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The future of Indonesia's green industrial policy

ANALYSES

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Cover image: A worker manning a furnace during the nickel smelting process at Indonesian mining company PT Vale's smelting plant in Soroako, South Sulawesi (BANNU MAZANDRA/AFP via Getty Images)

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Key findings

- Indonesia now supplies more than half of the world's nickel. Under its green industrial policy, it has also become a leading destination for foreign investment in critical minerals, electric vehicles (EVs), and the battery supply chain.
- While this strategy has offered some concentrated economic gains, rapid industry expansion has also been costly. Nickel processing has had damaging environmental, labour, and governance impacts, and has increased reliance on Chinese investment, technology, and demand, which presents vulnerabilities.
- Indonesia can strengthen its industrial policy by improving environmental and labour standards in the nickel industry, fostering a more competitive and export-oriented EV industry, and diversifying trade and investment partners.

Executive summary

Indonesia's green industrial policy has focused on increasing the value of raw critical minerals through onshore processing and building a domestic electric vehicle (EV) industry. It appears to have worked, in a limited sense. The country now produces much of the world's mined and refined nickel and has become a major destination for global EV supply chains.

However, this success has drawbacks. Growth in the nickel industry has not translated into significant local job creation, poverty reduction, or government revenues, while serious environmental degradation, labour violations, and poor governance persist. Whether downstreaming can be applied to Indonesia's other critical minerals is also dubious. Additionally, Indonesia's reliance on China for investment, technology, and demand is turning into a vulnerability as China's economy slows and global economic competition heats up.

Indonesia has a commanding lead over regional peers in attracting investment into EV and battery supply chains. But both its downstreaming and EV industrial policies must evolve to provide more sustainable growth. This paper offers four recommendations: 1) secure the economic benefits Indonesia has already earned by prioritising the nickel and EV industries; 2) address adverse environmental, health, social, and governance impacts; 3) diversify trade and investment partners; and 4) shift policy priorities to drive long-term competitiveness in manufacturing.

Introduction

Indonesia has used industrial policies — targeted government intervention in the economy in pursuit of national objectives¹ — since independence in 1945. As an economic policy tool, it is controversial, and its record mixed. The latest focus is “downstreaming” of critical minerals — using subsidies and export bans to encourage domestic value-adding rather than the export of raw materials — and the development of a fully integrated domestic electric vehicle (EV) ecosystem. Indonesia’s government has lauded these initiatives as pillars to achieving its 2045 Golden Indonesia Vision of becoming a high-income country.²

To reach high-income status, President Prabowo Subianto has set a growth target for the economy, saying “I am sure we will achieve, and perhaps even exceed, eight per cent [annual] growth”.³ The aim is to reach the target within two years, with downstreaming seen as a key driver.⁴ However, Indonesia’s growth rates have not reached above eight per cent since before the Asian Financial Crisis in 1997 and have held steady at about five per cent since 2014, when downstreaming was introduced.

But there has been some success.

Indonesia exceeded the expectations of international observers for downstreaming in nickel,⁵ becoming the world’s largest producer and exporter of refined nickel. Nickel is a crucial input to the most common EV batteries. This has provided a unique point of leverage for Indonesian authorities who have put EV and battery manufacturing in their development plans.⁶ The goal is to build a fully integrated EV ecosystem where everything from critical mineral processing to battery production and final vehicle manufacture is done inside Indonesia.

Policy certainty driven by government commitments, openness to foreign investment and technology, leveraging comparative advantage, and contributing to renewable energy technology supply chains has served Indonesia well. Indonesia is now at the forefront of critical mineral and EV supply chain foreign investments (Table 1).

However, concerns remain.

The policy levers used with questionable efficacy in previous industrial policy initiatives are being used again. Nickel downstreaming is creating high levels of CO2 emissions, pollution, and waste. Worker safety and health are inadequately protected. Governance failures are enabling preventable environmental and

social harms, which also risk isolating Indonesia from potential future economic partners.

Indonesia’s manufacturing policies are historically inward-looking and protectionist, allowing inefficient production to propagate, and current policies are consistent with this practice. As EV manufacturing becomes more contested, Indonesia will need to compete globally, but current industrial policies do not encourage this.

Table 1: New foreign direct investment into battery supply chains, critical minerals, and EVs by sector, US\$ billion

Destination countries	Batteries	Automobiles	Metals, production and processing*	All other sectors	Total
United States	82,675.2	38,364.6	7,375.7	31,177.8	159,593.2
China	15,104.5	36,505.0	496.5	10,031.7	62,137.6
Indonesia	20,250.0	5,180.4	20,735.0	5,774.1	51,939.4
Canada	16,660.4	9,186.5	2,795.7	8,571.9	37,214.6
Germany	15,454.5	10,737.0	117.8	2,212.2	28,521.5
All other countries	87,861.8	74,044.2	25,313.4	119,365.6	306,585.2
Total	238,006.4	174,017.7	56,834.1	177,133.3	645,991.5

* Combined subsectors of “Nonferrous metals production and processing” and “Other (metals)”

Source: FDI Markets, authors’ calculations Note: Data January 2003 to December 2024

Downstreaming and critical minerals

Indonesia's downstreaming policy aims to stimulate resource-based industrialisation by processing raw commodities into products for export and domestic consumption.⁷ The recent focus has been on critical minerals, in particular nickel. The definition of "critical minerals" varies between countries but is broadly understood to include minerals essential for modern technologies, which are vital for economic or national security, and which have vulnerable supply chains.⁸ However, plans to extend downstreaming to non-critical-mineral commodities are already in motion. This approach aligns closely with the Indonesian politics of resource nationalism through state ownership and management of natural resources — a concept enshrined in Indonesia's constitution.⁹

Critical mineral downstreaming via policies such as export restrictions, investment and import incentives, and value-add objectives, has been in place for more than a decade. It began with the 2009 Mineral and Coal Mining Law, which expanded government control of mining resources, and was reinforced by regulations introducing the use of export bans or taxes for various minerals.¹⁰ The export bans aim to force foreign investment into domestic processing of critical minerals by withdrawing raw mineral exports from the global marketplace.

The success of nickel

Nickel is a downstreaming success story. Indonesia's policy enhanced industrial capabilities, produced greater domestic value-add, and increased exports. Crucial to this success was Indonesia's dominance of global nickel reserves, possessing a significantly larger share than any other country.¹¹

The story of Indonesian nickel ore production illustrates the effect of downstreaming. Initially, downstreaming caused production declines. In 2014, the export ban on bauxite and nickel ore was introduced and production collapsed by between 60 and 85 per cent for nickel ore (Figures 1 and 2). Recovery to pre-ban levels did not occur until 2018 or 2019. Estimates for government revenue losses are in the hundreds of millions of US dollars, and net trade balance losses in the billions.¹²

But the export ban, supplemented by tax and investment incentives, attracted substantial foreign capital, mainly from China and South Korea. The policies included tax allowances, deductions, and holidays as well as import duty exemptions for joint venture projects across metal processing and electricity generation.¹³ This boosted the number of Indonesian nickel smelters from two in 2016 to more than 60 either operational or under construction in 2023.¹⁴

The Indonesian government partially relaxed export bans in 2017 in the face of budget difficulties.¹⁵ However, it reintroduced the export ban on nickel ore at the beginning of 2020 after domestic processing capacity increased with the construction of these nickel smelters.

Nickel ore production initially declined between 10 and 20 per cent after the second export ban but then recovered and subsequently boomed (Figure 2). The demand created for nickel ore from dozens of nickel smelters drove mine production to expand rapidly, averaging above 30 per cent annual growth.

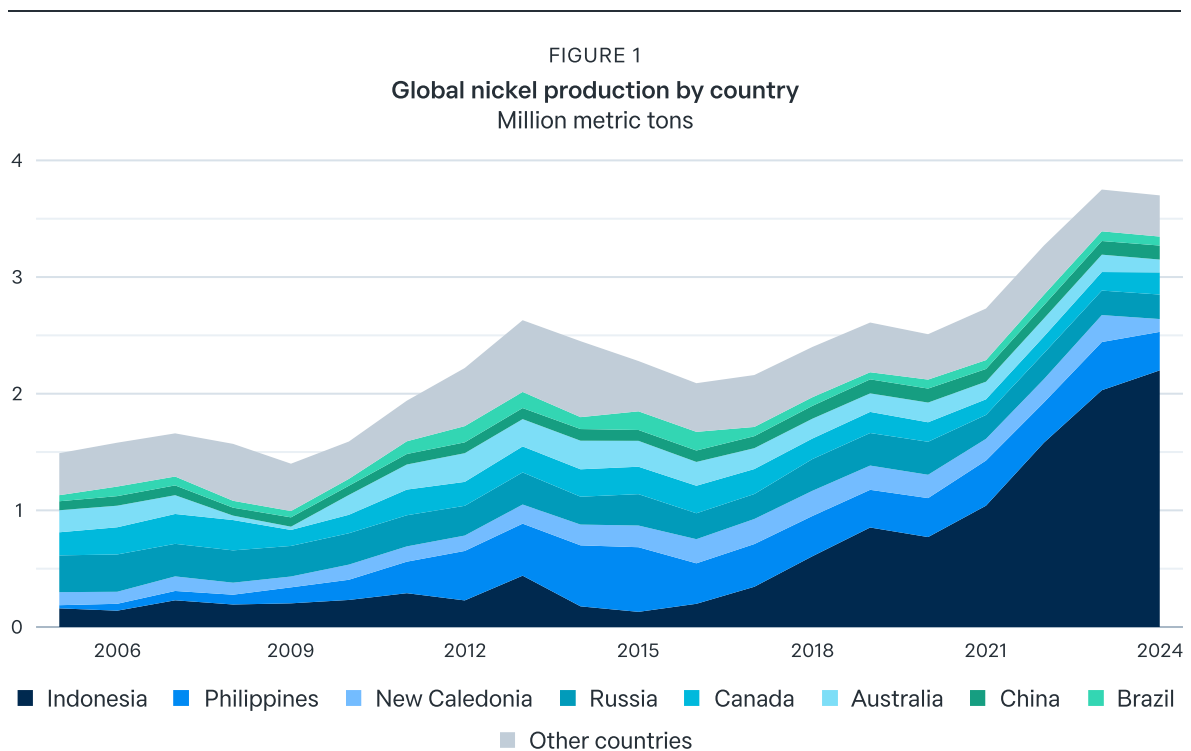
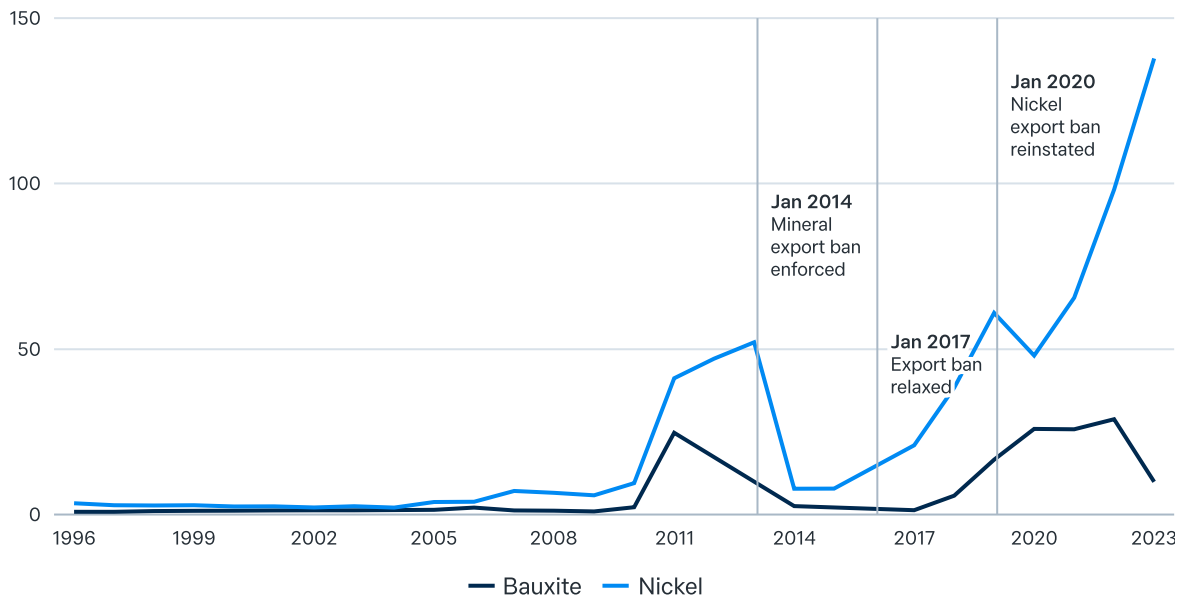


