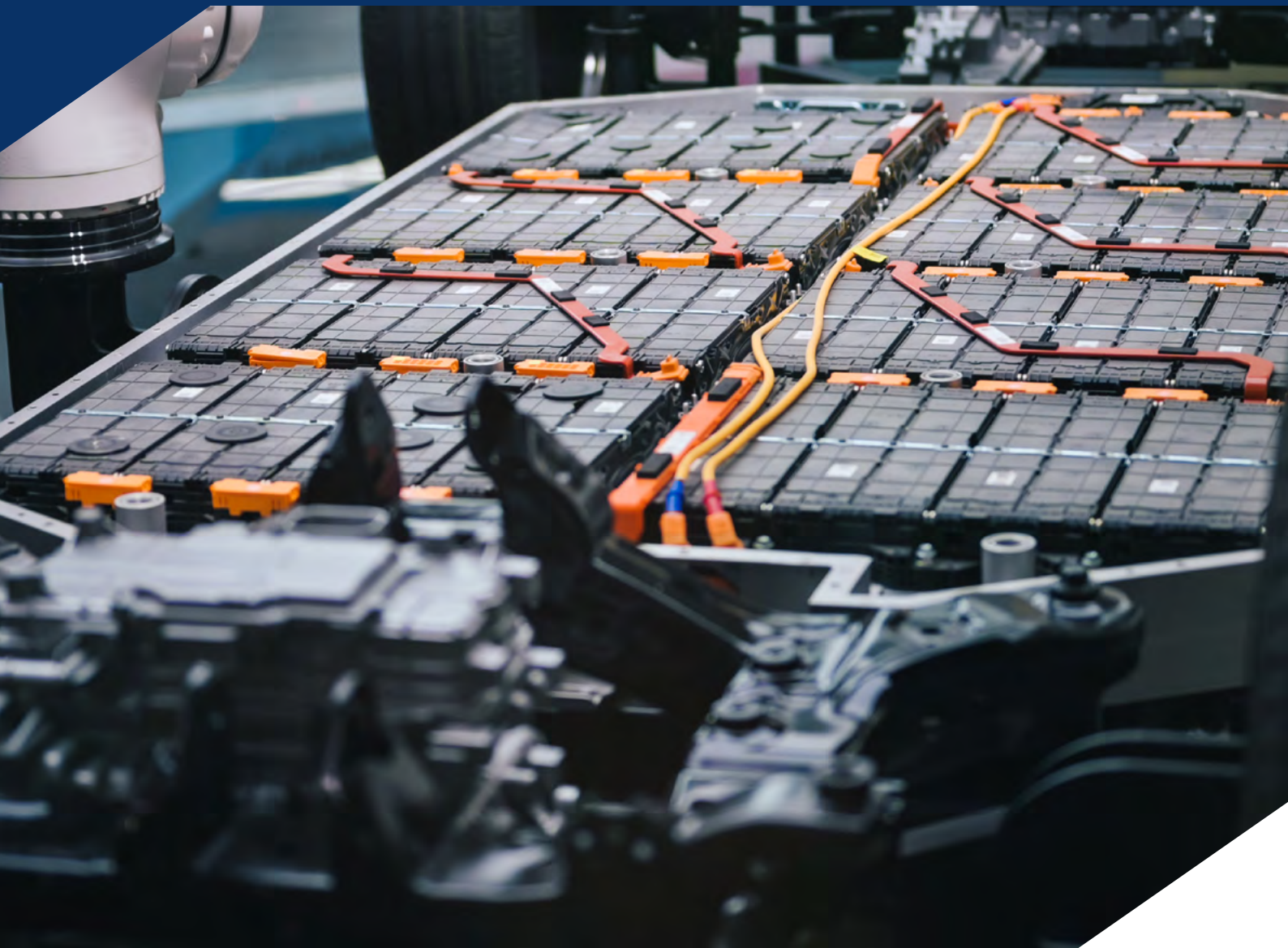




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INTERGOVERNMENTAL FORUM
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Developing Sustainable Nickel-Based Battery Value Chains in Indonesia and the Philippines



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Executive Summary

Rising global demand for batteries and renewable energy technologies is creating increasing opportunities for Indonesia and the Philippines to capture greater value from their nickel resources and strengthen their role in emerging energy transition supply chains. Together, the two countries account for the majority of global nickel production and possess the resource base needed to support the development of regional battery and electric vehicle value chains.

However, the outlook for nickel is becoming increasingly complex. Persistent oversupply, depressed prices, declining ore grades, evolving battery technologies, and concerns about environmental, social, and governance expectations are placing pressure on the long-term competitiveness of nickel-based industries. At the same time, global supply chains are becoming more regionalized, with increasing emphasis on resilience, traceability, sustainability, and value addition.

Against this backdrop, the report assesses how Indonesia and the Philippines can maximize the economic benefits of their nickel resources while managing emerging risks. It argues that success will depend not only on national industrial policies, but also on stronger regional cooperation within the Association of Southeast Asian Nations (ASEAN). Neither country can efficiently develop every segment of the value chain alone. Regional integration offers opportunities to build complementary industrial capabilities, achieve economies of scale, strengthen investor confidence, and improve competitiveness in global markets.

The analysis highlights a number of important strengths. Indonesia has successfully attracted significant investment into refining, battery materials, and industrial parks, establishing itself as a major hub for nickel processing. The Philippines remains a critical supplier of nickel ore and possesses significant potential to expand domestic value addition. Together, the two countries could form the backbone of an integrated ASEAN nickel ecosystem spanning mining, processing, battery materials, manufacturing, and recycling.

At the same time, several structural challenges require policy attention. Exploration investment remains insufficient relative to production levels, threatening long-term resource security. Infrastructure, logistics, energy costs, and skills shortages continue to constrain competitiveness. Environmental and social risks are increasingly affecting project viability and market access. Recycling systems remain underdeveloped despite growing future volumes of end-of-life batteries. Finally, policy uncertainty and regulatory fragmentation can undermine investor confidence and slow industrial development.

The report therefore recommends a coordinated agenda built around the following strategic priorities:

- **Protect the investor base for nickel.** This can be achieved through supportive industrial policies and flexible yet predictable regulations for governing and taxing the mineral value chain. Policy-making should be based on consultation with industry and regional harmonization where appropriate.
- **Promote mineral exploration** by improving public geological data and providing incentives and training programs.
- **Strengthen energy and transport infrastructure** while streamlining international trade logistics.



- **Strengthen research, development, and skills in key areas.** Key profiles to strengthen include metallurgy, battery chemistry, process engineering, and industrial operations.
- **Promote competitive midstream processing and industrial clustering,** including through increased/better use of industrial parks and special economic zones and greater cooperation between the two countries.
- **Support the circular economy for nickel** through public investments, incentives, and improved regulations.
- **Strengthen benefits for local communities and labour standards,** including through improved community consultation, transparency, accountability, and mineral traceability.
- **Improve environmental regulations,** including on tailings and mine waste management, industrial decarbonization, and alignment with international standards.

At the regional level, ASEAN has an important opportunity to move beyond cooperation in mineral trade toward the development of integrated mineral value chains. Regional collaboration on standards, infrastructure, skills, geological information, recycling systems, traceability, and industrial development could significantly improve competitiveness while reducing the duplication of investments. By combining national reforms with stronger regional integration, Indonesia, the Philippines, and ASEAN can position themselves as strategic suppliers of nickel and as key participants in the next generation of sustainable battery and clean energy value chains.



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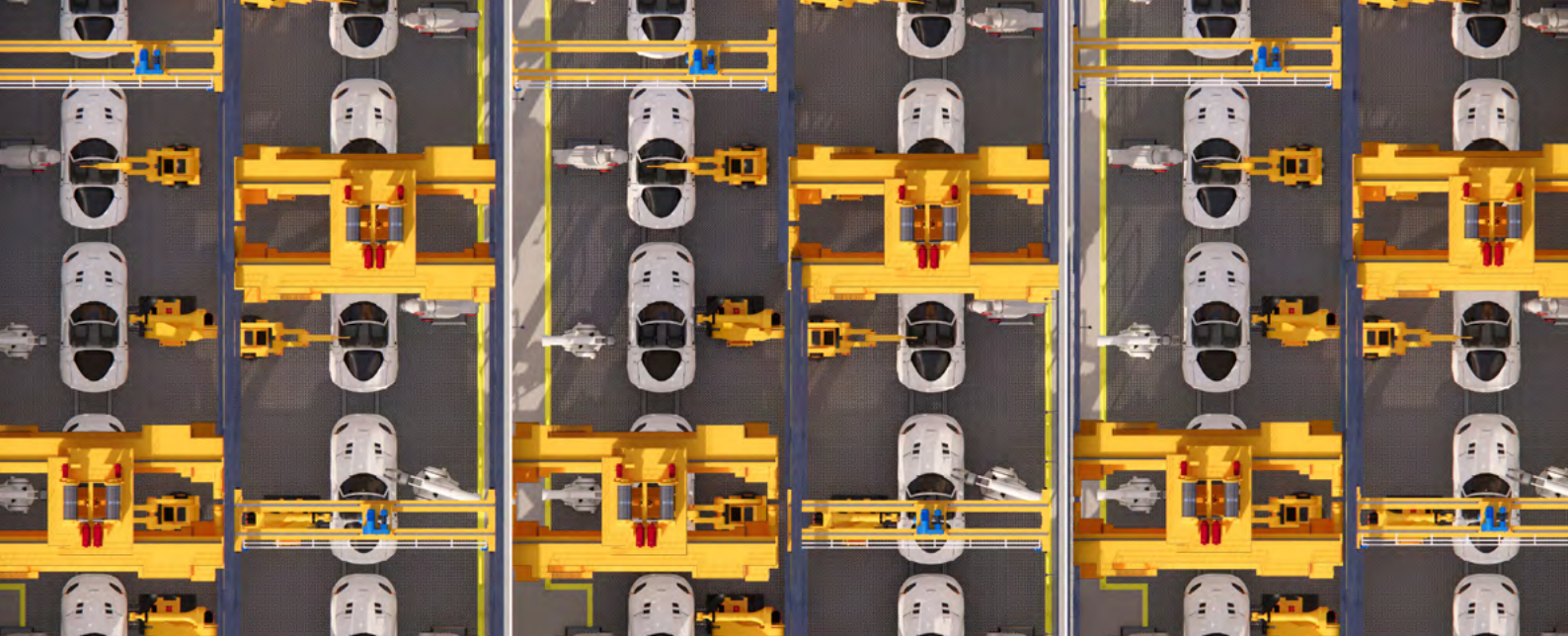


Acronyms and Abbreviations

ADB	Asian Development Bank
AMIS	ASEAN Minerals Information System
ASEAN	Association of Southeast Asian Nations
ASM	artisanal and small-scale mining
CBAM	carbon border adjustment mechanisms
CREATE Act	Corporate Recovery and Tax Incentives for Enterprises Act
EO	Executive Order
EPR	extended producer responsibility
ESG	environmental, social, and governance
EU	European Union
EV	electric vehicle
FPIC	Free, Prior, and Informed Consent
FTAA	financial or technical assistance agreements
GR	Government Regulation
IBC	Indonesia Battery Corporation
IGF	Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development
IMIP	Morowali Industrial Park
INA	Indonesia Investment Authority
IWIP	Weda Bay Industrial Park
HPAL	high-pressure acid leach
LFP	lithium iron phosphate
LME	London Metal Exchange
LMFP	lithium-manganese-iron-phosphate
MEMR	Ministry of Environment and Mineral Resources
MIND ID PT	Mineral Industri Indonesia
MOF	Ministry of Finance
MPAC	Master Plan on ASEAN Connectivity
NBRI	National Battery Research Institute
NCA	nickel-cobalt-aluminium batteries
NMC	nickel-cobalt-manganese batteries
NPI	nickel pig iron
OECD	Organisation for Economic Co-operation and Development
PEZA	Philippine Economic Zone Authority
PMK	Peraturan Menteri Keuangan (Ministry of Finance Regulation)



R&D	research and development
RA	Republic Act
SEZ	special economic zones
SME	small and medium-sized enterprise
TKDN	Tingkat Komponen Dalam Negeri (= Local content requirement)
USGS	United States Geological Survey
VAT	value-added tax



1.0 Introduction

Nickel is an indispensable metal for high-energy-density electric vehicle (EV) battery technologies, but global nickel markets are subject to complex market dynamics. The global landscape of EVs is driven by the rapid development of demand for sustainable transportation alongside rapid technological advancements in battery chemistry. Different demand and supply drivers mean that complex trends, including fluctuating demand and volatile prices, now characterize the nickel market. Nickel currently lies at the heart of the EV transition, as it is indispensable for the high-energy-density lithium-ion batteries that currently power the highest-performing EVs. While the stainless steel industry has traditionally dominated nickel consumption, the demand from the battery sector is now steadily rising, with EV production forecasted to quadruple by 2030. This has driven a substantial expansion of nickel supply. Yet there are significant technological shifts toward nickel-free lithium iron phosphate (LFP) battery chemistries. As a result of these countervailing trends, since 2016, growing demand has led to a significant increase in nickel prices; however, in recent years, the global nickel market has shifted to an oversupply, contributing to substantial price volatility.

Alongside these market dynamics, rising environmental, social, and governance (ESG) concerns—such as deforestation, land rights violations, water pollution, and alarming industrial accidents at smelters, which together have led to health impacts and the displacement of communities—plague the nickel industry. These multifaceted issues underscore the urgent need for more sustainable supply chain practices and robust due diligence from EV manufacturers to mitigate reputational and financial risks.

With two major global nickel producers in Indonesia and the Philippines, Southeast Asia stands as a region of paramount significance in the global nickel market. As the world's leading nickel producer, Indonesia possesses substantial global reserves and will contribute considerably to future global (refined) nickel output. The Philippines, although a smaller producer than Indonesia, remains a significant participant in the global nickel market. Policy decisions implemented by these two nations have had, and will continue to have, a demonstrable effect on international trade flows and global nickel prices.

This strategic positioning of Southeast Asia's nickel industry is pivotal to the development of regional EV and battery supply chains. The continuous increase in nickel content within high-energy-density cathodes offers a distinct advantage for developing vertically integrated battery and EV value chains in Southeast Asia. This synergy between regional resource



endowment and the technological imperative for nickel in high-performance EV batteries creates a compelling foundation for Southeast Asia to emerge as a significant global player in the clean energy transition for mining, mineral processing, and mineral-based manufacturing. This is not limited to Indonesia but also includes countries like Thailand and Vietnam now positioning themselves as regional ex-China manufacturing hubs (though not in the nickel value chain).



2.0 Context

2.1 Nickel Market Trends

Global nickel demand is growing steadily but remains uneven and highly dependent on China. In 2025, global consumption is projected to rise 3.3% to 3.54 Mt, with China accounting for most of the increase through its stainless steel and battery industries. New capacity in Indonesia, India, and South Korea will also add support, but demand growth elsewhere is constrained. By 2035, stainless steel's share of nickel use is expected to fall below 51%, while batteries will rise to more than 30% of demand (Wood Mackenzie, 2025).

Nickel is one of the most versatile industrial metals, essential not only for stainless steel and batteries but also for a wide array of high-performance applications across sectors. Almost 70% of global nickel production is used to make stainless steel, which underpins industries such as construction, power generation, renewable energy, transportation, and metal fabrication. Another 24% is allocated to batteries, where demand is rapidly expanding and is expected to grow from just 7% of nickel use in 2021 to about 40% by 2040, with stainless steel use falling to 45% (African Development Bank & Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development [IGF], 2025).

Beyond these main uses, nickel also plays a critical role in high-technology alloys, plating, electronics, and chemical applications. Class 1, high-purity nickel is also used in aerospace alloys, electronics, and specialized industrial equipment that require corrosion and heat resistance. Nickel alloys are vital in jet engines, turbines, and chemical processing plants, where performance under extreme conditions is essential. Electroplating applications use nickel to provide durable, corrosion-resistant coatings on metals, while nickel compounds—such as nickel sulphate and nickel catalysts—are used in ceramics, pigments, and hydrogen production.

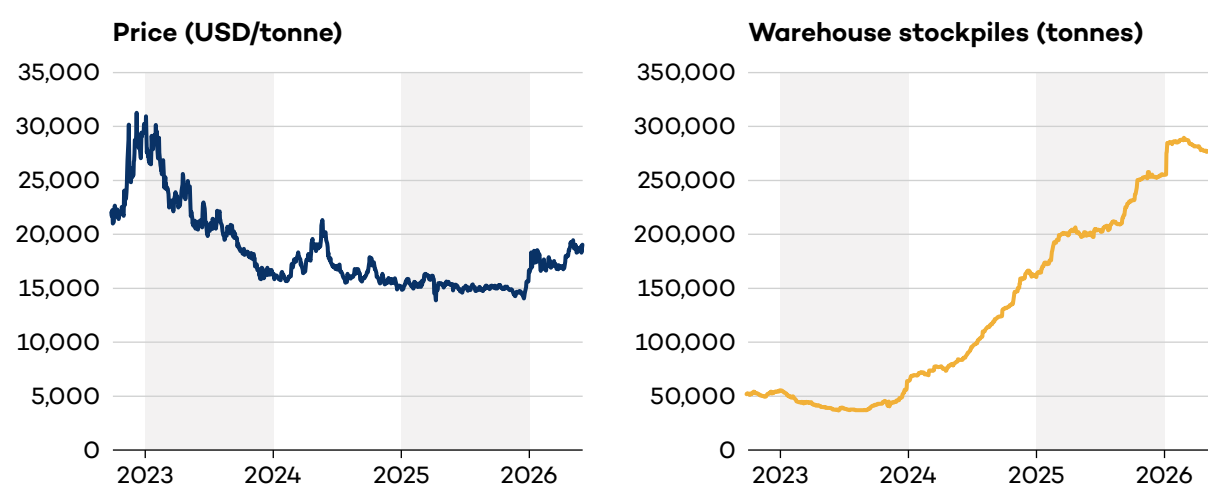
Nickel prices remain depressed under conditions of persistent oversupply and are unlikely to recover before the end of the decade. Nickel oversupply started in 2022 and has persisted due to a combination of factors. Besides the aforementioned dynamics in battery chemistries, these factors include growth in Indonesia's raw material and refinery operations, as well as the curtailment of operations in Australia due to low prices. These low prices have meant that London Metal Exchange (LME) inventories have been building strongly in the past 2 years, while the price has halved from heights of USD 32,000/tonne in 2022 to around USD 16,000/tonne since 2024 (see Figure 1). The sole small price increase in Q2 2024 was the result of LME



banning new Russian-origin metal delivery due to sanctions and protests that led to supply disruptions in New Caledonia (S&P Global Market Intelligence, 2025a). Prices are currently mostly influenced by Indonesia's policy decision, given its sheer weight in the global nickel market (see Section 3).

