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Policy paper

Path to Indonesia's 8% growth: Leveraging Nickel-based EVs for Energy Security

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This research paper serves as a platform for the research community to disseminate research findings and create a space for dialogue to exchange ideas.

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List of Abbreviation

ACC	Advanced Chemistry Cell
AP	Approved Permit
APAC	Asia Pacific
Bappenas	Badan Perencanaan Pembangunan Nasional / National Development Planning Ministry
BaU	Business as usual
BBNKB	Bea Balik Nama Kendaraan Bermotor / Duty on Transfer of Motor Vehicle
BEV	Battery Electric Vehicle
BKPM	Badan Koordinasi Penanaman Modal / Indonesia Investment Coordinating Board
BPS	Badan Pusat Statistik / Central Bureau of Statistics
CAFC	Corporate Average Fuel Consumption
CAGR	Compound annual growth rate
CBU	Completely Built-Up
CBU EV	Completely Built-Up Electric Vehicle
CFPP	Coal-fired power plant
CHEAPR	Connecticut Hydrogen and Electric Automobile Purchase Rebate
CKD	Completely Knocked Down
ERIA	Economic Research Institute for ASEAN and East Asia
EV	Electric Vehicle
FTA	Free Trade Agreement
FTV	Financing-to-Value
GAIKINDO	Gabungan Industri Kendaraan Bermotor Indonesia / Association of Indonesian Automotive Manufacturers
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GW	Giga Watt
GWh	Gigawatt-hour
ICE	Internal Combustion Engine
IRA	Inflation Reduction Act
IT	Information Technology
JKDM	Royal Malaysian Customs Department
KBLBB	Kendaraan Bermotor Listrik Berbasis Baterai / Battery-Based Electric Motor Vehicle
Kepmen ESDM	Energy and Mineral Resources Ministerial Decree
KeTSA	Ministry of Energy and Natural Resources
LCMB	Low Carbon Mobility Project
LFP	Lithium Iron Phosphate
LME	London Metal Exchange
LTS-LCCR	Long-Term Strategy for Low Carbon and Climate Resilience
LTV	Loan-to-Value
MEMR	Ministry of Energy and Mineral Resources
MGTC	Malaysian Green Technology Corporation
MIDA	The Malaysian Investment Department Authority
MNC	Multinational Companies
MoF	Ministry of Finance
MoT	Ministry of Transport
NCA	Lithium Nickel Cobalt Aluminum Oxide

NDC	Nationally Determined Contribution
NEMMP	National Electric Mobility Mission Plan
NETR	National Energy Transition Roadmap
NEV	New Energy Vehicle
NMC	Nickel Manganese Cobalt
NPL	Non-Performing Loans
NZE	Net Zero Emissions
OEM	Original Equipment Manufacturer
OJK	Otoritas Jasa Keuangan / Financial Service Authority
Perpres	Peraturan Presiden / Presidential Regulation
PHEV	Plug-in Hybrid Electric Vehicle
PKB	Pajak Kendaraan Bermotor / Motor Vehicle Tax
PLI	Production-Linked Incentive
PMK	Peraturan Menteri Keuangan / Finance Ministerial Decree
PMP	Phased Manufacturing Program
PP	Peraturan Pemerintah / Government Regulation
PPnBM	Pajak Pertambahan Nilai Barang Mewah / luxury tax
PPNDTP	Pajak Pertambahan Nilai Ditanggung Pemerintah / Value added tax borne by government.
PwC	PricewaterhouseCoopers
R&D	Research and Development
RUEN	Rencana Umum Energy Nasional / National Green Energy Plan
RUPTL	Rencana Usaha Penyediaan Tenaga Listrik / Electricity Supply Business Plan
SPBKLU	Stasiun Penukaran Baterai Kendaraan Listrik Umum / Battery Swapping Facilities
SPKLU	Stasiun Pengisian Kendaraan Listrik Umum / Charging Station
SRP	Suggested Retail Price
TKDN	Tingkat Komponen Dalam Negeri / Local Content Requirement
VAT	Value Added Tax

Executive Summary

A combination of factors led the Indonesian government to adopt a landmark policy in 2019 aimed at electrifying the country's transportation sector. These included the rising costs of imported crude oil and fossil fuels needed to power the growing fleet of internal combustion engine (ICE) vehicles, Indonesia's status as home to the world's largest nickel reserves, a critical mineral for electric vehicle (EV) battery production, and its position as Southeast Asia's largest market.

Under the current administration of President Prabowo Subianto, accelerating EV development and adoption supports several strategic economic goals, including achieving a high economic growth rate of 8 percent by the end of his term in 2029 and enhancing energy self-sufficiency by reducing dependence on imported crude oil and fuel.

What EVs Could Achieve

Driving high economic growth

Indonesia regained its upper-middle-income status in 2022, a position lost during the COVID-19 pandemic in 2020. This achievement was driven by rising gross domestic product (GDP) per capita, which increased from US$3,853 in 2020 to US$4,730 in 2022 and US$4,876 in 2023, surpassing the World Bank's threshold of US$4,466 for upper-middle-income classification. This progress reflects Indonesia's stable economic growth, which has averaged 4.2 percent annually, typically hovering around 5 percent.

However, this growth rate remains insufficient to escape the middle-income trap and realize the "Golden Indonesia 2045" vision of becoming a developed nation. According to the Ministry of National Development Planning (Bappenas), an annual growth rate of at least 6 percent is required to meet this goal by 2041. President Prabowo has set an even more ambitious target of 8 percent by 2029. Achieving this will require new engines of growth, particularly industrialization, to generate broad economic multipliers and societal benefits.

Historically, Indonesia's economy has been heavily reliant on commodity cycles. From 2000 to 2012, rising prices of palm oil and coal supported an average growth rate of 6 percent. However, after the commodity boom ended in 2015, growth stagnated at around 5 percent. In response, the government shifted focus toward industrialization as a new growth driver. A pivotal policy decision came in 2019, when the government banned nickel ore exports effective January 1, 2020, to encourage investment in downstream industries, especially nickel, a vital input for EV battery production.

This value-added strategy has significantly diversified the economy, created jobs, and increased export revenues, buffering the country from global commodity price volatility. As a result, nickel product exports skyrocketed from US$4 billion in 2017 to US$33.52 billion in 2023, an increase of 745 percent.

Despite these successes, challenges remain. The manufacturing sector's contribution to GDP declined from 21.6 percent in 2013 to 20.3 percent in 2023. Within this sector, transportation is a key component, accounting for 8.3 percent of manufacturing GDP. Yet, in 2024, declining

car demand caused a 4.3 percent contraction in the automotive manufacturing industry, with an estimated economic impact of Rp 7.1 trillion across related industries.

Developing the EV industry, especially the nickel-based battery ecosystem, has the potential to revitalize manufacturing, spur industrialization, and place Indonesia on a path to sustained high economic growth.

Accelerating the nickel downstream industry

One of the primary goals of Indonesia's nickel downstream strategy is to produce essential raw materials for EV batteries and support the broader growth of the EV industry. By 2023, nearly all domestically mined nickel was processed locally, according to the Directorate General of Minerals and Coal at the Ministry of Energy and Mineral Resources (MEMR). Building on this, the government is now prioritizing advanced refining processes, with a 95 percent realization rate for nickel matte and 75 percent for processed nickel.

Currently, most of Indonesia's nickel is used for stainless steel production, aligned with global trends, where 65 percent of nickel demand goes to stainless steel, according to Nornickel. However, battery-grade nickel demand is expected to rise dramatically, from 7 percent of total nickel use in 2021 to 41 percent by 2040. This surge is projected to double global nickel demand to 6 million tons annually, exposing a gap in Indonesia's EV supply chain, as no domestic infrastructure currently connects nickel processing directly to EV assembly.

Nickel-based batteries offer several strategic advantages over lithium iron phosphate (LFP) batteries, especially for Indonesia's EV ambitions. First, they serve different market segments, allowing Indonesia to diversify and avoid direct competition. Second, nickel-based batteries perform better in cold climates, making them ideal for export to right-hand-drive countries with cooler environments. Third, China currently dominates the LFP market, producing 98.45 percent of global LFP cathodes and controlling most of the refining capacity for key materials. Indonesia has a stronger opportunity to lead in nickel-based battery production due to its abundant reserves.

In contrast, producing LFP batteries domestically would require importing most materials, mainly from China. As global demand for LFP grows, this would likely increase iron imports, putting pressure on the Indonesian rupiah, especially given the country's status as a net iron importer since 2021.

Indonesia also has significant potential in the EV supply chain for cathode and anode production. Currently, there is no domestic production of nickel-based cathodes or anodes. As demand for advanced batteries and renewable energy storage systems rises, Indonesia can expand its export market and reduce reliance on imports by developing this sector. This would help lower production costs, shorten supply chains, and offer long-term economic benefits through market diversification.

To seize this opportunity, the government could introduce targeted incentives to promote nickel-based EV manufacturing and position Indonesia as a global EV supply chain leader. Policies similar to the U.S. Inflation Reduction Act (IRA) that support strategic resources, and localization could help channel investment into critical industries. Prioritizing the use of Indonesian nickel in EV technologies would better align the country's natural resource advantage with its ambition to become a global EV powerhouse.

Advancing Energy Self-Sufficiency

The transportation sector is Indonesia's largest oil consumer, accounting for 55 percent of total national oil usage. Since becoming a net oil importer in 2003, rising oil consumption has strained public finances and widened the trade deficit. Domestic oil production has declined from 1.4 million barrels per day in 2000 to just 576,000 barrels per day as of early 2024, while demand has surged to 1.6 million barrels per day. This disparity has led to fuel imports at twice the rate of domestic production, valued at US$12.8 billion (Rp 207.11 trillion) in the first half of 2024 alone.

Rising geopolitical tensions further underscore the need for energy resilience. During global crises like the Russia-Ukraine war in 2022, crude oil prices soared past US$100 per barrel, tripling the government's fuel subsidy expenditure compared to previous years.

Beyond fiscal savings, EV adoption aligns with Indonesia's evolving energy landscape. As of early 2024, the country had an electricity surplus of around 4 gigawatts, primarily generated from domestically sourced coal. While coal remains dominant, the government aims to gradually shift toward renewable energy sources. In this context, EVs represent a transitional solution, leveraging current energy availability while laying the groundwork for a cleaner energy future.

In response to these challenges and opportunities, President Prabowo has made energy self-sufficiency a top priority, integrating it into his 17 flagship programs. His administration aims to expand renewable energy and biofuel use while accelerating EV adoption. The target is to have 2 million EVs on the road by 2025, a substantial increase from approximately 200,000 in 2024. Although this would still represent a small portion of Indonesia's total vehicle fleet of 164 million units, widespread EV adoption could meaningfully reduce fossil fuel demand over the long term.

EV Policy: Supply and Demand Sides

Indonesia's electric vehicle (EV) policy took a major step forward with the issuance of Presidential Regulation No. 55 of 2019 on the acceleration of the battery electric vehicle (BEV) program. This regulation introduced key measures such as incentives for EV manufacturing, the expansion of public charging infrastructure, the regulation of electricity tariffs, and the enforcement of technical standards for EV operations.

Since then, the Indonesian government has implemented a series of policies aimed at fostering the growth of the EV ecosystem, addressing both the supply side (by attracting investment into the EV industry) and the demand side (by promoting EV adoption).

These efforts have produced tangible results. Global EV manufacturers, particularly from South Korea and China, have invested in assembly facilities in Indonesia. South Korea's Hyundai and China's Wuling were among the first to establish EV assembly plants. To accelerate EV adoption and attract further investment, the Indonesian government has offered import tax exemptions. As a result, Chinese EV manufacturers, including BYD, MG, Chery, and Neta, are eager to leverage these incentives and tap into Indonesia's growing EV market.

Hyundai completed its plant in Cikarang, West Java, in 2022, producing five models, including two EVs. Wuling has adapted its Cikarang plant to support EV assembly. Most recently, BYD has invested in a dedicated EV assembly plant with an annual capacity of 150,000 units.

Hyundai has also partnered with LG Energy Solution to establish Indonesia's first EV battery factory through their joint venture, PT HLI Green Power. Located in Karawang, West Java, the factory began mass production in April 2024, with an annual capacity of 10 gigawatt-hours, enough to power 150,000 EVs. Wuling has also announced plans to establish an EV battery facility in Cikarang with an annual capacity of 20,000 batteries.

On the demand side, government incentives have significantly boosted EV adoption. According to the Association of Indonesian Automotive Manufacturers (GAIKINDO), total EV sales between 2021 and 2024 reached 71,264 units. In 2024 alone, EV sales surged by 153 percent to 43,188 units, representing 5 percent of total car sales, up from 17,051 units (1.7 percent) in 2023. This growth occurred despite a 14.7 percent drop in overall car sales, which declined to 865,723 units in 2024 from over 1 million in 2023.

However, despite the rapid increase in EV sales, adoption remains relatively low compared to overall car sales. EVs accounted for only 5 percent of the market in 2024, far below the combined production capacity of local EV assembly facilities. Several key challenges continue to hinder broader adoption.

Cross-Country Comparison

Comparison with Malaysia, India, China, and Norway

Figure 1. Cross-Country EV policy comparison

Category	Incentives	Indonesia	Malaysia	India	China	Norway	Footnote
Supply	Import tax exemption	✓[1]	✓[1]			✓	[1] Only until Dec 2025
	Income tax incentive	✓	✓[1]				[1] Malaysia: LCMB
	Manufacturing subsidy			✓[1]	✓[2]		[1] **India: PLI sheme** [2] China: Made in China 2025
	Charging infrastructure		✓[1]	✓[2]			[1] Only until 2027 [2] Only until May 2024
Demand	Price subsidy	✓		✓[1]	✓[2]	✓[2]	[1] Only until May 2024 [2] Only until 2022
	Sales/service tax incentive	✓	✓	✓	✓	✓[1]	[1] Only until 2022, replaced with conditional price subsidy
	Ownership tax incentive (road tax, PBBKB)	✓	✓	✓		✓[1]	[1] Only until 2021
	Parking incentives				✓	✓[1]	[1] Has been abolished in several places since 2017
	Bus lane				✓	✓[1]	[1] Conditional exemption
	Corporate procurement		✓[1]			✓	[1] **Malaysia: Income tax deduction**

Source: Various sources

Indonesia's policy incentives to support the development and adoption of electric vehicles (EVs) are broadly comparable to those implemented in countries such as Malaysia, India, China, and Norway. These include supply-side incentives such as import tax exemptions, manufacturing subsidies, and support for the development of charging infrastructure.

Indonesia's supply-side policies are similar to those of Malaysia, which include tax holidays to attract investment and import tax exemptions to accelerate electrification. On the

demand side, incentives include reductions in sales taxes (such as VAT and luxury sales taxes), ownership tax reductions, price subsidies, and non-fiscal incentives like free or discounted parking, access to bus lanes, and corporate procurement incentives.

To reduce the upfront cost of EVs, Indonesia offers VAT reductions and exemptions from luxury sales tax, similar to India's approach. Regarding ownership costs, Indonesia exempts EVs from the Motor Vehicle Tax (PKB) and the Duty on the Transfer of Motor Vehicles (BBNKB), a strategy also seen in Malaysia and India.

However, based on the experiences of these countries, Indonesia has room to further enhance its incentive framework. On the demand side, Indonesia could introduce corporate procurement tax deductions and adopt China's policy of requiring apartment buildings to provide parking spaces equipped with charging stations. On the supply side, Indonesia could consider India's strategy of setting quotas for the import of completely built-up (CBU) EVs to mitigate potential risks to the domestic automotive industry.

Lessons Learned from Thailand

Thailand has introduced several policies to promote EV adoption, including customs duty exemptions and excise tax reductions. While these measures have helped accelerate the transition to EVs, they have also created challenges for the long-term sustainability of the domestic EV manufacturing sector.

Beginning in 2022, EV manufacturers in Thailand were allowed to import CBU EVs tax-free, provided they committed to local production. Under this policy, recipients must meet a 1:1 production-to-import ratio by 2024. If this target is not achieved, the required ratio increases to 1:1.5 in 2025, 1:2 in 2026, and 1:3 in 2027.

Between 2022 and 2023, around 84,000 EVs were imported under this scheme, necessitating the local production of 124,000 EVs by 2025. However, due to declining car sales, the Thai government extended the production timeline to accommodate manufacturers. To address potential oversupply, EV makers are also permitted to re-export EVs imported over the past two years.

While effective in spurring EV adoption, these policies have significantly disrupted Thailand's domestic EV manufacturing sector. CBU EV imports, benefiting from generous tax incentives, have become highly price-competitive, weakening the market position of locally produced vehicles. This challenge has been compounded by broader economic issues, including an economic slowdown, stricter loan regulations, rising household debt, and growing non-performing loans (NPL), all of which have dampened consumer demand for new vehicles.

As a result, major automakers such as Suzuki and Subaru have closed their plants in Thailand, while Honda has shut down one of its factories. This underscores the importance of designing EV policies that balance short-term adoption goals with the long-term health and sustainability of the domestic manufacturing industry.

1. Introduction

The Indonesian government introduced its electric vehicle (EV) policy in 2019 to stimulate manufacturing, develop the downstream nickel industry, and, most importantly, reduce the country's dependence on imported crude oil and fuel. The government's confidence in adopting this policy was grounded in Indonesia's large domestic market and its position as the holder of the world's largest nickel reserves, a critical material for EV battery production. That same year, the government issued a decree banning the export of nickel ore, effective January 2020, to support the development of the nickel downstream industry, particularly the production of raw materials for EV batteries.

Indonesia's EV policy was initiated with Presidential Regulation No. 55 of 2019 on the Acceleration of the Battery Electric Vehicle (BEV) Program. This regulation introduced several key measures, including incentives for EV manufacturing, the expansion of public EV charging infrastructure, electricity tariff regulations, and the enforcement of technical standards for EV operations. Since then, the Indonesian government has implemented additional policies aimed at fostering the growth of the EV ecosystem, addressing both the supply side, by attracting investment, and the demand side, by promoting EV adoption.

As EV prices remain higher than those of internal combustion engine (ICE) vehicles, making EVs more affordable is key to encouraging consumer adoption. In response to the high upfront cost, the government introduced fiscal instruments to lower purchasing costs, including a 10 percent Value Added Tax subsidy (PPNDTP) and luxury tax (PPnBM) exemptions. These efforts have shown results, attracting global EV manufacturers, particularly from South Korea and China, to invest in assembly facilities in Indonesia. Hyundai (South Korea) and Wuling (China) were among the first to establish EV assembly plants in the country. Hyundai completed its full-scale production facility in Cikarang, West Java, in 2022, producing five models, including two EVs. Wuling also adapted its assembly plant in Cikarang to produce EVs.

Hyundai has further invested in PT HLI Green Power, a joint venture with LG Energy Solution, to establish Indonesia's first EV battery factory. Located in Karawang, West Java, the factory began mass production in April 2024 with an annual capacity of 10 gigawatt-hours, sufficient to supply batteries for approximately 150,000 EVs. Wuling also announced, on September 21, 2024, its plan to establish an EV battery manufacturing facility in Cikarang, with an annual capacity to produce 20,000 EV batteries.

To further attract investment and encourage EV adoption, the government has implemented a relaxation policy for completely built-up (CBU) EVs, which includes exemptions from import duties and luxury taxes. This policy is driven by two main considerations. First, Indonesia's current corporate income tax structure poses a challenge in attracting global investors, especially when compared to more tax-friendly countries. Second, it allows EV manufacturers to test market readiness before committing to local production. If sales reach economies of scale, companies are more likely to establish production facilities in Indonesia and eventually expand into export markets.