FIGURE 2
Export bans and mine production of select minerals
Million tons

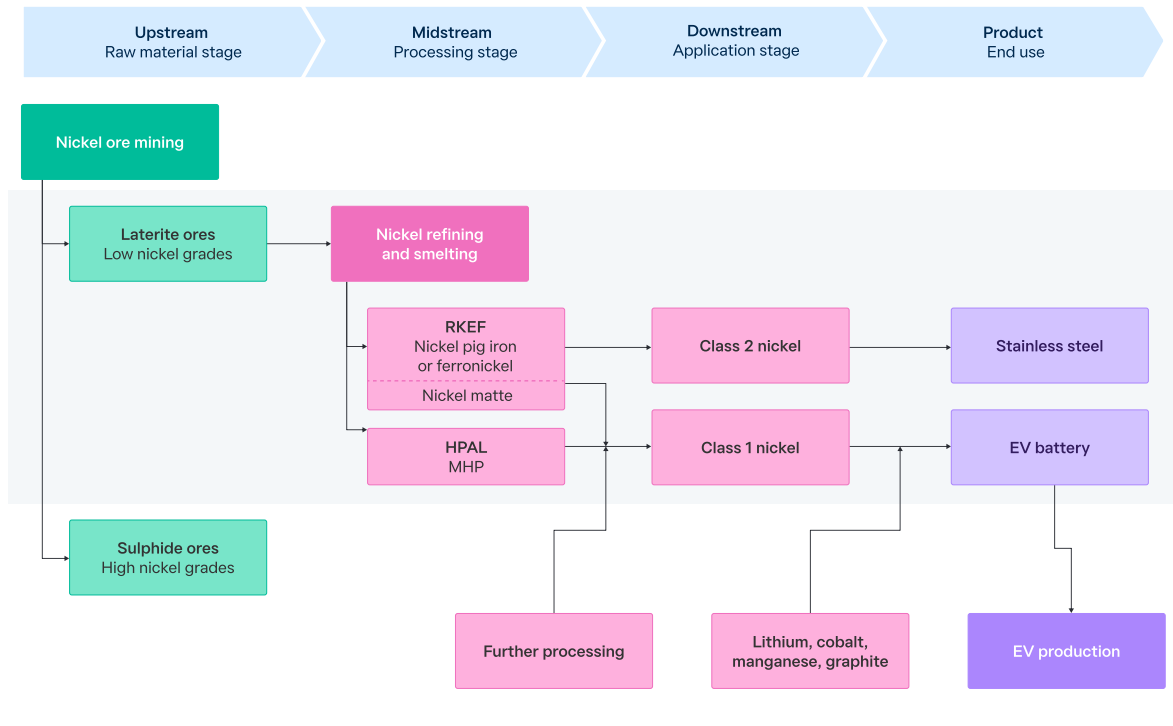


Source: CEIC, Statistics Indonesia

Initially, rotary kiln electric furnaces (RKEF) were set up to produce ferronickel or “nickel pig iron”, an important input for stainless steel production. However, soon smelters began to produce nickel matte and other nickel intermediate products that can be further refined into Class 1 nickel.¹⁶ Class 1 nickel products are a crucial input for manufacturing battery cathodes for certain EV battery chemistries. Recently, high pressure acid leaching (HPAL) smelters, a new technology developed by Chinese firms, have allowed Indonesia to process nickel ore into mixed hydroxide precipitate (MHP), which can be more easily refined into Class 1 nickel (Figure 3).

Indonesia’s nickel and stainless steel industries have rapidly expanded. Cheap nickel ore (a result of export bans) is processed by dozens of smelters (established through the influx of foreign capital and technology) and is used to manufacture nickel pig iron for stainless steel production and nickel intermediate products destined for further refining.

FIGURE 3
Nickel processing flow



Abundant ferronickel is not only a major export product but has created positive spillovers to the broader steel industry. As a major manufacturer of stainless steel products and intermediate nickel, Indonesia’s exports of these products have increased by several orders of magnitude (Figure 4). Combined exports in 2023 were US\$35 billion.

Indonesia’s nickel exports are dominated by nickel matte but have more recently included a growing share of unwrought nickel (Class 1 nickel) — indicating success in increasing domestic value-add. The narrow goals of promoting greater value-added metals manufacturing and supplying nickel products to global markets have therefore been reached.



Source: CEIC, Statistics Indonesia, authors' calculations

Note: Iron and steel exports are calculated by combining HS Code 72: Iron and steel and HS Code:73 Articles of iron and steel. Ferronickel and numerous stainless steel products are included in these categories. Nickel exports are calculated under HS Code: 75 Nickel and articles thereof. Intermediate nickel products and Class 1 Nickel products are both included in this category

The nickel boom looks set to continue with dozens more smelters under construction and Indonesia producing almost 60 per cent of the world's nickel ore.¹⁷ The country's export ban and investment incentives effectively drove foreign investments into nickel smelters, fostering a globally competitive steel and nickel industry.

Downstreaming other minerals looks dubious

Indonesian authorities are seeking to apply downstreaming to critical minerals other than nickel and bauxite, and to non-mineral commodities. Cobalt, copper, lead, manganese, tin, and zinc are seen as additional candidates.

The downstreaming of bauxite, which has been subject to similar export restrictions as nickel, has not been as successful, however. Unlike nickel, there are significant alternative sources of bauxite outside Indonesia. Australia, Brazil, China, and Guinea all mined more bauxite in 2023 than Indonesia. Although Indonesia possesses the fifth-largest reserves of bauxite, its global production share is only seven per cent and even lower for alumina and aluminium (Table 2).

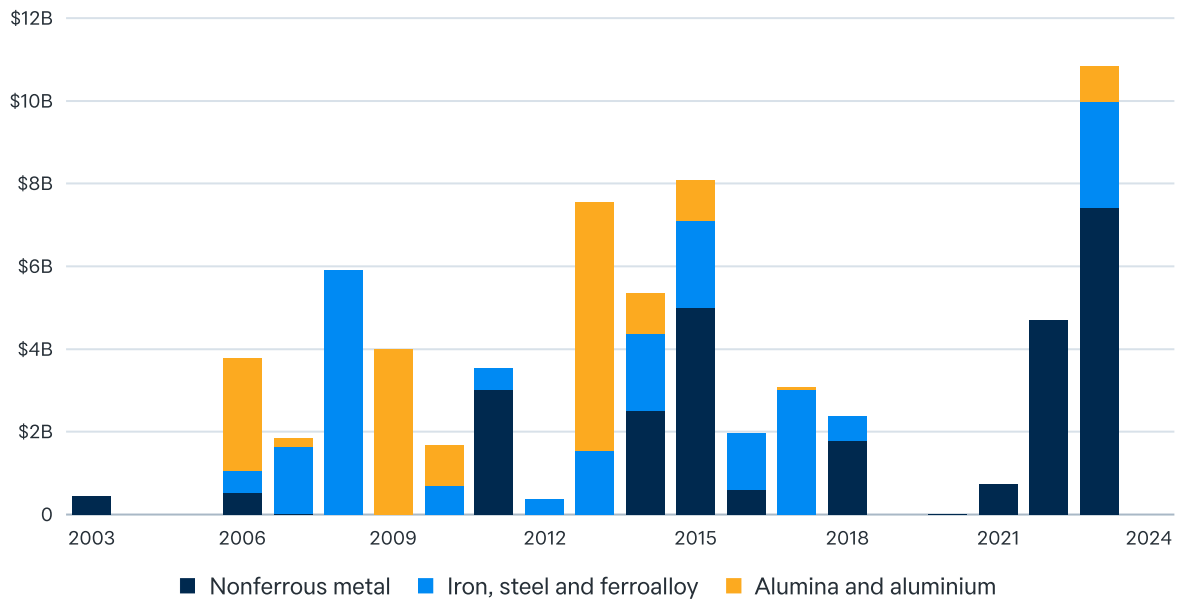
Table 2 — Key downstreaming critical minerals for Indonesia

	Production Ranking in 2024	Global production Share	Production in 2023 (metric tons)	Production growth since 2019	Share of global reserves
Nickel	1st	50%	2,030,000	138%	42%
Bauxite	5th	7%	30,000,000	76%	10%
- Alumina	13th	<1%	1,200,000	20%	-
- Aluminium	-	-	-	-	-
Cobalt	2nd	8%	19,000	-	6%
Copper	6th	4%	907,000	195%	2%
- refined copper	16th	<1%	225,000	-	-
Lead	-	-	-	-	-
Manganese	-	-	-	-	-
Tin	2nd	23%	69,000	-11%	-
Zinc	-	-	-	-	-

Source: United States Geological Survey Commodity Summary 2025, 2021; authors' calculations

Bauxite export bans followed a similar trajectory to nickel export bans, being first introduced in 2014, relaxed in 2017, and reinstated in June 2023. However, foreign investment into bauxite processing collapsed after the export ban in 2014 and never recovered (Figure 5). This contrasts with the surge of investment into nickel, iron, and steel.

FIGURE 5
Foreign investment flows for select metals subsectors
 US\$ billion



Source: FDI Markets

Indeed, across the entire metals sector, greenfield foreign direct investment (investment that involves a parent company setting up a new venture in a foreign country and constructing new operating facilities from the ground up) largely stagnated after the export bans in 2014 and the increasingly nationalistic turn in Indonesian resource policy. The surge of investment into nickel and steel is the exception.