As of 2025, approximately 32% of global nickel production was offline due to margin stress, with prices falling to multi-year lows near USD 15,000 per tonne, down from over USD 30,000 in January 2023 (Charles, 2025). Major closures have already occurred, specifically in Australia (including First Quantum's Ravensthorpe, BHP's Western Australia Nickel operations, Panoramic Resources' Savannah mine) and Glencore's Koniambo facility in New Caledonia (Ferreira & Pinto, 2025).

FIGURE 1. Nickel commodity price



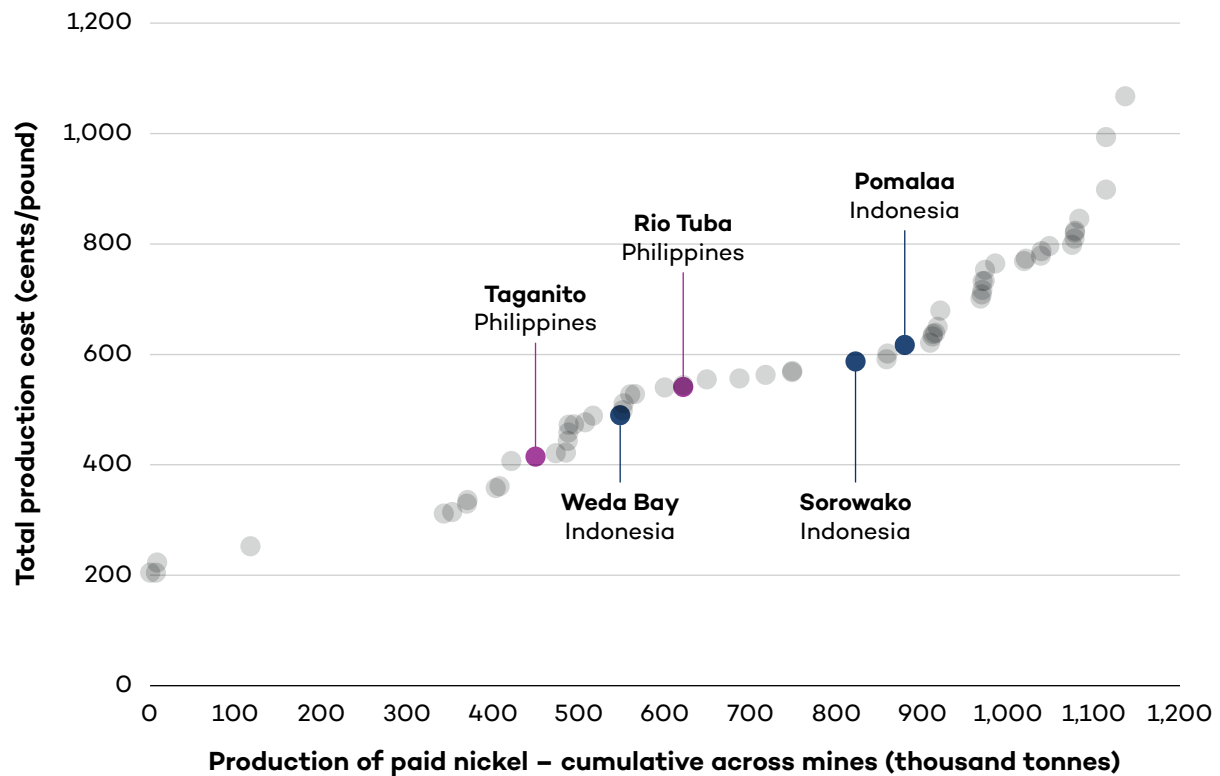
Source: S&P Global Market Intelligence, 2025a.

Declining ore grades in current producing mines and underinvestment in exploration are undermining the long-term competitiveness of Indonesia's and the Philippines' nickel sectors. Both countries face shrinking high-grade ore reserves, rising production costs, and oversupplied markets that pressure margins and discourage new investment. Without renewed exploration and efficiency gains, they risk depleting key resources and losing cost advantages essential to sustaining demand for nickel-based batteries.

As a result, the attractiveness of investing in nickel mining in Indonesia and the Philippines seems to be declining. Although nickel-focused exploration spending has recovered somewhat in absolute terms in recent years, both countries receive far less exploration spending than they did from 2010 to 2016, and much less than their shares of nickel mine output: as of 2024, 59% of the world's nickel output was mined in Indonesia, with 9% coming from the Philippines; but only 3% of nickel-focused exploration spending occurred in Indonesia and 2% in the Philippines (S&P Global Market Intelligence, n.d.; U.S. Geological Survey [USGS], 2025).



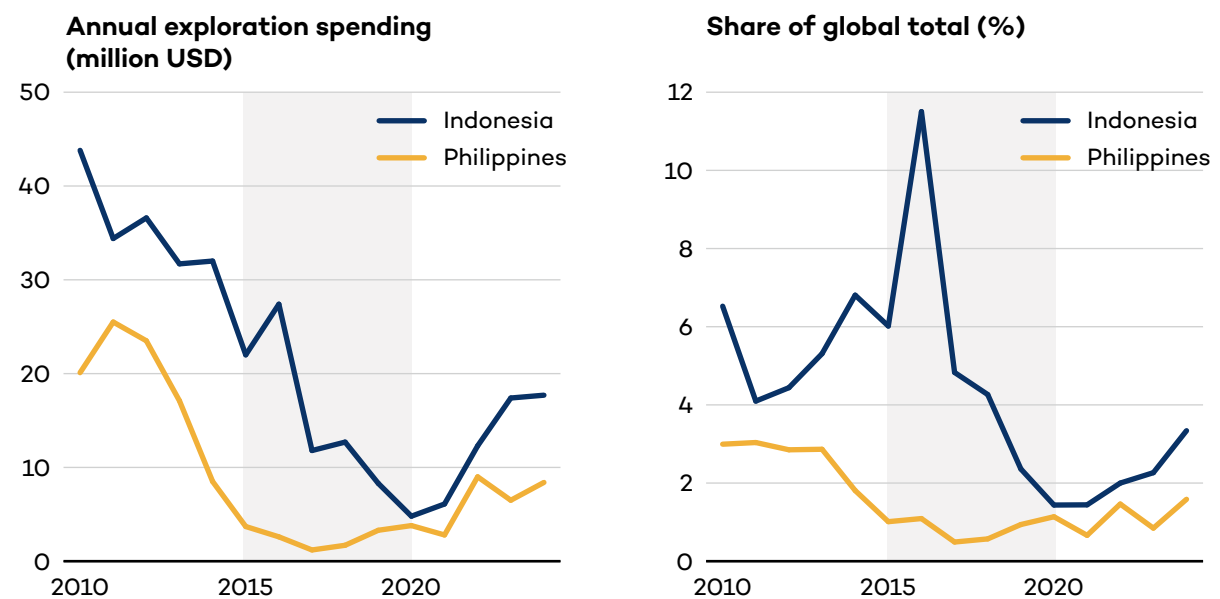
FIGURE 2. Nickel cost curve, 2025



Source: S&P Global Market Intelligence, n.d.

Note: This graph highlights Indonesian and Philippine mines with available data and their total production costs compared to other global mines, according to data from S&P.

FIGURE 3. Annual nickel-focused exploration spending, 2010–2024



Source: S&P Global Market Intelligence, n.d.



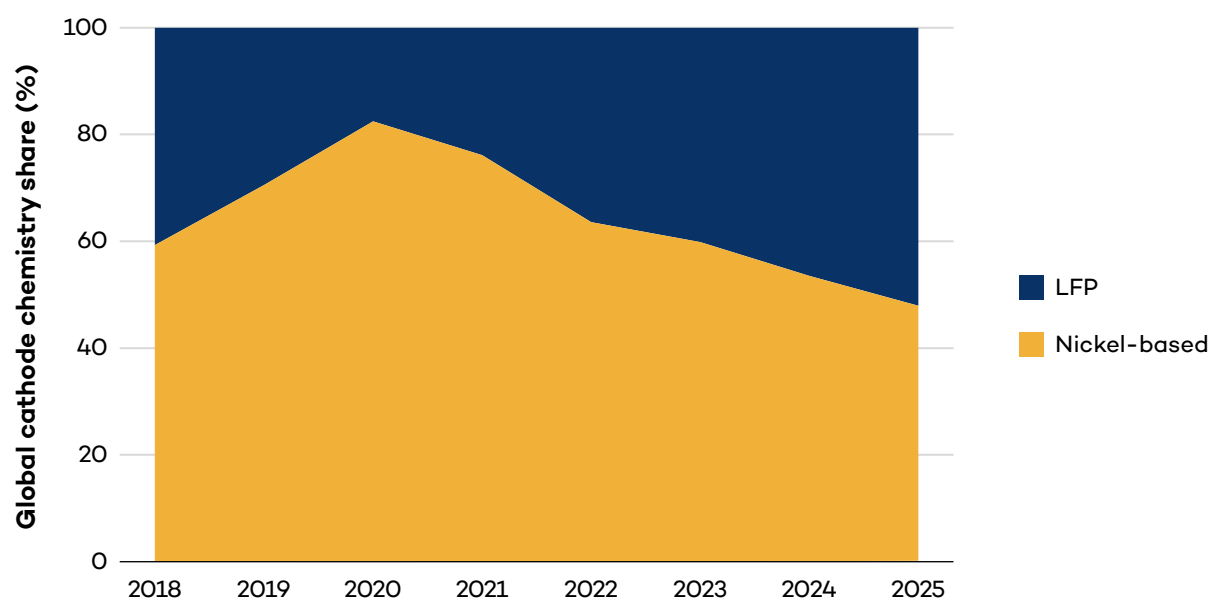
ESG factors are starting to play into demand for and supply of nickel. With Indonesia in particular advancing its ambitions in battery materials and EV supply chains, ESG standards are now subject to broader global scrutiny beyond Chinese offtakers, given the demonstrated environmental and social impacts associated with nickel mining and refining. This raises the prospect that future access to financing and export markets will hinge not just on production growth, but also on demonstrable improvements in governance, environmental safeguards, and community engagement.

As carbon border adjustment mechanisms (CBAMs) in the European Union (EU) and the United Kingdom come into force, Indonesian and Philippine exports risk being penalized if they do not transition to low-carbon power and demonstrate environmental responsibility. Although nickel is not currently covered by the EU and United Kingdom CBAM frameworks, both are revisiting the product scope, and there appears to be growing political support for the expansion to cover all sectors under the EU's Emissions Trading Scheme (including production of nickel metal) by 2030 (HM Treasury, 2025; Schmidt et al., 2025).

2.2 Battery Market Trends

The use of nickel in batteries is shaped by both demand- and supply-side drivers. While EV uptake has surged in recent years, the chemistry mix has also evolved significantly (see Figure 4 below). LFP has gained market dominance since 2020, particularly in China, which has eroded the market share of nickel-based cathodes. This shift has been driven by LFP's cost competitiveness, improved performance on energy density, and the security of supply chains that are less dependent on constrained metals. China's dominance in LFP production currently exceeds 98%, but the technology is now rapidly spreading to Europe, North America, and Southeast Asia, as automakers, including Tesla, Ford, Volkswagen, and Stellantis, adopt LFP for entry-level and mid-tier models (Greitemeier et al., 2025).

FIGURE 4. Global cathode chemistry share (%)



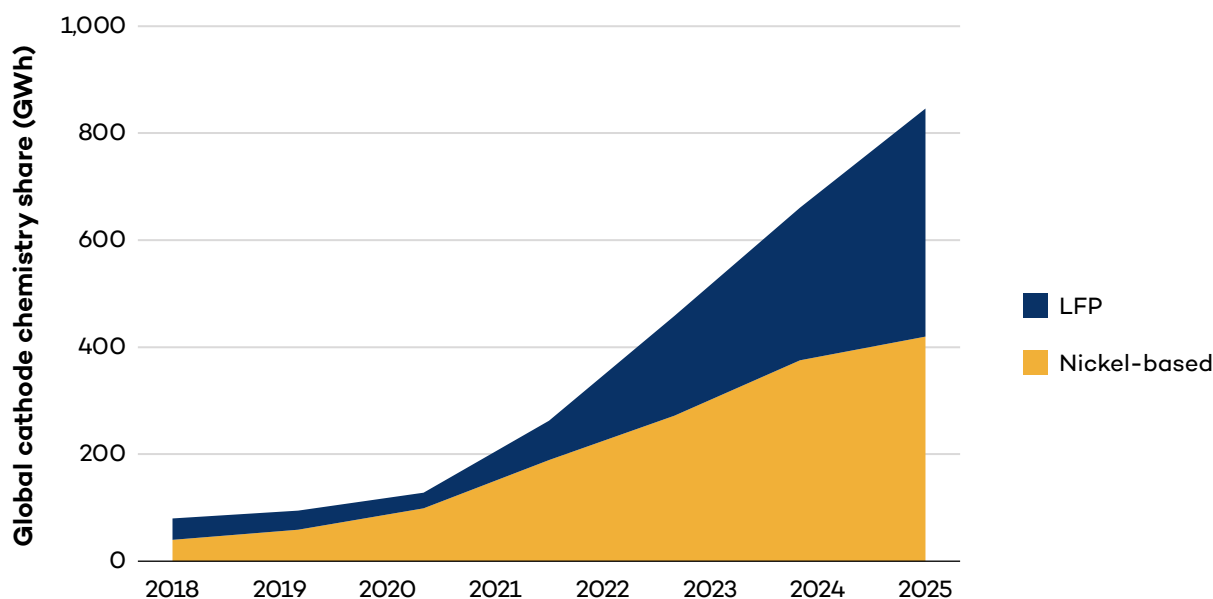
Source: Rho Motion, 2025.

Note: NCA = nickel-cobalt-aluminium batteries; NMC = nickel-cobalt-manganese batteries.



Despite its falling market share compared to LFP, absolute demand for nickel-based chemistries has continued to grow strongly. In gigawatt-hour terms, global deployment of nickel-bearing cathodes (NMC, NCA) rose from about 70 GWh in 2018 to 468 GWh in 2024 (see Figure 5). This growth reflects both the overall expansion of the EV market and the industry-wide shift toward higher-nickel cathodes, which substitute cobalt with larger proportions of nickel to improve energy density.

FIGURE 5. Global cathode chemistry share (GWh)



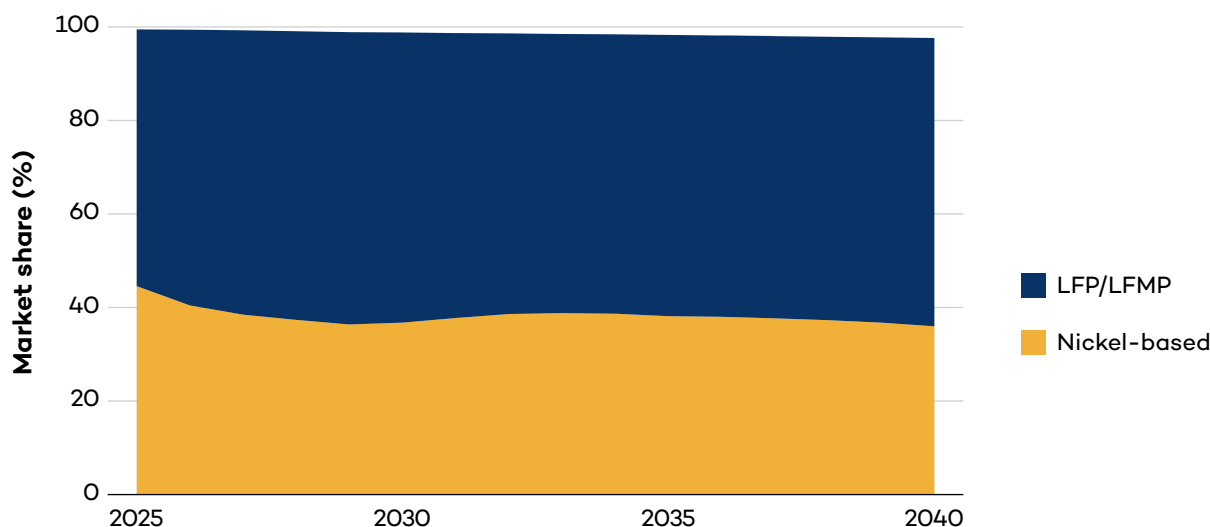
Source: Rho Motion, 2025.

Looking forward, nickel-based chemistries remain critical to meeting market demand in all major scenarios. Rho Motion's base case projects that LFP growth will slow from 2030 onward, peaking at 61% and then stabilizing at around 56%–57% market share through 2040 (see Figure 6). Within nickel-based chemistries, NMC 811 is projected to grow the strongest, which again underlines the importance of nickel supply.

Demand for nickel-based chemistries is forecasted to grow until 2040. Rho Motion's base scenario projects that nickel chemistries will supply over 3,500 GWh of annual battery demand by 2040, up from less than 50 GWh today (see Figure 7). This tenfold increase reflects nickel's continued strategic importance, especially in segments that require higher energy density, such as long-range EVs, heavy-duty transport, and stationary storage with premium performance needs.

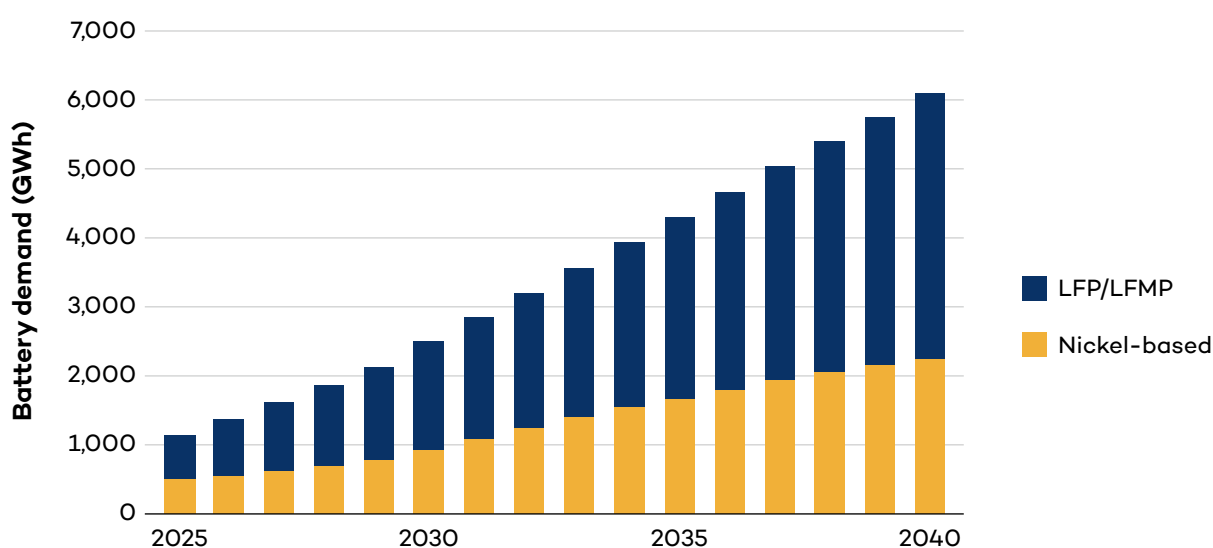


FIGURE 6. Cathode battery chemistry market share



Source: Rho Motion, 2025.