Recently, several global EV companies, including BYD, MG, Chery, and Neta, have expressed strong interest in entering Indonesia's growing EV market, drawn by government incentives and the country's strategic potential. Among them, BYD made a significant move by investing in a dedicated EV assembly plant with an annual production capacity of 150,000 units. This investment demonstrates BYD's commitment to establishing a strong local presence and aligns with Indonesia's broader goal of building a robust domestic EV manufacturing ecosystem.

Government incentives on the demand side have also contributed to the growth of EV adoption. According to data from the Association of Indonesian Automotive Manufacturers (GAIKINDO), total EV sales from 2020 to February 2025 reached 79,037 units, with the highest sales recorded in 2024. That year, EV sales increased by 153 percent compared to 2023. Notably, this sharp rise occurred even as overall automobile sales in the country declined by 18 percent, from 934,444 units in 2023 to 762,495 in 2024.

Despite the rapid growth, EV adoption remains relatively low compared to total vehicle sales. In 2024, EVs accounted for only 5 percent of total car sales. Moreover, EV sales remain far below the total capacity of all EV assembly facilities in Indonesia. Several factors contribute to this low adoption rate, including public concerns about battery charging duration, limited driving range, battery lifespan uncertainty, and insufficient public charging infrastructure.[1]

Affordability and infrastructure remain major concern for consumer to broader adoption. Charging infrastructure across Indonesia requires significant expansion to meet growing demand. In addition, limited public awareness and understanding of EV technology hinder consumer confidence and slow adoption. High vehicle prices, exacerbated by a consistent upward trend, continue to place EVs out of reach for many consumers. Moreover, consumer preferences vary based on purchasing power and perceptions of EVs' functional and emotional benefits, affecting the choice between EVs and ICE vehicles.

From a policy perspective, the government must carefully consider the potential downsides of relaxing import taxes on CBU EVs. Since EVs compete directly with ICE vehicles, a surge in imported CBU EVs could undercut the local automotive industry by reducing demand for domestically produced vehicles and weakening incentives for local manufacturing.

This situation highlights the need for a balanced approach to policy formulation, ensuring that incentives effectively support EV adoption while also fostering domestic industry development. To that end, this study will first examine the economics of EV development in Indonesia. It will then conduct a comparative analysis of EV policies and their impacts across countries to provide evidence-based policy recommendations that can support both EV development and adoption in Indonesia. Finally, the study will assess the economic benefits of building an EV ecosystem in Indonesia, including increased output, employment, and value added. Based on these findings, the study will offer policy recommendations to further develop the industry and, most importantly, accelerate the adoption of fully electric vehicles.

[1] PwC, "The Road Ahead: Indonesia's electric vehicle readiness and consumer insights 2024," November 2024

2. EV Economic Contribution

2.1. EV Adoption

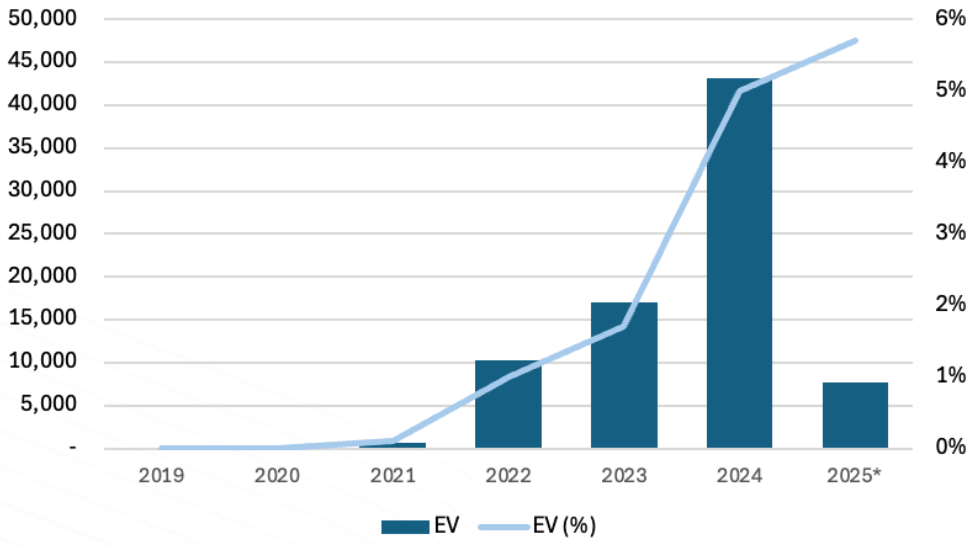
Global trends indicate that the electric vehicle (EV) market has evolved from a niche segment, once dominated by early adopters and environmentally conscious consumers, into a mainstream sector. This global shift is driven by several factors, including advancements in battery technology, the implementation of supportive environmental policies, and growing consumer demand for sustainable transportation solutions.

With its large population and rapid urbanization, Indonesia is emerging as a key player in the Asia-Pacific (APAC) region's expanding EV market. The country's automotive sector has seen considerable progress in EV adoption, supported by rising environmental awareness, government initiatives to attract investment, and increased availability of EV models. As of February 2025, EVs accounted for 5.7 percent of total automotive wholesale. For comparison, only 812 EVs were sold between 2021 and 2022. By the end of 2024, annual EV sales had surged to 43,188 units, 2.5 times higher than in 2023.

A Statista survey conducted in January 2024 revealed that 83 percent of respondents favoured electric vehicles due to their environmental benefits. Additionally, 48 percent cited long-term affordability, such as lower charging costs compared to petrol, as a key motivator.

Government subsidies and tax incentives have played an important role in encouraging the transition to EVs. As of 2024, 41 percent of survey respondents acknowledged that these financial incentives influenced their purchasing decisions. Moreover, 29 percent were drawn to EVs for their innovative features and driving comfort, while 16 percent cited a desire to stay current with trends as a factor in their adoption.

Figure 2. Monthly sales of battery electric vehicles in Indonesia 2023



Source: GAIKINDO (2025)

The Indonesian government has set an ambitious target of reaching 15 million EVs on the road by 2030, comprising 2 million electric cars and 13 million electric motorcycles. From an

industrial perspective, this widespread EV adoption is expected to stimulate substantial economic growth through increased investment in the development of key EV components and innovative vehicle models.

Additionally, the EV transition is projected to support Indonesia's national goal of processing 17 million tons of nickel annually by 2035, a critical raw material for EV batteries. The success of the EV movement can be further measured through its positive impact on key economic indicators, including increased industrial output, value-added contributions to the economy, and job creation within the industrial sector.

2.2. EV Adoption Challenges

Despite the rapid growth in electric vehicle (EV) sales, overall adoption remains low compared to total car sales in Indonesia. In addition, the current EV sales volume is far below the combined production capacity of EV assembly facilities in the country. Several factors contribute to this slow uptake, including public concerns about battery charging duration, limited driving range, uncertainty around battery lifespan, and insufficient public charging infrastructure.[2]

These issues largely stem from a lack of public awareness and understanding of EV technology, leading to widespread misconceptions, particularly "range anxiety," the fear that an EV's battery may not last long enough for daily travel needs. A survey by PwC revealed that 60 percent of potential buyers and 51 percent of sceptics were concerned about long charging times. Limited driving range was cited as a barrier by 59 percent of potential buyers and 75 percent of sceptics. Additionally, uncertainty about battery life, especially fears of rapid degradation and high replacement costs, remained a major concern for 46 percent of both groups. As a result, many consumers remain hesitant to transition to EVs. In this context, EV dealers play a vital role, not only as sellers but also as educators who can address misconceptions and promote awareness of the benefits and practicality of EVs.[3] [4]

Affordability is another significant barrier to EV adoption. Although EVs generally have lower operating costs than internal combustion engine (ICE) vehicles, their upfront prices remain high for most Indonesian consumers. Price sensitivity heavily influences purchasing decisions: EVs are moderately favoured by higher-income consumers and even more strongly favoured by lower-income groups, who are especially price-sensitive.[5] In fact, 25 percent of survey respondents said they would only consider buying an EV if it were cheaper than a conventional car, while only 16 percent were willing to pay a similar price.

Compounding the affordability issue is the broader trend in Indonesia's automotive market. Car prices have been rising by approximately 7.5 percent annually in recent years, significantly outpacing the average annual wage growth of 3.5 percent. This growing disparity has led to a decline in new car sales, with many consumers turning instead to the used car market.[6]

[2] PwC, "The Road Ahead: Indonesia's electric vehicle readiness and consumer insights 2024," November 2024
[3] Focus Group Discussion with Wuling Indonesia on Mar.13, 2025
[4] Interview with Coordinating Ministry for Infrastructure and Regional Development on Mar. 20, 2025
[5] Focus Group Discussion with Prasetiya Mulya University Associate Professor Ade Febransyah on Mar. 13, 2025
[6] Focus Group Discussion with GAIKINDO on Mar. 13, 2025.

Furthermore, while EVs offer clear environmental advantages and have the potential to benefit Indonesia's economy, the current financing environment has not adapted to support widespread adoption. Interest rates for EV loans remain the same as those for ICE vehicles, even though around 70 percent of car purchases in Indonesia are made through financing. As of now, there is no regulation from the Financial Services Authority (OJK) to mandate lower interest rates for EV financing. The only existing policy support from Bank Indonesia allows for 0 percent down payments on vehicle and residential loans until December 31, 2025.[7]

Beyond cost and financing, consumer preferences also shape EV demand. High-income consumers often choose EVs over ICE vehicles for emotional benefits such as prestige, comfort, and design rather than functional advantages. For consumers focused on practicality, regardless of income, there is little preference between EVs and ICE vehicles. Among low-income consumers driven by emotional appeal, ICE vehicles still tend to be slightly more attractive. The most effective way to accelerate EV adoption is through comprehensive, government-led initiatives supported by a strong local manufacturing ecosystem.[8]

Currently, some private actors, including financial institutions and EV manufacturers, are stepping in to fill the financing gap. Certain credit providers offer 0 percent interest loans under specific conditions, while manufacturers like Wuling and Hyundai provide low-interest financing options and extended payment terms to make EVs more accessible. However, without targeted government interventions, such as interest subsidies, down payment assistance, or dedicated EV loan programs, the high upfront cost of EVs will remain a major barrier. Addressing this financing gap is essential for achieving broader EV adoption in Indonesia.[9] [10]

2.3. Economic Growth

Indonesia lost its upper-middle-income status in 2020 due to the COVID-19 pandemic but successfully regained it in 2022. The country's GDP per capita rose from US$3,853 in 2020 to US$4,730 in 2022, and further to US$4,876 in 2023, surpassing the World Bank's upper-middle-income threshold of US$4,466. This growth in per capita income was the key factor in regaining the classification.

However, despite this progress, Indonesia's current economic growth rate remains insufficient to escape the middle-income trap and achieve its long-term vision of "Golden Indonesia 2045," which aspires to see Indonesia become a fully developed nation. According to the Ministry of National Development Planning (Bappenas), the country needs to maintain an annual GDP growth rate of at least 6 percent to reach this goal by 2041. President Prabowo has set an even more ambitious target of 8 percent growth by 2029.

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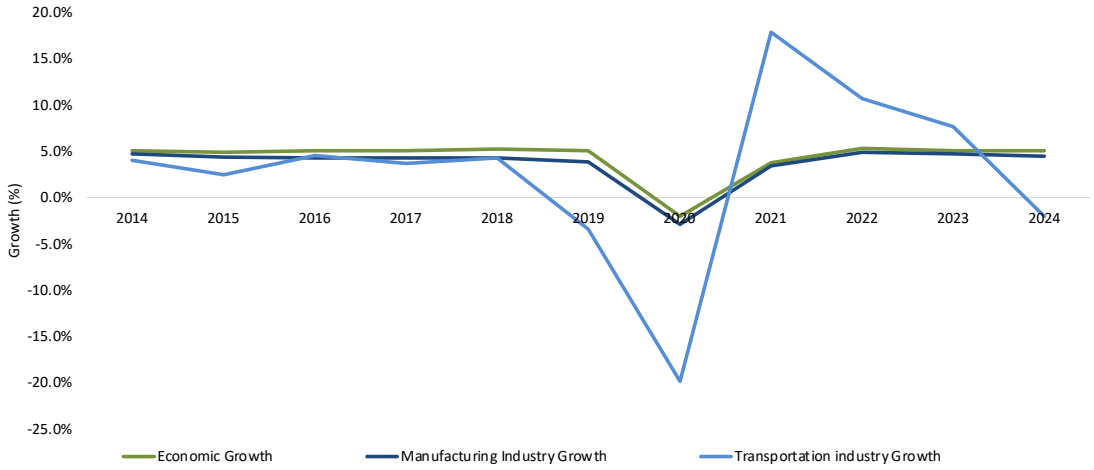
[7] CNBC Indonesia, "Beli Rumah & Kendaraan DP 0% Berlaku Sampai Desember 2025", Oct.24, 2024, https://tinyurl.com/54upptcu
[8] Focus Group Discussion with Prasetiya Mulya University Associate Professor Ade Febransyah on Mar. 13, 2025
[9] Detik, "Dongkrak Penjualan, Beli Mobil di Awal Tahun Ada Bunga Nol Persen", Jan.16, 2025, https://tinyurl.com/y449wkj5
[10] Kontan, "Penyaluran Pembiayaan Kendaraan Listrik Multifinance Masih Mini hingga Februari 2025", Mar.19, 2025 https://tinyurl.com/ja6wrs67

In reality, however, Indonesia's economic growth has remained stagnant at around 5 percent between 2013 and 2024, and it is projected to grow by only 5.1 percent in both 2025 and 2026 (see Figure 3). The manufacturing sector has mirrored this trend, with an average growth rate of just 3.7 percent over the same period.

Figure 3. Indonesia's economic growth, 2013-2024



Source: Central Bureau of Statistics (2025)

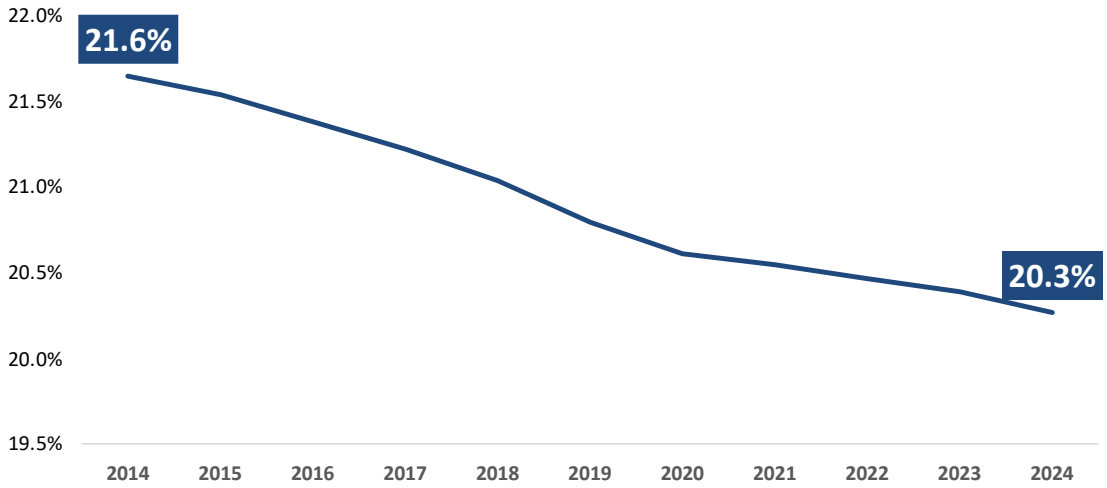
Indonesia's economy has historically been closely tied to global commodity cycles. Between 2000 and 2012, rising prices for palm oil and coal supported an average annual growth rate of 6 percent. However, following the end of the commodity boom in 2015, growth slowed to around 5 percent. In response, the government began shifting its focus toward industrialization as a new engine of economic growth.

A major turning point came in 2019 when the government announced a ban on nickel ore exports, effective January 1, 2020. This policy aimed to drive investment into downstream processing industries, particularly in nickel refining, a crucial step in developing electric vehicle (EV) battery supply chains. This value-added strategy has helped diversify the economy, generate employment, and increase export revenues, thereby reducing Indonesia's vulnerability to fluctuations in global commodity prices. As a result, nickel product exports soared from US$4 billion in 2017 to US$33.52 billion in 2023, an impressive increase of 745 percent.

Despite these achievements, challenges remain. The manufacturing sector's contribution to GDP has steadily declined, from 21.6 percent in 2013 to 20.3 percent in 2024 (see Figure 4). Within the manufacturing sector, the transportation industry plays a significant role, contributing 8.3 percent to manufacturing GDP. However, the transportation sector itself has experienced a decline, with its share of total GDP falling from 2.1 percent in 2013 to 1.7 percent in 2024.

Moreover, weakened car demand in 2024 led to a 4.3 percent contraction in the automotive manufacturing industry, with an estimated economic impact of Rp 7.1 trillion across related sectors.

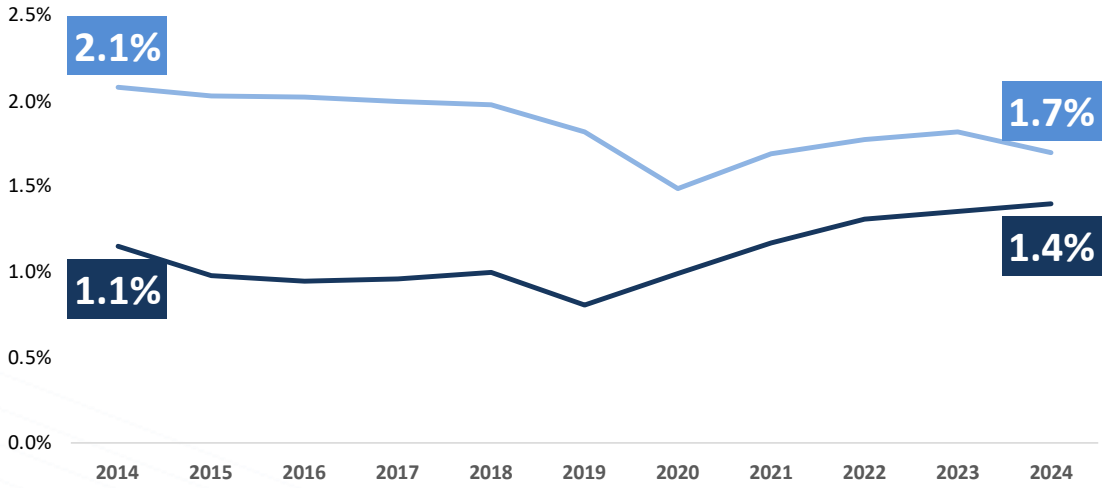
Figure 4. Manufacturing sector share in GDP, 2013-2024



Source: Central Bureau of Statistics (2025)

Meanwhile, the extractive industry has been gaining momentum. Driven by rising commodity prices since 2021, the metal ore mining sector experienced an average annual growth of 14.9 percent between 2021 and 2024, up significantly from the 5.7 percent average growth recorded between 2017 and 2020. This robust growth explains the increase in the sector's contribution to GDP, rising from 0.98 percent in 2013 to 1.34 percent in 2024 (see Figure 5).

Figure 5. Growth in metal ore mining and transportation industry, 2013-2024



Source: Central Bureau of Statistics (2025)

Developing the electric vehicle (EV) industry and its supporting ecosystem, especially the nickel-based battery sector, offers a strategic opportunity to reinvigorate Indonesia's industrial base, reverse the declining trend in manufacturing, and place the country on a trajectory of sustained high economic growth. Accelerated EV adoption also delivers broad societal benefits, stimulates economic multipliers, and supports the government's goal of achieving energy self-sufficiency.

Historically, the automotive industry has been a key contributor to Indonesia's economy. However, as EV adoption is still in its early stages, its market share remains limited. Of the 1,005,802 passenger cars sold in 2023, only 17,051, or 1.7 percent, were EVs.[11] That said, sales in 2024 have shown notable progress, with EVs capturing a 5 percent share of total car sales. While this may appear modest, the potential impact of EVs on Indonesia's economy is far greater than current figures suggest.