Indonesia is a significant global source of tin, but production and export revenues have fallen below 2019 levels. Copper production has increased; however, the country remains a minor producer globally. Cobalt production is also only possible through extraction from the nickel laterite ores from the HPAL smelting technique. As a result, nickel downstreaming has had the inadvertent benefit of producing significant amounts of cobalt as a by-product.

The benefits of downstreaming have not materialised for bauxite and other critical minerals.

Electric vehicles and their batteries

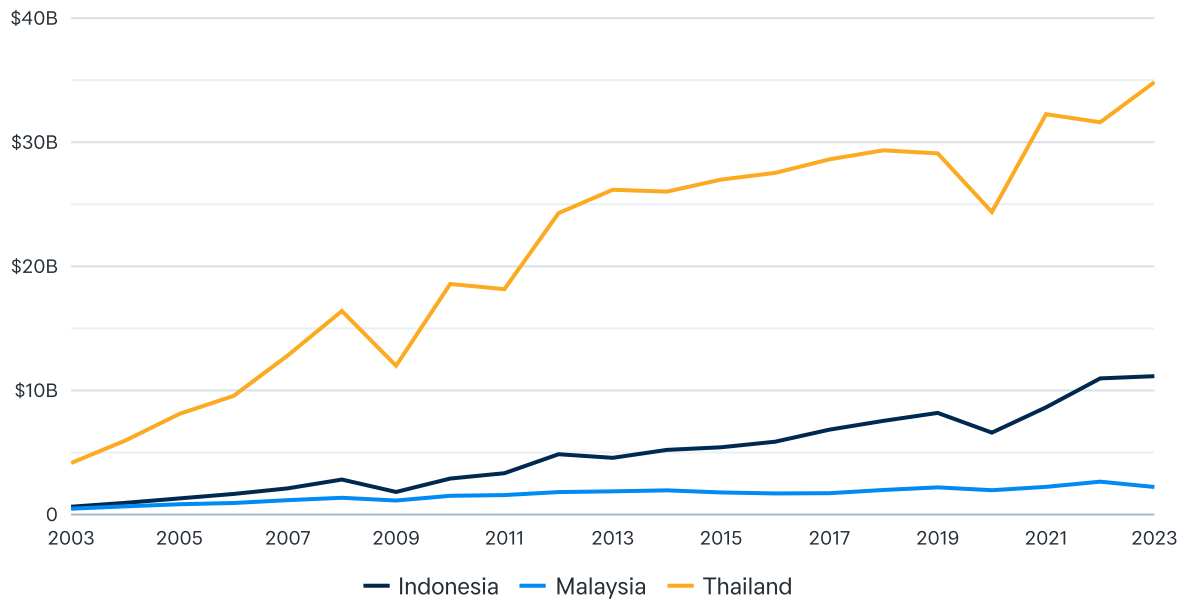
The goal of developing a fully integrated domestic EV manufacturing capacity is ambitious, and Indonesia has made notable progress. The government is leveraging the supply of nickel, crucial for EV batteries, to drive foreign companies to build an EV ecosystem. The objective is to become a leading EV manufacturer and exporter by producing every part of an EV domestically.

Nickel mining and processing, EV battery production, and EV final manufacture now all take place in Indonesia. The government has achieved its stated goal, though not yet at scale for EVs and batteries. But with Indonesia accounting for eight per cent of global greenfield foreign investment in critical minerals, the battery supply chain, and EVs (trailing only the United States and China; see Table 1), Indonesian capacity is set to expand significantly.

Indonesia has a pre-existing internal combustion engine (ICE) vehicle manufacturing capability, built partly through reliance on import-substitution strategies such as import tariffs and local content requirements.¹⁸ Such policies mandate that a certain share of the product is manufactured domestically. Import substitution allows domestic industry to develop without competition from foreign firms and is typically seen as inferior to export-oriented policies in which industries are incentivised to sell products into competitive foreign markets. The latter drive efficiencies and productivity through forcing firms to face global competition, while the former do not.¹⁹

Indonesia now has the second-largest vehicle production capacity in Southeast Asia, but it exports less than one-third the value of Thailand's vehicle exports (Figure 6). Indonesia is not a globally competitive ICE vehicle manufacturer and exporter, ranking only 24th in the world in 2022.²⁰ Unfortunately, the same combination of policies that created Indonesia's ICE vehicle industry is being applied to EV and battery manufacturing (and Indonesia's manufacturing sector more broadly). Applying the same suite of policy mechanisms to EVs will likely lead to the same result: a largely domestic-focused vehicle industry that is uncompetitive globally.

FIGURE 6
Thailand outshines in the automotive trade
 US\$ billion



Source: ASEAN Stats

There are promising signs, however.

The Indonesian government has negotiated an agreement with four Chinese EV companies with the aim of establishing Indonesia as an EV export hub, ambitiously targeting 54 countries as destination markets.²¹ This is a milestone as Indonesia attempts to move towards a more export-oriented policy mix, although it remains to be seen if these commitments will be met.

The government is also offering import and tax exemptions to attract EV manufacturers and has delayed increasing local content requirements to 2027 to incentivise more entrants.²² Furthermore, consumer subsidies for EVs, hybrids, and electric motorbike conversions, along with non-financial incentives such as exemptions from driving restrictions in major cities, are aimed at boosting domestic demand. Clearly, there is a growing recognition that import-substitution policies are insufficient to drive EV manufacturing.

Boosting Indonesia's domestic demand for EVs is a necessary step towards developing a profitable EV industry. Domestic adoption has been slow and Indonesia's EV market remains underdeveloped. Only 17,000 EV sales were recorded in 2023, less than half the government's target and lower than in Thailand and Vietnam, countries with much smaller populations.²³ One factor is that purchase incentives were limited to vehicles meeting local content

requirements of 40 per cent, which applied to just two models — Wuling’s Air and Kia’s Ioniq 5.

Without strong domestic demand, production numbers for eligible models are stagnating. This means access to external markets will be crucial. But Indonesia’s EV exports are insignificant. Total Indonesian exports of EVs reached only 1,504 units in 2023, representing less than one per cent of overall vehicle exports that year.²⁴

There remains a serious gap between government ambition and on-the-ground reality.

Box 1. Lessons from Malaysia and Thailand

In the 1980s, Malaysia attempted to develop a car manufacturing industry by creating the “national champion” firm Proton. Like Indonesia, the government employed import-substitution methods, making Malaysia the most protected vehicle market in Southeast Asia.²⁵ Proton has been a resounding failure as a result. The firm never achieved large-scale export success and Malaysians paid a much higher price for vehicles — as much as 50 per cent higher than Proton vehicles sold overseas.²⁶

Thailand, dubbed the “Detroit of Southeast Asia”, outperforms both Malaysia and Indonesia as a vehicle producer and exporter. Thailand’s government did not use import-substitution industrial policy or commit to a “national champion” firm like Proton, instead subsidising component and machinery imports and allowing foreign firms to operate in the country, keeping costs competitive, ensuring high quality, and focusing on exports.

The contrast highlights that countries open to global competition, investment, and technology are more likely to succeed than those relying on market protection and internal demand.

Openness to investment and technology needs to be combined with an openness to trade in manufacturing to drive productivity gains (Box 1). Evidence shows Indonesia’s local content requirements are driving inefficient manufacturing, reducing output, and not achieving desired goals, resulting in lower quality and higher cost production.²⁷

EV battery manufacturing is also nascent but there are hopeful signs. Greenfield foreign direct investment (FDI) inflows to the battery subsector since the export ban in 2014 are more than US\$20 billion. A significant increase in battery manufacturing capacity will follow and production has already begun in earnest, with the opening of several EV battery facilities in 2024.

This explains aggressive moves by leading EV manufacturers such as BYD, which is doubling down on production in Indonesia. The company plans to establish manufacturing capacity of up to 150,000 units annually, supported by more than 50 retail outlets nationwide.²⁸ BYD was not part of the agreement between four Chinese EV companies and the Indonesian government to export EVs. BYD claimed to be targeting local consumers,²⁹ though more recent comments by company executives suggest the firm is aligning with Indonesia's export ambitions.³⁰

Some fundamentals are moving in Indonesia's favour: a large middle class, better infrastructure, and a more skilled workforce. Combined with the policy commitments of the Indonesian government, the leverage of a world-leading nickel industry, and generous tax incentives, this has driven investment into EV and EV battery production facilities. Investment trends suggest the Indonesian EV industry is set to expand. But for now, the industry remains immature, with lacklustre domestic adoption, meagre exports, and questionable import-substitution industrial policies.

Economic impacts of the new industrial policy

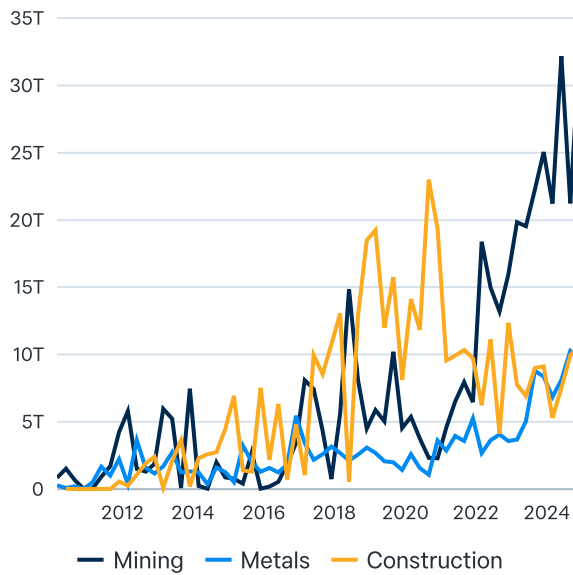
Downstreaming in nickel has produced fast but highly concentrated growth, while development of the EV industry is just beginning. Thus far, the economic benefits associated with the new industrial policy appear mixed.

Downstreaming

One of the biggest benefits for Indonesia's economy from the downstreaming policy is the country's emergence as a significant destination of FDI in critical minerals, batteries, and EVs. Indonesia was the 18th-largest recipient of FDI in 2022 and has seen foreign investment boom in recent years.³¹ Indonesia's greenfield FDI more than doubled in 2022 and again in 2023.³²

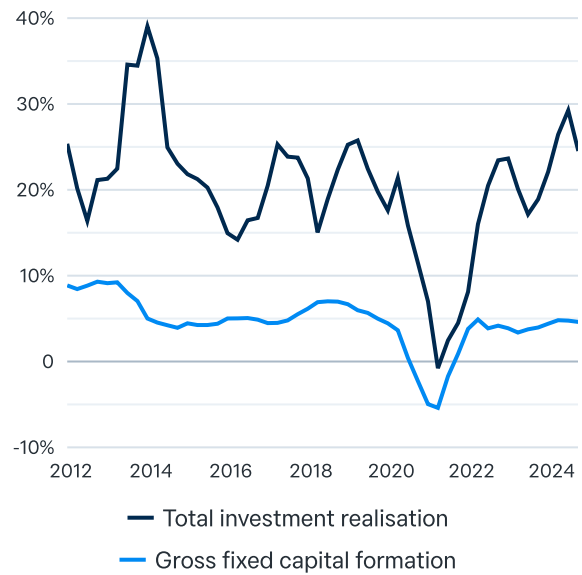
But industrial policy has not engendered a domestic investment boom. Construction investment experienced a temporary boost following the initial export bans in 2014 as smelters were constructed, while mining investment has skyrocketed in more recent years (Figure 7). Yet growth in aggregate investment realisation and real gross fixed capital formation have remained steady, exhibiting no deviation from longer run trends (Figure 8). This suggests domestic capital has been responsive to government policies, but rather than creating new opportunities, investment flows were reallocated to downstreaming industries. So, in the absence of growing domestic investment, FDI is crucial, as it brings the requisite capital and technologies to advance Indonesia's industrial policy objectives.