FIGURE 7. Cathode battery chemistry share, 2025–2040



Source: Rho Motion, 2025.

The long-term balance will depend on the interplay between technology trajectories and supply constraints. If LFP and emerging lithium-manganese-iron-phosphate (LMFP) batteries continue to improve in energy density, performance, and cost, their share may rise beyond the base scenario. Sodium-ion batteries are also an unknown factor as they may carve out significant market share in two- and three-wheelers, stationary storage, and low-cost vehicle segments, which could put some further pressure on nickel demand. On the other hand, breakthroughs in high-nickel cathodes, coupled with a secure supply of Class 1 nickel, would reinforce nickel's role in the battery mix. For example, semi-solid and solid-state batteries are generally expected to use ultra-high-nickel cathodes, which would reinforce demand for nickel if and when they are deployed at scale. Such cathodes move



toward nickel, accounting for around 82% of the cathode's weight (as in NCM 911) or even higher nickel usage (Wood Mackenzie, 2025).

2.3 Southeast Asia Battery and EV Market Trends

Several Southeast Asian nations are developing their EV and battery manufacturing capabilities, with significant investments and strategic industrial policy initiatives. This expansion is primarily concentrated in countries such as Indonesia, Thailand, and Vietnam, which are leveraging their natural resources, established automotive supply chains, and growing domestic markets. The three leading countries are actively seeking to attract foreign direct investment by offering incentives like tax breaks, favourable regulatory environments, and dedicated industrial parks.

Indonesia inaugurated Southeast Asia's first EV battery plant in West Java in July 2024 and is planning for a large expansion toward 2030. This plant is a collaborative effort with a USD 1 billion investment from a consortium including Hyundai Motor Group, LG Energy Solution, and the Indonesia Battery Corporation and will have an annual capacity of 10 GWh, which is sufficient for 150,000 EVs (Medina, 2024). Indonesia aims to be among the top three global producers of EV batteries by 2027 and targets an annual capacity of 140 GWh by 2030, which would account for 4% to 9% of global demand (Medina, 2024). In 2025, CATL announced plans to produce 6.9 GWh, which will be expanded to 15 GWh afterward (Hampel, 2025). In the Philippines, the first battery pack assembly plant was inaugurated, but this plant produces nickel-free LFP battery packs (Foley, 2024).

Thailand is actively developing its EV industry with the goal of becoming an integrated manufacturing hub for EVs and key components in the ASEAN region, which would reinforce regional offtakes for battery-grade nickel from Indonesia and the Philippines. The country's policy aims for zero-emission vehicles to comprise at least 30% of total motor vehicle output by 2030, which would be about 725,000 units alongside 675,000 electric motorcycles (Thailand Board of Investment, n.d.). To support this goal, the government has enacted several investment incentives for EV manufacturing, batteries, components, and charging infrastructure. As of June 2025, these incentives have USD 4.2 billion in investments across 169 projects. Battery production represents the largest share of this investment, with 53 projects valued at over 2 billion (The Nation, 2025). The government has also implemented demand-side incentives, such as subsidies and excise tax cuts; on the side of exports, it has adjusted incentive packages to encourage manufacturers to use Thailand as an export base (Thailand Board of Investment, 2025).

Vietnam is also emerging as a significant player in the Southeast Asian EV market, which will also create additional regional demand for battery-grade nickel. The government has included measures such as tax exemptions, preferential electricity pricing for charging stations, reduced registration fees, and favourable special consumption tax rates for EVs to attract both domestic and foreign investors (Tilleke & Gibbens, 2025). In combination with low labour costs and competitive electricity rates, this can build Vietnam's comparative advantage in the more energy-intensive segments of battery and EV component manufacturing (Energy Transition Partnership, 2025). In parallel, policies on emission standards and restrictions on fossil fuel vehicles in Hanoi and other major cities signal clear long-term demand for EVs (Tilleke & Gibbens, 2025).



3.0 Indonesia: Nickel supply chain strategy and trajectory

3.1 Overview of the Sector

Indonesia accounts for 64% of global mined nickel production, making it the world's largest nickel miner by far (Wood Mackenzie, 2025). Its nickel resource is laterite-dominated and geographically concentrated in Sulawesi and Maluku/Papua (Guberman et al., 2024). The country also has the largest global nickel reserves, at about 55 million tonnes out of 130 million tonnes worldwide (USGS, 2025b).

Indonesia's major nickel hubs are structured through joint ventures combining state, domestic, and foreign ownership, with Chinese firms holding dominant downstream positions. PT Vale Indonesia's Sorowako mine is operated under a joint-equity structure in which states holding Indonesian state-owned mining company PT Mineral Industri Indonesia ("MIND ID") now own the largest share following a 2023 divestment agreement with Vale Canada and Sumitomo. PT Weda Bay Nickel in North Maluku is majority foreign-owned through Strand Minerals, which is controlled by Tsingshan and Eramet, with a minority 10% share held by state-aligned PT Antam (Fair Finance Asia, 2024). The Morowali Industrial Park in Central Sulawesi exemplifies large-scale Chinese-led nickel-based industrial integration and is operated by a joint venture of Tsingshan subsidiaries and Indonesian partner Bintang Delapan (Business & Human Rights Resource Centre, 2024).

The state is actively increasing its ownership share in nickel mining to strengthen domestic control and leverage. As highlighted below, mining law amendments and implementing regulations require foreign shareholders to progressively divest, ensuring Indonesian state or domestic entities eventually hold at least 51% of equity in mining companies. The Vale Indonesia divestment, which elevated MIND ID to the position of largest shareholder, illustrates how the government links licensing to ownership restructuring.

3.2 Evolving Political and Policy Landscape in Indonesia

Prior to independence in 1949, mining activities were largely limited to ore extraction serving external interests (Sangadji, 2022), with no integrated national policy framework. From Independence to the 1980s, the role of the state was particularly prominent in the mining



sector (Gellert, 2019), with a focus on raw material exports and limited local processing (Liao & Zhang, 2024), although foreign investment increased over the years.

From the 1980s, policies changed toward liberalization, openness to foreign investment, and export-oriented growth. However, the 1997 crisis exposed Indonesia's vulnerability to external shocks (Liao & Zhang, 2024), prompting a reassessment of the country's dependence on export-led extraction. At the turn of the 21st century, the strategy shifted to capturing greater domestic value through beneficiation, with the imposition of export bans on unprocessed nickel in 2014. The period marked the return of a stronger role of the state, with new licensing regimes requiring foreign companies to renegotiate contracts. Divestment policies were institutionalized to further increase Indonesian ownership and in-country processing (Devi & Prayogo, 2013), laying the groundwork for export restrictions to force domestic smelting and refining. In 2017, the export ban policies were temporarily relaxed to provide more time for the development of smelters (Guberman et al., 2024), which also led to the acceleration of investment in smelting and refining capacity.

The full ban on nickel ore exports was enforced in 2020, marking a decisive shift toward integrated industrial development. Since 2019, Indonesia has increasingly aligned its nickel strategy with the EV and battery value chain, supported by the establishment of a national EV roadmap. This phase combined incentives, strengthened strategic partnerships with international investors (notably from China, Korea, and Japan), and accelerated investment in high-pressure acid leach (HPAL) projects to produce battery-grade nickel.

3.3 Legal and Regulatory Framework Governing the Nickel Supply Chain

Indonesia's regulatory framework for nickel reflects a policy system designed to reposition the country within global value chains. It combines a stronger role for the state, industrial policy, and investment facilitation to promote domestic value addition and downstream integration. (See Appendix A for a detailed overview of the legal and regulatory framework governing the nickel supply chain in Indonesia.)

Table 1 summarizes the key strategic objectives of the current policy framework, along with the main instruments and their practical implications for policy implementation.



TABLE 1. Indonesia's nickel policy framework: Core policy objectives and instruments

Strategic objective	Key instruments	How the policy works in practice
1. Strengthen state ownership and control over mineral resources	1945 Constitution (Art. 33); Law 4/2009 (Mineral and Coal Mining Law); Law 3/2020 (Omnibus Law amendment); divestment requirements; MIND ID	Declares state control over all mineral and coal resources. Establishes a constitutional foundation for resource sovereignty and processing mandates. Replaces the Contract of Work regime with a licensing system (Mining Business License [IUP]/ Special Mining Business License [IUPK]). Ensures increasing Indonesian participation in strategic assets over time.
2. Promote domestic value addition (downstreaming)	Export restrictions (2014, 2020); Law 4/2009; processing requirements	Limits raw ore exports and requires in-country processing into higher-value products (e.g., ferronickel, nickel pig iron [NPI], intermediates), encouraging investment in domestic processing capacity.
3. Attract large-scale industrial investment	Tax incentives (Ministry of Finance Regulation ("Peraturan Menteri Keuangan (PMK)) 130/2020; 69/2024); Omnibus Law (2020); Online Single Submission – Risk Based Approach licensing; special economic zones (SEZs).	Combines fiscal incentives, regulatory simplification, and streamlined licensing to improve the investment climate for capital-intensive processing industries.
4. Develop an integrated EV and battery ecosystem	Presidential Regulation 55/2019; EV incentives; local content requirements (Tingkat Komponen Dalam Negeri [TKDN]); Indonesia Battery Corporation (IBC)	Connects mineral development with industrial and energy transition objectives by supporting domestic demand, encouraging localization, and fostering partnerships across the value chain.
5. Enable coordinated industrial development	Industrial parks (Morowali Industrial Park [IMIP], Weda Bay Industrial Park [IWIP]); infrastructure support; Indonesia Investment Authority	Facilitates clustering of activities across the value chain, supported by infrastructure and co-investment mechanisms to accelerate scale and coordination.



Strategic objective	Key instruments	How the policy works in practice
6. Enhance domestic economic participation and value capture	Royalty regime; local content policies (TKDN); technology transfer provisions	Encourages greater domestic participation, employment, and capability development, while incentivizing higher-value processing activities.
7. Strengthen environmental and social management	Environmental Impact Analysis regulations; reclamation requirements; water and tailings regulations	Establishes environmental safeguards and monitoring systems, although implementation capacity continues to evolve alongside sector growth.
8. Maintain adaptive policy management	Production quotas; regulatory updates; engagement in international trade processes	Enables authorities to adjust policies in response to market dynamics, sector development, and international considerations.

Source: Authors' compilation.

3.4 Industrial Policy and Downstream Development

Indonesia's industrial policy in the nickel sector reflects a deliberate and state-led strategy to move from resource extraction to integrated industrial development. Building on export restrictions and regulatory reforms, the government has actively sought to anchor investment across the full value chain—from mining and refining to battery materials and, increasingly, EV manufacturing. This approach combines regulatory mandates; targeted incentives, including through industrial parks and SEZs; and strategic partnerships, with a strong emphasis on capturing domestic value and positioning Indonesia within emerging clean energy supply chains.

A central pillar of this strategy has been the rapid expansion of domestic nickel-refining capacity. Since the introduction of the first ore export ban in 2014 and its full enforcement in 2020, Indonesia has developed more than 50 nickel smelters, with many more in development (Rinaldi, 2025). These are predominantly located in integrated zones such as the IMIP in Central Sulawesi and the IWIP in North Maluku. Smelting operations are primarily based on rotary kiln–electric furnace technology and are supported by dedicated infrastructure, including captive power, ports, and logistics systems. This expansion has enabled Indonesia to become a dominant global producer of nickel intermediates for the stainless steel industry.

In recent years, the policy focus has expanded to higher-value processing linked to the battery supply chain. HPAL refineries have been developed in Pomalaa, Obi Island, and Weda Bay to produce mixed hydroxide precipitate, a key precursor for battery-grade nickel (C4ADS, 2025). These projects are typically structured as joint ventures between Indonesian state firms (notably MIND ID and Antam) and international partners, particularly from China (such as Tsingshan, Huayou, CATL), alongside participation from Korean and Western original equipment manufacturers (such as Ford). This reflects a strategy of combining domestic resource control with foreign capital and technology to accelerate industrial upgrading.



Indonesia is also beginning to extend this integration into battery manufacturing and downstream industries. The Hyundai-LG Energy Solution gigafactory, which is based on the NMC/nickel–cobalt–manganese–aluminum chemistry, began operations in 2024, with a 10-GWh annual capacity and plans to expand to 30 GWh (Nolan, 2024). More broadly, over 100 GWh of cell production capacity has been announced or is under development (Canto, 2023), signalling the government’s ambition to move beyond processing materials toward participation in higher-value segments of the electric mobility value chain.

3.4.1 The Role of Industrial Parks and SEZs in Indonesia

A distinctive feature of Indonesia’s approach is the strategic use of industrial parks and SEZs as implementation platforms for its nickel downstreaming agenda. These zones function not only as investment locations but also as integrated policy tools that combine infrastructure, regulatory facilitation, and investment incentives within a single framework. These are designed to attract large-scale foreign direct investment in smelting, refining, and battery materials production, while aligning projects with national policy priorities.

Moving beyond precursors and cathodes, industrial parks are now targeting cell production. In 2025, CATL announced its participation in the Indonesia Battery Integration Project, in partnership with ANTAM (part of MIND ID) and IBC. The project—valued at approximately USD 6 billion—aims to integrate activities from mining and processing to battery materials, cell production, and recycling, including a 6.9 GWh battery plant, as well as the ability to produce 142,000 tonnes of nickel, 30,000 tonnes of cathode materials, and 20,000 tonnes of recycled batteries (Guerra, 2025).

This model has proven effective in the Indonesian context for several reasons. First, it reduces transaction costs and implementation risks by bundling permits, infrastructure (including power, ports, and water), and administrative services. Second, it supports industrial clustering and economies of scale, enabling different stages of the value chain—from smelting to precursor production—to develop in close proximity. Third, it facilitates coordination between public authorities and investors, helping align project development with national policy priorities, including local content, environmental management, and downstream integration.

As a result, industrial parks have become a central mechanism through which Indonesia operationalizes its industrial strategy, translating policy objectives into large-scale investment and production outcomes.



TABLE 2. Industrial parks as the operational backbone of Indonesia's downstreaming policy

Institutional architecture	Strategic role	Key feature
Indonesia Investment Authority	Strategic investment and co-financing platform	Mobilizes long-term capital and co-invests with international partners to support large-scale projects
IBC	Coordination of state participation across the value chain	Facilitates partnerships and integration from mining through to battery production
SEZs	Platform to attract large-scale industrial investments across all sectors	Streamlined and one-stop licensing; provides tax incentives, fast-tracks customs procedures; offers integrated infrastructure and administrative support

Source: Authors' compilation.

TABLE 3. Examples of SEZs/industrial parks

Industrial parks/zones	Strategic role	Key features and contribution
IMIP	Core hub for nickel smelting and stainless steel production Now expanding to battery precursors	Largest global integrated nickel-stainless steel cluster with dedicated infrastructure; enabled rapid expansion of ferronickel and NPI production; strong international investment participation (dominated by Chinese investors)
WBIP	Hub for battery-grade nickel and precursor materials (HPAL; precursors)	Main focus on HPAL and Class 1 nickel; integration into global battery supply chains; increasing attention to environmental performance Also includes rotary kiln electric furnace and NPI facilities
North Maluku SEZ	Nickel-processing hub (multiple operators)	Multiple HPAL and smelting facilities; coordinated infrastructure development; proximity to major nickel laterite deposits
Batang Industrial Estate – Central Java	Downstream EV and battery manufacturing	Supports localization of EV production and links upstream nickel processing to manufacturing
Kolaka & Southeast Sulawesi Parks (Emerging)	Nickel smelting, ferronickel production	Smaller scale than IMIP/IWIP; growing activity in ferronickel; leveraging local ore proximity

Source: Authors' compilation.



Indonesia is preparing targeted incentives to sustain demand for nickel-based batteries in the face of shifting global chemistry preferences. By early 2026, the government plans to offer fiscal and non-fiscal incentives—including tax relief and duty exemptions—aimed at producers of nickel-based battery chemistries. These incentives are designed to encourage participation by both domestic and foreign manufacturers within Indonesia's EV ecosystem, while addressing emerging oversupply risks in the nickel market (S&P Global Market Intelligence, 2025a).

The measures respond to the rapid global shift toward LFP batteries, which are gaining market shares at the expense of nickel-based chemistries, therefore threatening Indonesia's nickel strategy. In China, the share of nickel-containing batteries dropped from 36.8% in 2024 to 28.4% in 2025, while LFP increased from 62.9% to 71.4% over the same period (S&P Global Market Intelligence, 2025a). This trend weakens the long-term outlook for nickel in the EV sector, despite Indonesia's large-scale investment in refining and precursor production. By lowering the cost base of nickel-based batteries, Indonesia is seeking to preserve the competitiveness of its industrial base while reinforcing its role in global EV supply chains.

3.5 Challenges for Further Expansion

Despite the rapid expansion of Indonesia's nickel industry and the success of its downstream strategy, the next phase of development is likely to be more complex. As the sector matures, it faces a set of structural challenges linked to market conditions, resource constraints, and evolving global demand dynamics. These include pressures from oversupply, rising production costs, shifting battery technologies, and increasing scrutiny around environmental and social performance. Together, these factors are shaping a more constrained operating environment, raising important questions about the sustainability and competitiveness of Indonesia's growth model going forward.

3.5.1 Market Challenges

Indonesia's nickel sector faces a conundrum between price support and competitiveness in global battery markets. On the one hand, miners and smelters require higher nickel prices to sustain financial health after years of heavy investment in refining and industrial parks. On the other hand, maintaining relatively low nickel prices is critical to preserving the attractiveness of nickel-rich chemistries in the face of growing competition from LFP battery chemistries, which have captured market shares as mentioned above. This tension has created a structural challenge for Indonesia's market strategy, as oversupply pressures continue to weigh on the ability to lift prices without eroding demand from the EV sector. This balance is increasingly difficult as ore grades decline, operating costs rise, and margins are squeezed.

