benchmark nickel prices on the LME rallied in response, but not to levels that fully restore producer margins[4].

At the same time, Indonesia's historic trade focus with China has created structural pricing challenges. Large volumes of nickel pig iron, matte, and intermediate products have flowed to China under long-term offtake agreements at lower quality adjustments and limited price upside. Indonesian producers and the state seek more diversified and transparent global pricing mechanisms that recognize product quality and environmental attributes[5].

Indonesia's policy agenda now includes deeper value chain development for critical minerals, aligning downstream industries with global standards, and integrating environmental safeguards. The government has signaled ambitious investment targets in downstream projects and supports measures to boost competitiveness in electric vehicle battery materials, and low carbon processing[6].

1 Ministry of Investment and Downstream Industry/BKPM, "Critical Minerals Downstreaming to Advance Indonesia's Green Economy," Ministry of Investment and Downstream Industry/BKPM, October 11, 2025, https://www.bkpm.go.id/id/info/siaran-pers/critical-minerals-downstreaming-to-advance-indonesia-s-green-economy

2 James Guild, "Advancing Resilient Critical Mineral Supply Chains in Indonesia: A Triumvirate Approach," The National Bureau of Asian Research, January 27, 2026, https://www.nbr.org/publication/advancing-resilient-critical-mineral-supply-chains-in-indonesia-a-triumvirate-approach/

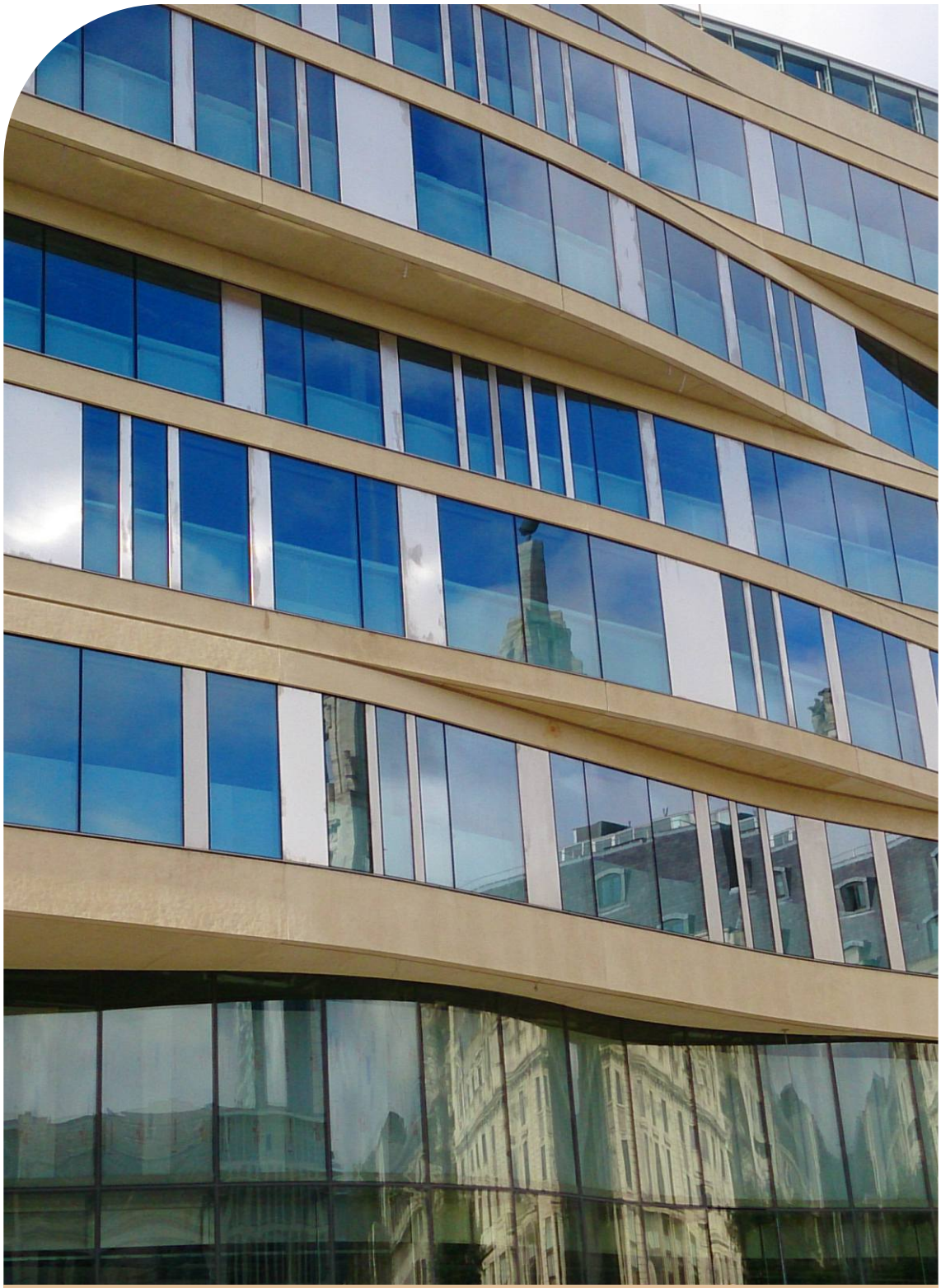
3 Mis Fransiska Dewi, "28 Lini Produksi Nikel di RI Distop, Bukan Smelternya yang Tutup," Bloomberg Technoz, July 15, 2025, https://www.bloombergtechnoz.com/detail-news/77271/28-lini-produksi-nikel-di-ri-distop-bukan-smelternya-yang-tutup.

4 Reuters, "Eramet says Indonesia nickel permit volume slashed for 2026," Reuters, February 11, 2026, https://www.reuters.com/world/asia-pacific/eramet-says-indonesia-nickel-permit-volume-slashed-2026-2026-02-11/.

5 Rick Mills, "Indonesia and China Killed the Nickel Market," Mining.com, March 4, 2024, https://www.mining.com/web/indonesia-and-china-killed-the-nickel-market/.

6 Ministry of Investment and Downstream Industry/BKPM, "Critical Minerals Downstreaming to Advance Indonesia's Green Economy."

This policy brief explains why the London Metal Exchange matters as a potential platform for Indonesian low carbon metals. It explores how Indonesia can use LME participation to capture price premiums, integrate environmental performance into market valuation, diversify export markets beyond China, and maximize long-term economic benefits for producers and communities.



Mark Hoogenboom (2013)

Nickel Market Dynamics

The global nickel market has changed rapidly over the last decade, driven by shifting supply, evolving demand, and major policy moves by producing countries.

Nickel is a key metal for stainless steel and battery materials. Stainless steel makes up most global nickel demand, while EV batteries are the fastest-growing segment. Indonesia nickel 60% for stainless steel, only less than 19% for batteries.

Despite strong long-term growth in EV demand, the overall market has been influenced heavily by supply dynamics. Nickel prices have been volatile, reflecting periodic imbalances between supply and demand, inventory levels, and macroeconomic trends. Indonesia's policy choices reshaped the market. After the 2020 ban on raw nickel ore exports, Indonesia became the world's largest nickel producer by volume. Its share of global output jumped from about 30 percent in 2020 to over 60 percent by 2024. Indonesia's processed intermediates, such as nickel pig iron and MHP, now dominate global supply and influence pricing[7].

The most notable price surge in recent history occurred in early 2022. Nickel prices on the LME spiked sharply above $40,000 per ton after supply concerns prompted speculative trading. This spike was extraordinary and driven by market dynamics, not fundamental demand growth[8]. Prices quickly retreated as volatility eased[9].

Since then, prices have struggled to reach sustained peaks. Indonesia's rapid expansion of production and intermediates output has bolstered supply well beyond underlying demand growth, creating a surplus environment that capped price gains. Global refined nickel production grew in the mid-2020s, with inventories increasing on exchange warehouses, particularly in Asia[10]. In 2024 and 2025, nickel prices declined from earlier highs. By mid-2025, benchmark prices on the LME fell below $16,000 per ton amid persistent surplus conditions and inventory builds. Refined production increased year on year, while demand from stainless steel and other industrial uses remained solid but not strong enough to absorb added supply[11].

Indonesia has actively managed output through quota systems known as RKAB. The government has cut production targets for 2026 to stabilize prices after years of oversupply. Announcements of large quota reductions have supported price rallies, with three-month LME nickel rising toward near $18,000 per ton following quota news[12]. The

7 Anthony Barich and Gaurang Dholakia, "Indonesia navigates nickel market with output cuts, policy shifts," S&P Global, December 29, 2025, https://www.spglobal.com/energy/en/news-research/latest-news/metals/122925-indonesia-navigates-nickel-market-with-output-cuts-policy-shifts.

8 Isabeau van Halm, "Nickel prices soar and plunge in 2022 volatility," Mining-Technology, January 10, 2023, https://www.mining-technology.com/features/nickel-price-surge-2022-markets/.

9 Ibid.

10 Shanghai Metal Market, "Current Status and Future Trends of the Global Nickel Industry: The Primary Nickel Market is Expected to Remain in a Surplus Situation in 2025 [Indonesia Mining Conference]," Shanghai Metal Market, June 30, 2025, https://news.metal.com/newscontent/103370053-Current-Status-and-Future-Trends-of-the-Global-Nickel-Industry%3A-The-Primary-Nickel-Market-is-Expected-to-Remain-in-a-Surplus-Situation-in-2025-%5BIndonesia-Mining-Conference%5D.

11 Ibid.

12 Financial Times, "Nickel price jumps as Indonesia slashes quota at world's biggest mine," Financial Times, February 11, 2026, https://www.ft.com/content/37455758-532a-41ce-9276-e4f1093aa100.

limits of current price growth are clear. Prices remain well below peak crisis levels and have been uneven across product grades. Intermediate products such as nickel pig iron continue to exert downward price pressure because they act as low-cost feedstock for stainless steel. Inventory accumulation and strong supply growth are factors that still weigh on price performance[13].

For Indonesian producers, these dynamics have mixed implications:

- Indonesia's output growth secured dominant market position and scale advantages.
- However, oversupply and inventory growth have kept benchmark prices subdued, impacting producer margins.
- Producers with high operating costs or lower quality output face tighter profitability.
- Downstream integration into higher-value products has helped capture some value but has not fully offset low prices.[14]

Nickel's market structure means that supply decisions by Indonesia, inventory movements on exchanges, and broader demand trends will continue to shape prices. Understanding these dynamics is critical if Indonesia seeks to use price mechanisms like the LME to elevate the value of its critical minerals.

CELIOS (2025)

13 Dominikus, "Indonesia's nickel market shifts in 2026 as intermediates gain ground: Shanghai Metal Market," Petromindo, January 21, 2026, https://www.petromindo.com/news/article/indonesia-s-nickel-market-shifts-in-2026-as-intermediates-gain-ground-smm.