FIGURE 7
Investment realisation by sector
IDR trillion



Source: CEIC, Statistics Indonesia, Indonesia Investment Coordinating Board, authors' calculations

FIGURE 8
Investment growth
Year-on-year %

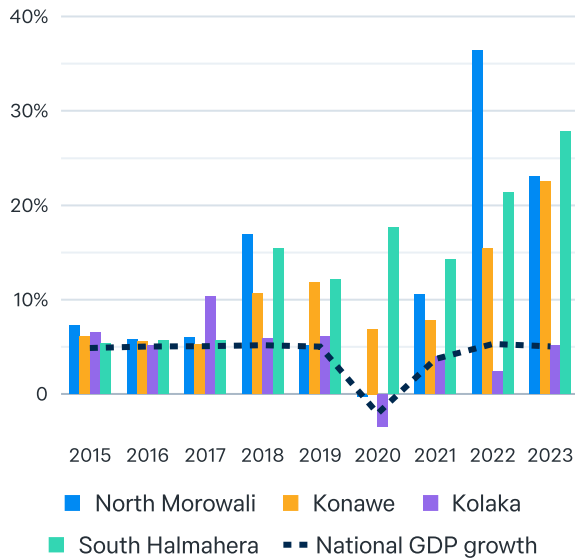


Source: CEIC, Statistics Indonesia, Indonesia Investment Coordinating Board, authors' calculations

What broader economic benefits have been generated?

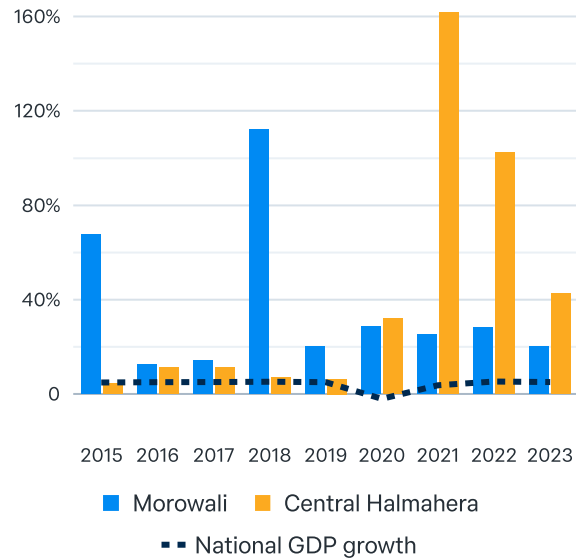
Local government administrative units in Indonesia (called districts) where nickel industrial parks are located have seen dramatic increases in economic growth. Five of the six districts with active nickel industrial parks reported GDP growth of 20 per cent or higher in 2023, with some reporting growth rates above 100 per cent in specific years (Figures 9 and 10).

FIGURE 9
GDP growth rates where
nickel smelters are operational
Year-on-year %



Source: Statistics Indonesia

FIGURE 10
GDP growth rates where
nickel smelters are operational
Year-on-year %



Source: Statistics Indonesia

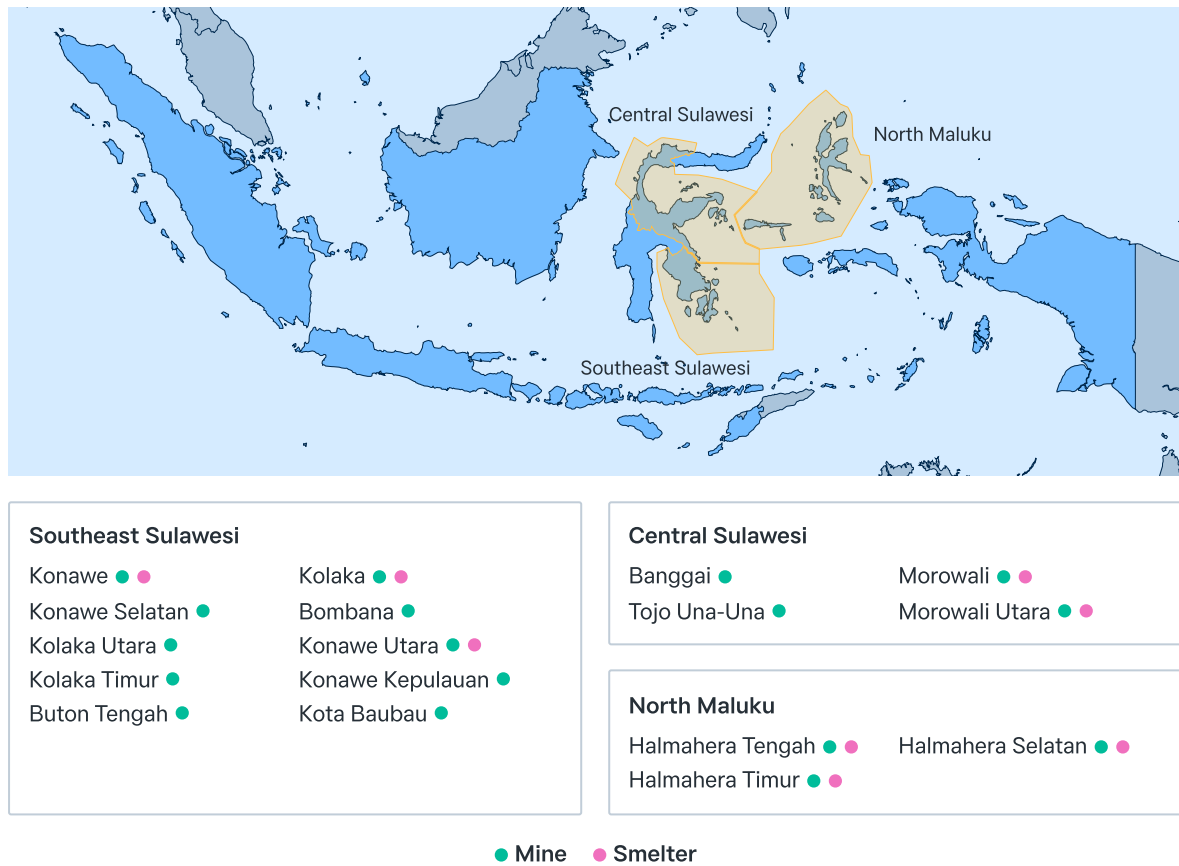
But growth at the district level has been highly concentrated, with minimal spillovers. These districts are in Southeast Sulawesi, Central Sulawesi, and North Maluku provinces, where the share of national real GDP was 4.2 per cent in 2010. This only increased to 5.9 per cent as of 2023. By contrast, Jakarta's province alone was responsible for 16.7 per cent of national real GDP in 2023. And while the contribution to economic growth rates from nickel-producing provinces has doubled, this was from a low base and was still only 0.3 percentage points of the total national growth rate of 5.1 per cent in 2023.

Nickel-producing provinces contributed a temporary boost to national employment growth, but this has largely dissipated. Jobs created per worker across nickel-producing provinces since the export ban have not diverged from the national average. Therefore, the aggregate labour impacts are not impressive.

In terms of poverty reduction, all districts with nickel industrial parks in operation, with the exception of South Halmahera, have experienced greater progress than the national average. But it is difficult to attribute this to nickel downstreaming. None of these provinces exhibited poverty reduction rates faster than what would be expected compared to other provinces and their initial rates of poverty.

FIGURE 11

Nickel mining and smelters across Indonesia



Nickel processing has imposed severe costs, generating waste products known as tailings that leech into the environment and harm agriculture and fisheries. Some estimates put cumulative losses over a 15-year period at US\$387 million for aggregate economic output and US\$234 million for individual incomes.³³ The same study suggests annual deaths from air pollution from processing activities could rise from 215 deaths in 2020 to almost 5,000 in 2030. Pollution, particularly from nickel smelting, can also cause serious respiratory illness, both acute and chronic. Health care costs, labour output losses from sickness, and lower productivity could cost up to US\$3.4 billion a year by 2030. This is roughly half the value of total nickel exports in 2023. Estimates suggest that if Indonesia’s government were to implement stringent air quality and emission reduction measures across the industry, more than 50,000 deaths could be prevented and US\$38.2 billion in losses avoided by 2060.

The benefit to public revenue from nickel processing is also not clear. The Indonesian government claims tax and export duty revenue has been higher than if the export ban had never been enforced and no processing had taken place domestically.³⁴ However, the tax breaks provided to nickel smelters under

the downstreaming policy, the heavy reliance on foreign firms that will repatriate profits, and the decline in export revenues from export bans on raw minerals, suggest any domestic profits or tax revenue benefits are likely marginal. Certainly, there is no indication that nickel downstreaming has been a boon for government coffers, with Indonesia still struggling with low tax revenue relative to GDP.

Despite high growth rates and a foreign investment surge, concentrated economic activity in nickel has created significant negative spillovers that are reducing the already meagre net economic benefits of downstreaming.

Electric vehicles and batteries

Linking the nickel industry with the global EV market has been a highly successful strategy. Indonesia has seen a surge of greenfield investments into battery and EV industries, totalling around US\$45 billion. Without nickel downstreaming, it is unlikely EV supply chains would be expanding in Indonesia to such a degree, given the lacklustre position of its ICE vehicle industry.

But it is difficult to assess the EV industry's impact on the economy so far. Estimates for the number of jobs created through greenfield FDI in these sectors indicate roughly 47,000 jobs are expected to be generated through existing or announced projects. Given Indonesia's official employment numbers increased by 140,000 in 2023, if these estimates are accurate, this is a substantial contribution.

Strengths, barriers, and opportunities

Indonesia's industrial policy for critical minerals and EVs has seen early success, but growing challenges and inadequate aggregate economic impacts suggest its long-term viability is uncertain. While some opportunities remain, the path to sustained success looks narrow.

While the nickel downstreaming policy positioned Indonesia as the top nickel producer and exporter, it was not the only factor. Having the largest global reserves of nickel and openness to FDI and technology were crucial. The beginning of the war in Ukraine in 2022 created a commodity price shock just as China's reopening economy rapidly increased demand for nickel. As a result, Indonesia's nickel exports took off. This confluence of global factors with domestic policy and resource advantages ensured success.