Indonesia's status as the world's largest nickel exporter, with the largest known reserves, places it at the forefront of the global EV revolution. Nickel is a key component in lithium-ion batteries, which power the majority of electric vehicles. The country's vast reserves provide it with a strategic advantage as global demand for nickel accelerates alongside EV market growth.

To capitalize on this advantage, Indonesia has adopted a policy shift aimed at moving from a raw material supplier to a fully integrated EV manufacturing hub. This downstream industrialization initiative focuses on processing natural resources domestically, such as producing nickel sulphate, a vital material in battery production, through the development of refineries and processing facilities. These efforts are intended to maximize value capture within the country and advance Indonesia's goal of becoming a global centre for EV production.

Aligned with this ambition, the government has introduced a range of incentives to support EV development, conditioned on compliance with domestic content requirements (TKDN). These incentives include tax breaks, subsidies, and reduced import duties on EV components. The TKDN policy mandates that EVs and their parts, particularly batteries, must meet a minimum threshold of domestically sourced materials in order to qualify for these benefits.

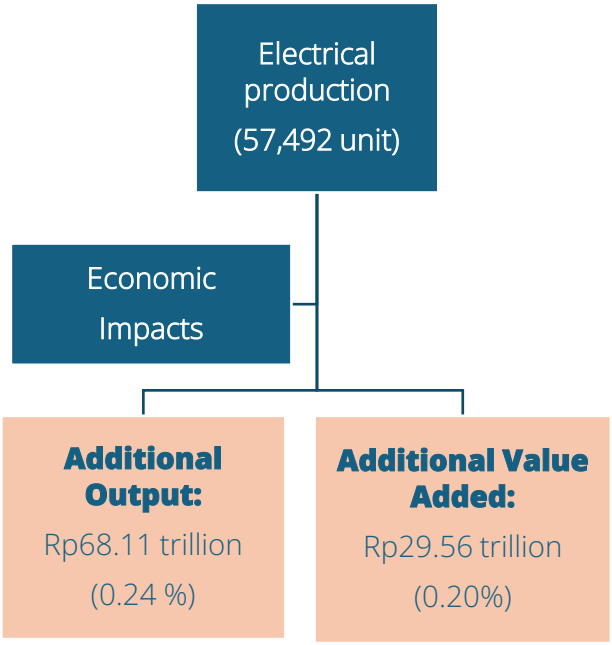
This approach supports broader national objectives, such as strengthening domestic industries and reducing reliance on imports. By promoting the use of local materials, especially nickel, in EV production, the government ensures that the economic benefits of the EV transition are retained within Indonesia. Moreover, the TKDN policy helps foster the development of a robust domestic supply chain, from raw material processing to final vehicle assembly, thereby creating jobs and stimulating industrial growth.

The findings underscore the urgency for Indonesia to commit to the EV transition without delay. Postponing this shift would not only increase economic costs exponentially but also exacerbate the environmental and fiscal burdens associated with continued fossil fuel dependency. Each year of delay compounds the challenge, making a smooth and cost-effective transition more difficult to achieve.

[11] Focus Group Discussion with GAIKINDO on Mar. 13, 2025.

2.3.1. Economic impact of investment in EV and EV battery

Figure 6. Economic impact of EV production



Source: Author calculation

This paper presents an *ex-ante* analysis to estimate the economic impact of investment in Indonesia's electric vehicle (EV) and EV battery industries. Using the input–output table 2020 published by Indonesia's Central Bureau of Statistics (BPS), we incorporate dedicated sectors for battery and EV production. The economic effects of EV production are assessed under the following assumptions:

- In line with the government's policy banning nickel ore exports, the study assumes that 100 percent of domestically mined nickel ore is absorbed by domestic economic activities.
- We assume that the EV batteries are of the lithium nickel cobalt aluminum oxide (NCA) type, which has the highest nickel content.
- It is assumed that the electric vehicles produced are entirely for export and do not substitute for domestic internal combustion engine (ICE) vehicle use. As such, there is no reduction in local conventional vehicle production or petrol consumption.
- The analysis focuses solely on the production phase. Impacts during the usage phase of the EVs are not considered, as it is assumed that all EVs are exported and only the domestic production impacts are relevant. [12]

[12] Viktor Pirmana, Armida Salsiah Alisjahbana, Arief Anshory Yusuf, Rutger Hoekstra, Arnold Tukker, "Economic and environmental impact of electric vehicles production in Indonesia", *Clean Technologies and Environmental Policy,* 25, pp.1871–1885, 2023

- The assumed investment in the EV industry includes Rp 19.52 trillion for EV production (notably by Hyundai, which uses nickel-based batteries) and Rp 19.14 trillion for battery production, realized between 2020 and Q3 2024.

The key findings on the economic and environmental impact of EV production in Indonesia are illustrated in Figure 6. Based on the assumption that the electric vehicles produced are comparable to a Tesla Model 3, priced at approximately US$23,300 per unit or Rp 310 million (using the 2020 exchange rate), an estimated 57,492 EVs are produced annually.

The ultimate demand from the EV sector generates a total increase of Rp 68.11 trillion in economic output, equivalent to 0.24 percent of national output. The sectors most directly connected to the EV manufacturing value chain, including the EV industry itself, experience the largest gains in economic output from this demand.

This growth primarily originates in upstream sectors: nickel ore (75.36 percent), bauxite (10.61 percent), and copper (1.61 percent). In the midstream and downstream segments, the most significant growth is seen in the "accumulators and dry batteries" sector, followed by the "motor vehicles (excluding motorcycles)" sector, which contributes 0.93 percent to the output increase.

Figure 7. Five sectors that benefit the most from EV production

No	Description	Sector Growth
1	Nickel ore	75.36%
2	Bauxite	10.61%
3	Copper	1.61%
4	Accumulator and dry batteries	1.06%
5	Motor vehicles except motorcycle	0.93%

Source: Author calculation

In terms of total economic output, approximately 85.35 percent of the additional output is generated by the ten industries with the highest contributions. The EV battery industry accounts for the largest share, producing Rp 22.7 trillion, or 33.34 percent, of the total additional output. This means that more than one-third of the economic gains come from this sector. The second-largest contributor is the electric vehicle industry itself, which generates 28.66 percent of the total additional output. This is followed by the nickel ore sector at 7.14 percent and the motor vehicles sector (excluding motorcycles) at 5.56 percent (Figure 8).

Figure 8. Top ten sectors creating additional output due to EV production

No	Description	Additional Output	Percentage
1	Electrical vehicle battery	22.71	33.34%
2	Electrical vehicle	19.52	28.66%

3	Nickel ore	4.86	7.14%
4	Motor vehicles except motorcycle	3.79	5.56%
5	Retail sale for car and motorcycle	1.97	2.89%
6	Retail sale for non-car and motorcycle	1.37	2.01%
7	Bauxite	1.00	1.48%
8	Land transport/non-railways	0.99	1.46%
9	Copper	0.96	1.41%
10	Banking	0.96	1.40%

Source: Author calculation

The final demand for electric vehicles (EVs) generated an additional Rp 29.56 trillion in value-added to the Indonesian economy, equivalent to approximately 0.2 percent. According to Figure 9, which outlines value-added changes across more than 187 sectors, nearly 83.5 percent of this additional value-added is concentrated in the top 10 sectors. The EV battery sector contributes the largest share, accounting for 28 percent of the total, followed by the electric vehicle sector at 23.11 percent. Other significant contributors include the nickel ore sector (9.9 percent), motor vehicles excluding motorcycles (5.6 percent), and retail sales of cars and motorcycles (4.7 percent).

Figure 9. Nickel-based EV value chain network

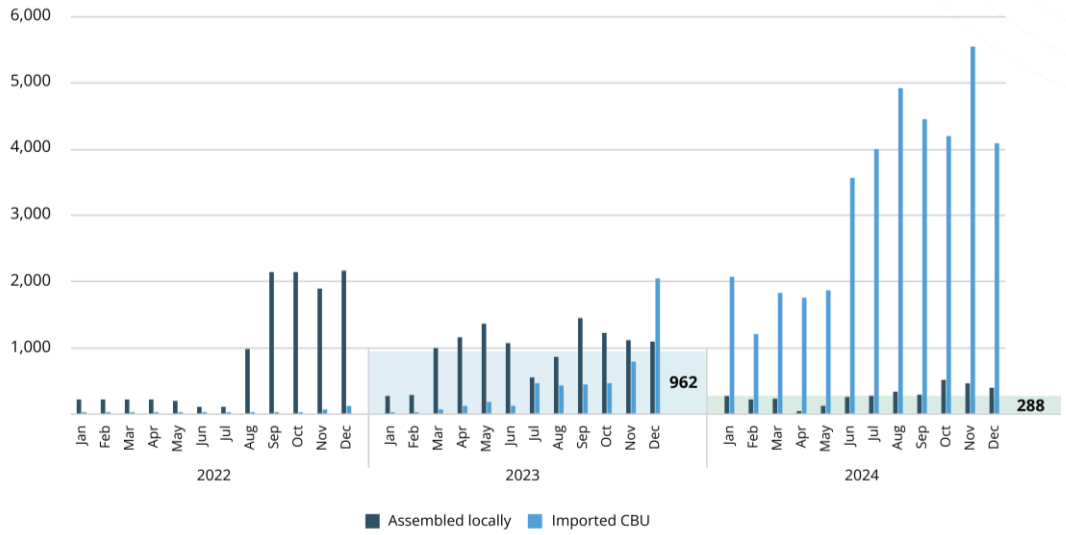
Upstream Raw Material			**Midstream** Parts and Components			**Downstream** EV Makers			**Aftermarket - Services**		
Rp 6.29 trillion			**Rp 8.94 trillion**			**Rp 10.84 trillion**			**Rp 0.23 trillion**		
											
Description	**Additional VA**	**%**	**Description**	**Additional VA**	**%**	**Description**	**Additional VA**	**%**	**Description**	**Additional VA**	**%**
Nickel ore	2.92	9.9%	Electrical Vehicle Battery	8.29	28.0%	Electrical Vehicle	6.83	23.1%	Reparation and maintenance of car and motorcycle	0.12	0.4%
Bauxite	0.72	2.4%	Accumulator and dry batteries	0.25	0.9%	Motor vehicles except motorcycle	1.66	5.6%	Services allied to transport	0.12	0.4%
Copper	0.71	2.4%	Tires	0.11	0.4%	Motorcycle	0.01	0.0%			
Other Mining and Quarriying services	0.34	1.1%	Electrical machinery	0.08	0.3%	Retail sale for car and motorcycle	1.38	4.7%			
Nonfertilizer basic chemical	0.28	0.9%	Multipley machine	0.07	0.2%	Retail sale for non-car and motorcycle	0.96	3.2%			

Source: Author calculation

2.3.2. Economic impact of importing CBU EVs

In the short term, the trend in EV sales has shifted from domestically assembled electric vehicles to completely built-up (CBU) imports. In 2023, CBU EVs accounted for only 32 percent of total EV sales. However, by 2024, their share surged dramatically, contributing to 92 percent of EV sales. This shift is also evident in the annual average of vehicles sold, as illustrated in Figure 10. In 2023, the average number of locally assembled EVs sold was 962 units, but in 2024, this figure dropped significantly to just 288 units.

Figure 10. Monthly wholesale of EV, 2022-2024

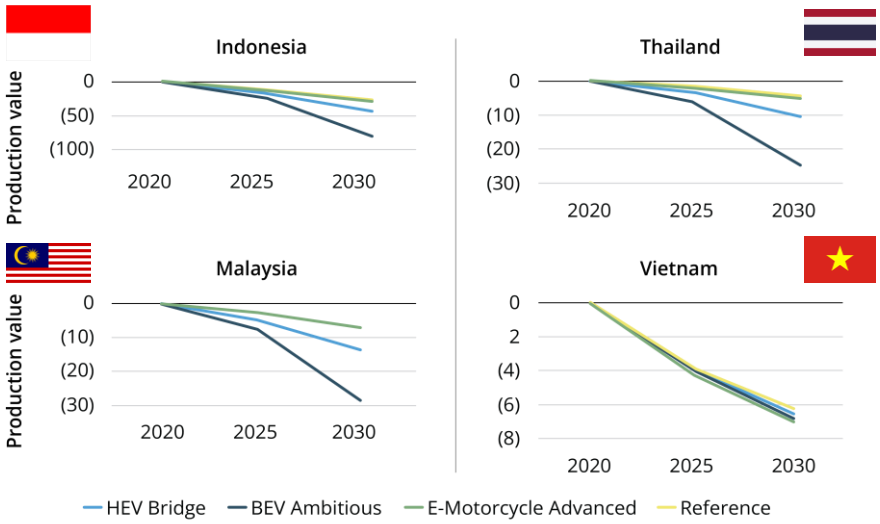


Source: GAIKINDO (2025)

These findings underscore a critical policy implication: Indonesia must prioritize the development of local EV and battery production to ensure that the energy transition bolsters, rather than undermines, the domestic economy. Heavy reliance on imported completely built-up (CBU) EVs risks turning the energy transition into a net economic burden instead of a catalyst for industrial growth.

Beyond the sales figures, the adoption of CBU EVs is also estimated to have a negative impact on domestic production value. A study by the Economic Research Institute for ASEAN and East Asia (ERIA), titled *"The Influence on Energy and the Economy of Electric Vehicles Penetration in ASEAN"*, projects that Indonesia will face the largest economic and employment losses among Southeast Asian nations if it continues to rely on imported EVs, including battery electric vehicles (BEVs), hybrid electric vehicles, and electric motorcycles.

Figure 11. Economic impact of importing CBU BEV



Source: Suehiro and Purwanto (2020)

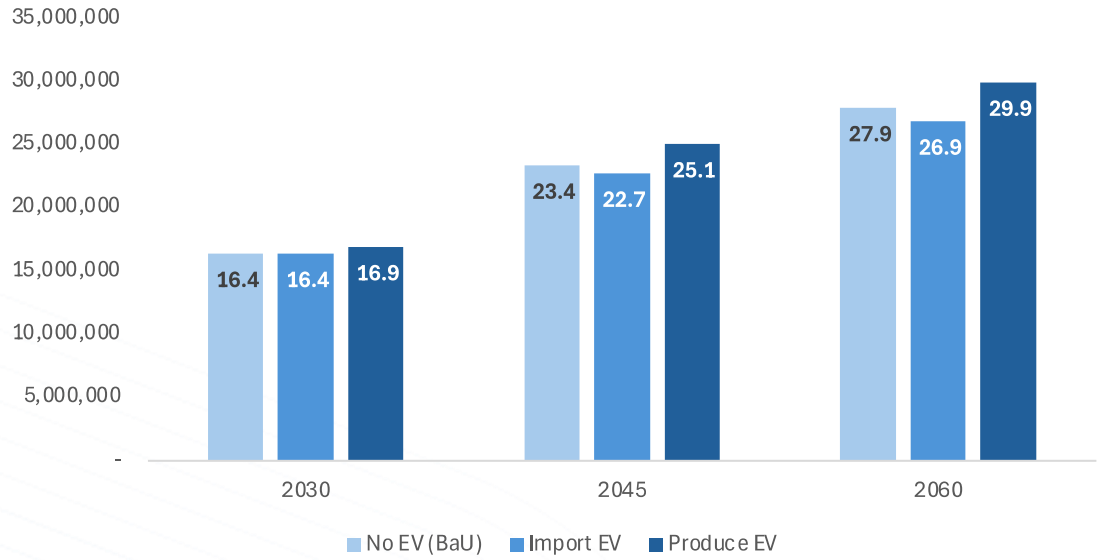
In this scenario, marked by rapid adoption of imported EVs, Indonesia is expected to see a sharp and sustained decline in both production value and employment. By 2040, the country's production value is projected to fall by over US$50 billion, far exceeding the losses anticipated in Thailand. The employment impact is equally severe, with job losses projected to surpass 1 million. These trends highlight the risk of significant disruption to the domestic automotive industry, as increased imports of CBU EVs displace the need for local manufacturing, assembly, and component supply chains.

2.3.3. Employment Impact of EV Ecosystem Industries

Transport electrification offers Indonesia an opportunity to develop a green economy. Moreover, with the rising demand for EVs worldwide, Indonesia has the potential to utilize its nickel reserves and become involved in the EV ecosystem. Amid the weakening manufacturing sector, the establishment of EV ecosystem industries in Indonesia creates opportunities to generate jobs and higher value added in the economy.

Based on the estimation depicted in Figure 12, EV adoption through domestic production is projected to generate 527,000 new jobs by 2030. This number is estimated to increase to 1.7 million by 2045 and 2 million by 2060 compared to the business-as-usual scenario without EVs.[13] Although EV production requires 30 percent less labour than ICE, EV domestic production can still generate a positive impact through higher EV demand and the development of production capacity. Therefore, the employment effect remains positive as it captures job losses in the ICE sector with emerging EV-related industries, including battery cell and battery pack manufacturing.

Figure 12. Industrial Labor Projection on Three Scenarios



[13] Centre of Reform on Economics and Partnership for Action on Green Economy, "Assessing the Impact and Opportunities of EV in Advancing Indonesia's Green Economy Index", Dec.2024.

Scenario	2030	2045	2060
Import EV	(41,685)	(676,835)	(1,021,401)
Produce EV	527,477	1,714,327	2,021,191

Source: CORE Indonesia (2024)

However, the net employment impact of the EV transition scenario compared to business as usual could become net negative if EV adoption targets are achieved solely through imports. The LCDI NZE scenario, which relies on imported EVs, projects potential job losses of over 40,000 by 2030 (see figure 12). This highlights the crucial role of developing domestic manufacturing capabilities to ensure positive employment outcomes. Without local production capacity, the phase-down of Internal Combustion Engine Vehicles (ICEVs) could lead to significant layoffs without alternative employment opportunities.

On the contrary, the second scenario of EV adoption, which is met solely through importing EVs, has a negative impact on employment. Higher EV demand without local production may cause a contraction in demand for ICEs, which can lead to reduced employment in manufacturing industries if there are no alternative employment opportunities. The potential impact of the importing EV scenario will be around 40,000 job losses by 2030 and could worsen to 1 million job losses by 2060. This potential massive layoff highlights the urgency for the Indonesian government to improve the business environment in Indonesia, which can attract investment in the EV ecosystem and provide alternative opportunities for workers in the manufacturing industries.

Aside from the employment substitution opportunities, the Indonesian government should be aware of the shifting demand for workers in the automotive industry as the EV ecosystem develops. The EV ecosystem's employment outcomes rely on the adjustment of workers' skills to be absorbed into the industry. A study in Thailand's case of electric mobility transition shows that worker occupations in small and medium component manufacturing decrease, as EVs require fewer components than ICEs. However, rising EV production requires technology adoption and more workers to produce the battery.

In regard to this adjustment, employment for skilled workers – engineers and technicians – will increase, while low-skill operator positions will potentially decrease. Thus, the Indonesian government should prepare proper training and certification and promote higher education attainment to meet the skilled worker–technician–demand in EV ecosystem industries.

Meanwhile, Indonesia's manufacturing workforce lacks high-skilled talent, with only 6 percent having a tertiary education, compared to Thailand's 19 percent. To address this matter, Indonesia should increase the number of people with tertiary degrees and improve education quality to keep up with industrial changes.