14 Mills, "Indonesia and China Killed the Nickel Market."

Indonesia's Strategy for Value Chain

Indonesia's government has focused on capturing more economic value from its minerals. For decades the country exported raw ore. This delivered limited income and little industrial growth. To change that, Indonesia introduced policies that require minerals to be processed domestically before export. This shift aims to build a full metal value chain within the country[15]. A cornerstone of this strategy is downstream development. The government wants investment in smelters and refineries that turn mined ore into higher value products, such as ferronickel, nickel matte, and battery precursors. These products sell for more than raw ore, and create jobs in processing, logistics, and manufacturing[16]. Indonesia set ambitious investment goals for the downstream sector. Authorities target nearly $226,5 million in downstream investment between 2025 and 2029, with nickel at the center because of its global reserve share and demand potential[17].

Key government actions include:

- Export controls on unprocessed minerals. These rules force companies to build domestic processing capacity before exporting products[18].
- Production quotas RKAB that limit raw output to manage supply and support prices. Recent quota cuts for nickel aim to tighten market balance and lift prices[19].
- Incentives for value addition. Policy frameworks prioritize mining concessions for firms that invest in processing facilities and job creation[20].
- Public investment facilitation. Government agencies engage investors and partners to build smelters, refineries, and related infrastructure[21].

15 Syahrir Ika, "Kebijakan Hilirisasi Mineral: Policy Reform untuk Meningkatkan Penerimaan Negara," *Kajian Ekonomi dan Keuangan 1*, No. 1 (2017):1-5, https://doi.org/10.31685/kek.v1i1.259.

16 Ibid.

17 Lili Handayani, "Nikel Jadi Andalan Utama, Pemerintah Dorong Investasi Hilirisasi Rp3.839 Triliun," Media Nikel Indonesia, July 21, 2025, https://nikel.co.id/2025/07/21/nikel-jadi-andalan-utama-pemerintah-dorong-investasi-hilirisasi-rp3-839-triliun/.

18 Directorate General of Mineral and Coal, "Direktur Jenderal Mineral dan Batubara: Hilirisasi Perkuat Posisi Strategis Indonesia di Pasar Global," Directorate General of Mineral and Coal, February 12, 2026, https://www.minerba.esdm.go.id/berita/minerba/detil/20260212-dirjen-minerba-hilirisasi-perkuat-posisi-strategis-indonesia-di-pasar-global.

19 Reuters, "Eramet says Indonesia nickel permit volume slashed for 2026."

20 Fransiska Nangoy, "Indonesia amends mining law to boost access, support processing," Reuters, February 18, 2025, https://www.reuters.com/world/asia-pacific/indonesian-parliament-set-vote-amendment-mining-law-2025-02-18/.

21 Ministry of Investment and Downstream Industry/BKPM, "Indonesia Tegaskan Kepemimpinan Global Transisi Energi Melalui Sektor Mineral Kritis," Ministry of Investment and Downstream Industry/BKPM, September 25, 2025, https://bkpm.go.id/index.php/id/info/siaran-pers/indonesia-tegaskan-kepemimpinan-global-transisi-energi-melalui-sektor-mineral-kritis.

The downstream push has delivered results. Indonesia now hosts dozens of operating smelters for nickel and other metals, and domestic processing has grown rapidly. Production of refined intermediates has replaced much raw ore exports[22].

Despite this progress, some challenges remain:

- Many products exported today are intermediate metals such as ferronickel and nickel pig iron rather than finished goods, lower value added product[23].
- The value chain is incomplete. There is limited domestic capacity for advanced products like battery-grade nickel sulfate and green steel components[24].
- Policy complexity and evolving regulations including recent ART Indonesia-US can create uncertainty for investors and processors[25].

Indonesia's strategy strengthened downstream capacity and captured more value than raw ore exports. However, price volatility and oversupply pressures show that domestic processing alone does not guarantee premium prices. This gap highlights the need for integration into global pricing mechanisms like LME low carbon metal benchmarks, which could reward quality and sustainability attributes and provide global price signals for Indonesia's refined metals.

CELIOS (2025)

22 Ramses Manurung, "Menjalankan Amanah Hilirisasi Industri Mineral, Menuju Indonesia Maju 2045," Nusantara TV, October 15, 2024, https://www.nusantaratv.com/finance/menjalankan-amanah-hilirisasi-industri-mineral-menuju-indonesia-maju-2045.
23 Shiddiq, "Untuk Dorong Hilirisasi hingga Produk Akhir, Pemerintah Batasi Investasi Smelter Nikel," Media Nikel Indonesia, November 27, 2025, https://nikel.co.id/2025/11/27/untuk-dorong-hilirisasi-hingga-produk-akhir-pemerintah-batasi-investasi-smelter-nikel/.
24 Ibid.
25 Ibid.

What is LME and Why It Matters

The London Metal Exchange is the world's main marketplace for trading industrial base metals. It was established in 1877 and remains the largest global hub for futures and related contracts on metals such as aluminum, copper, nickel, zinc, and lead. The LME also offers options and settlement contracts that underpin international metal pricing[26]. The LME plays several essential roles in the global metals economy:

- It sets global benchmark prices. Prices discovered on the LME serve as reference values used in contracts between producers, consumers, and traders worldwide. Physical sales of metal are commonly priced as "LME price plus premium", where the premium reflects regional factors such as transportation and quality differences[27].
- It allows risk management through futures and options. Producers and consumers use LME futures and options to hedge against price swings. A mining company can lock in a future selling price. A manufacturer can lock in future input costs. This reduces uncertainty in revenue and production planning[28].
- It provides price discovery and transparency. The LME aggregates real trading data from its global users and publishes reference pricing. Its systems combine electronic trading with traditional trading sessions in London. This process produces visible market prices that reflect global supply and demand conditions[29].
- It supports physical delivery through a network of approved warehouses. Metal stored in these warehouses can be delivered against futures contracts. This link between financial contracts and physical metal reinforces the credibility of prices discovered on the exchange[30].
- It promotes market liquidity and access. The LME operates nearly 24 hours a day and connects producers, consumers, traders, and financial participants from Asia, Europe, and the Americas into a single price formation venue[31].

26 SpotMarketCap, "What is the LME? London Metal Exchange Guide," SpotMarketCap, November 7, 2025, https://www.spotmarketcap.com/blog/what-is-the-lme.
27 Ibid.
28 Ibid.
29 London Metal Exchange, "Price Discovery Models Demystified," London Metal Exchange, accessed by February 17, 2026, https://www.lme.com/en/Sustainability-and-Physical-Markets/Physical-market-benefits/Price-discover.
30 SpotMarketCap, "What is the LME? London Metal Exchange Guide."
31 London Metal Exchange, "About the London Metal Exchange," London Metal Exchange, accessed by February 17, 2026, https://www.lme.com/about.

The importance of the LME extends beyond price quotes. Its reference prices are used in physical sales contracts, investment decisions, and global supply negotiations. Companies may base pricing, risk assessments, and long-term planning on LME benchmarks[32]. For Indonesia's mineral sector, engaging with the LME matters because:

- LME prices are transparent and widely trusted across markets[33].
- Price signals reflect real-time global supply and demand rather than solely bilateral negotiation outcomes[34].
- Hedging tools provide producers a way to protect revenue from price swings[35].
- A credible global benchmark can help diversify markets and reduce overdependence on a single buyer[36].

Increasingly, the LME is exploring ways to account for sustainability attributes in pricing mechanisms. This includes initiatives to integrate environmental and responsible sourcing metrics into pricing frameworks. Future enhancements could create differentiated pricing for low carbon metals that meet defined environmental criteria[37].

Understanding how the LME functions and why it matters lays the foundation for exploring how Indonesia's critical minerals could leverage global price mechanisms to achieve higher value and stronger market positioning.

Yahoo! Finance (2021)

32 SpotMarketCap, "What is the LME? London Metal Exchange Guide."
33 London Metal Exchange, "Price Discovery Models Demystified."
34 SpotMarketCap, "What is the LME? London Metal Exchange Guide."
35 Ibid.
36 London Metal Exchange, "About the London Metal Exchange."
37 London Metal Exchange, "Responsible Sourcing," London Metal Exchange, accessed by February 17, 2026, https://www.lme.com/education/online-resources/lme-digest/lme-responsible-sourcing.

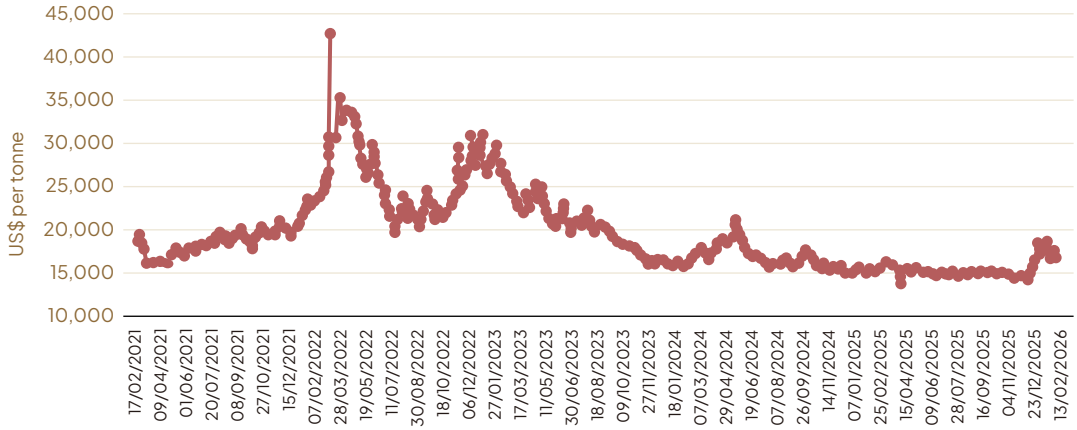
Current Metal Prices

This section shows the latest benchmark prices for key metals on the London Metal Exchange and short analysis of trends.

Current LME prices (latest available):

Nickel: around $16,800–$18,000 per tonne on the LME, reflecting recent strength as supply tightening expectations and Indonesian output cuts support price gains[38].