However, the abatement of these same external drivers is now turning tailwinds into short-term headwinds. Commodity prices have largely normalised, while China's economic troubles continue to depress domestic demand. Global EV demand is weakening. The nickel export boom has therefore plateaued since early 2023 (Figure 4) despite long-term fundamentals looking promising.

Indonesia will need to increasingly create its own demand for the nickel products it produces and seek out alternative markets to China, the major importer of Indonesian processed nickel. Therefore, ensuring a robust domestic EV industry that consumes nickel as an input is crucial, as is ensuring other major markets remain open to Indonesian nickel and EVs.

Nickel and EVs are complementary

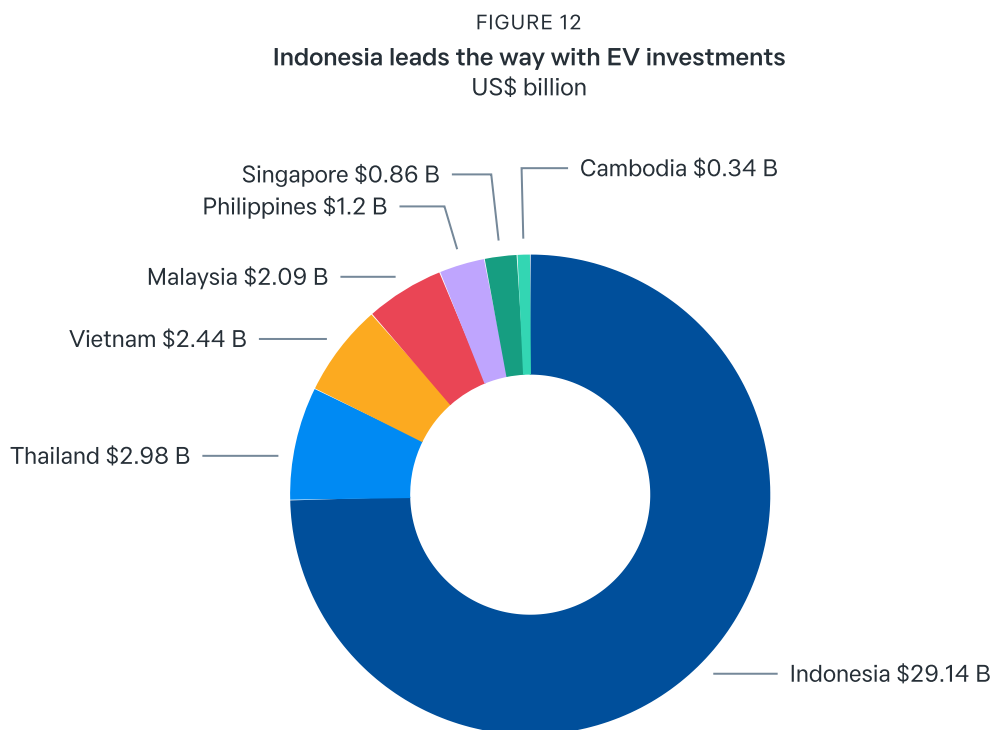
Downstreaming in nickel provides unique advantages

Nickel demand will trend strongly over the long term — the International Energy Agency expects it could peak between 165–228 per cent higher than in 2022. Indonesia is well placed to service this demand and integrate into EV supply chains.

There are signs that nickel downstreaming is working. Recently, tax holidays for RKEF smelters that produce nickel pig iron for stainless steel production have started to be revoked as the steel industry has matured and the government increasingly focuses on intermediate nickel for EV batteries.³⁵ A self-sustaining

steel industry and the government’s prioritisation of nickel products for battery cathode manufacturing demonstrate industrial policy architecture is adapting to changing conditions. Withdrawing support for a targeted industry indicates success and shows an ability to resist rent-seeking and ongoing protection of the industry, an endemic problem for industrial policy.³⁶

This success has left Southeast Asian rivals behind in terms of attracting EV investments, with Indonesia bringing in US\$29 billion — 75 per cent of total greenfield EV investments in the region (Figure 12). Given Indonesia’s less competitive manufacturing sector overall, it is hard to attribute this astounding lead to anything but nickel downstreaming and EV industrial policy. Confirming this early advantage, in 2024 Indonesia established the first EV battery manufacturing factory in Southeast Asia.³⁷



Source: FDI Markets Note: January 2016 to December 2024

EVs have huge upside potential

Indonesia has the largest four-wheel and two-wheel domestic market in Southeast Asia, offering a head-start for EV firms if they can capture substantial vehicle demand.

The government has provided credible and ambitious domestic policy settings for firms to encourage EV adoption. Major ridesharing and taxi firms, including Grab and Gojek, have aligned their EV adoption targets with government targets to transition to a 100 per cent EV fleet by 2030 by aiming to reduce the cost of two-wheel EVs to 30 per cent lower than ICE vehicles.³⁸ Furthermore, these firms have committed to developing the country's EV industry through investments in charging infrastructure.³⁹ Policy certainty has provided space for private sector buy-in to the national EV strategy.

Focusing on manufacturing also aligns with Indonesia's demographic dividend, as the working age population share peaks in 2031.⁴⁰ This gives a six-year window to generate a strong tailwind to future growth by providing jobs in a labour-intensive sector. Capitalising on demographic conditions through job creation could boost aggregate labour and capital in the economy and drive productivity growth.

Therefore, it seems that EV manufacturing, backed by a world-leading nickel industry, strong government policy commitments, large domestic firm buy-in, and unrivalled foreign investments for Southeast Asia, has some clear opportunities for Indonesia.

Resource allocation and the counterfactual

Objections to Indonesia's critical mineral and EV industrial policy based on resources allocation are valid. There is evidence that industrial policy targeting of certain industries can drive increases to economic output and productivity while avoiding negative impacts to non-targeted industries.⁴¹ But intensive growth in nickel processing has created substantial environmental and social harms, and EV and battery manufacturing are too small to have broader impacts to industry output or productivity yet.

Furthermore, if Indonesian policy efforts and resources were focused on improving productivity and opportunities in primary industries or services, which employ a far larger share of the labour force, the gains in poverty reduction and job creation are likely to have been greater than under this industrial policy path.

But the fact that Indonesia is the most integrated Southeast Asian economy for rapidly expanding global EV and critical mineral supply chains is important. Without concerted industrial policy efforts, nickel processing would not have scaled to the same extent and global EV and battery manufacturing investments are unlikely to have concentrated so firmly in Indonesia. A counterfactual scenario where Indonesia achieves this integration while allocating resources elsewhere seems unlikely.

Therefore, Indonesia must seek to drive output and productivity gains at the same time as reducing negative spillovers to non-targeted industries. Otherwise, the reallocation of resources towards industrial policy efforts will ultimately not be justified.

Downstreaming has produced unacceptably high costs

Downstreaming is costly and is not easily replicated

Nickel downstreaming success is unlikely to extend beyond this particular case. However, the government plans to apply it to other commodities.

Nickel demand is expected to increase rapidly under optimistic scenarios of emission reduction and Indonesia has close to 50 per cent of global reserves (Table 2). Of the other minerals considered for downstreaming, Indonesia has no comparable advantage.

Export bans are highly disruptive, causing substantial declines in mine production and export revenue to targeted industries. Bauxite and nickel mine production both suffered significant output losses after export bans were enforced (Figure 2). Worse, export bans for other minerals and commodities will not force foreign investment — bauxite demonstrates this reality.

Expanding downstreaming will almost certainly damage Indonesia's trade balance and absorb government attention and resources that are better spent elsewhere.

Governance failures are serious setbacks to Indonesian industrial policy

Indonesia's previous attempts at industrial policy have included failed downstreaming efforts for other commodities (Box 2). A major issue facing these previous efforts was over-exploitation of resources in pursuit of government-directed policy. Unfortunately, nickel downstreaming has not avoided this pitfall.

Indonesia's price-setting position in global nickel markets, the ongoing supply glut, and the huge pipeline of smelters still under construction indicate that over-exploitation is occurring in nickel processing.

Box 2. Indonesia's previous downstreaming attempts

Past experiences with sectors such as logging and cocoa show that resource-based industrial policies often have limited long-term benefits and can lead to resource over-exploitation.

Wood products

In the 1980s, Indonesia applied downstreaming policies to the logging industry, achieving initial success with plywood becoming the largest non-oil commodity export and Indonesia ranking as a top global producer.⁴² However, unsustainable logging, and market restrictions driven by international exception to rampant deforestation, led to a decline. Export restrictions fuelled over-exploitation (logs had to be sold domestically at lower prices, forcing loggers to increase production to remain profitable) and despite government support, the industry — dominated by government allies — failed to remain competitive.

Cocoa

In 2010, Indonesia attempted downstreaming in cocoa by shifting from raw cocoa bean exports to processed products through an export ban supported by favourable tax incentives. This was largely unsuccessful.⁴³ The policy was influenced by local producers lobbying for government support. Processed cocoa exports never significantly exceeded raw cocoa exports in value. Limited foreign investment into processed cocoa products and outbreaks of pests and disease further hindered growth.

The key lessons include: 1) over-exploitation of resources is hard to avoid; 2) the risk of rent-seeking must be reduced; and 3) commodity processing has not produced domestic manufacturing spillovers.

Another clear sign of over-exploitation is the growing reports of rampant environmental, health, and labour violations.⁴⁴ These impacts of rapid industry expansion are implicitly tolerated in the Indonesian government's failure to redress violations or improve governance as the industry grows in prominence and these negative spillovers become more recognised.

The costs of these governance failures are primarily shouldered by local populations. The failure to act is a failure of governance, and inaction by Indonesian authorities is shrinking the net economic benefits.

“Captured” coal power plants are problematic for Indonesia

The industrial parks responsible for nickel processing are located in remote areas close to nickel deposits in Sulawesi and Maluku islands. Insufficient energy grid infrastructure has forced the building of coal power plants within the industrial parks, unconnected to the energy grid system. This “captive” coal power capacity has increased 800 per cent since 2013, now accounting for 23 per cent of total coal capacity and responsible for more than half of the additional coal capacity being commissioned nationally.⁴⁵ Most captive coal power plants are located in Sulawesi or Maluku islands near nickel industrial parks, and 76 per cent of captive coal power currently being used is for downstreaming.⁴⁶ More captive coal plants are under construction than are currently operational, so a dramatic increase in emissions is seemingly locked in, potentially causing up to 180,000 deaths by 2040.

Indonesia ranks as the sixth-largest CO₂ emitter as of 2022⁴⁷ and is the only large emitter to have experienced significant emissions growth in the last 15 years.⁴⁸ As a major emitter, its decarbonisation will be critical for meeting emissions targets to limit global warming to 1.5°C. Indonesia is highly vulnerable to climate change, facing severe risks including increased flooding, extreme heat, and rising sea levels. By 2100, the country could see its GDP shrink by up to seven per cent, more than four million people displaced, and food insecurity rise.⁴⁹

Indonesia’s own decarbonisation path is therefore directly linked to the country’s health and risks from climate change.