Figure 13. Impact of EV Transition on Workforce Profile and Occupation

	 Engineer	 Technician		 Operator
Employment change	Increase from 10% to 20%	Increase from 20% to 50%		Decrease from 70% to 40%
Skill level	High skilled	Skilled non-manual	Skilled manual	Low manual
Occupation	Quality assurance, quality management representative, Engineer: design, storage, and energy Product designer	Logistics and supply chain management, Warehouse, Technician, Information technology (IT)	Supervisor, Production, Maintenance, Parts assembler, Machine operators	Labours in the production line, Quality control

Source: Osatis and Asavamirandara (2022)

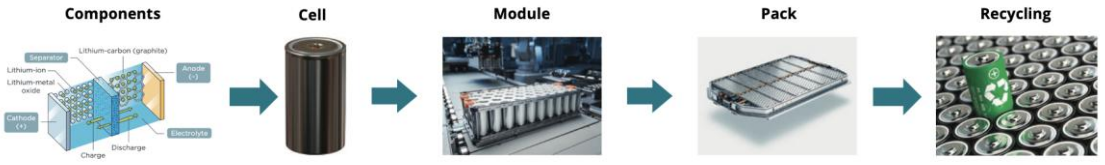
2.3.4. Employment Impact of the EV Battery Industry in the US

In the US case, EV battery investment is projected to generate new jobs in the manufacturing industry, estimated between 84,000 to 125,000 by 2032. The job creation stems from battery cell, module, and pack production, contributing 73,000 to 114,000 jobs. This figure is based on an average requirement of 95 jobs per GWh of battery produced at integrated facilities that manufacture the entire battery pack, multiplied by projected battery production. Battery production projections are divided into three scenarios: (i) 69 percent EV sales in 2032; (ii) announced production capacity for facilities producing only light-duty vehicle batteries; and (iii) announced production capacity for facilities producing light-duty vehicle batteries and other applications.

In addition to battery pack production, additional employment also arises from battery cell component manufacturing and battery recycling industries. Employment creation in these sectors could add up to 11,000 jobs, based on announced domestic production capacities.

This estimate is derived from an average of 49 jobs per GWh required in component manufacturing and battery recycling.[14]

Figure 14. Nickel-based EV Job Creation in the US



Components, Recycling	Cell, Module, Pack	Total
11,000 jobs	73,000 – 114,000 jobs	84,000 – 125,000 jobs

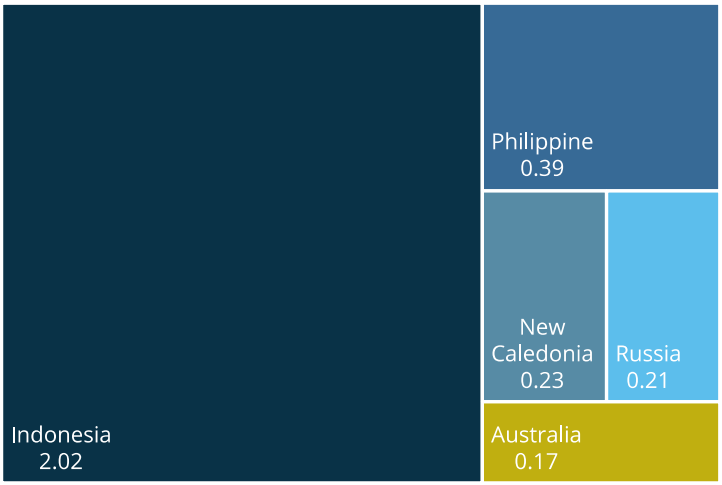
Source: International Council on Clean Transportation (2025)

2.4. Nickel Supply Chain Gap

2.4.1. Nickel-Based Battery Industry Trend

As the largest nickel producer, Indonesia has a competitive advantage over other Southeast Asian countries in developing the EV supply chain by leveraging its nickel reserves. In 2023, Indonesia produced 2.02 million metric tons of nickel, accounting for 56 percent of global nickel production (Figure 15).[15] This explains the significant impact of Indonesian government policy on the global nickel supply side. To maximize this potential, the Indonesian government has initiated a nickel downstream policy to produce essential raw materials for EV batteries and support EV industry growth.

Figure 15. Estimated National Mine Production in Million Metric Tons



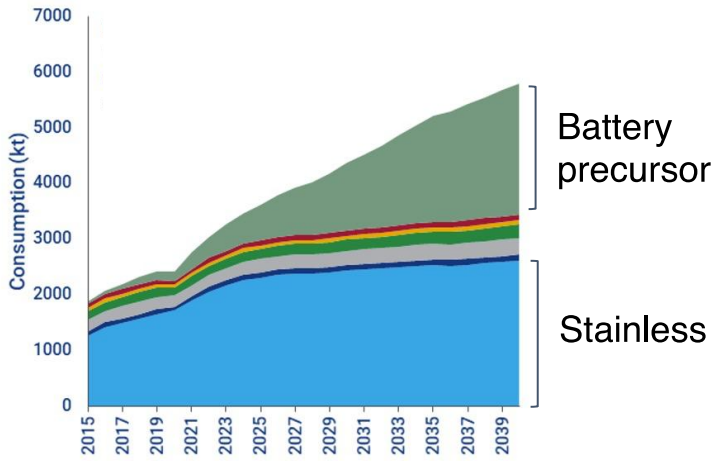
Source: Carbon credits (2024)

[14] International council on clean transportation, "Powering the future: Assessment of U.S. light-duty vehicle battery manufacturing jobs by 2032", 2025, https://tinyurl.com/4vbck7ya
[15] Carbon credits, "China and Indonesia Bolster Ties with $10B Deal in Strategic Sectors. How will it Impact Indonesia's Nickel Industry?", 2024, https://tinyurl.com/mr2smxj6

This initiative is beginning to yield results, with nearly all domestically mined nickel processed by local smelters in 2023, according to the Directorate General of Minerals and Coal at the Ministry of Energy and Mineral Resources (MEMR). Building on this progress, the government is now prioritizing advanced nickel refining, achieving a 95 percent realization rate for nickel matte and 75 percent for processed nickel.

Although the Indonesian government has been working on the raw material processing, gaps remain in the nickel supply chain. Currently, most of Indonesia's nickel is allocated to stainless steel production, aligning with global trends where 65 percent of nickel demand comes from the stainless-steel industry, as reported by Nornickel. Nevertheless, with increasing demand from the EV and mobility industries, nickel demand is projected to surpass that of stainless steel. According to Figure 13, nickel consumption from the battery industry is expected to rise from 7 percent in 2021 to 41 percent in 2040. Consequently, increasing battery demand is projected to drive nickel demand to double, reaching 6 million tons per year.[16]

Figure 16. Nickel Consumption Projection



Source: Wood Mackenzie (2022)

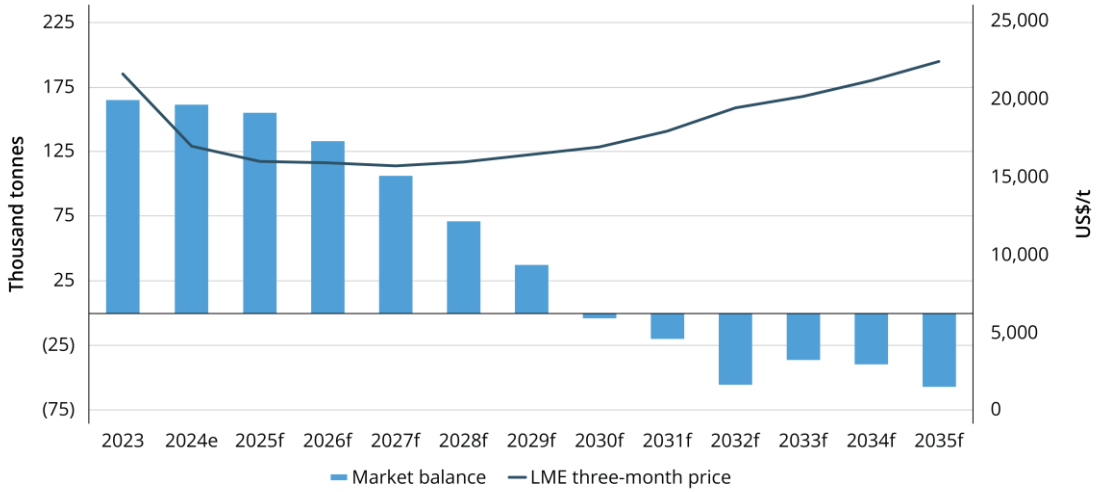
Given Indonesia's dominance and growing nickel output, the global market is currently experiencing oversupply, contributing to a decline in nickel prices over the past two years. Slower EV demand in 2024 and competition from LFP batteries have further weakened nickel demand. In 2024, the average London Metal Exchange (LME) price was US$15,328 per metric ton, 7.7 percent lower than in 2023. By early 2025, prices fell further, reaching US$15,078 per metric ton, their lowest level since 2020.

However, with rising demand for advanced batteries, nickel battery production is expected to increase.[17] As a result, in the long term, nickel demand is projected to recover (Figure 17). Nickel supply is expected to grow at a compound annual growth rate (CAGR) of 4.6 percent,

[16] Wood Mackenzie, "Nickel and copper: building blocks for a greener future ", 2022, https://tinyurl.com/5a3x4ejj
[17] Interview with Korea Institute for Industrial Economics and Trade on Apr.8, 2025

while demand is expected to grow at a higher CAGR of 5.1 percent. By 2030, nickel demand is projected to outpace supply, leading to a rebound in nickel prices.[18]

Figure 17. Global Nickel Market Balance and Price Forecast



Source: Carbon Credit (2025)

2.4.2. Potential for Nickel-Based Batteries

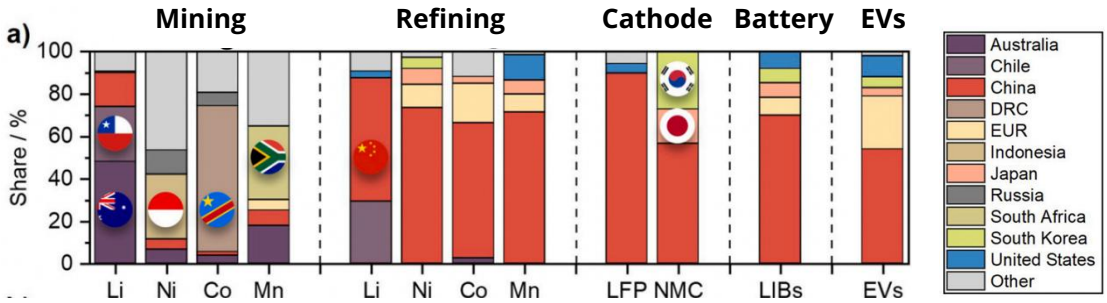
Nickel-based batteries offer several strategic advantages over LFP batteries, particularly for Indonesia's EV industry. First, nickel-based batteries serve a different market segment than LFP, allowing Indonesia to diversify its battery portfolio and avoid direct competition. Second, they offer better performance in low-temperature environments, making them more suitable for export to right-hand drive countries with colder climates.

Third, given China's strong dominance in the LFP battery market, Indonesia has a greater opportunity to position itself as a key nickel-based battery producer, leveraging its abundant nickel resources. Currently, China accounts for 98.45 percent of global LFP cathode production (Figure 19). In addition, Chinese companies hold the largest shares in refining elements (lithium, nickel, cobalt, manganese), ranging between 59.50 percent to 73.57 percent.

Although Indonesia leads in nickel production (Figure 18), Indonesian companies hold only 4.77 percent of nickel mining rights (Figure 19).[19] Given its abundant reserves, the Indonesian government should not miss the opportunity to increase Indonesian companies' participation in the nickel mining sector to boost nickel mining rights and strengthen its influence over the nickel-based EV supply chain. This expansion should cover the entire nickel-based value chain: mining, refining, cathode production, EV battery manufacturing, and EV assembly.

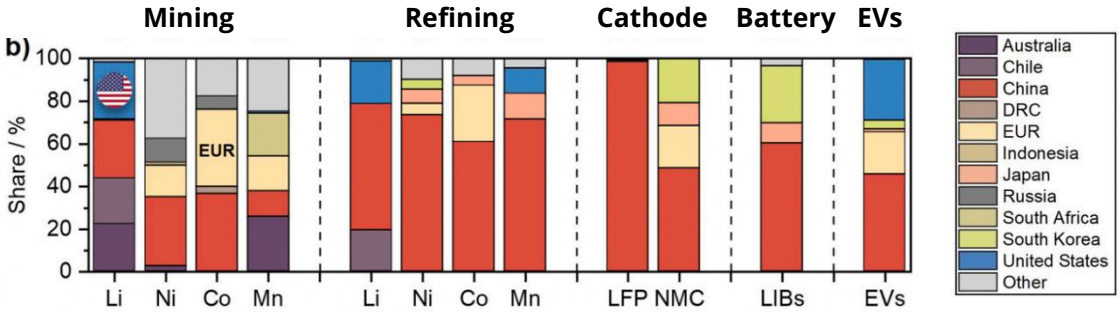
[18] Carbon credits, "Nickel Prices Plunge in 2025: Can Demand Revive the Market by 2030?", Feb.11, 2025, https://tinyurl.com/y83esb2r
[19] Tim Greitemeier, et.al., "China's hold on the lithium-ion battery supply chain: Prospects for competitive growth and sovereign control", *Journal of Power Sources Advances,* Vol.32, 2025

Figure 18. Geographical Distribution of EV Value Chain Sectors



Source: Greitemeier et al. (2025)

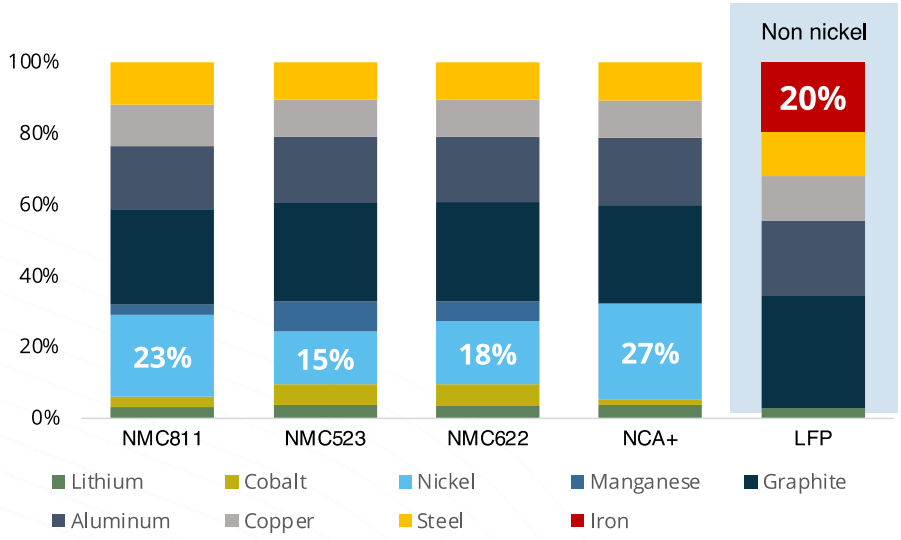
Figure 19. Ownership Distribution of the Lithium-Ion Battery Supply Chain



Source: Greitemeier et al. (2025)

Lastly, the dominance of LFP battery production in Indonesia may affect Indonesia's trade balance. The key difference between nickel-based batteries such as NMC811, NMC523, NMC622, NCA and LFP batteries lies in nickel and iron contents in their cathode composition. LFP batteries do not use nickel but contain 20 percent iron, while nickel-based batteries require 15 to 27 percent nickel (Figure 20).

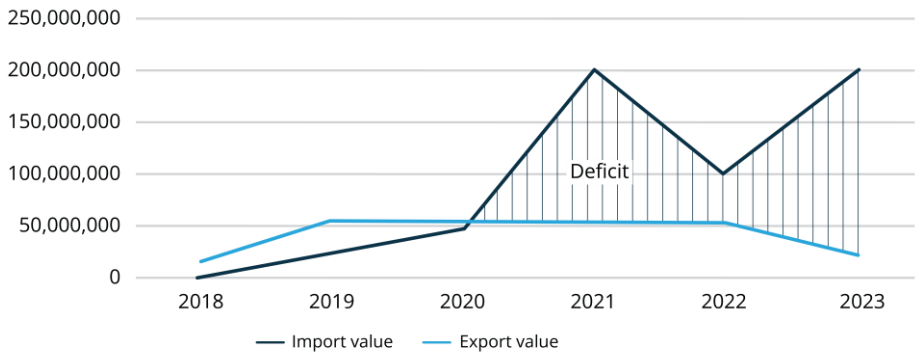
Figure 20. Battery Chemistry by Minerals for a 60 kWh Battery



Source: Visual Capitalist (2022)

To increase LFP battery production in Indonesia, manufacturers must import materials, primarily from Chinese companies. Rising LFP production may drive up iron imports amid climbing iron prices, driven by global LFP demand in the next few years. The rising imports could exert worse downward pressure on Indonesia's exchange rate, especially since Indonesia has been a net importer of iron since 2021 (Figure 21). In contrast, nickel-based batteries allow Indonesia to depend more on domestically available materials, strengthening the local supply chain and reducing import dependence.[20]

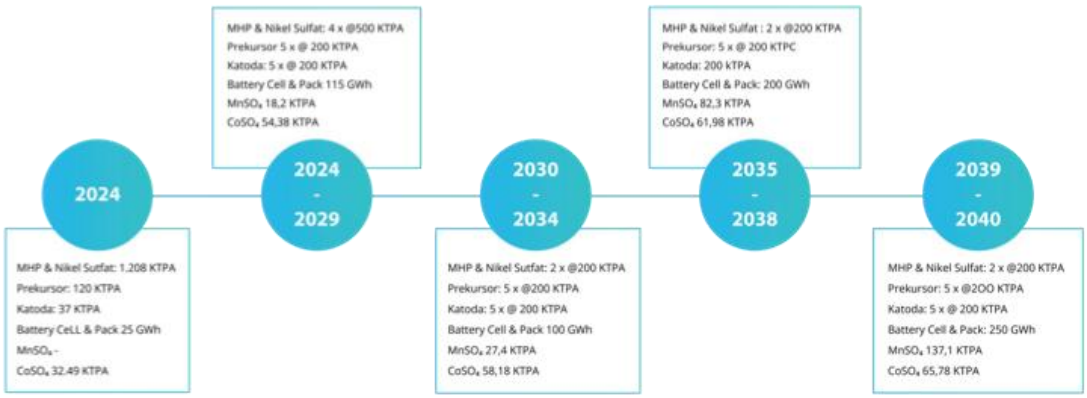
Figure 21. Iron Export and Import Value



Source: World Integrated Trade Solution (2025)

In response to the outlook of the nickel industry and Indonesia's advantage, the Indonesian government has established targets and initiatives for the EV battery industry. As part of the nickel downstream policy, the Indonesian government aims to become one of the world's top 5 EV battery producers by 2045. This target has been mapped out through multiple phases across the EV battery value chain, including the cell component production (precursor, cathode, anode, manganese sulphate, nickel sulphate, cobalt sulphate), battery cells, and battery packs (Figure 22).[21] Between 2025 and 2029, the government targets 115 GWh of battery cell and pack production, increasing to 250 GWh by 2039-2040.

Figure 22. Stage of Investment in EV Battery Ecosystem Development



Source: Ministry of Investment and Downstream Industry (2025)

[20] Focus Group Discussion with Indonesia Battery Corporation (IBC) on Mar. 13, 2025.
[21] Focus Group Discussion with Ministry of Investment on Mar.12, 2025

Aside from nickel, the Indonesian government has also mapped out the downstream potential of nine other critical minerals that may be related to the EV battery industry, including manganese, cobalt, tin, bauxite, iron, gold, silver, and silica sand. According to calculations by the Ministry of Investment and Downstream Industry, the investment potential of these ten critical minerals and coal reaches US$498.4 billion. However, the government has not given incentive to the manufacturer to achieve the target in the roadmap nor issue the sustainability regulation in the mining sector. To increase the production and the export, these two factors need to be addressed by the government.