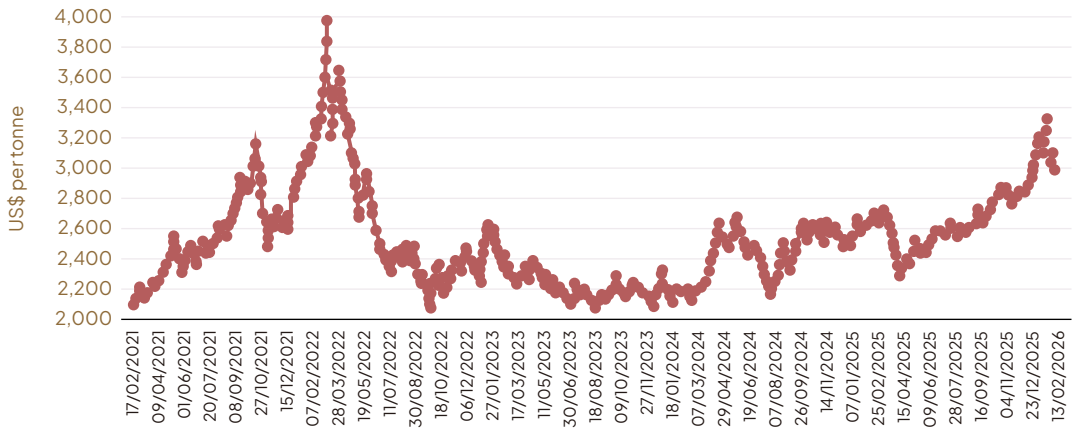
Nickel Offer Price Trends



Source: London Metal Exchange (2026)

Aluminium: roughly $3,000–$3,100 per tonne, near multi-year highs driven by tight inventories, production caps, and resilient demand[39].

Aluminium Offer Price Trends



Source: London Metal Exchange (2026)

38 Financial Times, "Nickel price jumps as Indonesia slashes quota at world's biggest mine."

39 Eric Onstad, "Aluminium pulls back from one-week low after market digests report Trump may ease tariffs," Reuters, February13, 2026, https://www.reuters.com/world/asia-pacific/shanghai-copper-tumbles-amid-broad-selloff-ahead-china-holiday-2026-02-13/

Copper: around $12,500–$13,400 per tonne, near elevated levels with occasional spikes due to tight supply and strong industrial demand[40].

Copper Offer Price Trends

Source: London Metal Exchange (2026)

Forecasts and trends:

Analysts expect nickel prices to remain supported but not return to extreme peaks. Some forecasts see averages near $15,800–$18,500 per tonne in 2026 amid tighter supply due to production cuts[41].

Aluminium price forecasts range broadly but many estimates are $2,700–$3,000 per tonne or more in 2026 if structural tightness persists[42].

Copper prices remain strong though forecasts vary, with some long-term projections around $10,000–$13,000 per tonne based on demand for electrification and infrastructure[43].

Analysis of trends:

Nickel prices have strengthened after Indonesian production quotas were cut, lifting price averages. However, prices still stay below some historic peaks and reflect ongoing market surplus risks in some grades[44].

40 Veer Sharma, "Vedanta shares rise 3%, hit record high as LME copper, aluminium prices gain. Will stock hit Rs 800?," The Economic Times, January 23, 2026, https://economictimes.indiatimes.com/markets/stocks/news/vedanta-shares-rise-3-hit-record-high-as-lme-copper-aluminium-prices-gain-will-stock-hit-rs-800/articleshow/127257223.cms?from=mdr.

41 Jacob Rossi, "Nickel," in David Thurtell, ed., Resources and Energy Quarterly: December 2025, Department of Industry, Science and Resources, December 19, 2025, https://www.industry.gov.au/sites/default/files/2025-12/resources-and-energy-quarterly-december-2025.pdf.

42 Aluminium China, "LME Aluminium Prices Rebound, Near $2900, Bullish 2026," Aluminium China, December 18, 2025, https://www.aluminiumchina.com/en-gb/news-center/industry-news/2025/12/11.html.

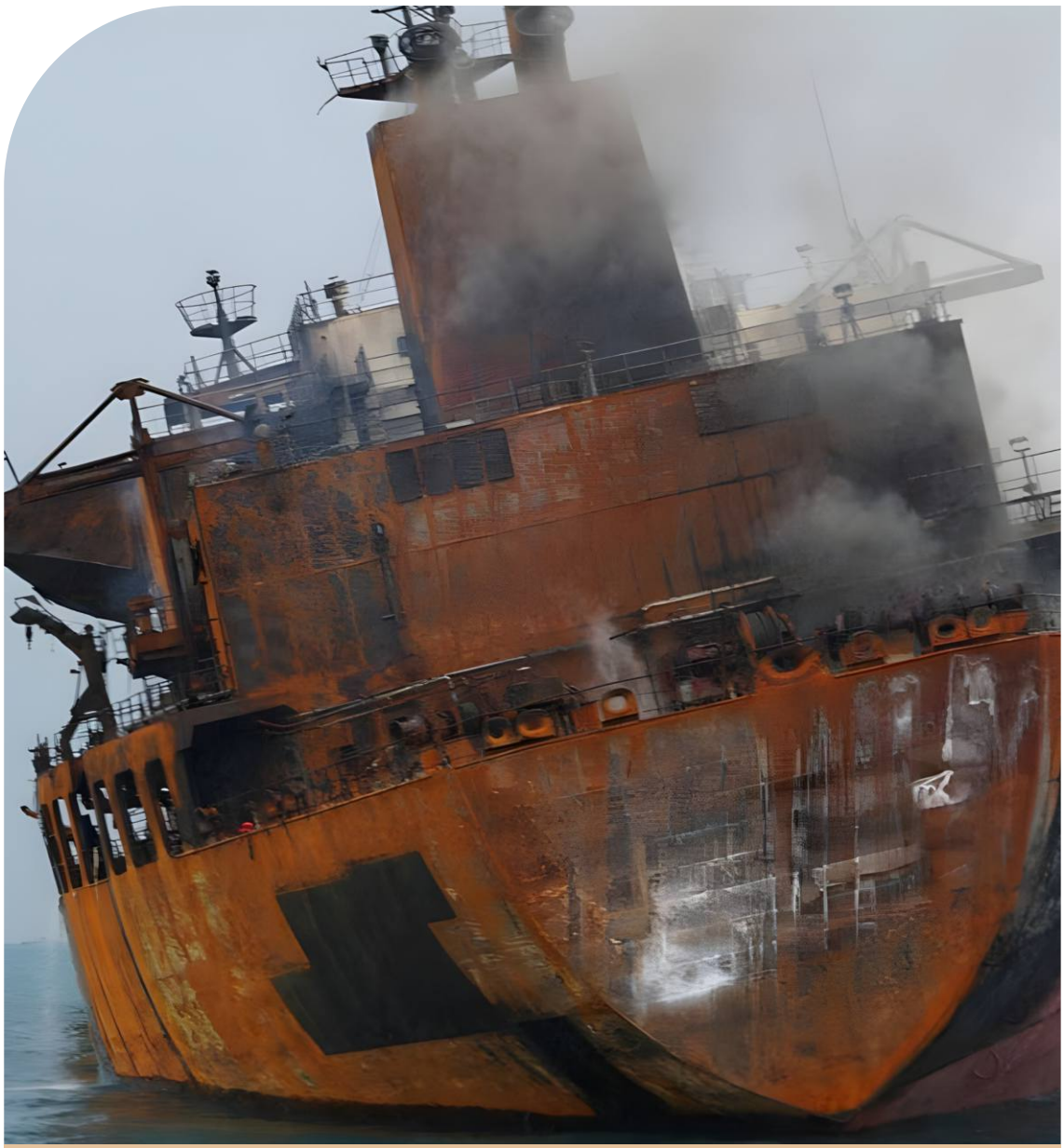
43 Sharma, "Vedanta shares rise 3%, hit record high as LME copper, aluminium prices gain. Will stock hit Rs 800?."

44 Financial Times, "Nickel price jumps as Indonesia slashes quota at world's biggest mine."

Aluminium prices have climbed as inventories tightened and supply constraints emerged, pushing cash prices to multi-year highs before slight pullbacks[45].

Copper prices are high compared to recent years, reflecting both structural demand from industry and speculative flows tied to global macro concerns[46].

Overall, prices for base metals remain elevated relative to earlier cycles, but volatility endures. Benchmark prices on the LME serve as critical signals for producers and buyers and shape global markets, including for critical minerals such as nickel and copper that are central to Indonesia's export strategy.



Reuters (2026)

45 Onstad, "Aluminium pulls back from one-week low after market digests report Trump may ease tariffs."
46 Sharma, "Vedanta shares rise 3%, hit record high as LME copper, aluminium prices gain. Will stock hit Rs 800?"

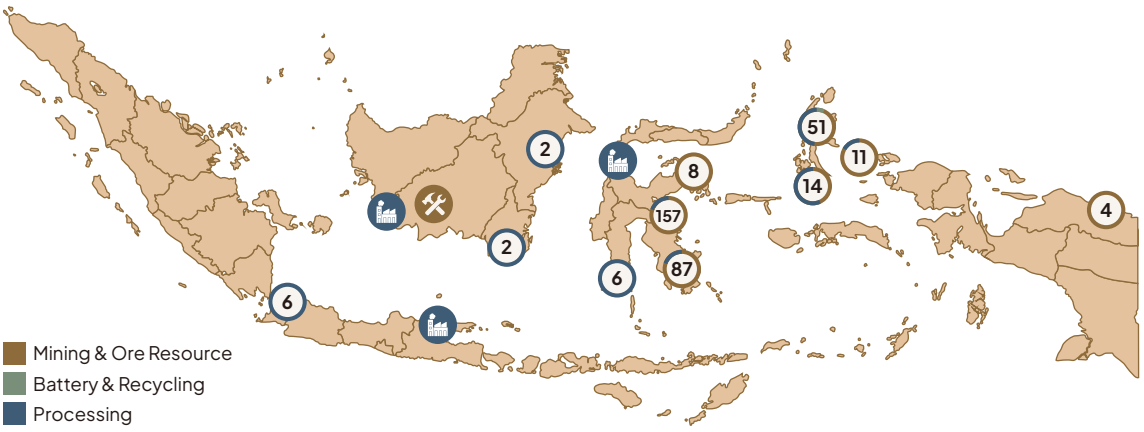
Indonesia's Critical Minerals Supply Chain

Indonesia's critical minerals supply chain starts at mining and extends to processing, refining, and finished products for global markets. The chain varies by mineral, but core stages are similar.