Market volatility is further exacerbated by oversupply conditions and regulatory uncertainty in Indonesia. Class I nickel, used in batteries, and Class II nickel, used in stainless steel, are both in oversupply due to Indonesia's rapid production expansion (Wood Mackenzie, 2025). While recent supply disruptions, such as the government's seizure of the Weda Bay quarry and political protests, have provided short-term upward price pressure, fundamentals remain weak with the LME 3-month nickel price still hovering around USD 15,000/tonne (S&P Global Market Intelligence, 2025a).



Indonesia's integrated supply chains and low-cost HPAL projects provide resilience, but parts of the sector remain under pressure in the current price environment. Benchmark Minerals estimates that over one fifth of the industry globally is in a cash-negative position. Indonesia's HPAL operations, which are supported by cobalt by-product credits, sit firmly in the first quartile of the global cost curve and continue to generate positive margins. On the other hand, non-integrated smelters and ferronickel plants remain particularly vulnerable. At the upper end of the cost curve, smaller Indonesian smelters, Chinese NPI producers, and aging ferronickel operations are already struggling to remain viable. Rising royalties, shorter and stricter mining quotas, declining ore grades, and signs of resource depletion all point to higher costs for Indonesian producers over time (Bird, 2025).

To address price volatility, the government has signalled its intention to shorten mining quotas from 3 years to 1 year. This is expected to give the Government of Indonesia tighter control over production, but it also creates greater uncertainty in ore supply and increases the likelihood of permit delays. Without genuine cuts in ore tonnage, however, these measures will not resolve the underlying oversupply, leaving the global nickel market prone to persistent instability (Wood Mackenzie, 2025).

The rapid expansion of refining capacity is putting pressure on ore availability, driving Indonesia to import nickel ore and raising supply tension. As Indonesia has built out dozens of smelters and industrial parks whose aggregate demand for feedstock is growing fast, domestic ore production has struggled to keep pace. According to ING, tighter ore availability (due to declining ore grades, regulatory constraints, and license delays) is pushing refineries to import more from the Philippines. Indonesia's nickel ore imports rose by a factor of 57 to about 9.3 million tonnes in the first 10 months of 2024 compared to the same period in 2023 (Manthey, 2024).

3.5.2 ESG Challenges

Environmental and social compliance is becoming a central challenge for Indonesia's nickel sector as enforcement actions intensify. In September 2025, the government confiscated approximately 148 ha of the Weda Bay concession in North Maluku and 172.8 ha at PT Tonia Mitra Sejahtera in Southeast Sulawesi, citing missing forestry permits. These seizures, part of a wider campaign against illegal mining and permit violations, briefly pushed the LME 3-month nickel price higher as markets priced in tighter regulatory risk (S&P Global Market Intelligence, 2025a). Similar scrutiny has affected PT GAG Nickel, which had operations suspended in June for environmental breaches and was only allowed to resume in September after demonstrating compliance (S&P Global Market Intelligence, 2025a). While most of the confiscated areas were small relative to total concession size and had limited direct impact on output, they signal a shift toward stricter oversight. This oversight is also linked to the government's goal of shouldering nickel prices.

The government's interventions come in response to mounting ESG risks, with both domestic and international repercussions. In the past 4 months alone, permits in Raja Ampat, Kabaena, and Gebe were cancelled, and in mid-September, 190 companies—of which 36 were nickel mines—were temporarily suspended for failing to provide reclamation guarantees (Wood Mackenzie, 2025). Although most of these operations are small, the actions highlight rising compliance costs and operational uncertainty. Investor concerns are compounded by criticism from environmental and Indigenous rights groups, who warn of irreversible impacts on ecosystems and communities. With Indonesia advancing its ambitions in battery materials



and EV supply chains, ESG standards are now subject to broader global scrutiny beyond Chinese offtakers. This raises the prospect that future access to financing and export markets will hinge not just on production growth, but also on demonstrable improvements in governance, environmental safeguards, and community engagement.

3.6 Geopolitical Positioning and Partnerships

China is Indonesia's key partner in the development of its nickel supply chain. Chinese companies such as Tsingshan, Huayou, and CATL anchor the Morowali and Weda Bay industrial parks, providing capital and technology but reinforcing dependency on a single partner. Similarly, in terms of offtakes, global nickel consumption in battery precursors was projected to have been 560 kt in 2025, of which China uses 449 kt (Wood Mackenzie, 2025). Indonesia's geopolitical positioning in nickel is increasingly tied to regional stainless steel and battery material dynamics that reinforce Asia's role as the global growth engine.¹ Stainless steel capacity in Indonesia continues to expand, including through new projects backed by Indian companies such as Jindal, while India itself is driving demand growth through government-led infrastructure spending (Wood Mackenzie, 2025).

The result is a structural surplus of stainless steel in China and Indonesia, pushing producers to redirect output to other countries. This has triggered rising trade frictions with antidumping and countervailing duties on Chinese and Indonesian stainless steel proliferating in Europe and the United States, while semi-finished products are increasingly rerouted via Taiwan, Vietnam, and Türkiye to circumvent restrictions. Such trade tensions illustrate how Indonesia's integration into global supply chains both enhances its industrial footprint and exposes it to geopolitical and commercial pushback.

Nickel diplomacy is now central to Indonesia's regional and multilateral positioning in critical minerals. Jakarta participates in frameworks such as the U.S.-led Minerals Security Partnership and engages with the EU on critical raw material supply, while simultaneously cultivating South-South linkages with Gulf investors and Indian conglomerates. These initiatives aim to secure financing, offtake, and higher standards, reflecting Indonesia's ambition to translate its mineral wealth into geopolitical leverage and recognition as an indispensable node in clean energy value chains.

Indonesia is leveraging nickel as a strategic instrument to balance Chinese dominance with broader global partnerships. To diversify, Indonesia has welcomed investment from Western and Asian counterparts, most notably through the Vale-Huayou-Ford Pomalaa HPAL project, which integrates a U.S. automaker into its battery supply chain. Similar ventures with Korean and Japanese firms seek to align nickel output with global EV producers, embedding Indonesia more firmly in diversified demand networks.

¹ In 2025, 92% by value of Indonesia's exports of stainless steel products went to Asia, particularly China (24%), Taiwan (21%), and India (16%) (authors' analysis of United Nations, n.d.).



4.0 The Philippines: Nickel supply chain strategy and trajectory

4.1 Overview of the Sector

The Philippines is the world's second-largest mined nickel producer, far behind Indonesia, but it faces limited supply growth. In 2024, nickel production decreased from 413 kt to 330 kt (USGS, 2025b). This decline is attributed to both falling ore grades and the absence of significant new project development. Benchmark forecasts suggest output will not return to 2023 levels until 2027 because of structural supply constraints (Bostock, 2025). In terms of reserves, the Philippines holds 4.8 million tonnes out of 130 million tonnes worldwide. This shows the large difference with Indonesia, which holds 55 million tonnes of economically proven reserves. The Philippines is only sixth in reserves, after Indonesia, Australia, Brazil, Russia, and New Caledonia (USGS, 2025b). This partially explains why the country's production outlook is constrained compared to Indonesia (Bostock, 2025).

Refining capacity in the Philippines remains nascent and dependent on foreign investment. The two existing HPAL facilities operated by SMM remain the only large-scale processing capacity, leaving the Philippines reliant on external partners for final-stage refining. Research by Wood Mackenzie for the Philippine government indicates that, with specific technologies, nickel refining in the Philippines would be cost competitive and commercially viable, even given the current depressed prices (Mines and Geoscience Bureau, personal communication, November 4, 2025). However, this may require substantial foreign investment and technology transfer. Without these, the Philippines' refining ambitions would be unlikely to be realized at scale (Bostock, 2025). On the contrary, Benchmark Minerals estimates that the Philippines' output of refined nickel is expected to stagnate, leading its share of the growing market for refined nickel to halve by 2033, from around 6% to 3%. This means that the country would miss out on the opportunity to increase its nickel exports as demand rises. Attracting investment in new refineries using cost-competitive technologies is therefore key to these ambitions. Contrary to Indonesia, the Philippines currently has no plans for nickel sulfate capacity, which is the chemical input for NMC batteries (Bostock, 2024).



4.2 Key Market Challenges

Nickel miners are facing similar challenges to Indonesian miners in terms of price volatility but have a slightly healthier cost profile. Average cash costs for primary nickel mines are slightly lower in the Philippines than in Indonesia (S&P Global Market Intelligence, 2025b), but Indonesia's strength lies in its integrated value chains, which allow the recouping of costs downstream. This is not the case for nickel in the Philippines, whose cost recovery is mostly dependent on exports to China and Indonesia.

4.3 Historical Political and Policy Evolution

The evolution of the Philippine mining sector has been shaped by successive political and regulatory cycles, resulting in alternating periods of liberalization and tighter state control. Under American colonial rule, the 1903 Mining Law opened the sector to full foreign ownership (Camba, 2024), attracting large-scale investment and positioning the Philippines as a major global gold producer by the early 20th century. Following independence, reforms sought to increase Filipino participation in the sector, although mining largely remained focused on raw material exports with limited downstream value addition (Camba, 2024).

During the Marcos era, the government pursued a more centralized and state-led industrialization strategy, combining generous fiscal incentives (Liao & Zhang, 2024) with efforts to promote downstream processing and metal-based manufacturing. However, weak institutional capacity (Israel, 2010) and declining commodity prices limited the success of these policies. Since the 1990s, the sector has experienced repeated shifts between liberalization and regulatory tightening, including the Mining Act of 1995 (Liao & Zhang, 2024), stricter environmental measures under Executive Order No. 79 (2012), and renewed investment promotion under Executive Order No. 130 (2021). While current policy directions continue to support investment and downstream development, persistent tensions (Liao & Zhang, 2024) around environmental impacts, Indigenous rights, and local government authority continue to shape the sector's investment climate (Cesista Law, 2025).

4.4 Legal and Regulatory Framework

The Philippine mining regime has been anchored in state ownership of mineral resources since the Philippine Mining Act of 1995, establishing the foundation for modern mining governance. As summarized in Table 3, the regulatory framework establishes systems of exploration permits, mineral agreements, and financial or technical assistance agreements (FTAAs). For instance, only Filipino citizens or corporations with at least 60% Filipino equity may hold permits, though foreign participation is possible under large-scale regimes covering key minerals such as nickel.

Subsequent reforms—particularly Executive Orders 79 (2012) and 130 (2021)— recalibrated the balance between investment promotion and sustainability concerns. Executive Order 130 of 2021 lifted a long-standing moratorium on new mineral agreements, while other laws strengthened obligations for biodiversity, community engagement, and rehabilitation. Mining firms remain eligible for incentives, but income tax holiday incentives for mining have been largely curtailed. At the same time, the government has extended zero tariffs and other incentives for EVs and parts, trying to indirectly link mineral policy to the emerging demand for battery inputs and nickel processing.



As a result of successive reforms, the Philippines presents a regulatory environment that is comprehensive but complex, with multiple instruments shaping how mining projects are approved, implemented, and governed. (See Appendix B for a detailed overview of the mining regulatory framework.)

The fiscal regime for mining in the Philippines combines taxation, profit-sharing mechanisms, and targeted incentives, with a structure that differentiates between extraction and downstream activities (see Table B1). Mining operations are subject to excise taxes, royalties, and, in the case of FTAAAs, additional government share linked to project profitability. Unlike some peer jurisdictions, fiscal incentives for extraction are relatively limited and focus primarily on reducing upfront and early-stage costs, including duty exemptions for capital equipment, accelerated depreciation, and loss carryforward provisions.

Broader reforms under the Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act have reduced corporate income tax rates and shifted the system toward performance-based incentives, with greater support directed at processing and manufacturing activities. Recent policy measures, including zero tariffs on EVs and related components, also signal an emerging effort to align fiscal tools with downstream and energy transition objectives, although these linkages remain in their early stages.

TABLE 3. Philippines' Mining Policy Framework: Summary of key objectives and instruments

Strategic objective	Key instruments	How the policy works in practice
1. Maintain state ownership and oversight of mineral resources	1987 Constitution (Art. XII) RA 7942 (Mining Act of 1995)	Establishes state ownership of mineral resources and governs their development through regulated agreements (Exploration Permit, Mineral Agreement, FTAA)
2. Embed multi-level governance through local government involvement	Local Government Code (RA 7160) Local Government Unit approvals and taxation powers	Introduces local government oversight and consent requirements, adding a layer of accountability and complexity to project approvals
3. Recalibrate governance through regulatory reforms	Executive Order 79 (2012) Department of Environment and Natural Resources administrative updates	Strengthens environmental oversight, introduces no-go zones, and enhances transparency in response to sector challenges



Strategic objective	Key instruments	How the policy works in practice
4. Enable investment within a structured legal framework	RA 7942 (licensing regimes) Foreign participation rules Implementing Rules and Regulations of Mining Act Executive Order (EO) 79 (2012) EO 130 (2021)	Provides multiple contracting modalities, including foreign participation under FTAA: Ensures Filipino majority control ($\geq 60\%$ Filipino equity), with exception for strategic minerals (such as nickel, copper) Regulates entry into exploration and exploitation; set area caps, relinquishment, and tenure rules EO 130 (2021) lifted 2012 moratorium of new mineral agreements, while maintaining stricter standards established by EO 79
5. Define the fiscal regime and rationalize incentives	Excise taxes FTAA government share CREATE Act (RA 11534) EO 226 Strategic Investment Priority Plan	Combines taxation and profit-sharing with performance-based incentives
6. Support emerging industrial and energy transition linkages	EV tariff policies (0% tariffs) Philippine Development Plan 2023–2028 Philippine Economic Zone Authority (PEZA) zones	Signals growing interest in downstream activities and green industries, though integration with mining remains at an early stage
7. Strengthen environmental management and regulatory safeguards	Environmental Clearance Certificate under the Environmental Impact Statement (EIS) system Clean Water Act (RA 9275) Clean Air Act (RA 8749)	Requires environmental impact assessments and compliance with national environmental standards throughout the project life cycle
8. Protect Indigenous rights and ensure community participation	Indigenous Peoples Rights Act (RA 8371) Free, Prior and Informed Consent (FPIC) process	Requires FPIC for projects affecting ancestral domains, making community approval central to project development

Source: Authors' compilation.



4.5 Industrial Policy and Downstream Development

The Philippines' approach to industrial policy in the mining sector has historically combined ambition with uneven implementation outcomes. While successive governments have articulated objectives to promote industrial upgrading and value addition, progress has been constrained by structural factors such as high energy and logistics costs, regulatory complexity, and coordination challenges across agencies. The literature consistently highlights that the central issue has not been the absence of policy frameworks, but rather the difficulty of sustaining coherent and coordinated implementation over time, particularly across political cycles and institutional mandates (Aldaba, 2014; Llanto, 2015; Organisation for Economic Co-operation and Development [OECD], 2026).

A key feature of the Philippines' industrial strategy has been the reliance on incentive-based frameworks and investment facilitation mechanisms. Instruments such as the CREATE Act and the Strategic Investment Priority Plan aim to attract investment into priority sectors, including mineral processing and green industries, while SEZs provide infrastructure, fiscal incentives, and streamlined procedures. However, evidence from both manufacturing and emerging sectors suggests that incentives alone have not been sufficient to drive sustained industrial deepening, particularly in the absence of complementary measures to address cost competitiveness and coordination failures (OECD, 2024; World Bank, 2017).

4.5.1 The Role of SEZs

In this context, the role of SEZs has been central but not transformative. Zones administered by PEZA and other authorities have successfully supported export-oriented manufacturing activities, notably through a combination of fiscal incentives—such as income tax holidays, duty and value-added tax (VAT) exemptions, and simplified administrative procedures—alongside access to infrastructure and streamlined permitting. Yet their impact on higher-value industrial upgrading has been more limited.

For the mining sector, SEZs offer a potential entry point for value addition through processing, refining, and downstream activities, but this remains largely opportunity-driven rather than policy-driven, with outcomes dependent on investor decisions and broader enabling conditions. This contrasts with more coordinated industrial clustering approaches observed in other contexts, where zones are embedded within a broader strategy linking resource extraction to industrial development (OECD, 2024). Figure 8 summarizes incentives provided by SEZs.



FIGURE 8. Incentives provided by SEZs in the Philippines

	SIPP (BOI Projects)	PEZA	Other SEZs	EV & Battery Platforms
Strategic Role	 Target priority sectors	 Export manufacturing hub	 Industrial & logistics hubs	 Integration into energy transition value chains
Key Incentives	• CREATE Act incentives • Income tax holiday (4–7 years) • Enhanced deductions/reduced tax rates • Shift to performance-based incentives	• Income tax holiday (4–7 years) • 5% gross income tax • Duty-free imports, VAT zero-rating, local tax exemptions • Nationwide zones • One-stop services, export-focused	• Performance-based incentives • CREATE Act benefits • Nationwide zones; one-stop services, export-focused • Industrial hubs (Clark, Subic, etc.) • Supports clustering and logistics	• Tariff exemptions • Evolving incentive packages • Emerging sector • Links mining to EV and battery value chains

Source: Authors' compilation.

Note: SIPP = Strategic Investment Priority Plan; BOI = Board of Investments

TABLE 4. Industrial policies and SEZs

Special projects/ zones	Strategic role	Key incentives	Key features and contribution
Board of Investment-registered projects under the Strategic Investment Priority Plan	Targeted support for priority sectors	Access to CREATE Act incentives, performance-based incentives: income tax holiday (4–7 years), enhanced deductions, reduced tax rates)	Major reform shifting from entitlement-based to performance-based incentives Not geographically bound; complements zone-based incentives; prioritizes sectors such as mineral processing, green industries, and manufacturing



Special projects/ zones	Strategic role	Key incentives	Key features and contribution
PEZA economic zones	Core platform for export- oriented manufacturing and processing	Income tax holiday (4–6 years) 5% gross income tax (post-income tax holiday) Duty-free imports for capital equipment, raw materials and spare parts VAT zero rating on local purchases Exemption from local taxes fees	Nationwide network of zones; streamlined permitting and one- stop services; mining extraction generally excluded, but processing and manufacturing activities may qualify
Other SEZs (BCDA [Clark], SBMA [Subic], CEZA [Cagayan], PHIVIDEA, others)	Industrial clustering and logistics hubs	Access to CREATE Act incentives, performance-based incentives: income tax holiday (4–7 years), enhanced deductions, reduced tax rates	Major reform shifting from entitlement-based to performance-based incentives Not geographically bound; complements zone-based incentives; prioritizes sectors such as mineral processing, green industries, and manufacturing
Emerging EV and battery platforms	Supporting integration into energy transition value chains	Tariff exemptions; evolving incentive packages	Policy signals toward linking mining to EV and battery manufacturing; still at an early stage compared to more established industrial zone strategies

Source: Authors' compilation.