2.4.3. The Importance of EV Battery Production

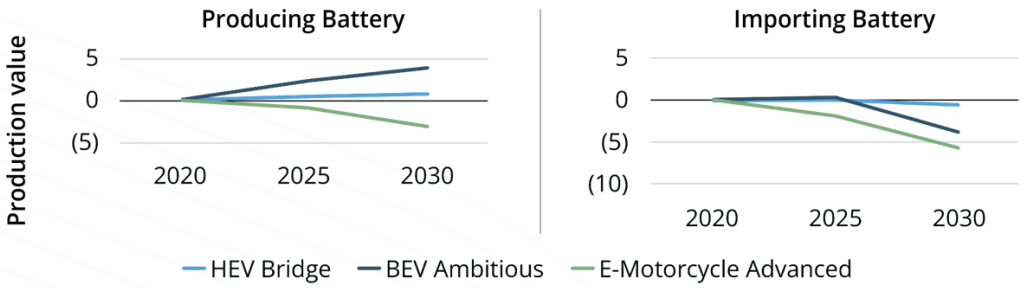
With Indonesia's prevailing advantage in critical mineral reserves, the substantial investment potential in EV battery production must be leveraged to generate economic benefits. Therefore, the Indonesian government needs to encourage EV battery production within domestic facilities rather than outsourcing battery supply from abroad. Heavy reliance on imported batteries, rather than building domestic production capacity, could undermine the development of Indonesia's EV industry.

According to research by the Economic Research Institute for ASEAN and East Asia (ERIA) titled *"The Influence on Energy and the Economy of Electric Vehicles Penetration in ASEAN"*, economic simulations under the Importing Battery Pack scenario show that reliance on imports leads to significantly more negative impacts on production value and employment compared to scenarios where batteries are produced domestically.

The BEV Ambitious scenario, which assumes high EV penetration supported by battery imports, initially shows modest positive effects, but these diminish rapidly by 2030. As shown in Figure 20, Indonesia sees gains in production value and employment when batteries are produced locally under the BEV Ambitious scenario, especially between 2025 and 2030. In contrast, when batteries are imported, these benefits largely disappear, and both production value and employment decline, even in the short term.

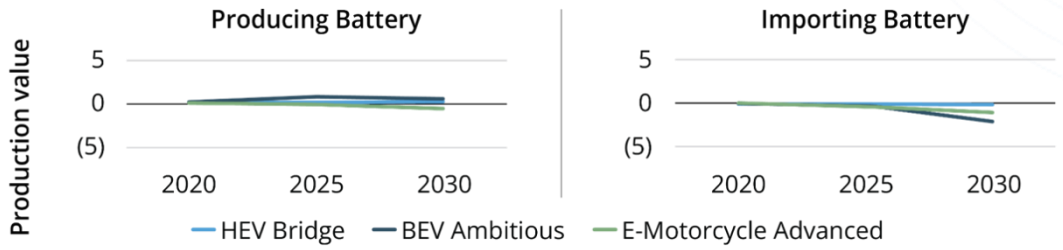
Among Southeast Asian countries, Indonesia stands out as having the highest economic and employment benefits from producing EV batteries domestically, and conversely, it suffers the greatest losses when batteries are imported.

Figure 23. Indonesia's Economic Impact of Producing and Importing Batteries



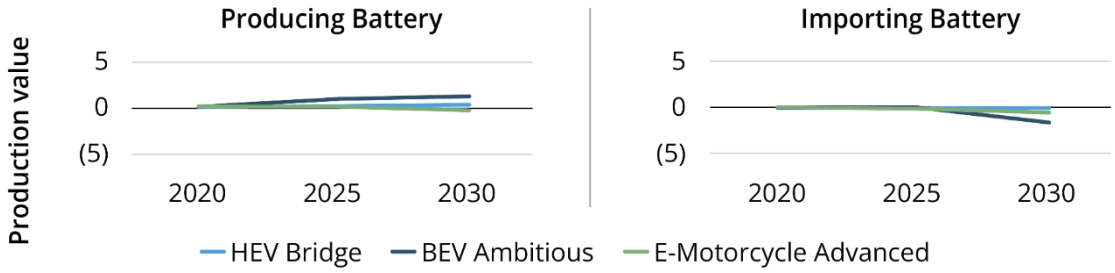
Source: Suehiro and Purwanto (2020)

Figure 24. Thailand's Economic Impact of Producing and Importing Batteries



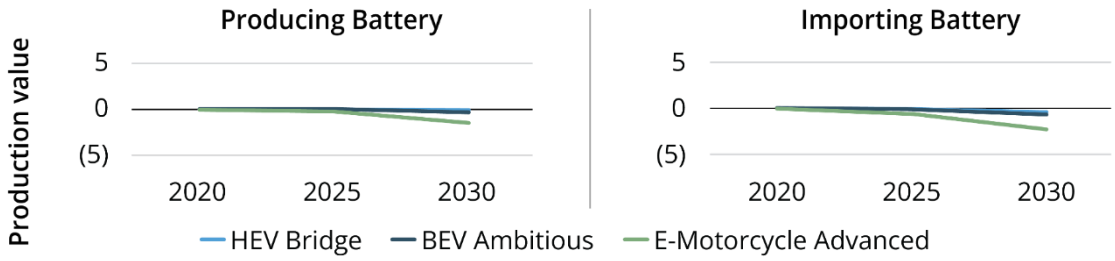
Source: Suehiro and Purwanto (2020)

Figure 25. Malaysia's Economic Impact of Producing and Importing Batteries



Source: Suehiro and Purwanto (2020)

Figure 26. Vietnam's Economic Impact of Producing and Importing Batteries



Source: Suehiro and Purwanto (2020)

2.4.4. EV Battery Investment in Indonesia

As mentioned previously, investment in EV batteries is a key part of Indonesia's broader mineral downstream initiative. By 2024, realized investment in the domestic EV battery industry had reached approximately Rp 8.4 trillion. For comparison, realized investment in nickel downstream reached Rp 153.2 trillion during the same period.

Additionally, investors' appetite for the basic metal industry in Indonesia has been rising, with the sector emerging as the top investment destination across all industries. In 2019, the basic metal industry ranked fourth, recording a total investment of Rp 61.6 trillion. By 2024, it had surged to the top position, with a total realized investment of Rp 238.4 trillion. This remarkable growth underscores investor confidence in the long-term potential of Indonesia's mineral processing and battery ecosystem, bolstered by government incentives and strategic partnerships with global players.

Currently, Indonesia has limited facilities capable of producing EV batteries, with the market dominated by PT HLI Green Power. Five other major facilities are under construction, signalling an upcoming wave of production capacity. These include PT Gotion Green Energy Solution Indonesia, PT Dharma Controlcable Indonesia, PT Hyundai Energy Indonesia, PT Huayu Teknologi Energi Baru Indonesia, and PT Greenway Energy Indonesia. Once operational, these plants are expected to significantly strengthen Indonesia's position in the global EV battery supply chain and create new opportunities for downstream industries, including EV manufacturing and battery recycling.

To achieve economies of scale and compete in the global EV market, Indonesia must expand its battery production beyond domestic demand. However, this ambition is closely linked to the environmental sustainability of the nickel supply chain. Environmental issues arising from nickel mining and processing may create barriers to international market access if left unaddressed. Ensuring that nickel production complies with global environmental standards will be essential to support long-term growth and enhance Indonesia's global competitiveness in the battery industry.

2.4.5. Opportunity in Cell Component Production Investment

The EV value chain comprises several segments, including mining, refining, cell components, battery cells, battery packs, EV assembly, and battery recycling (Figure 27). EV battery investment is critical for Indonesia, which holds between 40 to 45 percent of the world's total nickel reserves. However, to produce battery cells, a supply chain gap must be addressed by the government to integrate the full EV supply chain in Indonesia.

After the nickel is mined, the next step is to refine the raw ore into cathode precursor materials for EV batteries, including lithium carbonate, nickel sulphate, cobalt sulphate, and manganese sulphate. Refining takes place in smelters, which have been extensively developed in Sulawesi, following the government's ban on raw nickel ore exports to promote higher value-added processing.

The next stage of refining involves cell component production. Battery cells consist of four main parts: cathode, anode, electrolyte, and separator. The cathode, the battery's positively charged electrode, determines how well the battery works. The anode is the negatively charged electrode. The electrolyte serves as the medium for lithium-ion movement between the cathode and anode. Finally, the anode and cathode are separated by the separator. These battery cell components make up the majority of battery cell manufacturing. It is estimated that cathode material accounts for 51 percent of a battery cell's cost, followed by manufacturing (24 percent), and the anode (12 percent).[22]

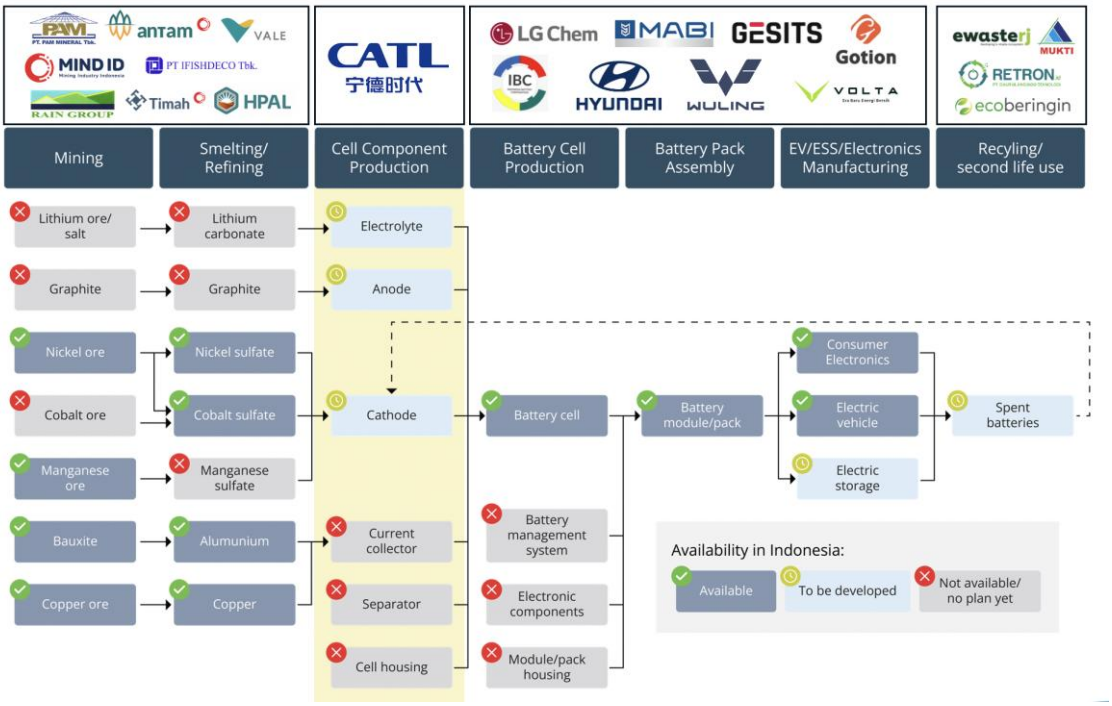
However, Indonesia has yet to establish cathode and anode production for nickel-based batteries, while LFP cathodes have already begun production domestically. Consequently, the EV industry in Indonesia still relies on imported cathodes and anodes. Since cathodes and anodes represent the highest cost components of battery cells, this supply chain gap

[22] Deutsche Gesellschaft für Internationale Zusammenarbeit, "The Untapped Potential of Spent EV Batteries: How Can Jordan's Economy Benefit?", 2023, https://tinyurl.com/275ft6ej

presents a significant opportunity for Indonesia to develop its nickel-based EV value chain further and generate higher economic benefits.

The establishment of cathode and anode production in Indonesia would allow EV manufacturers to avoid imports of cathode and anode, directly reduce production costs, and shorten transport times. Moreover, investment in cathode and anode production could support export markets, as these materials are also used in other sectors, such as renewable energy storage.[23]

Figure 27. Nickel-Based EV Value Chain



Source: Ministry of Energy and Mineral Resources (2025)

2.5. Realizing Energy Self-Sufficiency

The transportation sector is the largest consumer of oil in Indonesia, accounting for 55 percent of total consumption. Since becoming a net oil importer in 2003, rising oil consumption has strained the government's finances and trade balance. Domestic oil production has declined from 1.4 million barrels per day in 2000 to 576,000 barrels per day by early 2024, while demand has reached 1.6 million barrels per day. As a result, Indonesia must import oil and fuel at double the rate of domestic oil production, with imports valued at US$ 12.8 billion (Rp 207.11 trillion) in the first half of 2024.

The urgency to shift to EVs has grown amid increasing geopolitical uncertainty. During the uncertainty momentum, such as the Russia-Ukraine war that broke out in 2022, crude oil prices spiked above US$ 100 per barrel, peaking at US$ 118.86 in June 2022. As a result, the

[23] Interview with Coordinating Ministry for Infrastructure and Regional Development on Mar. 20, 2025

government's fuel subsidy tripled, reaching about three times higher in 2022 to Rp 551.2 trillion, 17.9 percent of total government spending.[24]

To address this, President Prabowo has prioritized energy self-sufficiency as part of his 17 priority programs. The government aims to expand renewable energy and biofuel usage while promoting EV adoption. By 2025, the target is to have 2 million EVs on the road, a significant increase from about 200,000 in 2024. Although this represents a small fraction of Indonesia's total vehicle population of 164 million units, widespread EV adoption could significantly reduce fossil fuel demand in the long term.

Besides saving on the national budget, EV adoption is aligned with Indonesia's current energy landscape. The country had an electricity surplus of 4 gigawatt (GW) in early 2024, largely from coal, a domestically sourced energy.[25] At the same time, the government aims to shift toward renewable energy as the source of electricity, with the target of 58-61 percent by 2050 and 70-72 percent by 2060.[26] Although the current electricity is dominated by coal-fired power plants (CFPP), EV adoption can serve as a catalyst for the energy transition. In developing nations like Indonesia, efforts to shift to clean energy may not immediately lead to the use of renewable sources, but EVs can enable a medium-to-long-term transition. By establishing renewable energy infrastructure early, Indonesia can ensure that once renewables become more accessible, a well-functioning ecosystem is already in place to support them.[27]

To support this goal, the government could implement targeted incentives for nickel-based EV manufacturing and position Indonesia as a leader in the global EV supply chain. Policies such as localization strategies, similar to the U.S. Inflation Reduction Act (IRA), could channel support toward strategic resources and industries. By prioritizing the use of domestic nickel in EV technology, Indonesia could better align its resource advantages with its ambition to lead in the EV industry.

[24] CNBC Indonesia, "Harga BBM Naik di 2022, Subsidi Energi Masih Bengkak Rp551 T", Jan.3, 2023, https://tinyurl.com/5n7dk95t
[25] CNBC Indonesia, "Bye Listrik Luber! Tahun Depan Pasokan Listrik RI Gak Berlebih Lagi", Oct.8, 2024, https://tinyurl.com/5n867f3s
[26] Institute for Essential Service Reform, "RPP KEN Pangkas Target EBT Menjadi 19 Persen di 2025", Jan.31, 2024, https://tinyurl.com/yc464y5p
[27] Interview with National Economic Council (DEN) on Mar.11, 2025.

3. EV Policy: Supply and Demand Side

Indonesia's electric vehicle (EV) policy took a major step forward with the issuance of Presidential Regulation No. 55 of 2019 on the acceleration of the Battery Electric Vehicle (BEV) program. This regulation introduced key measures, such as incentives for EV manufacturing, the expansion of public charging infrastructure, the regulation of electricity tariffs, and the enforcement of technical standards for EV operations. Since then, a series of policies have been adopted focusing on both the supply and the demand sides of EVs. The supply side aims to attract investment into EV manufacturing and its supply chain, while the demand side aims to boost EV adoption among the public.

3.1. Supply side

The government's policy framework for sustainable mobility places significant emphasis on the development and adoption of electric vehicles (EVs). A crucial component of this strategy is the Presidential Regulation (Perpres) No.55/2019, which specifically targets the EV sector by promoting production, infrastructure development, and consumption of electric vehicles. Essentially, this Perpres serves as a cornerstone in Indonesia's push for a greener future by driving the shift to electricity mobility and reducing reliance on fossil fuels in the transportation sector.

This policy was amended in 2023 through Presidential Regulation No.79/2023, introducing several significant changes. These include provisions for the conversion of conventional vehicles to EVs, regulations governing battery exchange at EV charging stations, revised domestic content level requirements, and updated guidelines for importing BEVs. Additionally, the regulation outlines incentives for recipients and provides detailed specifications for electric charging infrastructure.

The government provides fiscal and nonfiscal incentives to expedite the Battery Electric Vehicles (BEV) program. Article 19 introduces various fiscal incentives to support the EV sector's growth, focusing on bolstering financial incentives on the supply side of Indonesia's EV ecosystem. These include import duty exemptions for fully or partially disassembled BEVs and key components, sales tax exemptions on luxury goods for EVs, and reductions or exemptions in both central and regional taxes, deferred import duties for exports, and government-subsidized duties for raw materials and components.

3.1.1. Fiscal Incentives for Industry

Most EV owners in Indonesia – around 80 percent – primarily charge their vehicles at home rather than at public charging stations. However, concerns persist regarding the availability of charging infrastructure during long-distance travel, such as the annual holiday travel season (mudik), leading many consumers to avoid using EVs for such trips. To address these concerns, PLN has installed over 3,233 charging stations across 2,192 locations and is working to meet the government-mandated target of a 17:1 EV-to-charging station ratio, compared to the current ratio of 21:1 with 68,695 registered EVs. PLN aims to expand the network to 5,810 stations by the end of 2025. To further ease range anxiety among EV users, PLN is also developing a road planner application that maps out charging station locations along travel routes.

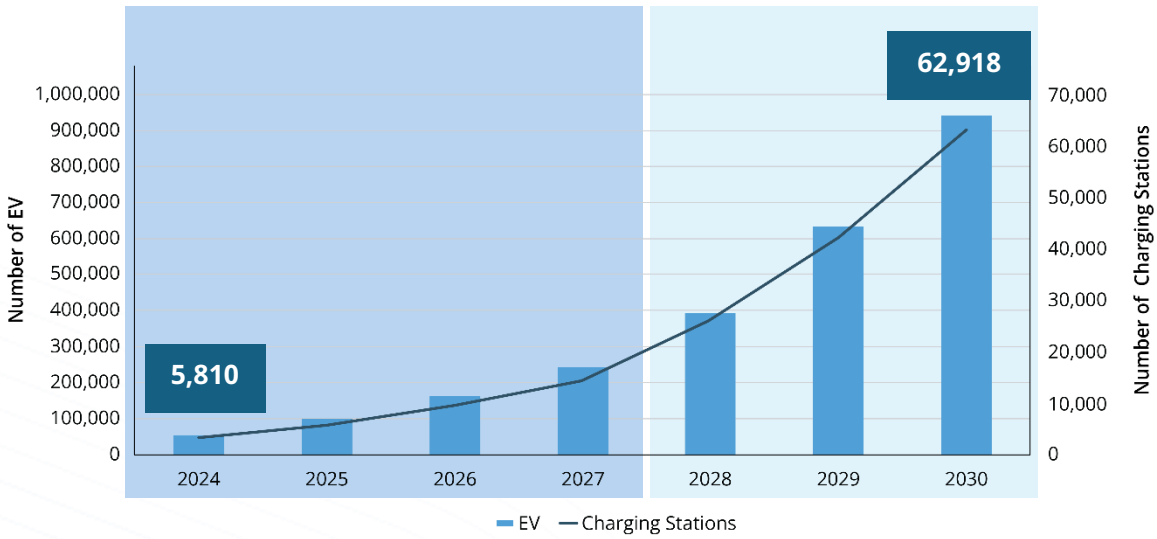
Nonetheless, Indonesia's EV-to-charging station ratio remains far behind major EV-adopting countries such as China, which achieved a 6:1 ratio by 2020. Moreover, the distribution of charging stations in Indonesia remains unequal, with 68 percent located on Java Island. In response to the unequal distribution and to enhance availability, the Minister of Energy and Mineral Resources has mandated PLN to prioritize the development of charging stations (SPKLU) outside Java and Bali through the Decree of the Minister of Energy and Mineral Resources (Kepmen ESDM) No.24/2025. This prioritization is expected to increase the availability of charging stations to meet the demand from rising EV sales, with a targeted EV-to-charging station ratio of 15:1 by 2030.[28]

Figure 28. Number of Public Electric Vehicle Charging Stations in Indonesia per December 2024

Location	Total
Java Island	2,211
Sumatera	410
Bali-Nusa Tenggara	217
Sulawesi	139
Kalimantan	209
Maluku	22
Papua	25

Source: PLN (2025)

Figure 29. Charging Stations Development Plan, 2024-2030



[28] Focus Group Discussion with Ministry of Energy and Mineral Resources on Mar.12, 2025

Projection	Year						
	2024	2025	2026	2027	2028	2029	2030
EV	53,764	98,764	163,764	243,764	393,764	633,764	943,764
EV/Charging Stations Ratio	17:1	17:1	17:1	17:1	15:1	15:1	15:1
Charging Stations	3,163	5,810	9,633	14,339	26,251	42,251	62,918

Source: Energy and Mineral Resource Ministry (2025)

To complement these initiatives, the government has introduced a tax holiday policy for EVs through PMK No.69/2024. This measure reduces manufacturing costs, encouraging investment, and thus expanding production capacities for electric vehicles and their core components. This policy seeks to strengthen the EV industry by making it more competitive and attractive, stimulating growth in the sector.