Mine Extraction

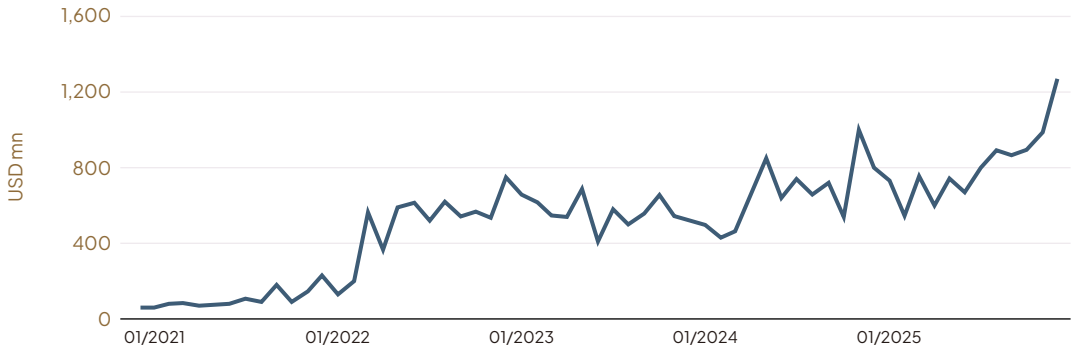
Nickel, copper, and bauxite are mined across Sulawesi, Maluku, Kalimantan, and Papua. Indonesia holds large reserves, including roughly 42% of global nickel ore reserves and substantial copper and bauxite deposits. This makes Indonesia a major upstream supplier of critical minerals[47].

Geographic Map of Nickel Production in Indonesia



Source: The China-Global South Project (2023)

Indonesia's Nickel Exports (Million USD)



Source: CEIC (2026), compiled by the authors

47 Guild, "Advancing Resilient Critical Mineral Supply Chains in Indonesia: A Triumvirate Approach."

Primary Processing

After extraction, ore is crushed and prepared for smelting or transportation.

In nickel, raw ore is processed into intermediates such as nickel pig iron, mixed hydroxide precipitate MHP, and MSP. Most Indonesian nickel currently is Class II intermediate product used for stainless steel production, while higher-value Class I nickel needed for EV batteries remains limited[48].

Smelting and refining

Nickel smelters and refineries have proliferated in Indonesia following export bans on raw ore. Domestic facilities now process ore into ferronickel, matte, and precursor materials[49].

Copper processing remains less developed, though major operations like PT Freeport Indonesia's facilities convert ore to concentrate and further refine it into cathode, gold, and silver[50].

Bauxite is processed into alumina feedstock, but local refining into aluminium and high-value derivatives is still emerging.

Intermediate Products to Global Supply Chains

Intermediates feed regional and global consumers, particularly steel mills in China and Southeast Asia. Indonesia's intermediates act as feedstock for stainless steel and alloy production overseas[51].

Export and Distribution

Products are shipped from Indonesian ports to buyers globally. China remains the largest destination in volume terms, especially for nickel intermediates. Supply chains extend from Indonesian refineries to stainless steel producers, battery makers, and downstream manufacturers in Asia and beyond[52].

48 Green Justice Indonesia, "Pemetaan Regulasi, Aktor dan Pendanaan Dalam Rantai Pasok Mineral untuk Baterai Kendaraan Listrik Indonesia: Kobalt, Nikel dan Lithium," Green Justice Indonesia, February 23, 2024, https://gji.or.id/2024/02/pemetaan-regulasi-aktor-dan-pendanaan-dalam-rantai-pasok-mineral-untuk-baterai-kendaraan-listrik-indonesia-kobalt-nikel-dan-lithium/.

49 Shiddiq, "Tobias Maya: Indonesia, Pemain Kunci dalam Rantai Pasok Global Mineral Kritis," Media Nikel Indonesia, June 17, 2025, https://nikel.co.id/2025/06/17/tobias-maya-indonesia-pemain-kunci-dalam-rantai-pasok-global-mineral-kritis/.

50 Ministry of Investment and Downstream Industry/BKPM, "Indonesia Tegaskan Kepemimpinan Global Transisi Energi Melalui Sektor Mineral Kritis."

51 Green Justice Indonesia, "Pemetaan Regulasi, Aktor dan Pendanaan Dalam Rantai Pasok Mineral untuk Baterai Kendaraan Listrik Indonesia: Kobalt, Nikel dan Lithium."

52 Viva Budy Kusnandar, "94% Ekspor Nikel Indonesia Dikirim ke China pada Semester I 2025," Katadata, September 11, 2025, https://databoks.katadata.co.id/perdagangan/statistik/68bfae2e0a290/94-ekspor-nikel-indonesia-dikirim-ke-china-pada-semester-i-2025.

Missing Value-added Steps

Indonesia's current supply chain captures more value than raw ore exports, but gaps remain:

- Advanced refining into battery-grade nickel sulfate and finished aluminium or copper products is limited[53].
- Certification and quality tiers recognized by global buyers are not uniformly met.
- Environmental performance tracking and low carbon credentials are not integrated across all producers.

Key Nodes Where Value Addition is Weak

Conversion to battery-grade nickel or other EV materials.

Production of aluminium, copper alloys, and finished components.

linkage into integrated manufacturing for batteries, EVs, and electric infrastructure.

Implications for Indonesia

Capturing higher value requires upgrading the supply chain toward refined and certified products.

Improved logistics and processing capacity can reduce dependence on intermediate exports and create stronger global market linkages.

This overview highlights the current shape of Indonesia's mineral supply chain, including the major steps, dominant intermediates, and the missing links to full value capture and integration with global markets[54].

The Wall Street Journal (2025)

53 Green Justice Indonesia, "Pemetaan Regulasi, Aktor dan Pendanaan Dalam Rantai Pasok Mineral untuk Baterai Kendaraan Listrik Indonesia: Kobalt, Nikel dan Lithium."
54 Shiddiq, "Tobias Maya: Indonesia, Pemain Kunci dalam Rantai Pasok Global Mineral Kritis."

Indonesia's Exports Historically Focused on China

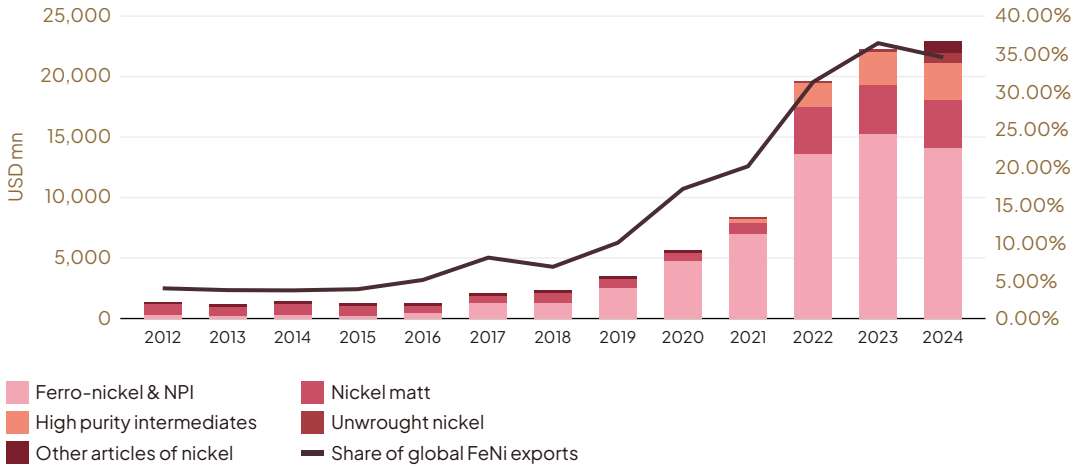
Indonesia's mineral export patterns have been shaped by strong demand from China. For years China has been the main destination for nickel and other minerals, forming the backbone of Indonesia's export market.

In 2023 about 89 percent of Indonesia's nickel exports went to China, based on Indonesia's official export data. China dominated as the destination for nickel shipments[55].

In the first nine months of 2024, exports of Indonesian nickel to China rose from around 722,000 tons to over 1.2 million tons, with export value increasing from about $3.7 billion to $4.34 billion[56].

In early 2025 an estimated 94 percent of Indonesian nickel exports were shipped to China, showing continued heavy concentration on that market[57].

Indonesia's Export of Nickel Products



Source: African Development Bank (2025)

55 Adi Ahdiat, "China borong 89% nikel Indonesia pada 2023," Katadata, March 7, 2024, https://databoks.katadata.co.id/energi/statistik/fe5b1bc68c74a0e/china-borong-89-nikel-indonesia-pada-2023.

56 Trio Hamdani, "Ekspor nikel RI dikuasai China, ini datanya," IDN Times, December 8, 2024, https://www.idntimes.com/business/economy/ekspor-nikel-ri-dikuasai-china-ini-datanya-00-bvq5c-8lmtvd.

57 Kusnandar, "94% Ekspor Nikel Indonesia Dikirim ke China pada Semester I 2025."

The heavy reliance on one market creates terms of trade challenges:

- Most exports to China are intermediate products such as ferronickel, nickel pig iron, and matte rather than finished metals or specialized products, leaving price setting largely outside Indonesia's control[58].
- Producers often accept lower negotiated prices and adjustments for quality and specification rather than global benchmark prices. This limits income and reduces leverage in commercial negotiations.
- China's custom import records can differ from Indonesian official export figures, creating data gaps and possible revenue losses in taxation and trade accounting. Estimates suggest export-import discrepancies in nickel products could total hundreds of millions of dollars over recent years[59].

Other minerals show similar patterns:

- China has been a major destination for other metal exports like copper ore and refined copper products, though downstream processing in Indonesia is less developed than for nickel[60].
- For bauxite, China was a key market before Indonesia's earlier export bans, but recent bans have shifted China's sourcing to other countries such as Guinea[61].

Heavy concentration of Indonesian mineral exports to China has benefits such as stable demand, but also limits price diversity and bargaining power. Producers sell large volumes into one market often without the transparency and premiums that global benchmark pricing platforms like LME provide. Diversifying export markets is important to capture higher margins and reduce risk tied to demand slowdowns in a single economy.

58 CRIF Asia, "The Mining Industry Opportunities in Indonesia in 2023," CRIF Asia, October 18, 2023, https://www.id.crifasia.com/resources/industry-insights/the-mining-industry-opportunities-in-indonesia-in-2023/.

59 Dany Saputra, "Ada Selisih Data Ekspor Nikel Matte ke China, Apa Pemicunya?," Kabar24, July 28, 2025, https://kabar24.bisnis.com/read/20250728/15/1897172/ada-selisih-data-ekspor-nikel-matte-ke-china-apa-pemicunya.

60 Agnes Z. Yonatan, "Indonesia Paling Banyak Ekspor Tembaga ke China," GoodStats, August 14, 2024, https://goodstats.id/article/indonesia-paling-banyak-ekspor-tembaga-ke-china-8bCCI.