There are plans for renewable energy to be integrated into some nickel processing operations, but this represents a fraction of the energy needs of the nickel industry.⁵⁰ There are also welcome indications that the government is seeking support in designing a decarbonisation plan for the nickel industry.⁵¹ However, given the scale of the problem and the number of plants under construction, this plan needs to be credible and ambitious.

Diversification will be key

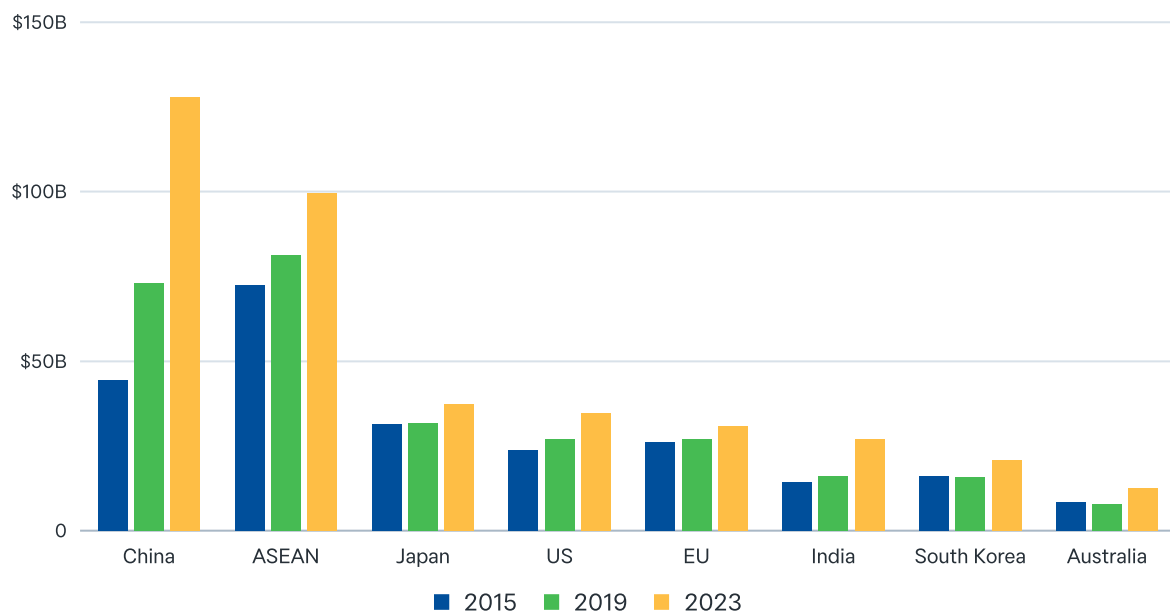
Indonesia’s industrial policy has seen economic ties with China boom. China is the largest greenfield investment partner, overtaking the United States in cumulative greenfield investments in 2015. Indonesia’s two-way trade with China almost tripled in value between 2015 and 2023 (Figure 13). China’s export share surged from 10 to 25 per cent over this time, outpacing all other trading partners.

These trends are intricately tied with the downstreaming policy. China is the largest destination for Indonesia’s steel and nickel exports and, conversely,

China has come to rely on Indonesia as its major source of intermediate nickel.

China was instrumental for the nickel downstreaming policy, and strengthening economic ties with China has clearly benefitted Indonesia, but now an over-reliance on China as an export destination presents a serious barrier. Chinese demand has faded rapidly. China’s nickel imports fell by 20 per cent between February 2023 and November 2024.

FIGURE 13
Indonesia’s two-way trade, select trading partners
US\$ billion



Source: CEIC, Statistics Indonesia

The US designation of Indonesia’s nickel industry as using forced labour,⁵² and the EU’s Battery Passport scheme which monitors environmental sustainability,⁵³ further complicate matters. Lax governance supporting rapid expansion of the industry at the expense of environmental and labour standards is now an impediment to diversification of Indonesia’s economic partners. For example, Eramet and BASF, two major European mineral companies, pulled out of their nickel–cobalt refinery investments in Maluku.⁵⁴ Concerns over inadequate environmental and human rights standards were strongly suspected of driving this decision.

The European Union also brought a World Trade Organization case against Indonesia over its critical mineral export bans, which the European Union won, although Indonesia’s appeal pushed the case to the currently non-functioning

Appellate Body, leaving the case unresolved for the foreseeable future.⁵⁵ Continued emphasis on downstreaming will likely keep relations with the European Union strained.

Indonesia has recognised the need to diversify, with suggestions of forced divestment of Chinese companies from some nickel smelters.⁵⁶ The scale of these plans, however, is unclear.

As rising uncertainty and inadequate industrial policy governance is isolating Indonesia from key potential partners, the country will need to do more to ensure it can diversify.

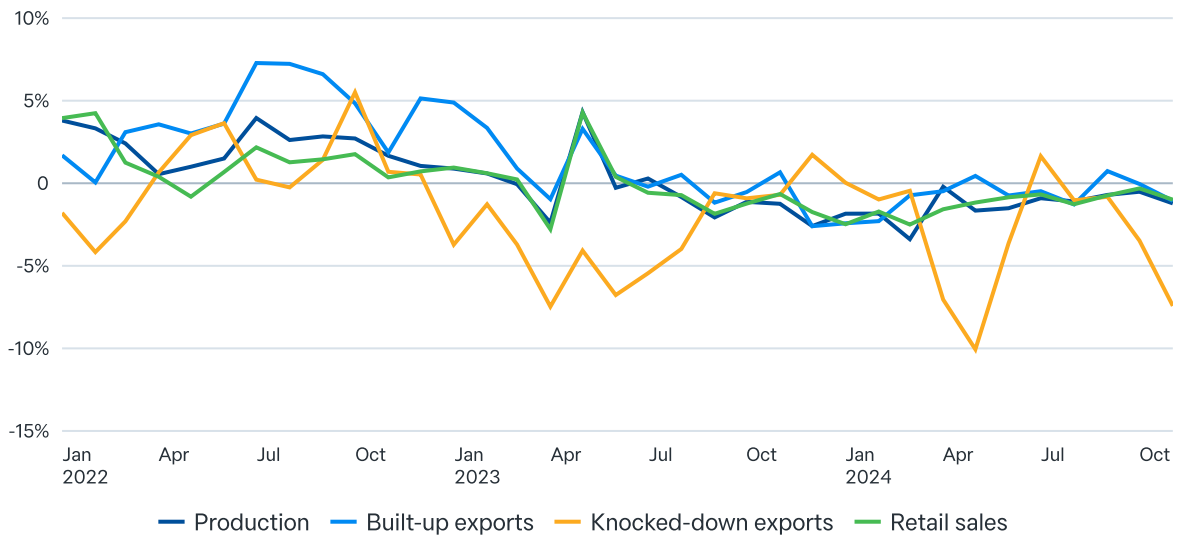
Building an EV ecosystem is not easy

Given these barriers, capitalising on the early advantages to further develop a domestic EV supply chain will not be straightforward.

Worse still, slowing global EV demand will impact the profit margins of new EV and battery factories and likely weigh on further foreign investments, leading to less manufacturing capacity being built in the near term. Compounding this, Indonesia's broader automotive industry appears to be in a downturn. Growth in exports, production, and retail sales have been largely negative since the second half of 2023 (Figure 14). If the broader industry is contracting, expanding EV manufacturing capacity will be difficult.

It is no surprise then that domestic EV adoption lags regional peers such as India, Thailand, and Vietnam, with particularly woeful uptake of electric motor-cycles despite the huge potential market.⁵⁷ Limited mileage per charge, a lack of charging infrastructure, long recharge times, and expensive batteries are all contributing to insufficient domestic demand.

FIGURE 14
Key growth rates for automotive industry
 Year-on-year %



Source: CEIC, The Association of Indonesia Automotive Industries (GAIKINDO), authors' calculations

Note: Knocked-down exports are exports of a “kit” with all parts needed for final assembly of the vehicle, which takes place elsewhere. Built-up exports are exports of a car that is already fully assembled.

Indonesia will also face fierce competition from Malaysia, Thailand, and Vietnam in attracting EV manufacturing. Remaining competitive is therefore essential. But Indonesia’s manufacturing productivity is lower than all these competitors. Manufacturing’s share of GDP has also declined more than in these rival economies, signalling poor performance in Indonesia’s broader manufacturing sector.

Managing to stay ahead of other exporters is even more essential given that China — Indonesia’s closest trading partner — will almost certainly not be a significant export market for Indonesian EVs. The cut-throat competitiveness and large-scale industrial policy that has catapulted China to be the world’s leading automotive exporter will essentially crowd out foreign EVs.⁵⁸ China will be a source of demand for nickel but not for EVs.

So, Indonesia must look elsewhere for EV export markets.

Europe and the United States are the largest EV markets outside of China, accounting for 25 and 10 per cent of global EV sales, respectively.⁵⁹ Indonesia must look to export EVs into the European Union and the United States. But as discussed above, tensions have been building with both over nickel governance standards.

Diversifying to the EU and US markets also has the benefit of hedging against technological disruption. Battery chemical compositions are shifting. Nickel-based battery chemistries as a share of total EV sales are falling, driven by the Chinese market. Nickel-based batteries accounted for roughly 50 per cent of total EV sales in China in 2021, but this declined to well below 40 per cent in 2023.²² At a time when Indonesia wants to pursue EV manufacturing and exports by leveraging its vast nickel reserves, nickel is becoming less relevant to EVs. Ninety per cent of EVs sold in the EU and US markets still use nickel-based batteries due to their higher energy density, better performance in cold climates, and simpler manufacturing process.⁶⁰

These evolving conditions make it clear that Indonesia must diversify its export markets and improve its manufacturing competitiveness to ensure it retains its lead over other countries seeking to attract EV supply chains.

Policy recommendations

Indonesia has had some early success with its downstreaming and EV industrial policies, but the growth generated has so far not been transformative. Indonesia will need to adjust policy settings to achieve broader economic benefits.

Nickel and EVs should remain the focus

Given Indonesia has committed politically to downstreaming and ongoing industrial policy, the government should continue prioritising nickel and manufacturing EVs and batteries where it has a clear comparative advantage, instead of expanding industrial policy. The focus should shift to enhancing competitiveness by boosting productivity, technological innovation, and governance standards in both the nickel and EV industries.

Pausing further downstreaming of critical minerals and non-minerals would be prudent. Improving nickel governance, advancing EV and battery manufacturing, and diversifying trade partners would yield significant long-term dividends and provide some security against short-term headwinds.

The recent tapering of exports, rising global subsidies for critical minerals and EVs, as well as weak global growth, indicate significant barriers ahead. Domestic capital and labour are finite resources, and expanding downstreaming to other commodities will redirect investment and workers elsewhere. Improving the outcomes from nickel and ensuring EV and battery manufacturing become globally competitive will yield the greatest returns.