The import duty tariff is outlined in the Investment Ministerial Regulation/Indonesia Investment Coordinating Board (BKPM) No.6/2023, which introduces a 0 percent import duty on both Completely Built-Up (CBU) and Completely Knocked Down (CKD) BEVs with a local content value ranging between 20 and 40 percent. Additionally, the government will assume the tax on sales of luxury goods for CBU and CKD BEVs within the same local content range.

3.1.2. Requirements for EV Subsidies

The Presidential Regulation No.55/2019 on the acceleration of BEV for road transportation outlines a phased approach to subsidy allocation, contingent upon increasing the domestic local content (TKDN). EVs must meet a minimum local content of 40 percent through 2023. This threshold will progressively rise to 60 percent by 2029, and to 80 percent from 2030 onwards. [29]

To incentivize domestic production, the Finance Ministerial Regulation (PMK) No. 38/2023 provides Value-Added Tax (VAT) reductions. The incentive is tiered based on the TKDN level: a 5 percent VAT reduction applies to buses with 20 percent TKDN, while a 10 percent reduction applies to buses and cars with 40 percent TKDN. Though initially in effect until the end of 2023, these incentives were extended through PMK No. 8/2024 at the beginning of 2024.

[29] Peraturan Presiden (Perpres) Nomor 55/2019, https://tinyurl.com/mv6v2yw4

Figure 30. List of Electric Vehicles Eligible for Subsidies 2023 [30]

Car type	Price before subsidy	Subsidy amount	Price after subsidy
Wuling Air EV Short Range	Rp 243 million	Rp 24.3 million	Rp 218.7 million
Wuling Air EV Long Range	Rp 299.5 million	Rp 29.95 million	Rp 269.55 million
Hyundai Ioniq 5 Prime Standard Range	Rp 748 million	Rp 74.8 million	Rp 673.2 million
Hyundai Ioniq 5 Prime Long Range	Rp 789 million	Rp 78.9 million	Rp 710.1 million
Hyundai Ioniq 5 Signature Standard Range	Rp 809 million	Rp 80.9 million	Rp 728.1 million
Hyundai Ioniq 5 Signature Long Range	Rp 859 million	Rp 85.9 million	Rp 733.1 million

Source: Mandiri Utama Finance

3.2. Demand side

3.2.1. Fiscal Incentives for Consumers

Indonesia's adoption of EVs is being strongly supported through fiscal incentives designed to make EVs more affordable for consumers. One of the key measures in this regard is PMK No. 8/2024, which introduces a Value-Added Tax borne by the government (PPNDTP) on BEVs. This policy reduces the VAT payable by the customer from 11 percent to 1 percent, effectively lowering the cost of purchasing BEVs and making them more accessible to a broader range of consumers. This initiative aims to encourage a shift from traditional internal combustion engine (ICE) vehicles to cleaner, more sustainable electric alternatives.

In addition to the VAT exemption, PMK No.9/2024 goes further by covering the Luxury Goods Tax (PPnBM) for certain BEVS. The PPnBM exemption is particularly significant for higher-end vehicles, which generally carry a higher price tag. By eliminating this tax, the government directly reduces the effective price of these vehicles, thereby making them more attractive to consumers. The luxury tax exemption has successfully brought two major automotive players to Indonesia - Hyundai and Wuling. These fiscal incentives, including the luxury tax exemption and value-added tax reduction, are significant instruments for accelerating EV

[30] Mandiri Utama Finance, "Subsidi Mobil Listrik: Peraturan, Syarat, dan Prosedur", https://tinyurl.com/mr3274rn

adoption in Indonesia. Accordingly, the Indonesian government continues to give incentives through VAT reduction (PPNDTP) and luxury tax exemption (PPnBM) to boost EV consumption in Indonesia.[31]

On the other hand, PMK No. 10/2024 introduces a significant policy aimed at supporting EV imports by exempting them from import duties. Under this regulation, businesses that meet the criteria set forth in the Investment Ministerial Regulation/BKPM No.6/2023 are eligible for 0 percent import duty tariff on EVs. This exemption is designed to lower the cost of importing electric vehicles into the country, thereby increasing their affordability and availability in the domestic market.

These measures reflect a broader effort to make EVs a viable option for a larger portion of the population. One of the main obstacles to EV adoption has been the relatively high initial purchase price compared to conventional vehicles. By removing some of these cost constraints, the government aims to accelerate the transition to EVs, which will help reduce GHG emissions and reliance on fossil fuels. As EVs become more financially accessible, a greater number of consumers are likely to consider them as a viable alternative, contributing to Indonesia's long-term environmental and energy goals.

3.2.2. Non-Fiscal Incentives for Consumers

The adoption of EVs in Indonesia is not solely driven by fiscal incentives such as subsidies and tax reduction but is also supported by non-fiscal measures aimed at fostering a sustainable and eco-friendly transportation ecosystem. These initiatives aim to make EVs more attractive by addressing barriers related to infrastructure, convenience, and public awareness. Through these initiatives, the government reinforces its commitment to reducing emissions and promoting green mobility nationwide.

One notable non-fiscal incentive is Jakarta's exemption of EVs from the odd-even traffic restriction policy, as stipulated in Governor Regulation No. 88/2019. This allows EV users to freely navigate roads subject to the policy, even during restricted hours. To facilitate identification, EVs are issued distinctive license plates featuring a blue line at the bottom, as a measure introduced in 2020.

3.2.3. Boosting EV Adoption at Government Offices

To further stimulate the nation's EV industry, Presidential Instruction No.7/2022 mandates the use of BEVs as official government vehicles and as personal vehicles for government officials at both the central and regional levels. This instruction empowers central and regional governments to enact supporting regulations and policies, allocate necessary budgets, and either directly procure BEVs or implement programs to convert existing combustion engine vehicles. Furthermore, it provides specific directives to fourteen ministries, the Chief of Presidential Staff, the Chief of the Indonesian National Police, as well as provincial, district, and municipal heads, outlining their respective responsibilities in advancing the national EV agenda.

[31] Focus Group Discussion with Coordinating Ministry of Economic Affair and Ministry of Finance on Mar.12,2025

4. Cross-Country Policy Comparison

4.1. EV Roadmap

Many countries have adopted a pipeline of policies to increase EV adoption, including fiscal incentives and non-fiscal incentives. These policies target both supply-side players and demand-side consumers, aiming to establish comprehensive frameworks that support EV adoption and generate economic multipliers in their respective countries. For instance, incentives provided to domestic car manufacturers are often coupled with relaxed import tariffs on EVs.

To accelerate EV adoption, many countries begin by laying a regulatory foundation and developing roadmaps. Indonesia, as one of the largest economies in Southeast Asia, has established regulations to accelerate EV adoption as part of its initiatives to reduce GHG emissions in the energy sector. These initiatives include improving energy efficiency, enhancing energy security, and promoting energy conservation in the transportation sector. This commitment has been stated in Presidential Regulation No. 55/2019, later amended by Presidential Regulation No. 79/2023 ("Perpres No.79/2023") on the Acceleration of the Battery Electric Vehicle (KBLBB) Program for Road Transportation.

Additionally, the Indonesian government issued an EV roadmap through the Ministry of Industry Regulation No.6/2022, aimed at attracting investors, facilitating electrification, and developing the EV ecosystem in Indonesia. The roadmap outlines policies and strategies for the demand and supply sides across short-, medium-, and long-term horizons, including EV battery technology advancement.

One of the apparent aspects of the EV roadmap is the local content requirement, which has been revised from the earlier roadmap in the Ministry of Industry Regulation No.27/2020. Local content requirement is a common practice globally to promote industrialization through multinational companies (MNCs) and generate indirect benefits from their investments. The approach taken by the Indonesian government is similar to the approach undertaken by other East Asian nations such as South Korea, Japan, and Taiwan between the post-Second World War period and the 1980s.[32]

The Indonesian government's roadmap specified TKDN criteria not only for physical components within the local content requirements, but also for labour in the assembly process, and in research and development (R&D). For instance, up to 50 percent of domestic content may be allowed if there is verified evidence of technology or skill transfer from foreign to Indonesian workers. In terms of Research and Development, 20 percent of the total TKDN can be met through activities such as market research, product planning, design engineering, vehicle testing, and licensing.

Attracting MNCs to developing countries can maximize benefits beyond money and employment to the country but also allows technology transfer to the host country. East Asian nations like South Korea and Taiwan offered tax breaks and relaxed regulations to attract MNC investments in high-tech industries such as electronics and automotive, while

[32] Ha Joon Chang, "Edible Economics", Allen Lane, United Kingdom, 2022

requiring MNCs to facilitate skill and technology transfer. This strategy led to the emergence of giant technology companies such as Samsung, LG, Hyundai, KIA, and TSMC to become the global leader in their industries. Meanwhile, China pursued more informal negotiations to allow technology transfer from MNCs to local firms.[33]

A successful example of EV-related technology development is China. The research and development play a key role in EV development for major EV producers in China. Similar to Indonesia, China released various roadmaps of EV development, starting with laying the R&D foundation. The Chinese government has been providing strong support for the EV development as early as the 2000s, where the EV industry was still nascent, viewing the EV industry as a strategic opportunity to compete with other major carmaker countries like Japan. In 2001, the Chinese government established a R&D layout for the development of fuel cell, hybrid, and pure electric vehicles as part of the "863 plan", a high technology R&D plan. EV related technologies were later prioritized as science research project in China's Five-Year Plans, the country's highest-level economic blueprints.

Since 2015, the Chinese government has established the "Made in China 2025" initiative targeting the acceleration of high-tech industries, including fuel cell and battery EV development. One of the strategies involves mandatory transfer agreements. Foreign businesses claim that they have to get into joint ventures with Chinese corporations under terms that force them to contribute advanced technological know-how and sensitive intellectual property in order to invest or conduct business in China. Through such agreements, China has acquired foreign technologies, such as electric vehicle batteries and high-speed rail.[34]

Following China's example to accelerate EV manufacturing, India began to promote BEV adoption through the launching of the National Mission for Electric Mobility in 2011, followed by the National Electric Mobility Mission Plan (NEMMP) 2020 in 2013. The NEMMP provided a comprehensive policy framework in promoting EV manufacturing and adoption, including incentives for demand, manufacturing, charging infrastructure, and R&D. It set an ambitious goal of 6-7 million BEV sales and a 14 - 16 percent EV market penetration by 2020.[35]

In addition of the successful cases of China, South Korea, and Taiwan, Indonesia has also taken notes from the less successful case of the Philippines. While high-tech products account for 60 percent of the Philippines' manufacturing exports, its GDP per capita remains around 10 percent of South Korea's, despite South Korea's lower export share of 35 percent. The reason is that many MNC subsidiaries in the Philippines operate only screwdriver assembly operations, failing to benefit from the technology and skill transfer. [36]

Over the past 20 years, China's EV ecosystem has evolved from a research and development project to the ambitious EV penetration and competitiveness goal. The most recent EV development plan was the People's Republic of China's State Council unveiling the New Energy Vehicle Industrial Development Plan (2021–2035) released in October 2020. Its goal

[33] Ha Joon Chang, "Edible Economics", Allen Lane, United Kingdom, 2022
[34] Council of Foreign Relations, "Is 'Made in China 2025' a Threat to Global Trade?", 2019 https://tinyurl.com/mpzn4c4w
[35] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh
[36] Ha Joon Chang, "Edible Economics", Allen Lane, United Kingdom, 2022

is to establish a strong, environmentally friendly, and globally competitive Chinese automobile industry. The Chinese government set various development goals for the NEV industry, including having more than 80 percent of new public fleet vehicles in key regions be NEVs and reaching 20 percent NEV penetration in new car sales by 2025. By 2035, the Chinese government targets 100 percent of all public fleets to be electric and BEVs are expected to become the mainstream of new vehicle sales. [37]

Alongside China that has mature EV ecosystem, Norway also has set ambitious EV penetration goal through its roadmap, the National Transport Plan 2022-2033. Unlike China, India, Indonesia, and Malaysia that have become EV manufacturing nations, Norway imports most of its EV cars, following the bankruptcy of its locally made called Think Global. Consequently, its EV policies focus on charging infrastructure and demand side by reforming behaviour and raising awareness. One of the three primary objectives of the National Transport Plan 2022–2033 is to create an environmentally friendly transportation system by 2050 as part of the decarbonization endeavour. The National Transport Plan's 2018–2029 policy targeting new zero-emission cars remains in place. By 2025, all new passenger automobiles and light vans must meet the policy's zero-emission vehicle standards.

[37] The International Council on Clean Transportation, "China's New Energy Vehicle Industrial Development Plan for 2021 to 2035", 2021, https://tinyurl.com/2fytspwp

4.2. Supply side policy

China and India have grown to become some of the largest car manufacturers, ahead of the western nations including France and Germany. In 2023, China held the highest share of total car manufactured in the world, comprising of 32.3 percent. China has surpassed Japan and the US, which was infamously known as the largest car manufacturer, India ranked in the fourth position with the share of 6.3 percent and had surpassed the western nations such as France, UK, and Italy in 2011.[38] [39]

Two of Asia's economic superpowers, China and India, have started bold projects to expand their manufacturing industries and raise their level of competitiveness internationally. China's "Made in China 2025" project and India's Production-Linked Incentive (PLI) program are examples of strategic initiatives by these countries to transform their industrial landscapes and establish significant positions in the global supply chain. China and India use these policies to lessen their reliance on foreign technology.[40] [41]

The government's 10-year strategy, Made in China 2025, was unveiled in 2015 and aims to modernize China's industrial base by accelerating the development of ten high-tech industries. These include advanced robots and artificial intelligence, next-generation telecommunications, and information technology (IT), and electric cars and other new energy vehicles. Its main goals are to lessen dependency on foreign technology and to build high-tech enterprises. China 2025 establishes clear goals as the country wants to be 70 percent self-sufficient in high-tech sectors by 2025, and by 2049, the 100th anniversary of the People's Republic of China, it wants to dominate international markets.[42]

4.2.1. Subsidy

China began to give direct fiscal incentives to EV manufacturers in 2009, which resulted in fewer than 500 EVs sold in the year. However, the government kept increasing funding, allowing businesses to continue investing in model improvement. China also began with pilot cities around the country. Cities collaborated with regional EV businesses to support their expansion and could tailor the kind and quantity of EV subsidies to meet their needs. For instance, the Chinese EV manufacturer BYD began with strong ties to Shenzhen and has subsequently expanded to become one of the world's largest EV manufacturers.[43] [44]

In its early years, the government also assisted domestic EV companies by awarding public transportation procurement contracts. In China, EVs were first introduced into the country's

[38] Visual Capitalist, "Ranked: The World's Top 30 Countries, by Automobiles Manufactured", 2024, https://tinyurl.com/yr47fh6k
[39] Ministry of Heavy Industries India, "National Electric Mobility Mission Plan 2020", 2013, https://tinyurl.com/adffz6yn
[40] Council of Foreign Relations, "Is 'Made in China 2025' a Threat to Global Trade?", 2019 https://tinyurl.com/mpzn4c4w
[41] Hinrich Foundation, "India's PLIs and their impact on foreign investments", Feb.28, 2023 https://tinyurl.com/2yauub32
[42] Council of Foreign Relations, "Is 'Made in China 2025' a Threat to Global Trade?", 2019 https://tinyurl.com/mpzn4c4w
[43] MIT Technology Review, "How did China come to dominate the world of electric cars?", Feb.21, 2023, https://tinyurl.com/5n79ez7j
[44] World Resources Institute, "These Countries Are Adopting Electric Vehicles the Fastest", Sep.14, 2023, https://tinyurl.com/yeuhvt3z

extensive public transportation system about 2010, before the consumer market began to accept them. The government gave these start-up businesses contracts as well as a wealth of data.

Nowadays, Indonesia is also following China's footsteps. The Ministry of Transportation has set a target of 90 percent electrification of the urban public transportation fleet by 2030, equivalent to more than 45,000 electric buses spread across 42 cities. However, only 0.51 percent of the 2030 target has been achieved with the number of electric buses in operation. Furthermore, only the Special Regions of Batam, Semarang, Pekanbaru, and Jakarta are presently considered ready to electrify their public transit systems.[45]

In 2018, China began shifting from direct subsidies to a market-based zero-emissions vehicle credit program, based on California's zero-emissions vehicle legislation. Manufacturers must produce fuel-efficient vehicles to meet Corporate Average Fuel Consumption (CAFC) credit criteria, and to manufacture New Energy Vehicles (NEVs) to satisfy NEV credit requirements. Manufacturers surpass the predefined targets are awarded extra points. Conversely, businesses that fall short of zero have to implement their offset plans and submit them to the Ministry of Industry and Information by a specific date. Otherwise, companies violating the law will be subject to penalties, including being barred from expanding its production capacity and from producing and marketing goods that use excessive amounts of fuel. [46] [47]

Another notable feature of China's EV policy is that subsidies are extended to both domestic and foreign manufacturers. Regulatory reforms enabled the Chinese government to woo Tesla to build production facilities in Shanghai in December 2019. Tesla's gigafactory now employs 2,000 people and has become the most productive EV manufacturing hub, accounting for 54.1 percent of total vehicle production.[48]

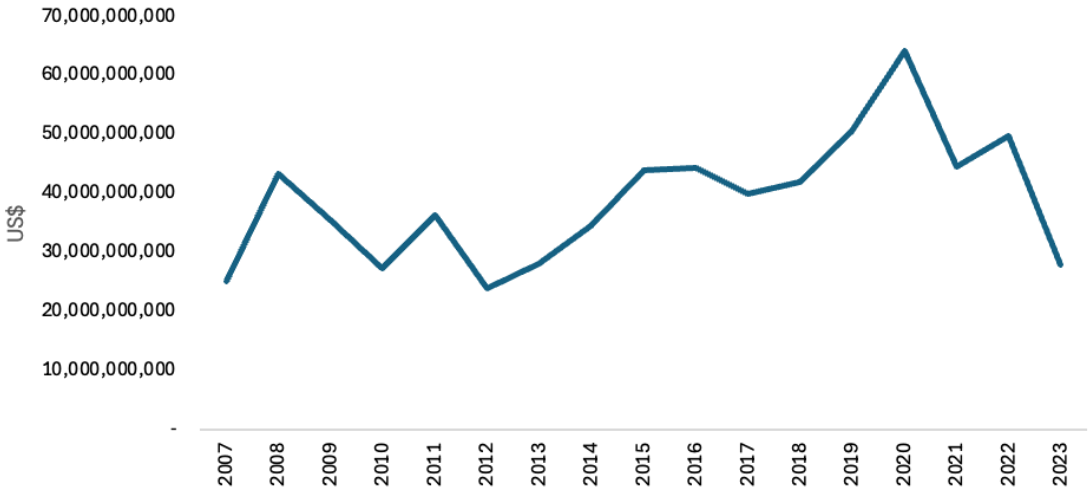
Although *Made in China* and India's PLI has similar goal of reducing import reliance and accelerate domestic manufacturing, their approaches differ significantly. The *Made in China 2025* strategy places a greater emphasis on government-led investment in important industries, subsidies, and state intervention. It adopts a more state-directed, top-down strategy. In contrast, the PLI scheme offers financial incentives to both foreign and domestic businesses based on incremental sales generated through local manufacturing in India. While both programs seek to increase local manufacturing, China's *Made in China 2025* plan takes a state-directed, top-down strategy, and primarily focused on supporting large, state-owned enterprises and national champions, whereas India's PLI scheme takes a more inclusive with strong focus on MSME, output-based, and globally aligned approach.