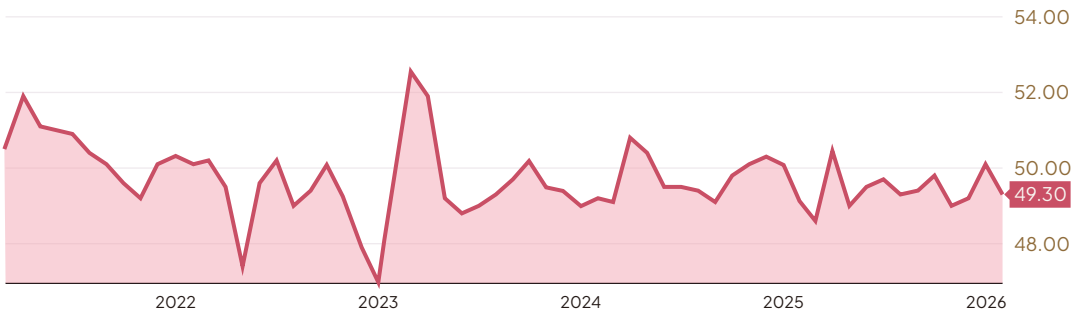
61 Laura Roberts, "Indonesia vows to invest more in aluminium supply chain in strategy for critical metals," Fastmarkets, June 20, 2024, https://www.fastmarkets.com/insights/indonesia-vows-to-invest-more-in-aluminium-supply-chain-in-strategy-for-critical-metals/.

China's Market Slowdown

Indonesia's heavy focus on China as a mineral export destination leaves producers exposed to year-on-year shifts in Chinese industrial demand. Recent indicators show mixed signals in China's manufacturing and metals sectors, with signs of slower growth in key areas that drive metal demand.

Data from official sources show China's manufacturing Purchasing Managers' Index or PMI hovered around the threshold that separates expansion from contraction. In December 2025 the PMI edged slightly above 50, indicating modest production growth, but by January 2026 it dipped to 49.3, signaling weaker momentum in factory activity and demand conditions. New orders were below expansion levels, reflecting softer market demand[62].

China Manufacturing Purchasing Managers' Index (PMI)

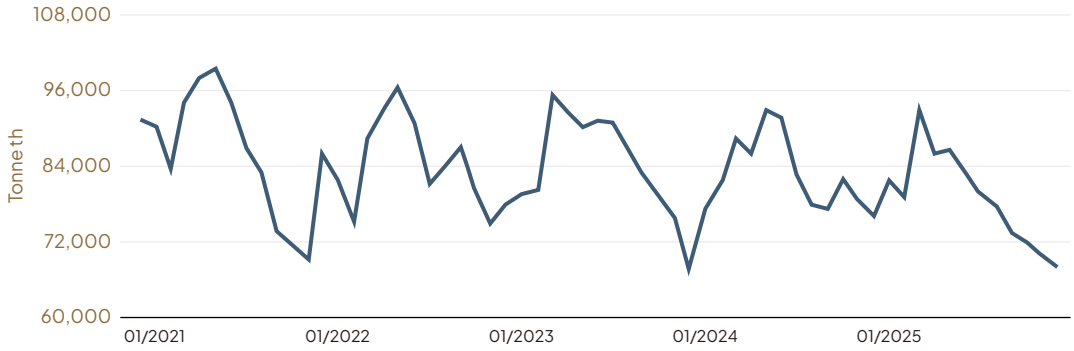


Source: Investing.com (2026)

China's steel production, which accounts for a large share of metal consumption globally, also showed signs of plateauing. Production in December 2025 fell to around 68.2 million tonnes, down from prior months, and remains below the peaks seen earlier in the decade. Lower steel output tends to reduce demand for iron ore and nickel-related inputs[63]. Other survey data on steel sector activity shows contraction in some sub-indices, with new steel orders retreating below expansion levels in late 2025[64].

62 Moody's Analytics, "China Purchasing Managers Index," Economy.com, accessed by February 17, 2026, https://www.economy.com/china/purchasing-managers-index.
63 Trading Economics, "China Steel Production," Trading Economics, accessed by February 17, 2026, https://tradingeconomics.com/china/steel-production.
64 Mysteel, "CSLPC: China's steel PMI drops further in December," Mysteel, December 31, 2025, https://www.mysteel.net/news/5108776-cslpc-chinas-steel-pmi-drops-further-in-december.

China's Crude Steel Production

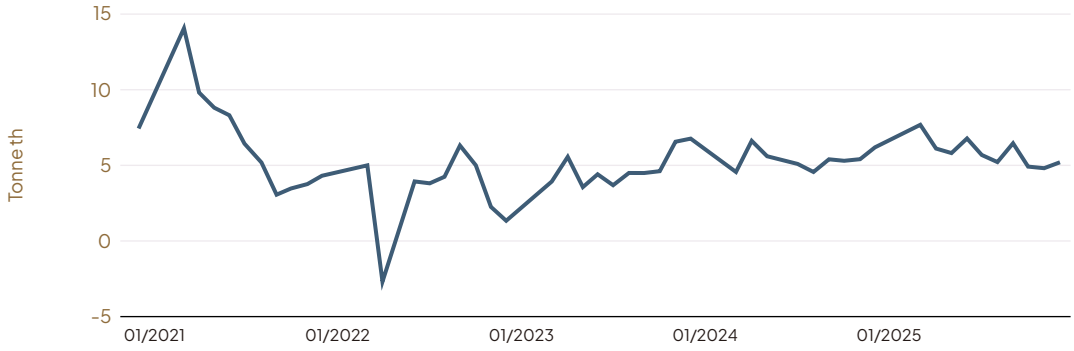


Source: CEIC (2026), compiled by the authors

EV market indicators further illustrate moderation. Recent industry reports show EV sales in China fell sharply, with registrations in early 2026 down around 20 percent year-on-year after tax incentives expired. This decline affects demand for battery metals including nickel and copper, which are key inputs in EV battery production and electric mobility systems[65]. Global EV registrations also fell marginally in January 2026, with China identified as one of the main drivers of the slowdown[66].

China's broader industrial output data presents a nuanced picture. Official statistics report overall industrial growth of near 5.9 percent in 2025, but this includes sectors beyond heavy metal intensive industries. Meanwhile steel production declined about 4.4 percent in 2025 compared to 2024, the lowest level in several years[67].

China Industrial Production Index (YoY)



Source: CEIC (2026), compiled by the authors

Taken together, these indicators show China's market as still large, but with weaker and mixed growth in sectors that matter most for base metal demand. Manufacturing momentum has softened, steel output has eased from previous peaks, and EV demand has cooled without strong policy support.

65 Jiahui Huang, "China EV sales drop for first time since February 2024," The Wall Street Journal, February 12, 2026, https://www.wsj.com/business/autos/china-ev-sales-drop-for-first-time-since-february-2024-d114a02a.

66 Reuters, "Global EV sales hampered by China, US slowdown in January," Reuters, February 13, 2026, https://www.reuters.com/sustainability/climate-energy/global-ev-sales-hampered-by-china-us-slowdown-january-2026-02-13/.

67 Index Box, "China's 2025 Industrial Output Grows 5.9% as Steel Production Hits 7-Year Low," Index Box, January 20, 2026, https://www.indexbox.io/blog/chinas-2025-industrial-output-grows-59-as-steel-production-hits-7-year-low/.

For Indonesia, slower demand growth from its largest export partner increases the urgency of market diversification and integration with global price mechanisms such as LME benchmarks. Diversification reduces reliance on any single market's demand cycle and helps Indonesia achieve more stable pricing and better revenue capture for its critical minerals.

Yahoo! Finance (2021)

Geopolitical Shifts and Market Diversification

Global critical mineral markets are reshaping due to geopolitical competition and strategic trade policies. Supply chains once driven by cost now reflect national security and economic strategy, creating new opportunities and risks for resource-rich countries like Indonesia[68].

China's dominant position in processing and refining remains a central force in global mineral geopolitics. It controls a large share of refining capacity for nickel, rare earth elements, lithium, and other critical inputs used in electric vehicles, renewable energy, and defense technologies. Its influence has shaped global trade flows and pricing mechanisms for years[69].

In response, major consuming economies have launched initiatives to diversify supply chains and reduce dependence on any single producer. For example:

- The United States has launched multilateral agreements and strategic investment programs aimed at building resilient critical mineral supply chains with allied partners. These efforts include investments in extraction, processing, and stockpiling of essential minerals[70].
- Japan is expanding imports of rare earths from Australia to reduce reliance on China's supply and processing infrastructure[71].
- The European Union is investing in critical minerals projects overseas, establishing partnerships with resource-rich countries, and promoting recycling to cut reliance on dominant suppliers[72].

These strategic shifts reflect a broader trend toward market diversification. Consumers and governments are seeking multiple sourcing routes, balanced trade relationships, and secure supply lines that are less vulnerable to export restrictions or geopolitical tensions[73].

68 Felicity Hurley, "Geopolitical Tensions Reshape Global Supply Chains for Critical Minerals," The Financial Analyst, March 5, 2025, https://thefinancialanalyst.net/2025/03/05/geopolitical-tensions-reshape-global-supply-chains-for-critical-minerals/.

69 Chaitanya Gupta, "Critical Minerals Explained: Why They Matter for Geopolitics, Clean Energy & Tech," The Belfer Center for Science and International Affairs, October 30, 2025, https://www.belfercenter.org/explainer-what-are-critical-minerals.

70 Andy Home, "US turns multilateral in search of critical mineral security," Reuters, February 11, 2026, https://www.reuters.com/markets/commodities/us-turns-multilateral-search-critical-mineral-security-2026-02-11/.

71 Yuka Obayashi, "Japan's Sojitz to expand Australian rare earth imports as partner broadens product lineup," Reuters, February 16, 2026, https://www.reuters.com/world/asia-pacific/japans-sojitz-expand-australian-rare-earth-imports-partner-broadens-product-2026-02-16/.

72 Rachel Looker and Euan Sadden, "US, EU to further intensify critical mineral investments as China tightens hold," S&P Global, January 9, 2026, https://www.spglobal.com/energy/en/news-research/latest-news/metals/010926-us-eu-to-further-intensify-critical-mineral-investments-as-china-tightens-hold.

73 İpek Kara, "Critical Raw Materials Supply Chains and Geopolitical Risks," Bloomsbury Intelligence and Security Institute, September 23, 2025, https://bisi.org.uk/reports/critical-raw-materials-supply-chains-and-geopolitical-risks.

For Indonesia, this global environment presents both risk and opportunity:

Risk: Continued concentration of exports to China exposes Indonesia to demand shifts and pricing pressures tied to one major partner's economic cycle. Slowing Chinese industrial demand could weaken terms of trade if alternative markets are not developed.

Opportunity: Diversification into markets such as Europe, the United States, and Middle East aligns with global moves to secure alternative sources of critical minerals. Bilateral and multilateral trade agreements can support access to new buyers[74].