4.5.2 Emerging Downstream Ambitions in the Philippines

Recent policy discussions around nickel downstreaming illustrate both the growing interest in capturing greater domestic value and the constraints shaping policy choices. Proposals to introduce export restrictions (Bostock, 2025) on nickel ore—drawing on Indonesia's experience—have not been adopted (Decena, 2025). The plans would have prohibited raw nickel ore exports 5 years after enactment, with the aim of spurring domestic processing and increasing local value capture. Decisions to abandon the export controls reflected concerns about readiness in terms of infrastructure, processing capacity, and investment conditions.



This points to a broader lesson from the Philippine experience: downstream development requires not only policy intent but also a strong enabling ecosystem, including stable and predictable regulation, competitive input costs, and effective coordination across institutions. Strengthening these foundations will be critical for translating mineral resource potential into sustained industrial and economic outcomes (OECD, 2026; Philippine Council for Industry, Energy, and Emerging Technology Research and Development, n.d.).

4.6 ESG Challenges in the Philippine Nickel Mining Sector

The rapid expansion of nickel mining in the Philippines—driven by global demand for energy transition minerals—has brought heightened ESG risks, particularly in regions such as Palawan, Zambales, and the Caraga region. These challenges are not new, but they have intensified in recent years as production has scaled up without a commensurate strengthening of enforcement and coordination across institutions.

4.6.1 Community Resistance and Social Tensions

Community opposition remains one of the most significant constraints on mining development. A central issue is the implementation of FPIC requirements for Indigenous Peoples. Recent evidence suggests that consultation processes have often been contested or perceived as inadequate, leading to disputes and project delays. For example, in Brooke's Point (Palawan), nickel projects linked to companies such as Ipilan Nickel Corporation and MacroAsia Mining have faced sustained opposition from the Pala'wan Indigenous community, with allegations of flawed consultation processes and social division (Amnesty International, 2025). Similarly, in Zambales, communities have raised concerns over exclusion from decision making and a lack of access to project information (Amnesty International, 2025).

These tensions have, in some cases, escalated into legal disputes, protests, and operational uncertainty, reinforcing the importance of a “social license to operate.” Reports also point to broader risks, including intimidation of environmental defenders and conflicts between pro- and anti-mining groups (Business and Human Rights Centre, 2025).

4.6.2 Environmental Impacts and Ecosystem Degradation

Nickel mining—largely conducted through open-pit methods—has generated significant environmental concerns, particularly related to deforestation, soil erosion, and water contamination. In Palawan, one of the country's most biodiverse regions, mining activities have been associated with sedimentation of rivers and coastal areas, damage to coral reefs, and declining agricultural and fisheries productivity (The Guardian, 2026). In Zambales and other mining areas, studies and community reports indicate exposure to heavy metal contamination through water, air, and food chains, with observable impacts on livelihoods and ecosystems (Amnesty International, 2025).

In the Caraga region—the centre of nickel production—communities have reported cumulative environmental impacts from multiple operations, including degradation of forests, water systems, and coastal ecosystems (Climate Rights International, 2025). These impacts are particularly concerning given the Philippines' high ecological sensitivity and vulnerability to climate risks.



4.6.3 Artisanal and Small-Scale Mining and Informal Risks

While nickel production is dominated by large-scale operations, artisanal and small-scale mining (ASM) continues to play a role in the broader mining landscape, particularly in areas with abandoned or marginal sites. ASM activities are often informal and weakly regulated, raising concerns around environmental management, occupational safety, and community impacts. More broadly, the literature highlights systemic risks in critical mineral supply chains—including land degradation, unsafe working conditions, and limited access to formal oversight—many of which are relevant in the Philippine context (De Haies & Brink, 2025).

4.6.4 Government Responses and Implications for Mining Projects

The Philippine government has taken a number of steps to address ESG concerns, primarily through strengthening regulatory frameworks and enforcement mechanisms. Executive Order No. 79 (2012) marked a major policy shift by introducing no-go zones, stricter environmental compliance requirements, and enhanced transparency provisions. More recently, regulatory agencies such as the Department of Environment and Natural Resources have increased monitoring and, in some cases, suspended or reviewed mining operations in response to environmental violations.

However, enforcement remains uneven, and governance challenges persist. The coexistence of strong legal safeguards with capacity constraints and overlapping mandates has led to inconsistent implementation on the ground. In practice, ESG risks have translated into project delays, legal challenges, reputational risks, and, in some cases, calls for suspension of operations, particularly where community consent or environmental compliance is contested (Climate Rights International, 2025).

4.7 Geopolitical Positioning and Partnerships

The Philippines occupies an increasingly important position in global nickel supply chains, but its current role remains primarily that of a raw material supplier rather than a fully integrated processing hub.

From a trade perspective, nickel exports from the Philippines are highly concentrated in a few markets. In 2025, 90% of the Philippines' Nickel ore was destined for China (Velasco, 2025). However, in 2024, ore exports to Indonesia also surged with a 27-fold increase compared to the prior year, as Indonesian producers faced temporary ore shortages linked to delays in quota approvals (Bostock, 2025) and as Indonesian smelters sought additional ore supply. This reflects the Philippines' strategic importance as a flexible upstream supplier within Asian nickel value chains but also underlines its continuing dependence on external processing centres for higher-value conversion.

At the same time, the Philippines has begun to position itself more actively within the emerging architecture for critical minerals diplomacy. A significant recent development was the Philippines–United States Memorandum of Understanding on critical minerals, signed on February 4, 2026 (Philippines Embassy US, 2026), which aims to diversify critical mineral supply chains, promote investment, support domestic value addition and processing, and strengthen local capacity and responsible resource management. This is important because it gives the Philippines a more formal place in U.S.-aligned supply chain diversification efforts



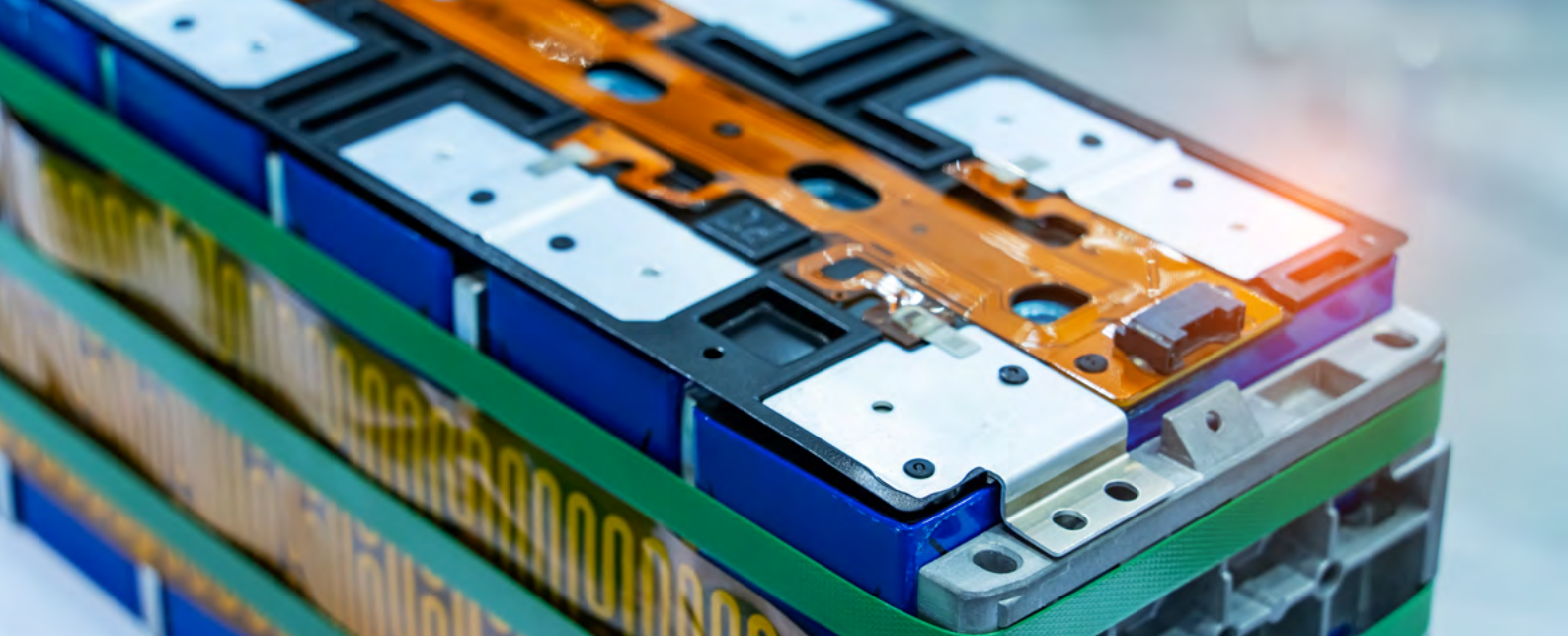
(U.S. Department of State, 2026), even as U.S. policy instruments have evolved. In parallel, the Philippines is now a member of the Minerals Security Partnership Forum, which the European Commission describes as a platform focused on responsible, resilient supply chains with local value addition at the centre; the Philippines joined the Forum in September 2024 (European Commission, 2024).

Japan remains one of the Philippines' most established and strategically important downstream partners. Japanese firms—most notably Sumitomo Metal Mining (Sumitomo Metal Mining, n.d.)—have long operated in the country through the Coral Bay and Taganito HPAL facilities, which produce mixed nickel-cobalt sulfide in the Philippines for further refining in Japan into higher-value nickel products, including nickel sulphate.

Beyond these legacy industrial links, the Philippines is also engaging with the U.S.–Japan–Philippines trilateral framework (U.S. Department of State, 2024), including the Luzon Economic Corridor, which has explicitly included critical minerals among its priority areas and where pledges of USD 100 billion have been made for investment into infrastructure and strategic sectors, including critical minerals (Bostock, 2025). This gives Japan a dual role in the Philippine nickel sector: both as a long-standing industrial off-taker and processor, and as part of a broader strategic partnership aimed at strengthening supply chain resilience in the Indo-Pacific.

The partnership landscape is also widening beyond the traditional triangle of China, Japan, and the United States. The Philippines has used multilateral and bilateral channels to raise its profile in discussions on responsible critical minerals governance, including a 2024 Philippines–Asian Development Bank (ADB) dialogue at the World Trade Organization on resilient and responsible critical minerals.

Taken together, these developments suggest that the Philippines is seeking to move from being simply an ore exporter to becoming a more visible strategic partner in critical minerals. However, compared with Indonesia, its geopolitical positioning is still less anchored to a single, clearly articulated downstreaming policy. Its partnerships are expanding, but their long-term impact will depend on whether they translate into concrete investments in processing, infrastructure, and higher-value industrial linkages.



5.0 Regional Integration and the Development of Nickel Value Chains in ASEAN

Indonesia and the Philippines are among the world's most important nickel producers, but they occupy different positions in the value chain. Indonesia has moved rapidly into smelting, HPAL processing, battery materials, and early battery manufacturing, while the Philippines remains largely upstream, with limited domestic processing capacity. This creates both a challenge and an opportunity: without coordination, the two countries may pursue overlapping strategies and compete for the same investments; with coordination, they could help form the backbone of a more integrated ASEAN nickel and battery ecosystem.

5.1 Why Regional Integration Matters

Regional integration matters because many of the constraints facing Indonesia and the Philippines cannot be solved through national policy alone. Declining ore grades, underinvestment in exploration, infrastructure bottlenecks, high energy costs, skills shortages, ESG risks, and the rapid shift in battery chemistries all have regional dimensions.

These factors affect investor confidence, the cost of production, the credibility of supply chains, and the ability of ASEAN producers to respond to changing global demand.

At the same time, global EV and battery supply chains are becoming more regionalized and more demanding. Buyers increasingly seek diversified, traceable, lower-carbon, and responsibly produced supply. ASEAN therefore has an opportunity to position itself not only as a source of nickel ore, but as a credible regional platform for critical minerals, battery materials, recycling, and related industrial capabilities. This will require coordination across countries, standards, infrastructure, skills, and investment promotion.

5.2 Where Regional Value Chains Could Emerge

Every country in ASEAN should not replicate the full nickel-to-battery value chain. Rather, regional integration should enable specialization across segments where countries have



different strengths. Indonesia can anchor large-scale refining, HPAL, precursor production and battery materials. The Philippines can strengthen responsible upstream supply, selectively expand processing, and explore complementary roles in logistics, battery components, recycling, and services linked to SEZs.

Regional value chains could develop around six areas: (i) shared exploration and geological data; (ii) cross-border infrastructure and energy solutions; (iii) midstream processing and industrial clustering; (iv) skills, technology, and research and development (R&D) platforms; (v) common ESG, labour, and carbon standards; and (vi) battery recycling and circular economy systems. These are areas where regional scale can reduce costs, pool scarce capabilities, strengthen bargaining power, and avoid duplication.

TABLE 5. Potential areas for regional cooperation in nickel-based battery value chains

Area for regional cooperation	Strategic rationale
Exploration and data	Shared geological mapping, harmonized reporting, and stronger ASEAN Minerals Information System (AMIS) implementation can lower investor risk and improve public decision making.
Infrastructure and energy	Regional corridors, port standards, and ASEAN Power Grid initiatives can reduce costs and support lower-carbon processing.
Industrial clustering	Coordinated planning can help avoid redundant smelters and identify complementary roles across mining, refining, components, and recycling.
Skills and R&D	Regional centres of excellence can pool scarce technical capacity in metallurgy, HPAL, battery chemistry, recycling, and environmental monitoring.
ESG and market access	Common standards on labour, community engagement, tailings, carbon accounting, and traceability can strengthen credibility with buyers and financiers.
Recycling and circularity	Regional aggregation of end-of-life batteries and black mass can create the scale needed for safe and viable recycling systems.

Source: Authors' compilation.

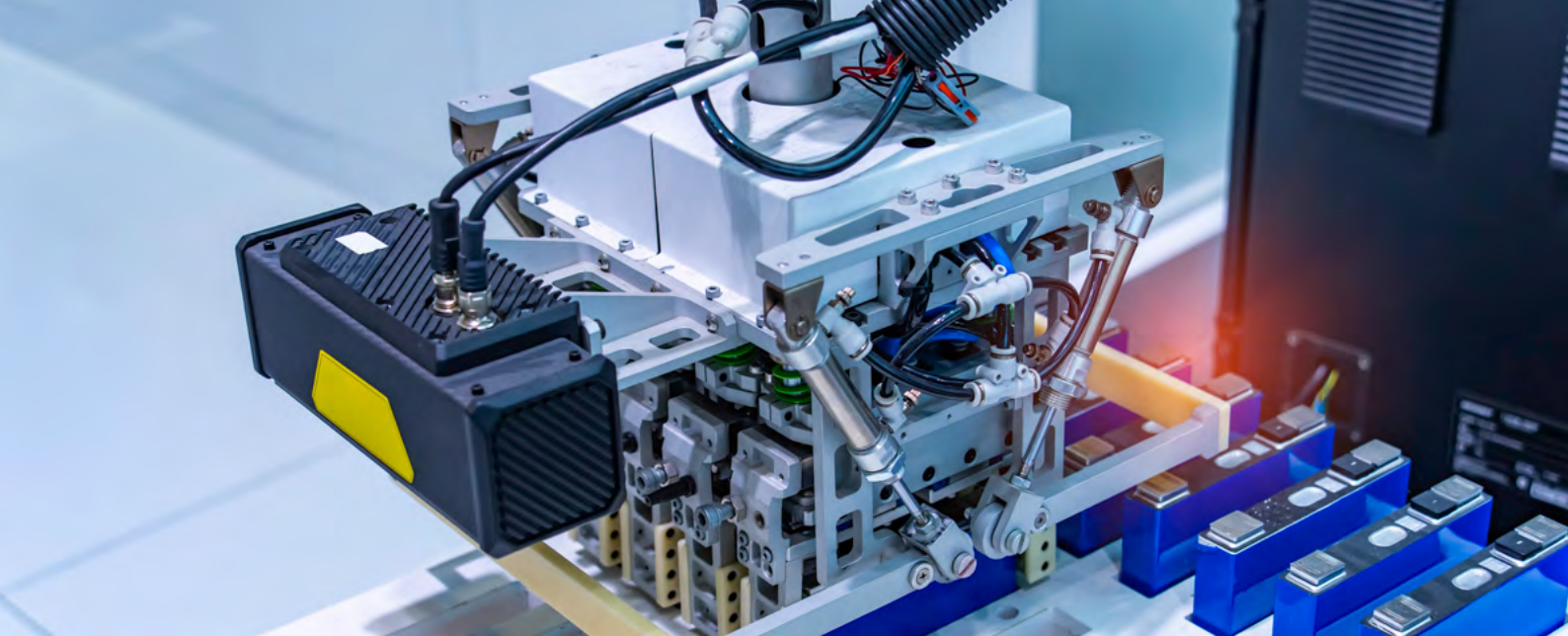
5.3 Roles of Indonesia and the Philippines in Regional Value Chains

Indonesia is already the regional anchor for nickel downstreaming. Its industrial parks, processing capacity, state participation mechanisms, and international partnerships give it scale in ferronickel, NPI, HPAL, mixed hydroxide precipitate, and emerging battery manufacturing. Its main policy challenge is to sustain competitiveness while managing oversupply, rising costs, ESG scrutiny, and exposure to shifts away from nickel-rich battery chemistries.



The Philippines has a different role. At the moment, the country is primarily an upstream supplier, with exports concentrated in raw ore and limited domestic processing. Its opportunity is not necessarily to replicate Indonesia's model, but to identify realistic and complementary roles: responsible mining, selected processing where commercially viable, battery-related components, logistics, recycling, and services. Its main policy challenge is to improve regulatory coherence, project certainty, infrastructure, and social and environmental performance.

Together, the two countries could support a more resilient ASEAN nickel ecosystem. Indonesia can provide scale in processing and industrial clustering; the Philippines can provide upstream supply, diversification, and complementary industrial capabilities. A coordinated approach would help reduce duplication, create regional demand signals, strengthen ESG credibility, and improve ASEAN's leverage with global automakers, battery manufacturers and strategic partners.



6.0 Policy Recommendations for National and Regional Responses

The recommendations below are organized around two levels of action.

First, Indonesia and the Philippines need to strengthen national policy foundations—in particular, licensing, fiscal regimes, ESG enforcement, community engagement, and project-level governance.

Second, ASEAN cooperation can amplify national reforms where regional scale, harmonization, or coordination adds value. It should focus on areas where ASEAN adds clear value: shared data, common standards, pooled technical capacity, regional infrastructure, coordinated investment promotion, and recycling systems.