The Production Linked Incentive (PLI) program has been a crucial step in increasing domestic manufacturing, lowering reliance on imports from China, and promoting economic expansion. India's increased export competitiveness and incorporation into the global

[45] Institute for Transportation Development Policy and Viriya ENB, "Peta Jalan dan Program Insentif Nasional untuk Elektrifikasi Transportasi Publik Perkotaan Berbasis Jalan", 2024, https://tinyurl.com/yndxdftr
[46] Zheinan Chen, Hui He," How will the dual-credit policy help China boost new energy vehicle growth?", 2022, https://tinyurl.com/y72tcb3z
[47] Dialogue Earth, "Life after subsidies for China's EVs", Nov.30, 2023, https://tinyurl.com/ynrun38p
[48] Inside Evs, "Over Half of All Teslas Sold In 2022 Were Made in Giga Shanghai", Jan.8, 2023, https://tinyurl.com/mry23raw

supply chain are further benefits of the PLI scheme. As a result, foreign direct investment net inflows in India increased by 27.1 percent in 2020 compared to 2019.[49]

Figure 31. Foreign direct investment net inflow, India



Source: World Bank

Together with state-specific industrial strategies, the Production-Linked Incentives (PLI) program, which targets 14 sectors, aims to increase the manufacturing's sector-wise GDP contribution to 25 percent by 2025. Advanced Chemistry Cell (ACC) Battery and Automobile and Auto Component are two of the 14 sectors that receive the PLI scheme with budget outlays of INR 181 billion (US$ 2.1 billion) and INR 570.42 billion (US$ 6.7 billion). [50] As of August 2024, investments amounting to Rs. 1.46 lakh crore had been realized across 14 sectors, resulting in increased sales and output of over Rs. 12.50 lakh crore, the creation of more than 9.5 lakh jobs, and exports exceeding Rs. 4 lakh crores.[51]

The goal of the National Programme on Advanced Chemistry Cell Battery Storage is to produce 50 GWh of batteries. In mid-2022, the government provided funds to four businesses under the program: Reliance New Energy Solar Limited, Ola Electric Mobility Private Limited, Hyundai Global Motors Company Limited, and Rajesh Exports Limited. Production was expected to begin in 2024. Over five years, the funds will be disbursed based on the sales of batteries made in India. Beneficiaries are required to achieve a minimum of 25 percent domestic value added in the first year, increasing to 60 percent by the fifth year. [52] [53]

[49] World Bank, Foreign direct investment, net inflows (BoP, current US$) - India, https://tinyurl.com/2ertp77n
[50] India Briefing, "India Manufacturing Tracker: 2024-25", https://tinyurl.com/sfdaystz
[51] Ministry of Commerce and Industry India, "How the PLI Scheme is Reshaping Industries", Dec.21, 2024, https://tinyurl.com/3s569593
[52] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh
[53] Ministry of Heavy Industry, "Allotment made for 50 GWh of battery capacity to 4 successful bidders for incentive under (PLI) Scheme for Advanced Chemistry Cell (ACC) Battery Storage", mar.24, 2022, https://tinyurl.com/ysu9es5t

The Automobile and Auto Component PLI scheme is divided into two sections. The first one is the Component Champion scheme, which offers incentives for the sale of specific internal combustion engine (ICE) and electric vehicle (EV) components. However, the incentive factor for ICE vehicle components decreases over time. The second is the Champion OEM (Original Equipment Manufacturer) incentive scheme, which offers incentives for the sale of advanced automotive technology vehicles, including battery electric and hydrogen fuel cell vehicles. Both programs require a minimum domestic value-added criterion of 50 percent.[54]

4.2.2. Tax incentives

Meanwhile, Indonesia and Malaysia account for less than 2 percent of global car manufacturing.[55] Unlike India, which provides financial support to EV manufacturers, Malaysia and Indonesia currently use tax incentives for EV manufacturers. The Malaysian Investment Development Authority (MIDA) offers tax incentives to EV manufacturers through the Low Carbon Mobility Blueprint (LCMB) framework. In addition, Malaysia grants personalized tax incentives under Malaysia's Green Technology Tax Incentive Framework, which has existed in Malaysia since 2014.

Applicants for the Green Technology Tax Incentive must first be approved by the Malaysian Investment Development Authority (MIDA) before they can be granted tax incentives by the MGTC. Recipients of these incentives are periodically updated. In the context of EVs, according to the MGTC's latest guideline from 2022, only specific EV-related activities are eligible for incentives, as outlined in figure 32.

Figure 32**. EV-related Assets and Services Eligible for Green Technology Tax Incentives**

Green Investment Tax Allowance (GITA) assets	Type of asset
	Electric motorcycle/scooter
	Electric bus
	Electric MPV/truck
Green Income Tax Exemptions (GITE) services	Type of service
	Services related to installation, maintenance and repair of EV charging equipment, infrastructure and EV charging station.
	Services related to operation of the EV charging station.
	Services related to maintenance, repair, and overhaul of EV.

Source: Malaysia Green Technology Corporation (MGTC)

Similar to Malaysia's attempt to EV manufacturers, the Indonesian government has also introduced the EV tax holiday through PMK No.69/2024, which reduces the costs for

[54] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh
[55] Visual Capitalist, "Ranked: The World's Top 30 Countries, by Automobiles Manufactured", 2024, https://tinyurl.com/yr47fh6k

manufacturers, encouraging investment and expanding production capacities for electric vehicles and their core components. This policy seeks to strengthen the EV industry by making it more competitive and attractive, stimulating growth in the sector.

4.2.3. Local Content Requirement

Indonesia does not have a program similar to India's that provides direct funding to EV manufacturers. Instead, Indonesia relies on the local content requirement mechanism as the basis for offering tax incentives to EV manufacturers, including materials, assembly, and R&D. Through local content requirement, the government expects the EV industry to generate a strong economic multiplier effect, benefiting the broader economy, downstream and upstream industries, as well as labour and capital providers. This economic potential becomes increasingly critical as Indonesia holds the world's largest nickel reserves, and the battery industry's share of global nickel consumption is projected to rise from 7 percent in 2021 to 37 percent in 2030.[56]

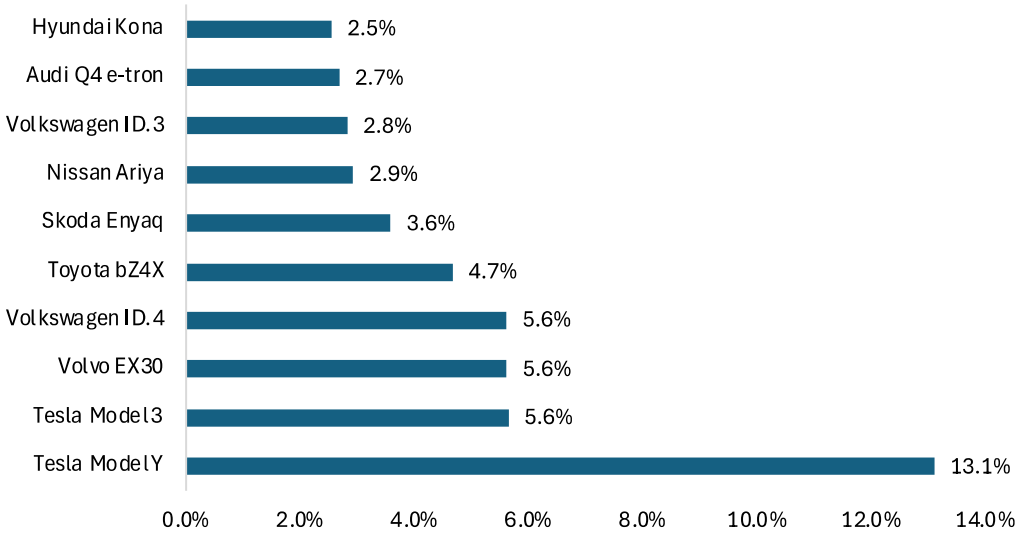
Although the mineral processing sector lacks the capacity to generate 600,000 new energy vehicles by 2030, Indonesia views this sector as one of its top development goals. To increase the value of its nickel production, Indonesia banned the export of nickel ore in 2020 and mandated domestic processing.

Indonesia's content localization approach is similar to India's Phased Manufacturing Program (PMP), which aims to increase local content in the EV supply chain. The PMP enforces strict deadlines for component localization. If component localization targets are not met, then EV buyers are not eligible for FAME subsidies.[57] This effort is taken to enhance value addition and domestic capacity building significantly. The revised PMP introduced in April 2020 includes higher localization targets compared to the 2019 version: 50 percent component localization for completely built-up (CBU) buses and trucks; 25 to 30 percent for semi-knockdown passenger vehicles, two-wheelers, buses, and trucks; and 15 percent for completely knocked-down passenger vehicles, two-wheelers, three-wheelers, and trucks.[58]

In addition to 5 direct fiscal incentives for manufacturers, governments in various countries also provide incentives to promote EV adoption through import tax exemptions. These policies are particularly important in countries that are still developing their domestic EV industries or that prefer to import EVs. In Norway's case, although the country initially had a domestic EV manufacturer, Think Global, which eventually went bankrupt in 2011, incentives also extended to support local industry growth. From 1990 to 2022, Norway granted import tax exemptions for fully imported EVs. These exemptions broadened consumers' choice from various EV producers, thus accelerating EV adoption. With a wide range of alternatives and shifting consumer behaviour, new EV car sales reached a record high of 89.9 percent, the highest in the world. Today, most EVs in Norway are imported, with Tesla holding the largest market share.

[56] Tuyu Zhou, Jorrit Gosens, and Frank Jotzo, "China's EV plans", *Policy Brief*, 2023
[57] Asian Development Bank, "Resolving Demand-Side Issues in Electric Vehicle Financing in India", *ADB South Asia Working Paper Series*, No.99, 2023, https://tinyurl.com/53bkvu33
[58] Government of India, National Level Policy, https://tinyurl.com/dwkf6fxn

Figure 33. New Car Registrations in Norway, 2024



Source: Road Traffic Information Council (2025)

Indonesia and Malaysia also offer import tax exemptions for completely built-up (CBU) EVs. Both countries have committed to exemptions until 31 December 2025. Malaysia has applied the exemption since 1 January 2022 without any specific production requirement for EV manufacturers.[59] By contrast, Indonesia only introduced its exemption more recently through the Ministry of Investment Regulation No. 6/2023. Under this regulation, CBU EV imports are exempt from import tax until the end of December 2027, provided that manufacturers produce an equivalent number of EV units locally by the end of 2027.[60] This policy mirrors Thailand's approach, which also required production commitments, although that requirement has been relaxed.

Unlike Indonesia, Thailand, and Malaysia, India does not offer full import tax exemptions for EVs. Instead, the Indian government provides a conditional import tax reduction of 15 percent for CBU EVs, from the current 70 to 100 percent rate.

Similar to Indonesia, India requires manufacturers to invest and establish local production facilities. The reduced tax requires a minimum investment of INR 4,150 crore ($500 million), set up local production facilities within three years, and a domestic value addition of at least 25 percent within that period. By the fifth year, 50 percent of EV components must be sourced locally. Additionally, the Indian government added another strict limit of 8,000 imported EVs, with localization requirements mandating that half of the vehicle's

[59] Malaysian Investment Development Authority, "Going EV: What the Malaysian government is doing to charge up the transition", Jul.9, 2024, https://tinyurl.com/42v9meew
[60] Kementerian Investasi dan Hilirisasi, Peraturan Badan Koordinasi Penanaman Modal Nomor 6 Tahun 2023, https://tinyurl.com/2pyah7e8

components be manufactured or sourced locally, ensuring substantial investment in India's automotive industry.

4.2.4. Lessons from Thailand's Automotive Industry

Thailand is the largest car producer in Southeast Asia, contributing approximately 2 percent of total global vehicle production.[61] The Thai government has actively promoted EV adoption through customs duty exemptions and excise tax reductions. While these measures have effectively accelerated EV adoption, the emphasis on importing completely built-up (CBU) vehicles has created challenges for the local manufacturing sector, raising concerns about the sustainability of the domestic EV industry.

The Thai government extended customs duty incentives for CBU battery electric vehicles (BEVs) from January 1, 2024, to December 31, 2025. This notification extends customs duty incentives for CBU and BEVs that were previously granted in 2022 and expired on December 31, 2023.

Eligible BEVs include passenger or transport cars with a seating capacity of up to 10 persons and a Suggested Retail Price (SRP) of up to THB 2 million, and for passenger or transport cars with a seating capacity of 10 persons or less priced between THB 2 million to THB 7 million.

Under these incentives, import duties are fully exempted for CBU BEVs imported under FTA with a pre-existing duty rate of less than 40 percent. For BEVs imported under an FTA with a pre-existing duty rate above 40 percent, the duty is reduced by 40 percent. BEVs imported outside of any FTA are also eligible for a 40 percent reduction.

While the Thai government provided CBU EV incentives, it did not maintain support for domestic automotive manufacturers during the COVID-19 pandemic. The Thai automotive industry accounted for 10 percent of national GDP and produced over 2 million vehicles in 2019. In Q1 2020, production declined by 19.2 percent (to approximately 453,682 units), followed by a 24.09 percent drop in sales.[62]

On the contrary, Malaysia's automotive industry received incentives during the COVID-19 pandemic.[63] Despite severe economic hardships following the pandemic, the automobile sector was one of the major beneficiaries of the government stimulus efforts injected by the new Perikatan Nasional-led government. Under the Prihatin Rakyat Economic Stimulus Package, launched on February 10, 2020, the government gave a six-month loan moratorium for the period of April 1 - September 30, which boosted sales and consumer spending, particularly for low-end models. As a result, 2020 became a banner year for Malaysia's automotive industry.[64]

The Thai automotive industry policy is also accompanied by the economic slowdown, strict loan regulations, rising household debt, and growing non-performing loans (NPL). Car sales

[61] Visual Capitalist, "Ranked: The World's Top 30 Countries, by Automobiles Manufactured", 2024, https://tinyurl.com/yr47fh6k
[62] Climate Scorecard, "Thailand Government Has Yet to Respond to Requests to Help Automobile Industry Hurt by COVID-19", Jul.25, 2020, https://tinyurl.com/5b8v9fwc
[63] Focus Group Discussion with Hyundai Motor Indonesia on Mar.13,2025
[64] Malaysian Investment Development Authority, "Auto industry: Banner year, driven by govt incentives", Dec.8, 2020, https://tinyurl.com/yc6am76m

in 2024 dropped to 562,000 units, the lowest level in 15 years, and almost half of Thailand's peak sales. The decline in purchasing power has led to a unique situation where second-hand car prices have surpassed those of new vehicles, [65] reducing consumer trust and limiting new car purchases.[66]

Thailand's policy of providing incentives for EV imports has significantly impacted the domestic manufacturing industry. While aimed at promoting EV adoption, these measures have created serious challenges for local producers. The emphasis on importing CBU BEVs, backed by favourable government incentives, has caused domestic manufacturers to struggle in terms of competitiveness. Imported CBUs are now increasingly price-competitive due to these policies, which have undermined the position of locally produced EVs. Moreover, with the weakening purchasing power, this policy exacerbates the competition between the domestic manufacturer and the foreign players. This shift has contributed to structural changes in the industry, with Suzuki and Subaru announcing the closure of their Thai manufacturing plants while Honda closed one of two car manufacturing facilities.

4.3. Charging infrastructure policy

The growth of electric mobility faces a coordination issue that resembles a chicken-and-egg dilemma. Although a dense and practical charging network is necessary for EVs to become appealing to customers, investors must be certain of a sizable market before making significant investments in charging networks. Therefore, until a critical mass is reached, early support may be needed for EV purchases or charging networks.[67]

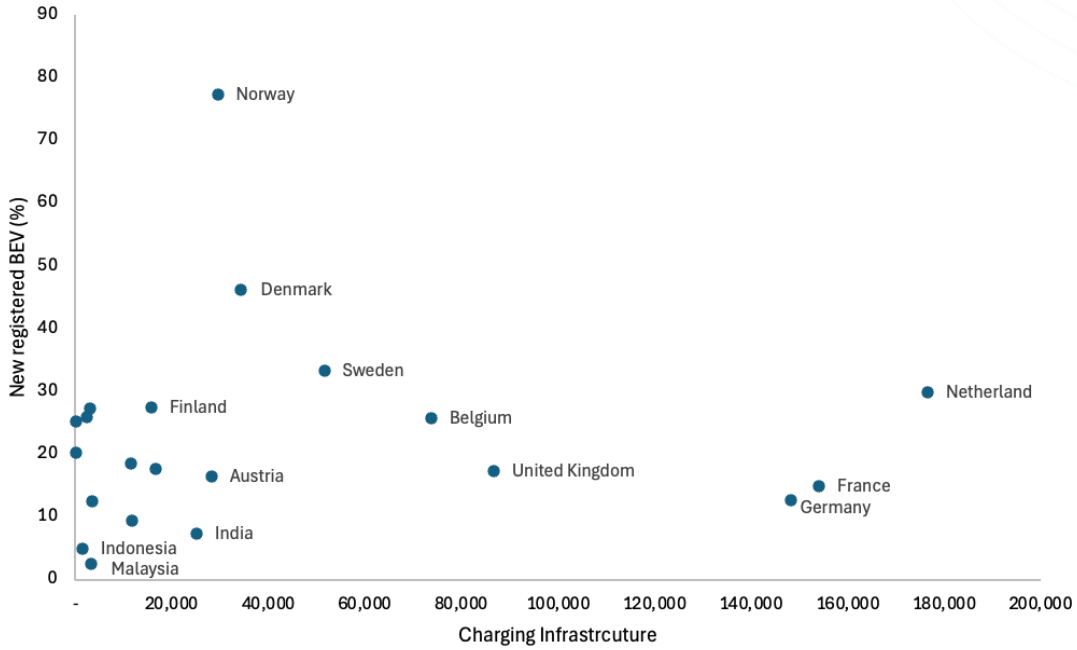
At present, the Indonesian government has set regulations governing the technical aspects and requirements for charging infrastructure, as outlined in Energy and Mineral Resources (ESDM) Ministerial Regulation No.13/2020. This regulation mandates the provision of both public charging stations (SPKLU) and battery swapping facilities (SPBKLU) to support BEV users.

However, the number of charging stations in Indonesia remains insufficient to elevate EV demand. As of April 2024, there were only 3,233 charging stations in Indonesia, with 68 percent of the chargers concentrated on Java Island.[68] Malaysia, by comparison, has more than twice as many charging stations, 3,354 in total. India has taken a significant leap, with 25,202 public charging stations installed.