Indonesia's membership in ASEAN also enhances its strategic position. The ASEAN region collectively accounts for a significant share of global nickel reserves and elements like rare earths, giving its members leverage in diplomatic and economic engagement with major consuming blocs. Effective regional cooperation can strengthen Indonesia's voice in global supply dialogues[75].

In the emerging multi-polar trade order, diversification reduces dependence on any single buyer or pathway. By engaging with new markets and aligning with global strategies for secure, transparent supply chains, Indonesia can increase its negotiating power and achieve more stable, diversified revenue for its critical minerals.

Reuters (2026)

74 Karlitos Brian Decena, "Commodities 2026: Southeast Asia navigates power rivalry for critical minerals," S&P Global, December 18, 2025, https://www.spglobal.com/energy/en/news-research/latest-news/metals/121825-commodities-2026-southeast-asia-navigates-power-rivalry-for-critical-minerals.

75 Shiddiq, "ASEAN siap memainkan peran kunci dalam geopolitik mineral kritis untuk transisi energi global," Media Nikel Indonesia, November 19, 2024, https://nikel.co.id/2024/11/19/asean-siap-memainkan-peran-kunci-dalam-geopolitik-mineral-kritis-untuk-transisi-energi-global/.

Future Demand for Low Carbon Metal

Demand for low carbon metals will shape global markets through the 2030s and beyond, driven by decarbonisation policies, electric mobility, and the energy transition.

Global steelmakers are shifting toward greener production. Surveys show a rising share of green steel demand by 2030 as buyers seek lower carbon intensity in materials used for infrastructure and manufacturing. This trend is strongest in North America and Europe as carbon pricing and import policies tighten. Demand for lower-emission steel input materials will grow accordingly[76].

Decarbonised steelmaking itself will change metal demand. EAF use is rising because it emits less carbon than traditional blast furnaces. Broader adoption of EAF and other low-carbon technologies increases demand for scrap and high-quality metal feedstocks over the long term, especially where carbon costs and regulations penalise high emissions[77].

On the battery metals side, electrification drives long-term growth. Even after short-term market cyclical swings, forecast models see demand for key battery metals such as nickel and copper increasing sharply as EV production scales globally. EV batteries may require three times more nickel by 2030 compared to today if EV fleets expand rapidly and higher-nickel chemistries remain popular. Meanwhile, copper demand tied to electrification, grid infrastructure, data centres, and renewable energy systems is projected to grow substantially through 2030 and toward mid-century.

Global materials analysts highlight that energy transition metals such as nickel, cobalt, lithium and copper could see demand levels far above historical norms as solar, wind and transport electrification expand. In this context, low carbon metal supply chains that reduce emissions during extraction and processing will become increasingly attractive to buyers under regulatory and investor pressure[78]. Green steel's long-term prospects also show significant growth potential. Scenario analyses of global hydrogen-based green steel projects indicate that demand could rise from a small share of total steel production by 2030 to a much larger share by 2050. Even if early adoption is modest, long-term projections point to hundreds of millions of tonnes of low-carbon steel demand by mid-century, reinforcing the need for metals with verified low carbon footprints[79].

76 Kunwar Vijayant Singh, Rajat Gupta, Amit Aggarwal, and Ankit Agarwal, "Evolving with steel: Future growth and opportunities," McKinsey & Company, September 4, 2024, https://www.mckinsey.com/in/our-insights/evolving-with-steel-future-growth-and-opportunities#/.

77 M Iqbal Al Machmudi, "Kurangi Emisi Karbon, Permintaan Baja Berteknologi EAF Diprediksi Meningkat," Media Indonesia, December 7, 2024, https://mediaindonesia.com/ekonomi/724287/kurangi-emisi-karbon-permintaan-baja-berteknologi-eaf-diprediksi--meningkat.

78 Konstantinos Komnitsas, Ilias Lazos, and Toni Eerola, Energy Transition Metals: Future Demand and Low-Carbon Processing Technologies, MDPI 15, no. 1 (2023): 56, https://www.mdpi.com/2673-4605/15/1/56

79 Takuma Watari and Benjamin McLellan, "Global Demand for Green Hydrogen-Based Steel: Insights from 28 Scenarios," International Journal of Hydrogen Energy 79 (2024): 630–635, https://doi.org/10.1016/j.ijhydene.2024.06.423.

These trends reflect intersecting drivers:

- Decarbonisation policies in major economies that raise the value of low carbon inputs.
- EV and battery growth that boosts metal demand for electrification, even as chemistries evolve.
- Infrastructure expansion for renewables and data networks that require copper, nickel, and aluminium.
- Steel industry transformation toward greener production methods that prefer low carbon metal feedstocks.

Indonesia's strategic positioning as a major supplier of key metals places it well to benefit from these structural shifts if it aligns production with low carbon criteria and connects to markets that reward environmental performance.

Recycling today, Photo courtesy of Cleveland-Cliffs (2021)

Strategic Demand from Future Cities

Future urban megaprojects illustrate global demand for large volumes of metals with low carbon footprints. These cities require durable construction materials and advanced infrastructure that align with environmental goals, and they present long-term demand opportunities for producers that can supply certified low carbon metals.

NEOM in Saudi Arabia is a leading example. It is a planned smart city covering tens of thousands of square kilometers, with designs emphasizing sustainability and zero carbon emissions. The project includes The Line, a linear smart city concept stretching up to 170km, and Oxagon, a floating industrial hub focused on advanced manufacturing, energy, and logistics[80]. NEOM's development is expected to host millions of residents and major industrial activity[81].

Construction of NEOM requires extraordinary material volumes. Industry estimates suggest its steel demand alone could represent up to 20 percent of the global steel market during peak phases, given the scale of infrastructure, transportation systems, and buildings planned[82]. This makes Neom one of the largest metal consumers in modern construction.

These demand patterns matter for low carbon metal producers for several reasons:

Scale of demand: Future cities require millions of tonnes of structural metals such as steel, aluminium, and copper for construction and infrastructure. A project demanding a significant share of global steel output creates long-term purchase contracts and sustained metal flows.

Focus on sustainability: Neom and similar developments emphasize energy efficiency, renewable power, and reduced emissions. They prefer materials with verified low carbon footprints to align with broader sustainability goals. This preference can translate into premium pricing for producers who can certify low emissions in production and supply chains.

Advanced infrastructure needs: Smart cities need metal inputs for digital infrastructure, renewable energy systems, electric grids, transportation systems, and data centres. These systems rely on reliable supplies of copper, aluminium, and nickel in addition to steel.[83]

Indonesia's role as a key supplier of nickel, copper, and other critical metals positions it to capture demand from future cities, provided its industry can meet quality and environmental specifications. As urban megaprojects increasingly align with low carbon objectives, producers with certified sustainable products gain a competitive edge.

Linking supply from Indonesia with global megaproject requirements encourages investment in cleaner production technologies and strengthens export opportunities beyond traditional buyers.

80 Rachel Cole, "Neom: High-Tech Planned Mega-Project, Saudi Arabia," Britannica, February 15, 2026, https://www.britannica.com/place/Neom.
81 Ibid.
82 Sophie Clark, "Saudi Arabia Megaproject Neom Says It Needs 20% of the World's Steel," Newsweek, October 22, 2024, https://www.newsweek.com/saudi-arabia-neom-line-steel-1972265.
83 Shanghai Metals Market, "New Energy Revolution: Which Non-Ferrous Metals Will Lead the Future Clean Energy Market?", Shanghai Metals Market, January 9, 2025, https://news.metal.com/id/newscontent/103130513.

Economic Benefits of LME Participation

Participation in the London Metal Exchange can bring concrete economic benefits for Indonesian producers, downstream industries, and local communities by linking domestic production to transparent global markets.

- **Transparent price signals reduce uncertainty**
  LME prices reflect real-time global supply and demand, giving producers a clear reference for contract negotiations and investment decisions. Transparent benchmark prices help firms plan production, manage cash flow, and negotiate premiums or discounts based on quality and location. This reduces the need for costly internal price research and supports more informed commercial strategies[84].

- **Risk management through hedging tools**
  Producers and consumers use futures and options on the LME to hedge against price volatility. A miner can lock in a future selling price, protecting revenue if prices fall. A refiner or metal user can manage input cost risk by purchasing futures that cap costs in advance. These tools stabilise earnings and reduce exposure to short-term price swings that hit producers dependent on spot market contracts[85].

- **Improved market access and liquidity**
  The LME is one of the most liquid metal markets worldwide, with global participation that ensures buyers and sellers can transact at competitive pricing. High liquidity lowers transaction costs and supports efficient price discovery, creating opportunities for Indonesian metals to attract a broader set of international buyers[86].

- **Global benchmark pricing creates bargaining power**
  Using LME prices allows Indonesian producers to anchor negotiations with buyers to a widely accepted global standard rather than relying on opaque bilateral deals. This can lead to higher realised prices when demand is strong and reduce the risk of unfavourable terms tied to single markets[87].

84 London Metal Exchange, "How Are LME Reference Prices Used in Physical Metals Contracts," LME Insight, January 26, 2026, https://www.lmeinsight.com/how-are-lme-reference-prices-used-in-physical-metals-contracts/.
85 SpotMarketCap, "What is the LME? London Metal Exchange Guide."
86 The Sindh Health Department, "London Metal Exchange: Your Essential Guide," The Sindh Health Department, January 6, 2026, Sindh Health Departmenthttps://attendance.sindhhealth.gov.pk › free-area › london-metal-exchange-your-essential-guide-1767648660London Metal Exchange: Your Essential Guide.
87 London Metal Exchange, "How Are LME Reference Prices Used in Physical Metals Contracts."

- **Premiums for certified low carbon and responsible metals**
  The LME is developing frameworks for sustainability premiums that reward metals produced with low carbon footprints and verified responsible sourcing. Certified low carbon nickel, copper, and aluminium could trade at a premium compared to conventional products if producers meet environmental standards and verification criteria. This could generate higher returns for Indonesian producers that invest in cleaner processing and certification systems[88].

- **Integration with global supply chains**
  Listing brands and metals on the LME and meeting its quality specifications enhances the visibility and credibility of Indonesian metal producers. This can attract new buyers in Europe, North America, and other regions, support long-term contracts, and diversify export markets beyond traditional partners.

- **Community and revenue benefits**
  Stable revenue streams created through transparent pricing and risk management support investment in mines, smelters, and processing facilities. Higher and more predictable income can increase tax revenues and royalty flows to government budgets, which can be reinvested in infrastructure, education, and community development around mineral regions.

CELIOS (2026)

88 Shanghai Metals Market, "The London Metal Exchange Will Introduce Sustainability Premiums for Four Metals: Aluminum, LME Zinc Contract, Copper, and Nickel," Shanghai Metals Market, May 12, 2025, https://news.metal.com/newscontent/103320126-the-london-metal-exchange-will-introduce-sustainability-premiums-for-four-metals-aluminum-lme-zinc-contract-copper-and-n.