In today's rapidly evolving global economy, governments are once again turning to industrial policy to spur economic transformation, create jobs, and foster technological capabilities. Despite successful experiences in major countries such as China, experience in emerging and developing economies shows that there is no “one-size-fits-all” blueprint for successful industrial policies. Rather, policies should be adapted to the key opportunities in the country in question and tailored to meet the needs of the industry being targeted. The literature emphasizes that this depends on the practices outlined in Box 1.

BOX 1. PRINCIPLES FOR EFFECTIVE INDUSTRIAL POLICY IN NICKEL VALUE CHAINS

- Align industrial policy with national development objectives (IGF, 2018).
- Prioritize selectively based on capabilities (IGF, 2018; Reed, 2024), infrastructure, market demand, and fiscal space.
- Engage investors and industry while preserving regulatory independence and public-interest safeguards. Successful models combined close coordination with institutional independence to minimize state capture. This concept of “embedded autonomy” would ensure that dialogue is structured, transparent, and linked to measurable reform outcomes (Juhasz & Lane, 2024).



- Make incentives performance based and conditional (Rodrik & Stiglitz, 2024) on investment, productivity, technology transfer, ESG compliance, and local value creation.
- Build implementation capacity across ministries, regulators, and subnational authorities.
- Monitor outcomes and adapt policies as technologies, prices, and battery chemistries evolve (Juhasz & Lane, 2024). This iterative approach mirrors China's experimentalism and contrasts with past experiences where protection or subsidies became permanent due to political capture. Effective learning requires institutionalized feedback loops, transparency, and accountability (IGF, 2018; Rodrik & Stiglitz, 2024).

6.1 Adopting Predictable Yet Flexible Governance Approaches

Protecting investor confidence will be critical to sustaining the long-term viability of nickel industries in Indonesia and the Philippines. Global nickel markets are facing increasing pressure from persistent oversupply, price volatility, and rapidly evolving battery technologies. At the same time, the growing market share of LFP batteries is creating uncertainty over future demand for nickel-intensive chemistries. These trends are placing pressure on margins, increasing the risk of stranded assets, and weakening incentives for long-term investment across the nickel value chain.

In this context, predictable and credible policy frameworks are essential. Nickel mining, refining, and battery-related industries require large-scale, long-term capital investments that are highly sensitive to regulatory uncertainty. Frequent changes in export restrictions, royalties, taxes, local content requirements, and permitting procedures can increase investor risk, delay projects, and reduce the competitiveness of both countries relative to other emerging critical mineral producers. Governments therefore need to strike a balance between policy flexibility and long-term predictability.

At the same time, governments face legitimate pressures to adapt fiscal and regulatory frameworks to changing market conditions, evolving industrial objectives, and social and environmental expectations. The challenge is therefore not simply to create stable systems, but to design regulatory and fiscal frameworks that are both predictable and sufficiently flexible to respond to changing economic circumstances. Transparent rules-based approaches, clear consultation processes, and credible enforcement mechanisms are essential to balance investor confidence with national development objectives. This includes transparent fiscal regimes, stable regulatory frameworks (Luttrell & Murphy, 2021), and stronger coordination across mining, industry, trade, and energy policies. International guidance, including the OECD *Guiding Principles on Durable Extractive Contracts* (2020) and IGF report *Evolving Standards on Stabilization: A practical guide to the Organisation for Economic Co-operation and Development's Guiding Principles on Durable Extractive Contracts, Principles VII and VIII* (2025), provides useful reference points for designing fiscal regimes that are both stable and adaptable.



Regional cooperation can help reinforce national reforms and reduce harmful competition and fragmentation among ASEAN producers. Greater coordination on fiscal stability principles, market intelligence, production planning, and investment promotion could improve investor confidence while reducing the risk of duplication and oversupply. Existing regional frameworks, including the ASEAN Economic Community Blueprint 2025, provide a foundation for greater cooperation on investment facilitation, licensing transparency, ESG standards, and regulatory coordination (ASEAN, 2015). ASEAN can also play a stronger role in anchoring future demand for nickel-rich battery technologies through coordinated industrial policies; regional standards, including on battery chemistries; and collective engagement with automakers and battery manufacturers to secure long-term offtake agreements for high-nickel cathodes and other precursors (Afesorgbor, 2019; Cruz et al., 2018; Hayakawa et al., 2014; Lederman et al. 2010; Marcelin & Nanivazo, 2019).

TABLE 6. Strategic recommendations to protect investors' base

Strategic issues	National-level policy options	Regional-level policy options
Regulatory predictability and policy coherence	Adopt long-term mining and downstream industrial strategies with clear objectives, implementation timelines, and regulatory roadmaps. Require consultation processes before major policy changes, reduce ad hoc regulatory shifts. Strengthen coordination across relevant ministries and agencies. Consider transition periods or grandfathering provisions to improve investor predictability and policy coherence.	Develop ASEAN reference principles on regulatory predictability, consultation processes, transition periods, and investment transparency to promote greater policy coherence across member states (Mejia & Aliakb, 2023). Strengthen regional benchmarking and peer learning on regulatory quality, permitting efficiency, and mining investment governance.
Fiscal stability and royalty regimes	Strengthen fiscal stability and establish transparent, rules-based fiscal systems that balance investment attractiveness with domestic revenue objectives. Clarify royalty, tax, and stabilization mechanisms. Strengthen transparency in mining contracts and fiscal terms. Design fiscal frameworks that can adjust to changing market conditions while maintaining predictability for investors.	Promote regional dialogue and exchange good practices on fiscal design, stabilization approaches, and revenue-sharing frameworks to reduce harmful competition and improve policy consistency across ASEAN. Strengthen regional learning on balancing investor incentives, long-term fiscal stability,² and domestic value addition.

² IGF's Global Mining Tax Initiative provides guidance on best practice in mining taxation. See <https://www.igfmining.org/financial-benefits/>.



Strategic issues	National-level policy options	Regional-level policy options
Licensing and permitting systems	Streamline licensing and permitting procedures through digital platforms, one-stop investment services, and clear approval timelines for exploration and mining activities. Reduce administrative discretion by establishing transparent criteria and service standards. Require public disclosure of awarded licences and key permitting decisions. Strengthen coordination across mining, environmental, land, and industrial agencies.	Develop ASEAN principles on licensing transparency, disclosure, and reporting practices to facilitate cross-border investment and regional value chains. Promote greater harmonization of permit categories, reporting formats, and project information systems, including regional information sharing on major mining and processing projects. Harmonize reporting standards for nickel supply and demand.³
Regulatory enforcement and institutional capacity	Strengthen the technical capacity, independence, and accountability of regulatory agencies and inspectorates. Expand training for mining, environmental, and labour inspectors; establish stronger anti-corruption safeguards and penalties for rent-seeking behaviour; improve enforcement consistency across agencies. Strengthen judicial and administrative review mechanisms for regulatory disputes.	Establish ASEAN cooperation platforms for regulatory training, peer learning, and exchange of good practices on inspections, ESG oversight, and mining governance. Promote regional cooperation on inspector training, peer review of enforcement practices, and information sharing on regulatory and ESG compliance challenges, including those with cross-border implications.
ESG standards and responsible investment	Strengthen environmental, labour, and governance frameworks in line with evolving international standards; improve ESG reporting, traceability, and disclosure systems to support market access.	Promote greater regional convergence around ESG standards, reporting frameworks, and responsible sourcing principles to strengthen ASEAN's credibility with international buyers and investors.

³ Author recommendation based on ASEAN Senior Officials Meeting on Minerals structure.



Strategic issues	National-level policy options	Regional-level policy options
Investor confidence and market positioning	Strengthen legal protections for investors while maintaining governments' policy space. Avoid abrupt policy changes. Publish medium-term fiscal and regulatory roadmaps. Strengthen transparency in licensing and contract enforcement. Establish regular public-private dialogue mechanisms to address operational and regulatory concerns.	Coordinate ASEAN engagement with international investors, automakers, and financial institutions to position ASEAN as a stable and competitive hub for critical minerals and battery supply chains. Establish a regional forum with investors and governments to address specific regional challenges.
Managing price volatility and oversupply risks	Use transparent, rules-based approaches to royalties and production management. Conduct stress tests on project viability under different price scenarios. Avoid supporting structurally uncompetitive capacity.	Improve regional information sharing on production trends and market outlooks. Strengthen coordination to reduce risks of excessive regional overcapacity and harmful competition.
Reducing risks of stranded assets	Require clearer commercial viability assessments for new smelters and refining projects. Require integrated business planning linked to long-term market demand and competitiveness.	Share methodologies for project viability assessments. Encourage regional coordination on industrial planning and sequencing of new capacity. Establish regional early warning system for projects at risk.
Responding to changing battery technologies	Support innovation and competitiveness in higher-value nickel products, including nickel-rich cathode materials. Support R&D on battery technologies. Provide targeted industrial incentives where economically justified. Publish integrated nickel-to-battery development strategies.	Support regional demand through coordinated incentive mechanisms and regional engagement with battery and EV manufacturers. Explore regional approaches to battery standards, technology cooperation, and long-term offtake partnerships.

Source: Authors' compilation.



6.2 Exploration and Long-Term Resource Security

Indonesia and the Philippines should make exploration and resource security a strategic priority to sustain the long-term competitiveness of their nickel sectors. Declining ore grades, rising production costs, and underinvestment in exploration are already placing pressure on future supply. Despite accounting for the majority of global nickel production, both countries attract only a limited share of global exploration spending relative to their output, raising concerns over the long-term sustainability of reserves and future production capacity.

At the national level, priorities should focus on improving geological knowledge, reducing investor uncertainty, and strengthening the enabling environment for exploration. This includes expanding geological surveys, improving access to high-quality geoscience data, streamlining licensing procedures, and maintaining predictable fiscal and regulatory frameworks. Both countries could also consider providing targeted incentives for exploration companies, such as accelerated depreciation, guarantee schemes for high-risk and greenfield projects, co-financing of early-stage surveys, or exploration tax credits.

International experience suggests that well-designed incentives can significantly improve exploration investment. For example, Canada's flow-through share regime and Critical Mineral Exploration Tax Credit have helped mobilize substantial private capital for mineral exploration activities.

BOX 2. AN EXAMPLE FROM CANADA'S FLOW-THROUGH SHARE REGIME

Proven international models demonstrate that regional cooperation and fiscal incentives can substantially increase exploration activity. Canada's flow-through share regime allows mining companies to shift through the 100% tax-deductible exploration expenses to investors, which can help reduce the net cost of investment (Natural Resources Canada, 2024). This is supplemented by a 15% Mineral Exploration Tax Credit and a 30% Critical Mineral Exploration Tax Credit for exploration targeting nickel, lithium, cobalt, and other battery metals (Natural Resources Canada, 2024). Flow-through share financing now contributes almost 70% of funds raised on Canadian stock exchanges for exploration (PDAC, 2024).

Regional cooperation can complement national reforms by reducing duplication, improving data quality, and strengthening ASEAN's collective attractiveness as a critical mineral investment destination. Existing frameworks such as the ASEAN Minerals Exploration Strategy and the AMIS provide an important foundation, but implementation remains uneven. Greater regional coordination on geological data standards, exploration information systems, skills development, and infrastructure planning could reduce investor risk and support more integrated regional value chains (ASEAN, 2023). Regional approaches may also help ASEAN diversify beyond nickel and strengthen resilience to changing battery technologies and global market shifts.



TABLE 7. Strategic recommendations for exploration and long-term resource security

Strategic issues	National-level policy options	Regional-level policy options
Improving data, technical capacity, and skills	Standardize reporting requirements for exploration data. Strengthen national geoscience institutions. Expand geological surveys and publish high-quality open-access geoscience data. Enforce data submission requirements for exploration licences. Expand university and technical training in geology, mining, and metallurgy.	Expand the ASEAN mineral database to include geological, production, trade, and ESG data to form a real-time regional information platform. Harmonize data protocols using international standards. Fund shared testing laboratories and analytical facilities. Establish ASEAN regional centres of excellence in geoscience and exploration. Develop regional training, certification, and academic exchange programs.
Strengthening exploration and resource development	Introduce targeted incentives and subsidies for exploration. Maintain predictable fiscal and licensing frameworks.	Accelerate implementation of the ASEAN Minerals Exploration Strategy. Complete core AMIS datasets and harmonize reporting standards (Joint Ore Reserves Committee-equivalent).
Reducing investor risk and improving investment attractiveness for exploration	Strengthen tenure rules and transparency. Improve consultation and strengthen FPIC processes to reduce social and political risks.	Establish an ASEAN Critical Minerals Exploration Facility with multilateral development bank support to provide - financial support for high-risk greenfield projects (learning from international experience on exploration tax credit structures) and - regional guarantee schemes to de-risk investment. Coordinate investor outreach positioning ASEAN as an integrated critical minerals hub.



Strategic issues	National-level policy options	Regional-level policy options
Avoiding harmful competition and policy fragmentation	Avoid ad hoc fiscal and regulatory changes. Provide transparent multi-year policy frameworks for exploration and mining investment.	Develop ASEAN guidelines on incentives, fiscal policies, and licensing standards to reduce harmful competition and improve regional coherence. Coordinate incentives in designated ASEAN exploration and mining corridors.
Strengthening long-term supply security and diversification	Diversify exploration beyond nickel where relevant. Secure supply agreements for critical minerals and feedstocks where deficits exist.	Explore coordinated approaches to securing supply of other critical minerals relevant to battery value chains. Establish regional procurement strategies and agreements to anchor downstream investments.

Source: Authors' compilation.

6.3 Supply Chain Bottlenecks: Infrastructure, energy, and logistics

Infrastructure, energy, and logistics constraints remain major barriers to the competitiveness of nickel industries in Indonesia and the Philippines. Many mining and processing operations are located in remote regions with inadequate transport links, congested ports, and unreliable power supply. These bottlenecks increase operating costs, reduce efficiency, and discourage investment in higher-value downstream activities. At the same time, continued reliance on captive coal power raises both production costs and carbon intensity, creating growing risks as international buyers place greater emphasis on low-carbon and traceable supply chains.

Addressing these constraints will require both national investment and stronger regional coordination. At the national level, priorities include improving transport infrastructure linking mining regions to industrial hubs, modernizing port facilities, strengthening grid reliability, and expanding access to competitive renewable energy. Reducing logistics inefficiencies and improving energy security will be essential to maintaining cost competitiveness and supporting future downstream investment.

Regional cooperation can help lower costs and improve connectivity through coordinated infrastructure planning, shared logistics systems, and greater energy integration. Existing ASEAN initiatives—including the Master Plan on ASEAN Connectivity (MPAC) 2025 and the ASEAN Power Grid—provide important foundations for deeper regional cooperation. Harmonized standards for transport, ports, carbon accounting, and industrial infrastructure



could also improve interoperability, reduce duplication, and strengthen ASEAN's position as a competitive and lower-carbon critical minerals hub.

TABLE 8. Strategic recommendations for infrastructure, energy, and logistics

Strategic issues	National-level policy options	Regional-level policy options
Transport connectivity and logistics efficiency	Invest in roads, ports, and transport corridors linking mining areas to processing hubs. Improve customs and border clearance efficiency. Enforce transparent concession rules and competition in logistics services. Provide incentives where necessary.	Develop strategic regional mineral corridors and shared infrastructure planning under ASEAN Connectivity frameworks to reduce duplication and improve connectivity across mining and processing hubs. Harmonize infrastructure standards⁴ and set up implementation committee.
Port capacity and operational efficiency	Expand and modernize port infrastructure. Digitize port and customs systems. Encourage private investment in ore handling and logistics facilities.	Promote shared regional logistics hubs and interoperable transport systems. Develop regional guidelines and harmonize standards for ports, loading systems, and shipping operations.
Affordable and reliable energy supply	Strengthen grid infrastructure, including microgrid solutions where appropriate. Provide regulatory support for renewable energy deployment in mining and industrial regions. Allow mining renewable energy producers to sell surplus power to grid. Provide incentives for renewable captive power.	Share best practices and advance ASEAN Power Grid integration where feasible.⁵ Coordinate regional procurement of renewable energy technologies and storage systems through ASEAN Power Grid framework. Support cross-border power pooling to reduce energy costs in mineral hubs. Develop ASEAN mineral and industrial corridors under MPAC 2025.

⁴ ASEAN Connectivity 2025 and Master Plan on ASEAN Connectivity (MPAC) 2025 provide existing frameworks.

⁵ ASEAN Centre for Energy coordinates technical cooperation on energy issues.



Strategic issues	National-level policy options	Regional-level policy options
Reducing the carbon intensity of nickel production	Phase out or reduce reliance on captive coal power. Introduce carbon reporting requirements and incentives for lower-carbon production. Mandate minimum renewable power quotas for industrial parks. Support energy efficiency improvements in industrial parks.	Develop ASEAN approaches to carbon accounting and certification for nickel and battery materials. Coordinate joint renewable energy procurement for industrial parks. Coordinate regional R&D on industrial decarbonization technologies. Explore regional low-carbon nickel certification systems aligned with evolving international market requirements. Consider ASEAN financing facilities for clean industrial power using ADB and World Bank mechanisms
Reducing duplication and improving regional coordination	Regulate and oversee logistics concessions to reduce inefficiency. Improve coordination among transport, energy, mining, and industrial planning agencies. Align infrastructure investment with long-term industrial strategies. Enforce competitive bidding for transport contracts.	Promote regional planning for logistics, industrial infrastructure, and energy systems to support integrated ASEAN value chains and reduce unnecessary duplication of investments.
Shared industrial infrastructure and services	Support development of shared industrial services within clusters, including logistics, testing facilities, waste management, and utilities.	Develop regional approaches to shared industrial infrastructure, logistics systems, testing facilities, and specialized service hubs to improve economies of scale and reduce duplication.

Source: Authors' compilation.

6.4 Skills, R&D, and Innovation

Human capital, technological capabilities, and innovation systems will be critical determinants of whether Indonesia and the Philippines can move beyond basic mineral extraction and processing into higher-value segments of battery and EV value chains. Both



countries continue to face shortages of engineers, technicians, and specialized professionals in areas such as metallurgy, battery chemistry, process engineering, and industrial operations. At the same time, research and innovation ecosystems remain fragmented and underfunded, limiting domestic technological upgrading and increasing dependence on foreign expertise and imported technologies.

Strengthening skills and innovation capacity therefore needs to become a central pillar of industrial policy. National priorities should include upgrading technical and university curricula, strengthening vocational education, expanding industry-linked training programs, and supporting applied research in critical minerals and battery technologies. Governments should also encourage stronger collaboration between universities, research institutions, and industry to improve commercialization and workforce readiness.