Some specific recommendations:

- Stimulate EV demand through strengthening EV consumer incentives and include all electric and hybrid vehicles, not just those meeting local content requirements.
- Focus on building charging infrastructure and addressing other barriers to adoption such as slow battery recharge times and low mileage. This may require easing import restrictions to bring in higher-quality products.
- Create explicit export incentives for manufacturers.

“Greening” Indonesia’s industrial policy

Indonesia needs to urgently improve governance within its industrial policy architecture.

Widespread health impacts, unsafe working conditions, pollution from industrial waste products, and rising emissions are reducing economic benefits and diversification efforts. Raising environmental, social, and governance standards will have direct benefits for Indonesia’s economic development objectives while simultaneously providing a pathway for further expansion and maturation of these industries.

Some specific recommendations:

- Introduce more stringent environmental and labour protections and provide robust enforcement.
- Monitor and analyse health impacts, labour violations, emissions, and waste management from downstream industries. Publish relevant data and establish a regular reporting cycle to increase transparency and create an accountability feedback loop.
- Introduce compulsory emission control and reduction schemes for coal power plants and smelting operations.
- Accelerate nickel decarbonisation plans and align with energy grid expansion initiatives to reduce reliance on captive energy sources.

Diversify economic partners

The nickel and EV industries require new economic partners to hedge against downturns in China’s economy and to expand export markets. Governance reforms in downstreaming will take Indonesia part of the way. Increasing trade with the European Union and the United States, the largest markets for EVs behind China, will require meeting higher environmental, labour, and emissions standards, a reduced Chinese presence in at least some nickel operations, and a more competitive manufacturing sector.

Some specific recommendations:

- Indonesia’s government should facilitate renegotiations on nickel smelters under construction or in planning stages between Western firms and Chinese firms. Negotiations between Chinese nickel firms and Stellantis and Ford are a promising example of the collaboration required.⁶¹

- Forced divestment of Chinese interests is a high-risk strategy. Previous forced divestment in Indonesia's mining sector drove foreign mining firms out of the country, which redirected scarce domestic capital to mining investment. Forced divestment of Chinese firms will cause alarm and could be counterproductive.
- Indonesia should join the Minerals Security Partnership Forum to access financing for sustainable and diversified critical mineral supply chains.⁶² Establishing formal links with the Minerals Security Partnership would drive diversification of both foreign investment partners and export destinations.

Stay competitive in the long run

To become a leading EV manufacturer and exporter, Indonesia needs to avoid protectionist and inward-facing policies. Further integration with global EV supply chains requires greater openness. Indonesia must avoid the import-substitution policies that hobbled Malaysia's vehicle ambitions with Proton.

Some specific policy recommendations:

- Avoid government involvement in EV manufacturing. Focus on allowing internationally competitive firms to drive production and industry expansion.
- Increase openness and export-orientation of the EV industry. Keeping industry export-oriented is a core feature of historically successful industrial policy. This will require allowing a greater share of inputs for EVs to be imported.
- Low manufacturing productivity has been linked with local content requirements, which are not driving competitive manufacturing. Pausing or removing these could yield significant dividends.
- Broader reform efforts will deliver enhanced labour productivity and boost output. Reforms include improving general governance, tackling corruption, reducing excessive business regulation, and increasing openness to trade and foreign investment.⁶³

Conclusion

Indonesia has clearly committed to downstreaming and EV industrial policies. This strategy has offered some concentrated economic gains alongside substantial costs. The major benefit has been an isolated success story for nickel downstreaming, instrumental in positioning Indonesia within emerging supply chains for EVs, exemplified by a foreign investment surge. But this success cannot come at any price — action on nickel governance standards and arresting the growth in captive coal power generation are essential.

An industrial policy ecosystem that is export-oriented and seeks further integration into global supply chains is also needed. This requires diversifying the investment and trade partners available and improving Indonesia's manufacturing competitiveness through a more open policy framework. The regressive and closed trade policies that worked for nickel downstreaming are not broadly applicable.

Indonesia has proven it can provide policy certainty. But difficult policy reform is needed if the country wishes to capitalise on the leverage a leading nickel industry has provided for integrating with global EV supply chains. And it is EV and battery manufacturing that will generate broader economic gains.

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Notes

- 1 Simon Evenett, Adam Jakubik, Fernando Martin, and Michele Ruta, “The Return of Industrial Policy in Data”, IMF Working Paper, 4 January 2024, <https://doi.org/10.5089/9798400260964.001>
- 2 Office of Assistant to Deputy Cabinet Secretary, “President Jokowi Reveals Strategies to Achieve 2045 Golden Indonesia Vision”, Cabinet Secretariat of the Republic of Indonesia, 16 August 2023, <https://setkab.go.id/en/president-jokowi-reveals-strategies-to-achieve-2045-golden-indonesia-vision/>
- 3 M. Razi Rahman, “Prabowo Says Increasingly Confident of 8% Growth”, *Antara*, 16 January 2025, <https://en.antaranews.com/news/341702/prabowo-says-increasingly-confident-of-8-growth>
- 4 Yvette Tanamal, “Prabowo Promises 8% Growth through Downstreaming”, *The Jakarta Post*, 16 May 2024, <https://www.thejakartapost.com/indonesia/2024/05/16/prabowo-promises-8-growth-through-downstreaming.html>
- 5 Nathan Associates Inc, “Economic Effects of Indonesia’s Mineral-Processing Requirements for Export”, *USAID*, April 2013, https://web.archive.org/web/20221006162347/http://pdf.usaid.gov/80/pdf_docs/pbaaa139.pdf
- 6 EIU, “Indonesia’s Quest to Enter EV Supply Chains”, *Economist Intelligence Unit*, 2 March 2023, <https://www.eiu.com/n/indonesia-quest-to-enter-ev-supply-chains/>
- 7 Jeffrey Neilson, Angga Dwiartama, Niels Fold, Dikdik Permadi, “Resource-Based Industrial Policy in an Era of Global Production Networks: Strategic Coupling in the Indonesian Cocoa Sector”, *World Development* 135: 105045, November 2020, <https://doi.org/10.1016/j.worlddev.2020.105045>
- 8 Geoscience Australia, “Critical Minerals at Geoscience Australia”, Scientific Topics, <https://www.ga.gov.au/scientific-topics/minerals/critical-minerals>
- 9 Eve Warburton, *Resource Nationalism in Post-Boom Indonesia: The New Normal?*, (Sydney: Lowy Institute, 27 April 2017), <https://www.lowyinstitute.org/publications/resource-nationalism-post-boom-indonesia-new-normal>
- 10 World Bank, “Investment in Flux”, *Indonesia Economic Quarterly*, March 2014, <https://www.worldbank.org/content/dam/Worldbank/document/EAP/Indonesia/IEQ-March2014-english.pdf>
- 11 US Geological Survey, “Mineral Commodity Summaries 2024”, *Geological Survey*, 30 January 2024, <https://pubs.usgs.gov/periodicals/mcs2024/mcs2024.pdf>
- 12 World Bank, “Investment in Flux”, *Indonesia Economic Quarterly*, March 2014, <https://www.worldbank.org/content/dam/Worldbank/document/EAP/Indonesia/IEQ-March2014-english.pdf>

- 13 Indonesia Ministry of Investment, “Regional Investment Potential”, <https://regionalinvestment.bkpm.go.id/pir/insentif/>
- 14 Ayman Falak Medina, “Indonesia’s Electric Battery Industrial Strategy”, *ASEAN Briefing*, 2 February 2024, <https://www.aseanbriefing.com/news/indonesias-electric-battery-industrial-strategy/>
- 15 Eve Warburton, *Resource Nationalism in Post-Boom Indonesia: The New Normal?*, (Sydney: Lowy Institute, 27 April 2017), <https://www.loyyinstitute.org/publications/resource-nationalism-post-boom-indonesia-new-normal>
- 16 David Guberman, Samantha Schreiber, Anna Perry, “Export Restrictions on Minerals and Metals: Indonesia’s Export Ban of Nickel”, Working Paper ICA-104, Office of Industry and Competitiveness Analysis, US International Trade Commission, February 2024, https://www.usitc.gov/publications/332/working_papers/ermm_indonesia_export_ban_of_nickel.pdf
- 17 Alfian Al-Ayubby, “The Workers Paying the Price for Indonesia’s Nickel Boom”, *New Mandala*, 14 June 2024, <https://www.newmandala.org/the-workers-paying-the-price-for-indonesias-nickel-boom/#:~:text=As%20of%20July%202023%2C%20Indonesia,United%20States%2C%20Brazil%20and%20Australia>
- 18 John Thoburn, Kaoru Natsuda, “How to Conduct Effective Industrial Policy: A Comparison of Automotive Development in the Philippines and Indonesia”, *Journal of the Asia Pacific Economy* 23 (4): 657–82, 17 January 2019, <https://doi.org/10.1080/13547860.2018.1503768>
- 19 Reda Cherif, Fuad Hasanov, “The Pitfalls of Protectionism: Import Substitution vs Export-Oriented Industrial Policy”, IMF Working Paper, April 2024, [https://research.hinrichfoundation.com/hubfs/HTUI%20PDFs/The%20Pitfalls%20of%20Protectionism%20\(IMF\)/The%20Pitfalls%20of%20Protectionism%20-%20IMF%20-%20May%202024.pdf](https://research.hinrichfoundation.com/hubfs/HTUI%20PDFs/The%20Pitfalls%20of%20Protectionism%20(IMF)/The%20Pitfalls%20of%20Protectionism%20-%20IMF%20-%20May%202024.pdf)
- 20 OEC, “Cars in Indonesia”, The Observatory of Economic Complexity, <https://oec.world/en/profile/bilateral-product/cars/reporter/idn>
- 21 “Neta, Wuling, Chery, and Sokon to Make Indonesia an EV Export Hub”, *Jakarta Globe*, 14 June 2024, <https://jakartaglobe.id/business/neta-wuling-chery-and-sokon-to-make-indonesia-an-ev-export-hub>
- 22 Bernadette Christina, Fransiska Nangoy, “Indonesia Relaxes Tax Rules on EV Imports to Attract Investment”, Reuters, 13 December 2023, <https://www.reuters.com/business/autos-transportation/indonesia-relaxes-tax-rules-ev-imports-attract-investment-2023-12-13/>
- 23 IEA, *Global EV Outlook 2024: Moving Towards Increased Affordability*, (International Energy Agency, April 2024), <https://iea.blob.core.windows.net/assets/aa21aa97-eea2-45b4-8686-ae19d8939161/GlobalEVOutlook2024.pdf>
- 24 Uyu Septiyati, Raka Adji, “Tap Automotive Sector Potential to Compete Globally: Govt to Industry”, *Antara*, 15 February 2024, <https://en.antaranews.com/news/306105/tap-automotive-sector-potential-to-compete-globally-govt-to-industry>
- 25 Jane Terpstra Tong, Robert H. Terpstra, Ngat-Chin Lim “Proton: Its Rise, Fall, and Future Prospects”, *Asian Case Research Journal* 16 (02), December 2012, https://www.researchgate.net/publication/263907043_Proton_Its_Rise_Fall_and_Future_Prospects