How LME Could Drive Premium Prices for Indonesia

The London Metal Exchange is actively creating mechanisms that can generate premium pricing for low carbon and certified metals. This can help Indonesia move beyond standard commodity pricing toward differentiated value for cleaner products[89].

1 — Transparent sustainable premium framework
The LME has published a roadmap and methodology to establish sustainable metal premium pricing for LME-approved brands that meet defined environmental and quality thresholds. This initiative is supported by a new pricing administrator, Commodity Pricing and Analysis Limited, which will compute premiums based on actual transactions and market intelligence[90].

2 — Eligibility for premium pricing tied to sustainability credentials
To qualify, metals must appear on the LME brand list and disclose sustainability data on the LMEpassport system that meets premium sustainability thresholds. These thresholds include maximum allowable carbon footprints and third-party sustainability assurances based on internationally recognised methodologies[91].

3 — Metalshub as a price discovery engine
A key driver of the premium pricing mechanism is @Metalshub, a digital trading platform linked with the LME. Trades executed on Metalshub between independent buyers and sellers of sustainable metal contribute to transparent price discovery. This ensures that premiums reflect real market transactions, not theoretical models[92].

4 — Focus on core metals relevant to Indonesia
Initial LME premium plans target base metals including nickel, copper, aluminium and zinc. These are core to Indonesia's export portfolio, particularly nickel, where low carbon product contracts have already traded[93].

5 — Market recognition of low carbon quality
The LME's sustainable premium system creates visible incentives for cleaner metal production. Buyers looking for verified low carbon metals can pay "LME price plus premium", attaching extra value to environmental performance. This differs from standard commodity pricing, where environmental attributes are not explicitly priced[94].

89 London Metal Exchange, "LME Drives Forward Sustainable Metal Premium Pricing Plans," London Metal Exchange, October 13, 2025, https://www.lme.com/news/press-releases/2025/lme-drives-forward-sustainable-metal-premium-pricing-plans.
90 Ibid.
91 London Metal Exchange, "Sustainable Metals Premium Pricing," London Metal Exchange, accessed by February 17, 2026, https://www.lme.com/sustainability-and-physical-markets/sustainability/sustainable-metals-premium-pricing.
92 Samir Jaber, "Metalshub Enables Verified Sustainable Metals Pricing with the London Metal Exchange," Metalshub, October 21, 2025, https://www.metals-hub.com/en/blog/metalshub-enables-verified-sustainable-metals-pricing-with-lme/.
93 Shanghai Metals Market, "The London Metal Exchange Will Introduce Sustainability Premiums for Four Metals: Aluminum, LME Zinc Contract, Copper, and Nickel."
94 London Metal Exchange, "LME Drives Forward Sustainable Metal Premium Pricing Plans."

Examples of how this benefits Indonesia

- A nickel product certified to low carbon standards and listed on the LME can fetch a positive premium against the benchmark price[95].
- Indonesian producers with low carbon credentials can compete in markets that emphasise sustainability rather than lowest cost.
- Diversified pricing reduces dependence on one buyer or regional market cycles.

6 — Link to global supply chain value signals

Premium pricing on the LME offers a public, transparent signal of value for clean metals. This can improve negotiating power in export contracts and encourage investment in low carbon processes at refineries and smelters.

In summary, LME's premium pricing initiative creates a pathway for Indonesia to capture higher value from low carbon metals. Through sustainability thresholds, transparent trade-based pricing, and a global benchmark, Indonesian producers can differentiate their products and secure better returns than under conventional bulk commodity prices.

Reuters (2022)

95 Viral Shah, "LME Outlines Plan for 'Sustainable' Base Metal Premiums: LME Week 2025," Fastmarkets, October 14, 2025, https://www.fastmarkets.com/insights/lme-outlines-plan-for-sustainable-base-metal-premiums-lme-week-2025/.

LME Components for Low Carbon Metal

This section explains how the London Metal Exchange defines, prices, and trades low carbon metals, and what components Indonesian producers must meet to participate.

1 — LME Brand Eligibility and Standards
Metals must first appear on the LME-brand list and meet quality and responsible sourcing standards. Only branded metals are eligible for structured price discovery and premium pricing initiatives. Producers must apply and meet LME requirements to list their metal as an approved brand[96].

2 — Sustainability Data and LMEpassport
LMEpassport is the exchange's digital credentials register. To qualify for low carbon recognition, producers must disclose verified sustainability data on LMEpassport. This includes carbon emissions and third-party assurances that meet the exchange's premium sustainability thresholds. Carbon limits and assurance criteria are set for each metal to differentiate low carbon supply from conventional production[97].

3 — Sustainability Thresholds
The LME defines carbon footprint limits and third-party standards as part of its premium pricing methodology. Updated thresholds balance ambition with achievable production profiles. For example, lower thresholds for aluminium and copper emphasise meaningful carbon differentiation, while requirements vary by metal type[98].

4 — Trading and Price Discovery on Metalshub
Low carbon metals that meet the sustainability criteria can be traded on the Metalshub digital platform, an independent marketplace linked to the LME. Transactions on Metalshub form the basis for transparent price discovery of sustainability premia. If actual trades are insufficient, the price administrator will use bids, offers, and market intelligence to determine premiums[99].

5 — Pricing Administrator Role
A new independent entity, CPAL, has been established to administer sustainability premiums. CPAL aggregates transaction data from Metalshub and other inputs to publish transparent premium figures for eligible metals[100].

96 London Metal Exchange, "LME Drives Forward Sustainable Metal Premium Pricing Plans."
97 Ibid.
98 Ibid.
99 Ibid.
100 Ibid.

6 — Contract Specifications and Physical Delivery

LME sustainable pricing does not use standard futures contracts but instead relies on spot-oriented physical trading with clearly defined characteristics or grades. Physical lots must match the sustainability specifications published on LMEpassport and trade through approved channels so that price discovery reflects real transactions[101].

7 — Buyers and Market Participants

Buyers include steel producers, battery makers, manufacturers, traders, and funds that value low carbon metals for regulatory compliance or corporate sustainability goals. Transparent prices and premium signals help buyers compare products on both cost and carbon performance[102].

8 — Quality and Verification Requirements

To participate, Indonesian producers must:

- Register metal brands with the LME.
- Submit reliable carbon data and third-party sustainability certification.
- Ensure consistent quality that meets global buyer expectations.
- Align production processes with recognised methods for carbon measurement and environmental performance[103].

9 — Connection to Global Value Chains

Meeting LME requirements positions Indonesian metals for global supply chains that emphasise low carbon credentials. Transparent sustainable pricing can enhance negotiation power and facilitate entry into markets that prioritise environmental performance[104].

Indonesia's integration with LME's sustainable metal framework strengthens the link between price and environmental quality, enabling producers that meet strict criteria to capture differentiated value in global markets.

Danantara Indonesia (2026)

101 London Metal Exchange, "Sustainable Metals Premium Pricing."
102 London Metal Exchange, "LME Drives Forward Sustainable Metal Premium Pricing Plans."
103 Ibid.
104 Ibid.

Role of Danantara and Other Facilitators

Danantara Indonesia, the new sovereign wealth fund established under Indonesian law, is playing a strategic role in advancing the country's critical minerals sector and supporting integration into global value chains. Its involvement links national assets, international investment, and downstream development in metals that matter for markets like LME[105].

Facilitating international cooperation

Danantara is actively engaging with foreign partners to broaden market access and investment. It has held formal talks with US export agencies and American firms on access to Indonesia's critical minerals, working within tariff negotiations to support business-to-business cooperation between Indonesian producers and US buyers. This creates avenues for new export markets beyond traditional partners[106].

Catalysing strategic investments

Danantara has partnered with global mining and processing firms to strengthen Indonesia's downstream capacity. For example, it joined the INA and French miner Eramet in a platform to drive investment into the nickel sector, combining financing expertise with global technical capacity to build sustainable downstream infrastructure[107].

Danantara also signed a significant framework agreement with GEM Limited, a Chinese metallurgical and green solutions company, to explore joint investment in HPAL processing capacity for nickel. This initiative supports higher-value production and aligns with low carbon supply objectives[108].

Mobilising finance for downstream projects

As a sovereign fund managing state-owned company assets, Danantara mobilises capital for large-scale industrial projects that extend beyond mining into integrated processing ecosystems. Its projects include facilities for aluminium smelting and other mineral processing that aim to capture more value domestically[109].

105 Anton Santoso, "Indonesia's Danantara in Talks on US Access to Critical Minerals," Antara News, December 26, 2025, https://en.antaranews.com/news/397807/indonesias-danantara-in-talks-on-us-access-to-critical-minerals.
106 Ibid.
107 Indonesia Investment Authority, "Danantara, INA Partner French Miner Eramet to Boost Investments in Nickel Sector," Indonesia Investment Authority, May 28, 2025, https://www.ina.go.id/ina-in-the-news/danantara-ina-partner-french-miner-eramet-to-boost-investments-in-nickel-sector/.
108 Muhammad Heriyanto, "Danantara dan GEM teken perjanjian proyek nikel senilai Rp23 triliun," Antara News, August 27, 2025, https://www.antaranews.com/berita/5067317/danantara-dan-gem-teken-perjanjian-proyek-nikel-senilai-rp23-triliun.
109 Ruth Dea Juwita, "Danantara Breaks Ground on $7b Downstream Industry Projects," The Jakarta Post, February 9, 2026, https://www.thejakartapost.com/business/2026/02/09/danantara-breaks-ground-on-7b-downstream-industry-projects.html.

Attracting global finance partnerships

Danantara is in discussions with international financiers such as the USDFC to support investment in minerals ecosystems. This opens access to development finance that can help underwrite capital-intensive downstream and processing facilities, enhancing competitiveness in low carbon markets[110].

Connecting producers to global markets

By establishing investment vehicles and strategic partnerships, Danantara helps Indonesian state and private firms align with global buyers and supply chains. Its activities help bridge domestic producers with international demand for higher quality and environmentally responsible metals, potentially easing entry into benchmark markets like the LME[111].

Summary of roles

- Facilitates foreign market access and export cooperation.
- Attracts and co-invests with global partners in downstream metal processing.
- Mobilises public and private investment for critical minerals infrastructure.
- Creates platforms that support quality, sustainability, and integration with global pricing mechanisms.

Danantara's emerging role is key to supporting Indonesia's objectives in premium pricing, diversified export destinations, and value-added production, reinforcing broader policy goals outlined in this brief.

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110 Bayu Saputra, "Airlangga: Danantara siap gandeng USDFC untuk investasi mineral kritis," Antara News, July 24, 2025, https://www.antaranews.com/berita/4990549/airlangga-danantara-siap-gandeng-usdfc-untuk-investasi-mineral-kritis.