Regional cooperation can help ASEAN achieve economies of scale in skills development and innovation. Shared training programs, regional centres of excellence, joint research initiatives, and academic exchange programs would strengthen regional capabilities while reducing duplication of efforts. Existing ASEAN mechanisms—including the ASEAN Committee on Science, Technology and Innovation (COSTI) and ASEAN+3 cooperation frameworks—could provide important platforms to support regional technology partnerships, knowledge transfer, and collaborative R&D in critical minerals, battery technologies, and recycling.

TABLE 9. Strategic recommendations for skills, R&D, and innovation

Strategic issues	National-level policy options	Regional-level policy options
Improving skills in mining and processing	Strengthen university, technical, and vocational training programs in geology, metallurgy, battery chemistry, and industrial operations. Expand apprenticeships and industry-linked training schemes. Provide scholarships and incentives for science, technology, engineering, and math fields.	Develop ASEAN-wide training curricula, certification systems, and academic exchange programs to support regional mobility of skilled labour (nbriuser, 2024). Establish regional exchange programs for students and professionals. Pool resources for advanced technical training centres. Coordinate with the National Battery Research Institute (NBRI) to create regional Battery School programs (nbriuser, 2024).



Strategic issues	National-level policy options	Regional-level policy options
Reducing dependence on foreign expertise	Provide fiscal incentives for companies that invest in workforce localization. Strengthen domestic training and fund continuous learning programs for operators and technicians and for mid-career workers, including with a focus on female workers. Include technology transfer and skills development provisions in investment agreements where appropriate.	Establish ASEAN regional centres of excellence in mining, metallurgy, battery technologies, and recycling; promote regional technical cooperation and advisory networks. Negotiate regional training partnerships, including with Japan, Korea, and China through ASEAN+3 mechanisms.
Strengthening R&D and innovation ecosystems	Increase budget support and strengthen innovation financing mechanisms for R&D. Provide grants for applied research and pilot projects. Establish and finance private–public and university research partnerships in critical minerals and energy storage technologies.	Launch an ASEAN Battery Research Network anchored by NBRI and linked to the Committee on Science and Technology and Innovation. Support cross-border collaboration on commercialization and technology development and on intellectual property rights. Establish regional testing facilities and pilot plant (NBRI, 2024).
Knowledge diffusion and commercialization	Strengthen collaboration between industry, universities, and research institutions. Support national patent registration and commercialization frameworks. Build incubators for mining and materials start-ups. Require research output reporting from publicly funded projects.	Create an ASEAN innovation clearinghouse under COSTI to disseminate best practices. Harmonize intellectual property protection standards to encourage regional patenting and establish regional IP filing mechanisms.⁶ Promote open-access publication of non-sensitive R&D results.

⁶ ASEAN IP frameworks exist but need strengthening for technology sectors.



Strategic issues	National-level policy options	Regional-level policy options
Technology transfer, industrial upgrading, and local capacity development	Strengthen requirements for technology transfer, workforce development, and local content where appropriate and economically feasible with foreign firms. Where feasible, encourage local partner requirements in foreign investment agreements. Enforce knowledge-sharing clauses in licensing arrangements. Provide incentives to support the establishment of R&D centres.	Promote regional technology partnerships and shared industrial R&D platforms with external partners, including Japan, Korea, China, and other strategic partners, to support broader regional diffusion of knowledge and industrial capabilities.

Source: Authors' compilation.

6.5 Midstream Development and Industrial Clustering

Indonesia and the Philippines will need to strengthen midstream development and industrial integration if they are to capture greater value from their nickel resources and reduce dependence on raw material exports. While Indonesia has made major progress in smelting, refining, and precursor production, important gaps remain in downstream integration, technology transfer, local supplier development, and environmental performance. The Philippines, meanwhile, continues to rely heavily on ore exports, with limited domestic refining and processing capacity. In both countries, industrial development has often evolved in a fragmented manner, with weak linkages between mining, processing, manufacturing, and local economies.

Moving forward, industrial policy should place greater emphasis on integrated value chain development rather than isolated or individual projects. Industrial parks and SEZs can play an important role in attracting investment, lowering transaction costs, and supporting industrial clustering. However, the experience of Indonesia's Morowali and Weda Bay industrial parks also highlights the risks associated with rapid industrial expansion without adequate infrastructure planning, environmental safeguards (EJ Atlas, 2025), labour protections, or local economic integration. Strengthening governance, infrastructure coordination, and environmental and social oversight will therefore be essential to ensure that industrial clustering contributes to broader economic transformation.

Regional cooperation could significantly strengthen ASEAN's competitiveness in nickel and battery value chains. Rather than pursuing individual national strategies that compete with each other, ASEAN countries could benefit from a more complementary approach to industrial specialization. Indonesia is already emerging as a regional hub for refining, precursor production, and battery materials, while the Philippines could develop selected midstream and downstream activities linked to its mineral base, industrial zones, and manufacturing capabilities. Better coordination between the two countries—and across ASEAN more



broadly—could support economies of scale, reduce overcapacity risks, strengthen intra-regional supply chains, and improve bargaining power vis-à-vis global investors and battery manufacturers.

Indonesia and the Philippines could establish shared precursor hubs, pooling feedstock from Indonesia—and potentially the Philippines—to achieve scale efficiencies. This could follow models similar to Indonesia–Malaysia–Thailand Growth Triangle (IMT-GT) frameworks and create a Philippines–Indonesia Nickel Processing Partnership where Philippine ore supplies joint ventures with Indonesian refining and precursor production.

Regional industrial cooperation could also support shared infrastructure, common standards, supplier development, technology transfer, and more integrated investment promotion. Existing ASEAN frameworks—including ASEAN Minerals Cooperation Action Plan-IV, the ASEAN Economic Community Blueprint (MITI Malaysia, n.d.), and ASEAN industrial cooperation initiatives—provide an important institutional basis for deeper collaboration on critical minerals and battery-related industries.

TABLE 10. Strategic recommendations for midstream development and industrial clustering

Strategic issues	National-level policy options	Regional-level policy options
Strengthening industrial integration and developing value chains	Improve linkages between mining, smelting, refining, precursor production, and downstream manufacturing. Align industrial park development with broader national industrial strategies. Strengthen local supplier development. Support domestic supplier upgrading, small and medium-sized enterprise (SME) participation, and technology absorption. Encourage joint ventures that strengthen local industrial capabilities.	Promote complementary regional specialization across ASEAN value chains rather than duplicative investments. Support regional mapping of competitive advantages and industrial opportunities. Explore ASEAN critical minerals and battery cooperation platforms to facilitate joint ventures, participation of SMEs, supplier networks, and coordinated engagement with global manufacturers and investors. Facilitate cross-border SME participation in value chains through harmonized procurement and certification standards. Explicitly include nickel supply chains in the ASEAN Strategic Action Plan for SME Development 2016–2025. Form an ASEAN Critical Minerals Alliance for collective engagement with global automakers and battery manufacturers.



Strategic issues	National-level policy options	Regional-level policy options
Improving industrial park governance and sustainability	Strengthen environmental, labour, and land-use governance in industrial parks. Ensure adequate infrastructure planning, local benefit sharing, and stronger ESG enforcement. Integrate industrial parks into surrounding regional economies.	Develop an ASEAN Industrial Park Standards and Certification Scheme for sustainable industrial parks and eco-industrial development. Set minimum requirements for shared infrastructure, environmental management, and local economic integration. Design ASEAN-level clustering strategies to reduce duplication and spread facilities across member states.
Reducing fragmentation and duplication of investment	Prioritize commercially viable and strategically aligned downstream projects. Improve coordination across industrial, mining, energy, and infrastructure planning.	Encourage regional coordination on major refining and battery material investments to reduce overcapacity risks and improve regional complementarities. Establish regional centres of excellence, including battery materials testing and certification labs and metallurgical analysis facilities.

Source: Authors' compilation.

6.6 Recycling and the Circular Economy

Battery recycling and circular economy strategies offer Indonesia, the Philippines, and ASEAN an important opportunity to strengthen long-term supply security, reduce dependence on imported raw materials, and capture additional value from the energy transition. As EV deployment accelerates across Asia, growing volumes of end-of-life batteries, manufacturing scrap, and battery components will create new streams of secondary critical minerals, including nickel, cobalt, lithium, and manganese. The Economic Research Institute for ASEAN and East Asia projects that Southeast Asia could face 2,166 GWh worth of used batteries by 2040 (Thomson Reuters Foundation, 2024). If properly managed, these materials could become an important source of strategic inputs for regional battery supply chains and support the emergence of new industrial activities and jobs.

At present, however, recycling infrastructure and regulatory systems in Southeast Asia remain underdeveloped. Collection systems, hazardous waste management capacity, recycling facilities, and traceability mechanisms are still limited, while recycling volumes in individual countries remain too small to fully justify large-scale investment in advanced recycling technologies. This creates a strong rationale for regional cooperation and aggregation. Coordinated regional approaches could help ASEAN achieve economies of scale, reduce



duplication of investments, and support the emergence of competitive regional recycling value chains.

While Indonesia produced 2 million tonnes of e-waste in 2021, only about 17% was recycled (Thomson Reuters Foundation, 2024). For both Indonesia and the Philippines, the main constraint is not technical feasibility but aggregation: neither country alone generates sufficient volumes at this time to justify large-scale investment in advanced hydrometallurgical recycling. Indonesia and the Philippines could therefore play complementary roles within a regional circular economy ecosystem. Indonesia's growing refining and HPAL infrastructure could support hydrometallurgical upgrading and recovery of battery materials, while the Philippines could develop capabilities in collection, dismantling, pre-treatment, and early-stage recycling activities. Co-locating recycling facilities within or near existing industrial parks could further reduce costs through shared logistics, utilities, waste management systems, and infrastructure.

Regulatory coordination will also become increasingly important. Existing international frameworks, including the Basel Convention, create significant procedural requirements for cross-border movement of battery waste and black mass, while diverging national regulations risk fragmenting regional recycling markets. ASEAN therefore has an opportunity to harmonize approaches to hazardous waste handling, extended producer responsibility (EPR), traceability systems, and battery standards. Emerging international requirements—including EU Battery Regulations and Digital Battery Passports—will further increase pressure on producers and recyclers to strengthen traceability, sustainability reporting, and circular economy practices

TABLE 11. Strategic recommendations for recycling and circular economy

Strategic issues	National-level policy options	Regional-level policy options
Collection systems and safe handling of battery waste	Strengthen EPR frameworks for batteries and e-waste, with clear obligations for producers and importers to finance collection transport, recycling, and disposal systems. Establish standardized systems for collection, discharge, storage, and transport of end-of-life batteries, including certified storage facilities, fire safety protocols, and specialized training for customs and port authorities.	Harmonize ASEAN approaches to EPR systems, battery packaging, labelling, transport, and hazardous waste handling to facilitate safe cross-border movement of end-of-life batteries and black mass. Develop ASEAN-wide technical guidelines and certification systems for battery recycling, storage, and discharge operators.



Strategic issues	National-level policy options	Regional-level policy options
Developing recycling infrastructure and industrial scale	Support investment in battery recycling, pre-treatment, and material recovery facilities, including through fiscal incentives, concessional financing, and industrial park policies. Require industrial parks hosting recycling activities to integrate shared hazardous waste; wastewater; and health, safety, and environment infrastructure, while ensuring access to reliable low-carbon power.	Promote regional specialization and clustering of recycling activities to achieve economies of scale and avoid redundant investments. Support integrated ASEAN recycling value chains, including early-stage collection and shredding hubs and shared black mass upgrading facilities linked to existing nickel and processing clusters.
Addressing trade and regulatory barriers	Align national hazardous waste regulations with Basel Convention requirements while improving the efficiency and predictability of permitting systems for battery waste and black mass movement. Streamline customs procedures through electronic permitting, trained inspectors, and pre-approved facilities for compliant operators.	Develop ASEAN “green lane” approaches for the safe cross-border movement of end-of-life batteries and black mass between approved facilities. Harmonize regional procedures for permitting, packaging, labelling, and digital prior informed consent systems, supported by trusted-operator frameworks and common technical standards.
Supporting circular economy and second-life applications	Develop regulatory frameworks for battery repurposing, second-life applications, and recycling standards, including clear State of Health thresholds, liability rules, and safety requirements for reused batteries. Support R&D and pilot projects in battery recycling, second-life use, and chemistry-neutral recovery technologies.	Develop ASEAN-wide standards and protocols for battery testing, repurposing, certification, and recycling to support interoperability, and regional market development. Establish regional data-sharing systems on battery volumes, chemistry mix, and expected end-of-life flows to support investment and infrastructure planning.



Strategic issues	National-level policy options	Regional-level policy options
Improving traceability and compliance with international standards	Develop national battery registries and reporting systems to strengthen traceability across battery supply chains. Require producers, importers, and recyclers to report on battery composition, movement, recovery, and recycled content under EPR and ESG frameworks.	Develop ASEAN-compatible digital traceability and battery passport systems aligned with evolving international sustainability and market requirements. Promote interoperable regional registries and data-sharing platforms accessible to regulators, customs authorities, recyclers, and manufacturers.
Financing and investment in circular economy systems	Introduce fiscal incentives, concessional finance, and blended finance mechanisms to support recycling infrastructure and circular economy business models, including SMEs and start-ups operating in collection, dismantling, and material recovery.	Coordinate regional approaches to circular economy financing, technical assistance, and investment promotion to support development of regional recycling industries. Engage ASEAN and development finance institutions to support regional project pipelines, investment matchmaking, and technical assistance facilities for battery recycling and circular economy infrastructure.

Source: Authors' compilation.

6.7 Community, Labour, and Equitable Development

Ensuring that nickel development delivers broad-based social and economic benefits will be critical to maintaining the long-term legitimacy and sustainability of the sector in both Indonesia and the Philippines. While nickel investments have generated growth and industrial activity, benefits have often been unevenly distributed, particularly in mining regions where poverty, inequality, land conflicts, and weak access to public services remain significant concerns. At the same time, labour disputes, occupational safety incidents, and inadequate consultation with Indigenous Peoples and local communities have heightened social tensions and increased ESG-related risks for governments and investors alike.

Strengthening social outcomes therefore needs to become a central component of mining and industrial policy. Governments should place greater emphasis on local economic participation, fair benefit sharing, workforce development, occupational safety, and effective community engagement. This includes strengthening the implementation of labour standards, improving transparency in revenue allocation and community development spending, and ensuring that consultation processes are meaningful, culturally appropriate, and aligned with international standards, including FPIC principles where applicable.



Regional cooperation can reinforce national reforms by supporting greater convergence around labour, community, and ESG standards across ASEAN. Shared approaches could help reduce the risk of “race-to-the-bottom” dynamics in labour and environmental practices while improving ASEAN’s credibility with international buyers and investors. Existing international frameworks—including International Labour Organization conventions (International Labour Organization, 2024), Extractives Industries Transparency Initiative principles, and evolving responsible sourcing requirements in battery supply chains—provide important reference points for strengthening governance and market access.

TABLE 12. Strategic recommendations for community, labour, and equitable development

Strategic issues	National-level policy options	Regional-level policy options
Strengthening local economic benefits and benefit sharing	Require community development and benefit-sharing agreements as a condition for mining and processing licences, including clear provisions on local employment, local procurement, infrastructure, skills development, and social investment. Mandate public disclosure of royalty allocations and community development spending and strengthen monitoring of local content commitments in line with IGF guidance on local content (IGF, 2018), while considering local workforce and supplier capacity.	Develop ASEAN guidance and model frameworks for community benefit sharing, local content, and responsible mining governance, drawing on existing national and international practices. Promote regional transparency standards on the allocation and use of mining revenues and establish peer-learning mechanisms on local economic development and community participation.



Strategic issues	National-level policy options	Regional-level policy options
Improving labour conditions and occupational safety	Strengthen enforcement of labour laws and occupational health and safety standards in mining, smelting, and industrial parks, including mandatory independent safety audits and regular inspections. Align national frameworks with International Labour Organization Convention 176 and related international standards; require companies to provide adequate social security coverage, safety training, and grievance mechanisms for workers; strengthen protections for collective bargaining and worker representation; and mandate minimum health and safety requirements for industrial parks and processing facilities.	Promote greater convergence of labour and occupational safety standards across ASEAN industrial zones to reduce “race-to-the-bottom” dynamics. Develop regional certification systems and standardized training modules for mining, smelting, and battery-related industries, strengthen cooperation between labour inspectorates, and establish regional frameworks for labour and safety compliance aligned with international standards.
Protecting Indigenous Peoples’ and community rights	Require FPIC processes before land acquisition and project approval, consistent with the UN Declaration on the Rights of Indigenous Peoples and international good practice. Establish accessible grievance and dispute resolution mechanisms for affected communities; strengthen land tenure systems and land registries to reduce conflicts; and require consultation processes to be transparent, inclusive, culturally appropriate, and independently monitored where necessary.	Develop ASEAN guidance and good practice frameworks on FPIC, community consultation,⁷ and social safeguards to improve consistency across the region. Support regional training programs for government agencies and companies on FPIC implementation and community engagement and strengthen regional cooperation on grievance handling and cross-border social impacts linked to mining and processing projects.

⁷ These can be closely based on global guidelines—the objective is to ensure uniform application across ASEAN, rather than to create a new set of standards.



Strategic issues	National-level policy options	Regional-level policy options
Transparency and accountability	Require public disclosure of community development agreements, ESG commitments, labour audits, and environmental and social performance indicators for mining and processing projects. Establish independent monitoring and grievance mechanisms, and mandate regular third-party audits of community development spending, labour conditions, and ESG compliance.	Develop ASEAN platforms and guidelines for ESG and social performance reporting aligned with international standards and buyer requirements. Promote greater consistency in disclosure practices across the region, including reporting on community development, labour conditions, FPIC implementation, and environmental performance.
Maintaining market access and meeting ESG expectations	Strengthen compliance with international responsible sourcing, labour, and ESG requirements across critical mineral supply chains. Develop credible national certification and disclosure systems for responsibly produced nickel, support SMEs and domestic suppliers in meeting buyer standards, and strengthen enforcement of labour, environmental, and human rights obligations to maintain access to international markets.	Explore ASEAN approaches to responsible nickel certification, ESG benchmarking, and regional alignment with international standards⁸ and buyer expectations. Strengthen collective engagement with global automakers, battery manufacturers, and importing markets on responsible sourcing requirements, while building regional audit and verification capacity to reduce compliance costs.

Source: Authors' compilation.