- 26 Vikram Nehru, “Modern Industrial Policy: Lessons from Malaysia’s Auto Industry”, Carnegie Endowment for International Peace, 22 March 2012, <https://carnegieendowment.org/research/2012/03/modern-industrial-policy-lessons-from-malaysias-auto-industry?lang=en>
- 27 Deni Friawan, Haryo Aswicahyono, Ira S. Titiheruw, Yose Rizal Damuri, Adinova Fauri, Carlos Mangunsong, Jeremy Samuel Ngadiman, *Economic Impacts of Local Content Requirements in Indonesia*, (CSIS Indonesia, 2023), <https://www.csis.or.id/publication/economic-impacts-of-local-content-requirements-in-indonesia/>
- 28 Stefano Sulaiman, “China’s BYD Launches Electric Cars in Indonesia, Aims to be Market Leader”, Reuters, 18 January 2024, <https://www.reuters.com/business/autos-transportation/chinas-byd-launches-electric-passenger-cars-indonesia-2024-01-18/>
- 29 Divya Karyza, “BYD, Other Carmakers to Follow Through on Local Factory Plans: Govt”, *The Jakarta Post*, 21 July 2024, <https://www.thejakartapost.com/business/2024/07/21/byd-other-carmakers-to-follow-through-on-local-factory-plans-govt.html>
- 30 Ruly Kurniawan, Agung Kurniawan, “Airlangga Tagih Janji Pembuatan Pabrik BYD di Indonesia”, *Kompas*, 2 December 2024, https://otomotif.kompas.com/read/2024/12/02/070200215/airlangga-tagih-janji-pembuatan-pabrik-byd-di-indonesia#google_vignette
- 31 UNCTAD, “World Investment Report 2024”, UN Trade and Development, 20 June 2024, https://unctad.org/system/files/official-document/wir2024_en.pdf
- 32 Figures for 2024 show a significant slowdown after this post-pandemic surge. This is to be expected given the capacity constraints of absorbing so much foreign capital investment in so short a time span.
- 33 Lauri Myllyvirta, Katherine Hasan, Jamie Kelly, Jobit Parapat, Bhima Yudhistira Adhinegara, Atina Rizqiana, Fiorentina Refani, Nailul Huda, Lay Monica, Jaya Darmawan, Wishnu Try Utomo, *Debunking the Value-Added Myth in Nickel Downstream Industry*, (Centre for Research on Energy and Clean Air, 20 February 2024), <https://energyandcleanair.org/publication/debunking-the-value-added-myth-in-nickel-downstream-industry/>
- 34 Divya Karyza, “Govt Points to Revenue Jump in Defense of Downstream Nickel Policy”, *The Jakarta Post*, 15 August 2023, <https://www.thejakartapost.com/business/2023/08/15/govt-points-to-revenue-jump-in-defense-of-downstream-nickel-policy.html>
- 35 Fransiska Nangoy, Stefano Sulaiman, “Indonesia Cuts Tax Breaks to Discourage Low-Quality Nickel Investment, Minister Says”, Reuters, 4 May 2023, <https://www.reuters.com/markets/commodities/indonesia-cuts-tax-breaks-discourage-low-quality-nickel-investment-minister-2023-05-03/>
- 36 Anne O. Krueger, “Government Failures in Development”, *Journal of Economic Perspectives* 4 (3): 9–23, 1 August 1990, <https://doi.org/10.1257/jep.4.3.9>
- 37 Ayman Falak Medina, “Southeast Asia’s First EV Battery Plant Begins Operations in Indonesia”, *ASEAN Briefing*, 5 July 2024, <https://www.aseanbriefing.com/news/southeast-asias-first-ev-battery-plant-begins-operations-in-indonesia/>
- 38 “Ride-Hailing Giant Gojek to Shift to Electric Vehicles by 2030”, *The Straits Times*, 1 May 2021, <https://www.straitstimes.com/asia/se-asia/ride-hailing-giant-gojek-to-shift-to-electric-vehicles-by-2030>

- 39 ASEAN Centre for Energy, “Grab, Gojek, State-owned Electricity Provider PLN to Develop EV in Indonesia”, <https://aseanenergy.org/news-clipping/grab-gojek-state-owned-electricity-provider-pln-to-develop-ev-in-indonesia/>
- 40 International Monetary Fund, “Harnessing Indonesia’s Demographic Dividend: Opportunities and Challenges”, IMF Country Report, 6 February 2018, <https://www.elibrary.imf.org/view/journals/002/2018/033/article-A001-en.xml>
- 41 Nathaniel Lane, “Manufacturing Revolutions: Industrial Policy and Industrialization in South Korea”, SSRN, 29 November 2022, <https://ssrn.com/abstract=3890311>
- 42 Kian Wie Thee, “The Indonesian Wood Products Industry”, *Journal of the Asia Pacific Economy* 14 (2): 138–49, 2 April 2009, <https://doi.org/10.1080/13547860902785971>.
- 43 Jeffrey Neilson, Angga Dwiartama, Niels Fold, Dikdik Permadi, “Resource-Based Industrial Policy in an Era of Global Production Networks: Strategic Coupling in the Indonesian Cocoa Sector”, *World Development* 135: 105045, 8 July 2020, <https://doi.org/10.1016/j.worlddev.2020.105045>
- 44 Matthew Campbell, Annie Lee, “The Deadly Mining Complex Powering the EV Revolution”, Bloomberg, 17 June 2024, <https://www.bloomberg.com/features/2024-indonesia-sulawesi-nickel-fire/>
- 45 Jobit Parapat, Katherine Hasan, “Emerging Captive Coal Power: Dark Clouds on Indonesia’s Clean Energy Horizon”, Centre for Research on Energy and Clean Air, 20 September 2023, https://energyandcleanair.org/wp/wp-content/uploads/2023/10/CREA_GEM-Indonesia-Captive-Briefing_EN_09.2023.pdf
- 46 Viktor Tachev, “Addressing Captive Coal Power Crucial to the Decarbonisation of Indonesia”, *Energy Tracker Asia*, 26 February 2024, <https://energytracker.asia/indonesia-coal-power/>
- 47 Hans Nicholas Jong, “Indonesia’s Coal Burning Reaches Record High Amid Rise of Industrial Smelting”, *Eco-Business*, 17 July 2023, <https://www.eco-business.com/news/indonesias-coal-burning-reaches-record-high-amid-rise-of-industrial-smelting/>
- 48 Global Carbon Atlas, “Carbon Emissions 2023”, <https://globalcarbonatlas.org/emissions/carbon-emissions/>
- 49 Veronique Morin, Ana E. Bucher, Arghya Sinha Roy, Alex Chapman, William Davies, Ciaran Downey, “Climate Risk Country Profile: Indonesia”, World Bank Group and Asian Development Bank, 2021, <https://www.adb.org/sites/default/files/publication/700411/climate-risk-country-profile-indonesia.pdf>
- 50 Hilman Palaon, Robert Walker, “A Glimpse into Indonesia’s Nickel Policy”, *The Interpreter*, 23 August 2024, <https://www.lowyinstitute.org/the-interpreter/glimpse-indonesia-s-nickel-policy>
- 51 Adelia Dinda Sani, “Indonesia Pledges Nickel Industry Decarbonisation as Social and Biodiversity Concerns Linger”, *Eco-Business*, 28 June 2024, <https://www.eco-business.com/news/indonesia-pledges-nickel-industry-decarbonisation-as-social-and-biodiversity-concerns-linger/>
- 52 Bureau of International Labor Affairs, “List of Goods Produced by Child Labor or Forced Labor”, US Department of Labor, <https://www.dol.gov/agencies/ilab/reports/child-labor/>

list-of-goods

- 53 Vasileios Rizos, Patricia Urban, *Implementing the EU Digital Battery Passport*, (CEPS, March 2024), https://circulareconomy.europa.eu/platform/sites/default/files/2024-03/1qp5rxiZ-CEPS-InDepthAnalysis-2024-05_Implementing-the-EU-digital-battery-passport.pdf
- 54 Krista Shennum, "Cancellation of Nickel Investments Should be a Wake-Up Call for Indonesia", *The Diplomat*, 5 July 2024, <https://thediplomat.com/2024/07/cancellation-of-nickel-investments-should-be-a-wake-up-call-for-indonesia/>
- 55 "Indonesia — Measures Relating to Raw Materials", Dispute Settlement DS592, World Trade Organization, https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds592_e.htm#:~:text=On%20December%202022%2C%20the,Working%20Procedures%20were%20to%20be
- 56 A. Anantha Lakshmi, "Indonesia Moves to Reduce Chinese Ownership of Nickel Projects", *Financial Times*, 26 July 2024, <https://www.ft.com/content/0f8e2fe8-c7cb-4d6a-9436-1cb1806af4e0>
- 57 Feri Agus Setyawan, "Moeldoko Ungkap Keanehan Motor Listrik Sepi Peminat", *CNN Indonesia*, 21 February 2024, <https://www.cnnindonesia.com/otomotif/20240221130535-603-1065442/moeldoko-ungkap-keanehan-motor-listrik-sepi-peminat>
- 58 Robert Walker, "China's Car Exports Pose a Key Question to Policymakers: Compete or Protect?", *The Interpreter*, 19 October 2023, <https://www.lowyinstitute.org/the-interpreter/china-s-car-exports-pose-key-question-policymakers-compete-or-protect>
- 59 IEA, *Global EV Outlook 2024: Moving Towards Increased Affordability*, (International Energy Agency, April 2024), <https://iea.blob.core.windows.net/assets/aa21aa97-eea2-45b4-8686-ae19d8939161/GlobalEVOutlook2024.pdf>
- 60 EV Lithium, "LFP vs. NMC Batteries: Who's the Real Winner?", <https://www.evlithium.com/Blog/lfp-vs-nmc-batteries-comparison.html#:~:text=Both%20LFP%20and%20NMC%20batteries,depends%20on%20your%20specific%20needs>
- 61 A. Anantha Lakshmi, Harry Dempsey, "Stellantis in Talks with Vale to Invest in Indonesian Nickel Smelter", *Financial Times*, 14 May 2024, <https://www.ft.com/content/ee9800d1-545c-4766-957f-1757541c2063>
- 62 Robert Walker, Hilman Palaon, "Why Indonesia Should Join the Minerals Security Partnership", *The Jakarta Post*, 18 October 2024, <https://www.thejakartapost.com/opinion/2024/10/18/why-indonesia-should-join-the-minerals-security-partnership.html>
- 63 Christian Ebeke, Florence Jaumotte, "How Reform Can Aid Growth and Green Transition in Developing Economies", *IMF Blog*, 25 September 2023, <https://www.imf.org/en/Blogs/Articles/2023/09/25/how-reform-can-aid-growth-and-green-transition-in-developing-economies>

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