111 Anton Santoso, "Indonesia's Danantara in Talks on US Access to Critical Minerals."

Regulation Gap Analysis

This section compares key regulatory components in Indonesia's mineral governance with LME requirements for low carbon and premium metal participation, and identifies gaps that policy reform must address.

Connecting producers to global markets

Indonesia	LME
Current regulations focus on domestic value capture, benchmark pricing floors (Mineral Benchmark Price or HPM) and export controls for minerals like nickel. Benchmark prices are set monthly using formulas tied to reference prices, and license holders must report sales data to government authorities. Reporting focuses on transaction values, not detailed sustainability metrics[112].	Requirements for sustainability premiums rely on transparent, verified sustainability data disclosed on LME passport. Metals must meet premium sustainability thresholds for carbon footprints and third-party assurance to qualify for low carbon premium pricing[113].

Price Benchmarking

Indonesia	LME
The state determines benchmark prices for domestic sale and tax purposes based on reference prices tied historically to LME price averages. The system is evolving but remains a government-set floor price rather than a dynamic market price reflecting sustainability performance[114].	Pricing mechanisms for premium metals are grounded in actual market transactions through approved platforms (e.g., Metalshub), combined with sustainability disclosures. This creates market-based pricing that signals value for environmental performance[115].

112 International Energy Agency, "Metal Domestic Price Regulation," IEA Policies, August 25 2025, https://www.iea.org/policies/20265-metal-domestic-price-regulation.
113 London Metal Exchange, "Sustainable Metals Premium Pricing."
114 Cora Ji, "Indonesia revises regulations on mineral benchmark prices," Mysteel, March 4, 2025, https://www.mysteel.net/analysis/5078661-indonesia-revises-regulations-on-mineral-benchmark-prices.
115 London Metal Exchange, "Sustainable Metals Premium Pricing."

Sustainability and Carbon Reporting

Indonesia	LME
Companies must report greenhouse gas inventories under national carbon pricing mandates, but this reporting is general environmental compliance, not tailored to metal production standards for global markets[116].	Producers must supply third-party verified carbon and sustainability data to LMEpassport to qualify for premium pricing. Thresholds for carbon intensity are specific to each metal[117].

Quality and Responsible Sourcing Standards

Indonesia	LME
Regulation emphasises domestic processing and value addition but lacks standardised international quality classes or consistent certification for responsible sourcing aligned with global standards. Benchmark pricing regulation does not include quality tiers for carbon-intensity or third-party assurance[118].	Metals must be LME-approved brands with responsible sourcing compliance and sustainability disclosures registered with LMEpassport. Premium sustainable prices are only published for metals meeting these criteria[119].

Market Access and Trading Mechanisms

Indonesia	LME
Domestic regulation supports mineral sales based on government benchmarks and export policy, but does not include guidelines for direct engagement with price discovery platforms or metadata reporting for LME-style trading[120].	Access to sustainable pricing requires participation in transactions via platforms such as Metalshub, where net trades contribute to verified pricing data. Producers must engage commercially and meet listed criteria[121].

116 Nickel Institute, "ESG Requirements for Indonesian Nickel and Cobalt Producers," Nickel Institute, April 18, 2024, https://nickelinstitute.org/media/agtfzvox/20240418-webinar-esg-requirements-for-nickel-and-cobalt-producers-report-final.pdf.
117 London Metal Exchange, "Sustainable Metals Premium Pricing."
118 International Energy Agency, "Metal Domestic Price Regulation."
119 London Metal Exchange, "LME Roadmap: Sustainable Metals Premia," London Metal Exchange, October 2025, https://www.lme.com/-/media/Files/Physical-services/Initiatives/LME-Roadmap-Sustainable-Metals-Premia.pdf.
120 International Energy Agency, "Metal Domestic Price Regulation."
121 London Metal Exchange, "Sustainable Metals Premium Pricing."

Table: Indonesia vs LME Requirements

Regulatory Component	Indonesia's Regulations	LME's Sustainable Metal Requirements
Price Benchmarking	Government-set HPM based on reference prices	Market-based prices via transparent transactions
Carbon Reporting	General GHG reporting under national law	Verified carbon footprint disclosure on LMEpassport
Sustainability Certification	Not required for pricing or export	Third-party assurance required for sustainable premium eligibility
Quality Standards	Basic commodity classification	LME-brand quality and responsible sourcing requirements
Trading Platform Integration	No formal integration with global price discovery systems	Metalshub and LMEpassport linked to premium pricing
Export/Risk Diversification Metrics	Focus on export volumes and quotas	Emphasis on carbon criteria, third-party standards, and brand listing

Key Gaps Identified

- **Lack of sustainability benchmarks:** Indonesia's current pricing and regulatory regimes do not set thresholds for carbon intensity or responsible sourcing tailored to premium low carbon metals[122].
- **Verification mechanisms:** There is no standard mechanism in Indonesian regulation for independent third-party verification of sustainability metrics needed for LME passports[123].
- **Market linkage:** Domestic benchmarks and pricing guidelines are not designed to interface with market-based platforms that support price transparency for sustainability attributes.
- **Quality classification:** Indonesian regulation lacks international quality classes that align with LME brand specifications, which can impede eligibility for premium pricing[124].

Policy Implications

Closing these gaps will require regulatory reform in Indonesia to integrate sustainability-linked reporting, third-party certification, and quality standards aligned with global markets. It also requires enabling commercial participation in platforms that feed transparent price discovery. Aligning domestic governance with LME expectations can unlock premium pricing for low carbon metals and strengthen Indonesia's role in global critical minerals markets.

122 International Energy Agency, "Metal Domestic Price Regulation."
123 London Metal Exchange, "LME Roadmap: Sustainable Metals Premia."
124 Ibid.

Policy Recommendations

Indonesia's mineral sector has achieved strong upstream and downstream growth, but global market integration and sustainability standards present new challenges. National policy should help producers meet international requirements, support low carbon products, and unlock higher value through transparent pricing mechanisms such as the London Metal Exchange.

1 Align domestic pricing frameworks with global benchmarks

- Reform HPM to integrate market-based pricing signals rather than fixed floors alone[125]. This would help producers compete more effectively in international markets while ensuring fair resource rent for the state.
- Create mechanisms to adjust domestic benchmarks for quality tiers that reflect carbon intensity, grade, and product specification to align with global standards.

2 Integrate sustainability and carbon reporting into regulation

- Mandate consistent carbon footprint reporting for all metal producers, using internationally recognised methodologies.
- Require disclosure of emissions data compatible with global registries such as LMEpassport so producers can qualify for sustainable metal premiums.
- Support capacity building for firms to achieve third-party certification for low carbon and responsible sourcing to meet investor and buyer expectations.

3 Strengthen regulatory standards for metal quality and product classification

- Adopt harmonised quality classes for products like battery-grade nickel, copper cathode, and aluminium alloys based on international norms.
- Update domestic standards to support export readiness for low carbon metals aligned with premium pricing frameworks.
- Encourage accredited testing and verification infrastructure to support quality assurance.

4 Promote innovation in low carbon processing technologies

- Provide targeted incentives for clean smelting, renewable electricity use, carbon capture, and energy efficiency in mineral processing facilities.
- Support R&D collaborations between government, industry, and universities on advanced refining and low carbon materials processing.

125 Diki Mardiansyah, "Pemerintah Menetapkan Harga Patokan Mineral, Begini Pengaruhnya ke Pertambangan," Kontan, September 1, 2025, https://industri.kontan.co.id/news/pemerintah-menetapkan-harga-patokan-mineral-begini-pengaruhnya-ke-pertambangan.

5 Encourage diversified export markets and strategic partnerships

- Expand bilateral trade agreements and critical minerals cooperation with regions such as the EU, US, Japan, and Middle East to reduce dependence on any single market and increase bargaining power.
- Use diplomatic channels to negotiate reduced tariffs and non-tariff barriers for Indonesian refined metals, building on ongoing talks with partners.
- Facilitate industry-to-industry matchmaking at international forums and investment summits to open new buyers and contract opportunities.

6 Build infrastructure and logistics to support value chains

- Invest in port capacity, rail and road links, and energy infrastructure that reduce costs and emissions in mineral transport and processing.
- Prioritise nodes in the supply chain where bottlenecks hinder movement from mine to refinery to port.

7 Enhance workforce skills and institutional capacity

- Expand education and training programs for advanced metallurgy, sustainability reporting, and quality assurance.
- Support SMEs and local communities in mineral regions with technical training and access to finance so they can participate in downstream value chains.

8 Strengthen governance and transparency

- Clarify institutional roles and reduce fragmentation across agencies responsible for mining, environment, trade, and finance to improve policy consistency.
- Improve data interoperability for production, sustainability metrics, and trade flows to enhance compliance, monitoring, and investor confidence.
- Embed community benefit standards into mining and processing permits to increase local economic impacts and social licence to operate.

9 Monitor and manage risks from policy shifts

- Conduct regular cost-benefit analysis of export bans, downstream incentives, and quota systems to avoid unintended market distortions or trade disputes.
- Design policy guardrails that support competition and innovation while minimising negative spillovers in global markets. (IMF commentary on hilirisasi suggests the need for ongoing analysis)[126].

126 Pardomuan Gultom, "Catatan IMF soal Hilirisasi Nikel Indonesia: Strategi Deregulasi dan Intervensi," Kompas, July 3, 2023, https://money.kompas.com/read/2023/07/03/093457326/catatan-imf-soal-hilirisasi-nikel-indonesia-strategi-deregulasi-dan-intervensi?page=all.

Conclusion

The global transition toward clean energy and digital technologies has placed critical minerals like nickel, copper, and bauxite at the center of strategic economic planning. Indonesia's abundant deposits, especially in nickel, give it a strong basis to shape its role in global supply chains, provided policy and market alignment keep pace with demand trends. Indonesia has already advanced downstream processing, aligning production with global needs for refined materials used in EVs, renewable energy, and industrial metals. The government's downstreaming strategy aims to capture more economic value and strengthen the domestic industrial base. However, current governance mechanisms still fall short of linking sustainability attributes directly to premium pricing in global markets. Integrating domestic production with transparent market benchmarks and global sustainability frameworks is increasingly important as buyers and investors demand low carbon and responsibly produced metals. Indonesia's policy ecosystem must bridge regulatory gaps, improve sustainability reporting, and engage with global pricing platforms to unlock higher value for its critical minerals. Concerted efforts to diversify export markets and embed sustainability into domestic regulation will help ensure that Indonesia's mineral wealth supports long-term economic growth, resilient domestic industries, and meaningful participation in global low carbon markets.

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