6.9 Environmental Safeguards and Sustainable Practices

Environmental performance will increasingly determine the long-term competitiveness and social legitimacy of nickel industries in Indonesia and the Philippines. Environmental degradation linked to mining and processing—including deforestation, tailings failures, water contamination, biodiversity loss, and heavy reliance on coal-powered processing—is creating growing environmental, financial, and reputational risks. These risks are becoming more significant as international buyers, investors, and regulators tighten ESG requirements, including through emerging carbon accounting and due diligence frameworks such as the EU CBAM and battery regulations.

⁸ This can build on or adopt existing standards for sustainable nickel production. Examples include The Nickel Mark and Initiative for Responsible Mining Assurance standard.



Strengthening environmental governance therefore needs to become a strategic priority, not only to reduce environmental harm, but also to maintain market access, attract investment, and improve the long-term resilience of nickel value chains. National governments should prioritize stronger regulatory enforcement, independent monitoring systems, improved mine waste management, and clearer accountability frameworks for environmental performance. Particular attention is needed for tailings management, water quality, biodiversity protection, industrial decarbonization, and environmental monitoring capacity.

In particular, both countries need to build basic regulatory capacity, enforcement mechanisms, and technical expertise. Indonesia should conduct independent forensic investigations of the March 2025 IMIP tailings failures, publish findings, prosecute responsible parties, and implement mandatory corrective actions across all facilities. This should include requiring independent dam safety reviews by qualified engineers, implementing real-time monitoring systems with automatic alerts, and establishing clear liability frameworks. The Philippines needs to complete seismic and hydrological risk assessments for all existing tailings facilities, particularly given typhoon exposure, and mandate upgrades where risks are unacceptable. Both countries should establish independent environmental monitoring agencies with adequate budgets, trained inspectors, and enforcement powers. Without credible domestic enforcement, regional cooperation becomes window dressing. A regional emergency response protocol for tailings failures would enable rapid deployment of expertise and equipment.

At the same time, regional cooperation can help ASEAN countries reduce costs, strengthen technical capacity, and avoid fragmented or inconsistent environmental standards. Shared approaches to carbon accounting, tailings management, environmental monitoring, and low-carbon certification could improve ASEAN's positioning in global critical mineral supply chains while facilitating access to green finance and international markets. Existing ASEAN cooperation frameworks also provide opportunities to strengthen coordination on environmental standards, emergency response systems, industrial decarbonization, and ESG-related reporting requirements.



TABLE 13. Strategic recommendations for environmental safeguards and sustainable practices

Strategic issues	National-level policy options	Regional-level policy options
Tailings and mine waste management	Strengthen tailings governance through mandatory independent dam safety reviews, real-time monitoring systems, emergency preparedness plans, and stronger liability and enforcement frameworks. Require seismic and climate-risk assessments for all facilities, prohibit construction in high-risk areas, mandate financial assurance covering closure and emergency response costs, and establish clear accountability—including penalties and liability provisions—for negligence and non-compliance. Investigate and publicly disclose findings from major tailings failures to strengthen regulatory learning and oversight.	Develop ASEAN technical standards and cooperation mechanisms on tailings safety, monitoring, emergency response, and public disclosure, taking into account regional risks such as earthquakes, typhoons, and high rainfall conditions. Strengthen regional information sharing, technical peer review, and monitoring systems, including regional registries, emergency response coordination, and technical cooperation on tailings risk management and oversight.
Water management and industrial pollution	Strengthen wastewater treatment requirements and monitoring systems for mining and HPAL operations, including binding discharge limits, continuous monitoring, and mandatory public disclosure of environmental performance. Require new HPAL facilities to adopt zero liquid discharge or equivalent advanced treatment systems, strengthen laboratory and inspection capacity, and establish clear penalties for non-compliance, including suspension of operations where necessary.	Promote greater convergence of ASEAN water quality standards, environmental monitoring protocols, and laboratory accreditation systems for nickel processing. Strengthen regional cooperation on pollution control technologies, environmental monitoring, inspector training, and information sharing, including regional platforms for water quality data and technical cooperation on emerging treatment technologies.



Strategic issues	National-level policy options	Regional-level policy options
Industrial decarbonization and carbon competitiveness	Reduce reliance on captive coal generation and accelerate renewable energy integration, energy efficiency, and industrial decarbonization in mining and processing hubs. Establish clear emission reduction targets and timelines for industrial parks, require carbon reporting aligned with international standards such as the Greenhouse Gas Protocol, and support grid upgrades, energy storage, and direct renewable power procurement for industrial users.	Develop ASEAN approaches to carbon accounting, low-carbon nickel certification, and industrial renewable energy cooperation to support compliance with emerging international market requirements. Strengthen regional cooperation on carbon reporting methodologies, renewable energy financing, and low-carbon industrial standards to improve ASEAN's competitiveness in global battery and EV supply chains.
Biodiversity protection and land-use planning	Strengthen strategic environmental assessments, biodiversity safeguards, and land-use planning for mining and processing projects. Establish clear no-go zones for high conservation value ecosystems, including primary forests, peatlands, mangroves, and protected areas; require biodiversity management and rehabilitation plans based on “no net loss” or “net gain” principles; and mandate progressive rehabilitation, long-term monitoring, and financial assurance mechanisms for restoration and closure.	Develop ASEAN tools, methodologies, and information sharing platforms on biodiversity management, restoration, and cumulative impact assessment aligned with international good practices. Strengthen regional cooperation on mapping high conservation value areas, ecological restoration, biodiversity monitoring, and technical guidance for permitting and land-use planning.



Strategic issues	National-level policy options	Regional-level policy options
Environmental governance and enforcement capacity	Strengthen the independence, technical capacity, and enforcement powers of environmental agencies and inspectorates, including adequate budgets, trained staff, laboratory capacity, and digital compliance systems. Implement risk-based inspections, strengthen public transparency and community participation, and establish stronger enforcement mechanisms, including penalties, environmental liability requirements, and powers to suspend or close non-compliant facilities.	Establish ASEAN platforms for environmental enforcement cooperation, technical training, and exchange of best practices on environmental monitoring, inspections, and ESG oversight. Strengthen regional cooperation on incident reporting, joint investigations, inspector training, and information sharing for environmental risks and cross-border impacts.
Market access and ESG alignment	Align domestic environmental standards and reporting systems with evolving international ESG and responsible sourcing requirements. Strengthen environmental disclosure and traceability systems.	Coordinate ASEAN engagement with international buyers, regulators, and standard-setting initiatives to improve recognition of regional standards and facilitate access to sustainable finance and export markets.

Source: Authors' compilation.



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Appendix A. A Detailed Legal and Regulatory Framework for Indonesia's Nickel Sector

TABLE A1. Detailed legal and regulatory framework for Indonesia's nickel sector

Policy area	Instrument/law/regulation	Objective	Key features/explanation
A. Resource governance and licensing			
Resource ownership and state stewardship	1945 Constitution (Art. 33); Law 4/2009	Establish state control over mineral resources	Confirms that mineral resources are controlled by the state for public benefit; provides constitutional basis for regulatory oversight and downstream policies
Mining licensing framework	Law 4/2009; Law 3/2020 (amendment)	Modernize mining regime and strengthen regulatory control	Replaces Contract of Work system with Mining Business Licence ("Izin Usaha Pertambangan (IUP)"/ Special Mining Business Licence ("Izin Usaha Pertambangan Khusus (IUPK)"); introduces processing requirements; recentralizes licensing authority under central government
Divestment requirements	Law 4/2009 and implementing regulations	Increase domestic participation	Requires gradual divestment to reach majority Indonesian ownership (typically 51%) after a defined production period
State participation vehicle	PT Mineral Industri Indonesia (MIND ID) (Government Regulation [GR] 72/2016)	Consolidate state role in mining sector	State-owned holding managing stakes in strategic mining assets; facilitates compliance with divestment requirements



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
B. Downstream processing and export measures			
Export restrictions	Law 4/2009; GR 11/2019; related regulations (2014, 2017, 2020)	Promote domestic processing	Progressive restrictions on raw ore exports; full ban on nickel ore exports since 2020 to channel supply into domestic smelters
Processing requirements	Law 4/2009 and implementing regulations	Ensure in-country value addition	Mandates minimum processing stages (e.g., ferronickel, NPI, matte); prohibits export of unprocessed ore
Production controls	Ministry of Energy and Mineral Resources (MEMR) Regulation 10/2023 (under revision)	Manage supply and market balance	Introduces production quotas (initially 3-year cycles, moving back to 1-year cycles) to address market imbalances and improve oversight
C. Investment and business environment reforms			
Omnibus Law on Job Creation	Law 11/2020	Improve investment climate	Streamlines regulations across sectors; simplifies licensing, environmental approvals, and labour rules
Risk-based licensing system	Online Single Submission – Risk Based Approach (GR 5/2021)	Accelerate business approvals	Introduces centralized, digital licensing system; integrates multiple permits and reduces approval timelines
Land acquisition and permitting	Omnibus Law reforms; forestry regulations	Facilitate project development	Simplifies land acquisition and forest-use permits for strategic projects, reducing delays
D. Fiscal and industrial incentives			
Corporate tax incentives	Ministry of Finance Regulation (PMK) 130/2020; PMK 69/2024	Attract large-scale investment	Provides tax holidays (up to 20 years) and reduced rates for priority sectors including processing and electric vehicles (EVs)



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
Accelerated depreciation and allowances	Ministry of Finance (MOF) regulations	Improve project economics	Allows faster capital cost recovery, extended loss carryforward, and investment deductions
Import duty and value-added tax (VAT) incentives	Various fiscal regulations	Reduce capital and operating costs	Exemptions on machinery, equipment, and intermediate inputs for priority industries
E. EV and battery ecosystem development			
EV development roadmap	Presidential Regulation 55/2019	Build domestic EV industry	Establishes national EV strategy, including infrastructure development and production targets
EV incentives	MOF Regulations 38/2023; 10/2024	Stimulate domestic demand	Reduces VAT and import duties for EVs meeting local content requirements
Local content requirements ("TKDN")	Presidential Regulation 55/2019 and updates	Promote domestic manufacturing	Sets minimum domestic content thresholds for EVs and batteries to qualify for incentives
State battery platform	Indonesia Battery Corporation (2021)	Enable vertical integration	Coordinates partnerships across mining, refining, and battery production
F. State participation and strategic investment			
Sovereign wealth fund	Indonesia Investment Authority (2021)	Mobilize long-term investment	Co-invests in strategic sectors, including nickel processing and EV supply chains
Industrial policy coordination	State-owned enterprises; joint ventures	Align investment with national priorities	Facilitates partnerships with international firms while maintaining domestic participation
G. Industrial zones and infrastructure			
Special economic zones (SEZs)	Law 39/2009	Facilitate industrial clustering	Provides tax incentives, simplified procedures, and integrated infrastructure



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
Industrial parks (e.g., Morowali Industrial Park, Weda Bay Industrial Park)	Zone-specific frameworks	Support value chain integration	Offers bundled infrastructure (power, ports, logistics) and one-stop services for investors
Infrastructure development	National and zone-level programs	Reduce operational constraints	Ensures access to power, transport, water, and logistics for large-scale processing
H. Environmental and social management			
Environmental impact assessment	Law 32/2009 (Environmental Impact Analysis regulations; UKL- UPL)	Ensure environmental oversight	Requires environmental assessments and approvals prior to operations
Mine closure and rehabilitation	Law 4/2009; implementing regulations	Manage post- mining impacts	Requires reclamation plans and financial guarantees for closure
Water and tailings management	Environmental permits and standards	Control environmental risks	Establishes discharge standards and monitoring requirements for processing operations
I. Market regulation and trade considerations			
Royalty regime	Law 4/2009; MEMR regulations	Generate public revenue	Applies progressive royalties, with incentives for higher levels of processing
Trade measures and disputes	World Trade Organization case DS592 (EU– Indonesia)	Defend policy approach internationally	Reflects ongoing engagement with international trade frameworks regarding export restrictions

Source: Authors' compilation.



Appendix B. A Detailed Legal and Regulatory Framework for the Philippines' Mining Sector

TABLE B1. Detailed legal and regulatory framework for the Philippines' mining sector

Policy area	Instrument/law/regulation	Objective	Key features/explanation
A. Resource governance and state oversight			
Resource ownership and state stewardship	1987 Constitution (Art. XII)	Establish state ownership of mineral resources	Declares that all mineral resources are owned by the state and must be developed under its full control and supervision
Mining legal framework	Republic Act (RA) 7942 (Philippine Mining Act of 1995)	Define legal basis for exploration and exploitation	Establishes a modern mining regime, including exploration permits, mineral agreements, and financial or technical assistance agreements (FTAA)
Contracting regimes and participation	RA 7942 (Exploration Permit, Mineral Agreement, FTAA system)	Structure investor participation	Provides different modalities: EP (exploration), MA (production with Filipino ownership), and FTAA (allows foreign participation for large-scale projects)
B. Investment framework and licensing system			
Licensing and permitting system	Mining Act Implementing Rules and Regulations; EP/MA/FTAA procedures	Regulate entry and project development	Defines phased process (exploration → development → production), with area limits, tenure conditions, and compliance requirements
Foreign participation rules	RA 7942 (ownership provisions)	Balance investment attraction and national participation	Requires ≥60% Filipino ownership for mineral agreements; allows up to 100% foreign participation under FTAA for strategic minerals



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
Moratorium and reopening of permits	Executive Order 130 (2021)	Reopen sector to investment	Lifts moratorium on new mineral agreements introduced in 2012, signalling renewed interest in investment
Regulatory adjustments	Department of Environment and Natural Resources Administrative Orders (ongoing)	Improve regulatory efficiency	Periodic updates to permitting procedures to streamline timelines and clarify implementation
C. Fiscal regime and investment incentives			
Fiscal regime and state revenue	National Internal Revenue Code; excise tax laws; FTAA fiscal terms	Generate government revenue	Combines excise taxes, royalties, occupation fees, and profit-sharing under FTAA agreements
Traditional investment incentives	Executive Order 226 (Omnibus Investments Code)	Encourage mining investment	Provides incentives, such as duty-free import of capital equipment, tax deductions, and loss carryforward
Incentives reform framework	Republic Act 11534 (CREATE Act, 2021)	Rationalize incentives and improve efficiency	Reduces corporate tax rates and introduces performance-based incentives linked to economic contribution
Strategic sector prioritization	Strategic Investment Priority Plan	Guide investment into priority sectors	Identifies mining, processing, and green industries as priority areas eligible for enhanced incentives
Special economic zones (SEZs)	RA 7916 (Philippine Economic Zone Authority Law); other SEZ frameworks	Facilitate industrial investment	Offers tax incentives, duty-free imports, and simplified procedures for firms located in economic zones



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
D. Environmental management and sustainability			
Environmental impact assessment	Environmental Impact Statement system; Environmental Clearance Certificate	Ensure environmental due diligence	Requires projects to undergo environmental assessment and secure approval before operations
Water quality management	RA 9275 (Clean Water Act, 2004)	Protect water resources	Establishes discharge standards, permitting requirements, and penalties for violations
Air quality management	RA 8749 (Clean Air Act, 1999)	Control emissions	Sets air quality standards and emission limits for industrial operations
Climate policy integration	RA 9729 (Climate Change Act, 2009)	Integrate climate considerations	Introduces climate adaptation and mitigation considerations into development planning
E. Community, Indigenous rights, and social inclusion			
Indigenous rights and ancestral domains	RA 8371 (Indigenous Peoples Rights Act, 1997)	Protect Indigenous communities	Recognizes ancestral land rights and establishes legal framework for their protection
Free, Prior, and Informed Consent (FPIC)	RA 8371; NCIP regulations	Ensure community consent	Requires consent from Indigenous communities before mining can proceed in ancestral domains
Community participation and oversight	FPIC process; social development requirements	Strengthen social accountability	Embeds consultation and benefit-sharing mechanisms within project approval processes
F. Local governance and multi-level regulation			
Local government role	Local Government Code (RA 7160)	Ensure subnational participation	Requires local government approvals and enables local taxation and land-use regulation



Policy area	Instrument/law/ regulation	Objective	Key features/explanation
Local regulatory powers	LGU ordinances and permitting authority	Enhance local oversight	Some local governments impose restrictions or conditions on mining, contributing to regulatory complexity
G. Governance reforms and policy adjustments			
Comprehensive mining reform	Executive Order 79 (2012)	Strengthen governance and safeguards	Introduces stricter environmental controls, no-go zones, and improved transparency
Regulatory recalibration	Executive Order 130 (2021)	Balance investment and oversight	Reopens the sector to new applications while maintaining strengthened safeguards
Ongoing policy evolution	Department of Environment and Natural Resources and inter-agency updates	Improve implementation	Reflects continuous adjustment of regulatory processes in response to sector needs
H. Industrial policy and emerging linkages			
Electric vehicle (EV) and green transition policies	EV tariff measures (0% tariffs until 2028); Customs Memorandum Orders	Promote EV adoption	Reduces cost of EV imports, supporting demand for battery materials
Development planning	Philippine Development Plan (2023–2028)	Link mining to broader economic strategy	Identifies opportunities for downstream processing and integration into green value chains
Emerging downstream policy signals	Government policy statements and investment promotion	Encourage value chain development	Indicates growing interest in linking mining to processing and manufacturing, though still evolving

Source: Authors' compilation.



TABLE B2. Fiscal and investment incentives for the mining and downstream sector (excluding SEZs)

Instrument/ scheme	Primary focus	Key incentives	Explanation and eligibility
Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act Incentives (RA 11534, 2021) (via Board of Investment registration)	Strategic industries (including downstream processing)	Income tax holiday (4–7 years); enhanced deductions (training, R&D, domestic inputs); duty exemptions; reduced corporate tax rate (20% for exports)	Performance-based incentives tied to job creation, exports, and technology transfer; downstream mineral processing eligible; extraction generally excluded
Mining capital equipment incentives	Mining exploration and extraction	Duty and tax exemptions on imported equipment	Available to mining contractors under Mineral Agreements or FTAs; reduces upfront capital costs but does not include full income tax holidays
Loss carry forward	All businesses, including mining and processing	Deduction of net operating losses from future taxable income	Particularly relevant for capital-intensive projects with long pre-revenue phases; extended carry forward periods may apply for registered enterprises
Accelerated depreciation	Mining and processing assets	Shortened depreciation schedules for capital assets	Allows faster recovery of capital costs (minimum 5 years for long-life assets), improving early-stage project cash flow
EV and battery supply chain incentives	EVs and battery-related industries	Zero tariffs (0%) on EVs and parts until 2028; exemptions on selected components	Aims to stimulate EV adoption and indirectly support downstream demand for minerals; broader battery-related incentives still evolving
Local government unit incentives	Location-specific investment promotion	Property tax reductions; business fee exemptions; expedited permitting	Offered at the discretion of local governments; varies significantly across regions; can complement or constrain national policy objectives

Source: Authors' compilation.



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