A combination of fiscal and non-fiscal incentives has resulted in massive EV charging infrastructure in many countries, as depicted in Figure 34. European countries are leading in terms of charging station availability, supported by ongoing tax cuts and subsidies for EV charging stations. India, despite having 25,000 EV charging stations, still has low EV car penetration due to the dominance of 2-wheeler and 3-wheelers in its market.

[65] The Nation, "Stricter loans, rising debts drive Thai vehicle sales to historic low", Nov.29, 2024, https://tinyurl.com/zd2vhj5c
[66] Focus Group Discussion with Hyundai Motor Indonesia on Mar.13,2025
[67] World Bank, "The Economic electrical vehicles for passenger transportation, 2023, https://tinyurl.com/4zk7kdcf
[68] Focus Group Discussion with PLN on Mar.13,2025

Figure 34. New Registered BEVs and Charging Infrastructure, 2024



Source: Processed from various sources

Accelerating EV charging infrastructure is prominent in European countries. In Norway, direct incentives for the consumer are complemented by support for charging infrastructure. A local subsidy program is in place to support the building of charging stations, ranging between NOK 5,000 and 10,000 per charging point or between NOK 50,000 to NOK 1,000,000 per housing association.[69]

The most significant policy tool used by the Norwegian government to support the installation of publicly accessible light vehicle charging infrastructure has been Enova. Enova, a state-owned enterprise formerly known as Transnova, is funded by the public Energy Fund and overseen by the Ministry of Petroleum and Energy.[70] In 2009, Transnova invested €6 million to start building charging infrastructure, and since then, funding has been continuously provided.[71]

In 2023, Norway continued to develop EV charging infrastructure under its National Charging Strategy. In the light vehicle segment, EV demand has matured, increasing the need for rapid chargers. The plan ensures that public fast charging infrastructure for private vehicles continues to grow. By the end of 2024, Norway is projected to have more than 9,000 public fast-charging stations for light vehicles.[72] Consequently, by the end of 2024, Norway had

[69] Ayvens, 2024 Mobility Guide, https://tinyurl.com/3zuktsxy
[70] Davood Qorbani, et al., "Ownership of battery electric vehicles is uneven in Norwegian households", *Communications Earth & Environment*, Vol.5 No.170 2024, https://tinyurl.com/mr338u8p
[71] Dale Hall, Nic Lutsey, "Emerging best practices for electric vehicle charging infrastructure", 2017, https://tinyurl.com/4bpmyb58
[72] Ministry of Transport Norway, "Norway is electric", 2025, https://tinyurl.com/vdrt29hw

approximately 29,545 electric vehicle charging points.[73] Norway also has more public fast chargers per capita than any other country in the world due to sustained government investment. These chargers can replenish an EV battery from 0 percent to 80 percent in as little as 20 minutes. Furthermore, Norway has granted apartment residents the right to install their own chargers and provides funding to housing associations for this purpose.[74]

Similar to Norway, China has also developed a national strategy for charging infrastructure. In October 2015, the National Development and Reform Commission and four other ministries issued the Guidance for Developing Electric Vehicle Charging Infrastructure for 2015–2020, setting specific national and regional objectives. The document stated that between 2015 and 2020, China would add 800 intercity fast-charging stations across three vertical (north-south) and three horizontal (east-west) lines, and identified three key focus areas.

In response, the Ministry of Finance and four other central agencies introduced a set of incentives for charging infrastructure construction after this document. Cities received a specific amount of funding from the central government to construct charging infrastructure, but only after meeting a predetermined number of electric vehicle deployments. For instance, a city in a developed area may receive up to 120 million yuan for charging infrastructure if it deploys 30,000 new energy vehicles.[75]

China's total number of charging stations exceeds that of the rest of the world combined. The installation of 760,000 public fast-charging stations and 1 million public slow-charging stations has been a significant element accelerating EV adoption.[76]

In addition to China and Norway, India also provides incentives through a signature program called Faster Adoption and Manufacturing of Electric Vehicles in India II (FAME II), which is the largest subsidy program to provide incentives for charging infrastructure. Under FAME II, a 10 percent target, or INR 10,000 crore (USD 1.35 billion), is allocated to the deployment of charging infrastructure. Nearly 4,450 charging stations have been approved in FAME II across 68 cities, 9 expressways, and 16 highways, significantly exceeding 520 subsidized charging stations under FAME I. As of July 2022, a total of 532 charging stations had been installed under FAME I and II.[77]

In Malaysia, the government provides incentives in the form of tax cuts. Businesses manufacturing EV charging equipment are exempt from paying full income taxes on their statutory income from 2023 to 2032.[78]

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[73] Statista, "Publicly accessible electric vehicle charging points in Norway by current 2020-2024", https://tinyurl.com/yfn3vyyu
[74] World Resources Institute, "These Countries Are Adopting Electric Vehicles the Fastest", Sep.14, 2023, https://tinyurl.com/yeuhvt3z
[75] Hui He, et.al., "Assessment of Electric Car Promotion Policies in Chinese Cities", 2018, https://tinyurl.com/yc5ek5zj
[76] World Resources Institute, "These Countries Are Adopting Electric Vehicles the Fastest", Sep.14, 2023, https://tinyurl.com/yeuhvt3z
[77] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh
[78] Malaysia Investment Development Authority, Government bolsters EV charging infrastructure development with key incentives, 2024, https://tinyurl.com/mryfbcc9

To accelerate charging station development, non-fiscal instruments are also used. For example, collaboration between grid companies and local governments can be a source of charging station development. In Jinan's Laiwu District, China, the State Grid Company, Laiwu Power Supply Co., has invested in 75 charging stations and 280 charging piles, creating "10-minute charging circles" for EV owners' convenience.[79]

While Indonesia has made great strides in encouraging EV manufacturing and use through comprehensive tax policies, the country's ability to expand further is limited by the shrinking space for more tax-based incentives. Currently, the incentive for charging stations is a reduced charging fee offered by the State Electricity Company (PLN).

This incentive is deemed insufficient to match the progress made by other countries that already offer subsidies, tax cuts, and regulatory easing for setting up charging stations. Given Indonesia's ambitious EV adoption goals and geographic scale, additional efforts are needed to attract more participants to the charging sector, not only limited to domestic but also foreign players, to bring more investment to the EV ecosystem in Indonesia.

4.4. Demand-side policy

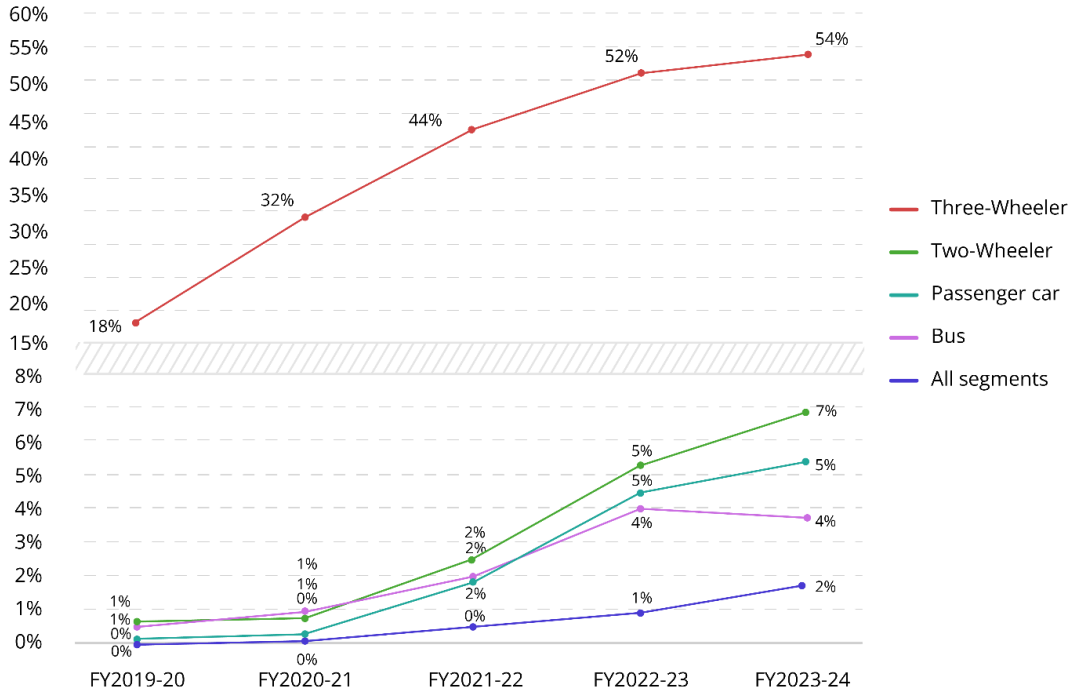
4.4.1. Purchasing Subsidy

India has a signature demand-side policy for EV adoption called the "Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles" (FAME). FAME was established under the National Electric Mobility Mission Plan (NEMMP) 2020, the primary policy framework to achieve India's EV goals. This subsidy program aims to reduce the upfront cost of hybrid and electric vehicles to boost adoption and support market development.[80] Phase I was implemented from 2015 to 2019 with a budget outlay of INR 895 crore (US$ 12 million), followed by Phase II, which ran from 2019 to May 2024 with a budget outlay of over INR 10,000 crore (USD 1.3 billion. The first phase of the FAME program has accelerated the adoption with 280,00 hybrid and EV sales, saving 50 million litres of fuel consumption and reducing CO_2 emissions by 130,000 tons.

Sales of BEVs across all variants have trended upwards in India since 2019. During the fiscal year 2023 -2024, new BEV sales reached 7 percent, with more than half of the sales coming from three-wheelers. Although passenger car growth is comparatively lower than other segments, BEV sales in this segment have reached 2 percent of new car sales, far exceeding 5 years ago (Figure 35). With current government policies, BEVs are projected to account for over 35 percent of all vehicle sales by 2030.[81] With current government policies, BEVs are expected to account for over 35 percent of all vehicle sales by 2030. [82]

[79] Abdul Latif Jameel, "How China rose to lead the world in electric vehicles", Apr.17, 2024, https://tinyurl.com/4w566zby
[80] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh
[81] Sumati Kohli, "Electric vehicle demand incentives in India", 2024, https://tinyurl.com/ms7veatz
[82] International Energy Agency, "Transitioning India's Road Transport Sector", 2023, https://tinyurl.com/bdem5nfh

Figure 35. Annual EV uptake in new vehicle sales from FY 2019-20 to FY 2023-24



Source: The International Council on Clean Transportation (2024)

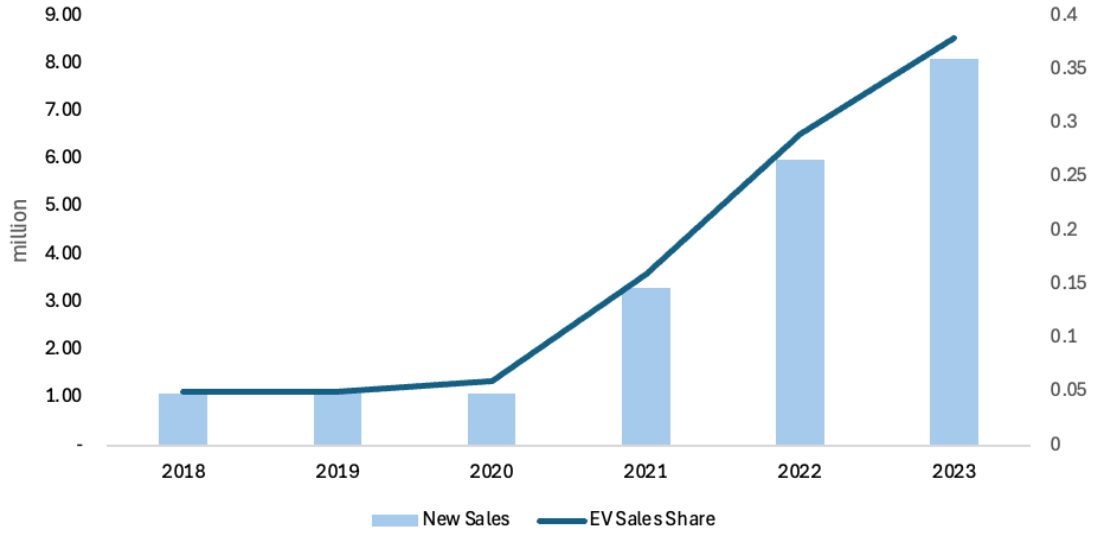
China began offering EV purchase subsidies in 2011. Major cities such as Beijing and Shanghai were among the six pilot cities, offering consumers purchase subsidies for electric vehicles. By 2014, 88 pilot cities developed incentive programs to boost consumer interest in making purchases.[83]

Individual consumers were eligible for subsidies based on the power battery pack's energy capacity, which was set at 3000 yuan/kWh, with a maximum of 60,000 yuan per BEV. However, these subsidies for buying BEVs have gradually declined since 2014. Initially set at 60,000 yuan in 2009, the maximum subsidy standard for BEVs was raised to 54,000 yuan in 2015, 44,000 yuan in 2017, 50,000 yuan in 2018, 25,000 yuan in 2019, 22,500 yuan in 2020, 18,000 yuan in 2021, and 12,600 yuan in 2022. [84] The subsidy program ended in 2022. Nonetheless, through combined fiscal incentives on both the supply and demand sides, China has become the global EV leader after Norway.[85] China utilizes a lot of market power to accelerate EV adoption through government policy and financial incentives. China sold 4.4 million BEV passenger cars in 2022, accounting for 22 percent of total passenger vehicle sales, exceeding the global EV total sales of 3 million.[86] More than 6 million EVs (BEV and PHEV) were sold in China in 2022, making up half of all EV sales worldwide.[87] EV sales share

[83] Xiaolei Zhao, et.al., "Policy incentives and electric vehicle adoption in China: From a perspective of policy mixes", *Transportation Research Part A*, No.190, 2024
[84] Xiaolei Zhao, et.al., "Policy incentives and electric vehicle adoption in China: From a perspective of policy mixes", *Transportation Research Part A*, 190, 2024
[85] World Resources Institute, "These Countries Are Adopting Electric Vehicles the Fastest", Sep.14, 2023, https://tinyurl.com/yeuhvt3z
[86] World Resources Institute, "These Countries Are Adopting Electric Vehicles the Fastest", Sep.14, 2023, https://tinyurl.com/yeuhvt3z
[87] Dialogue Earth, "Life after subsidies for China's EVs", Nov.30, 2023, https://tinyurl.com/ynrun38p

already achieved the target in 2023, with 38 percent of passenger car sales coming from EV (BEV and PHEV).

Figure 36. Electric car new sales and new sales share, 2012-2024



Source: International Energy Agency (2024)

4.4.2. Purchasing Tax Incentives

Indonesia has reduced the Value Added Tax for companies complying with the local content requirement. This initiative has accelerated the sales of Wuling Air EV and Hyundai Ioniq 5 in 2022. Additionally, the government provided import and luxury tax exemptions for fully imported EVs (CBU) to support market entry and accelerate EV sales in Indonesia.

Indonesia's approach is similar to Malaysia and Norway. Malaysia exempted EVs from excise tax in 2019, and by 2022, extended exemptions to import and excise duties. (Figure 37).

Figure 37. Malaysia's fiscal EV incentives[88]

Year	Incentive	Responsible Institution
2018 Budget	Exemption of excise duties for energy-efficient vehicles (EEVs), including hybrids	Ministry of Finance (MoF)
	Exemption from road tax for electric vehicles (EVs)	Ministry of Transport (MOT)
2019 Budget	Exemption of excise duties for EVs	Ministry of Finance (MoF)
	Introduction of EV charging infrastructure incentives	Ministry of Energy and Natural Resources (KeTSA)
2020 Budget	Continued excise duty exemptions for EVs	Ministry of Finance (MoF)
	Financial incentives for consumers purchasing EVs	Ministry of Energy and Natural Resources (KeTSA)

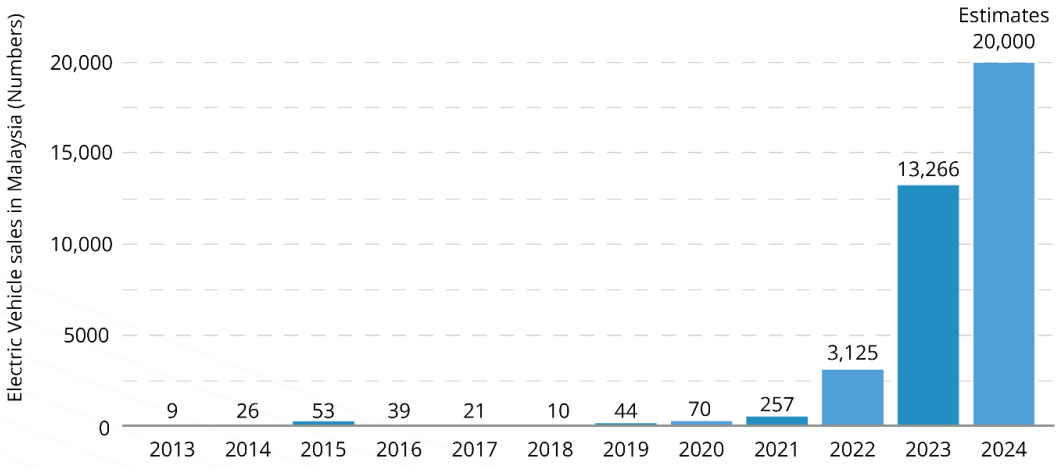
[88] Malaysia Finance Ministry (MOF) State Budget "Belanjawan" archives

	Tax incentives for the local assembly of EVs and charging stations	Malaysian Investment Development Authority (MIDA)
2022 Budget	Import and excise duty exemptions for EVs (both CKD and CBU)	Ministry of Finance (MoF)
	Sales tax waiver for EVs (both CKD and CBU)	Royal Malaysian Customs Department (JKDM)
	Income tax exemptions for manufacturers of EVs and EEVs	Malaysian Investment Development Authority (MIDA)
	Expanded support for EV charging infrastructure	Ministry of Energy and Natural Resources (KeTSA)
2023 Budget	Extension of duty exemptions and sales tax exemptions for EVs and EEVs	Ministry of Finance (MoF)
	Continued tax incentives for local EV manufacturers	Malaysian Investment Development Authority (MIDA)
	Income Tax Exemptions for Electric Vehicle Charging Equipment (EVCE) Manufacturers	Malaysian Investment Development Authority (MIDA)
	Tax deductions on EVs rented for non-commercial use	Ministry of Finance (MoF)

Source: Malaysia National Energy Transition Roadmap (NETR)

As a result, EV sales in Malaysia increased in 2022 and continued growing rapidly in 2023 and 2024 (Figure 38).

Figure 38. Growth of EV Sales in Malaysia, 2013-2024[89]



Source: Malaysia Ministry of Science and Education

The Chinese government also introduced a purchase tax exemption on September 1, 2014. This exemption has been extended three times. In 2023, the Chinese Ministry of Finance, the

[89] Muhammad Umair, et.al.,"A Review of Malaysia's Current State and Future in Electric Vehicles", *Journal of Sustainable Development of Energy, Water and Environment Systems*, Vol.12, No.4, 2024

State Administration of Taxation, and other departments jointly issued a notice on continuing and optimizing the policy of reducing and exempting the purchase tax. New EVs purchased before December 31, 2025, are exempt from car purchase tax, up to a maximum of 30,000 Yuan. Additionally, the purchase tax on new EVs purchased between January 1, 2026, and December 31, 2027, is halved, with a maximum exemption of 15,000 Yuan.[90]

In Norway, the exemption of 25 percent VAT on car purchases existed for two decades from 2001 until 2022. As of 2023, the value-added tax (VAT) exemption for EV has been eliminated and replaced with a subsidy program capped at NOK 500,000 (€43,780). Consequently, only the priciest electric vehicles will see price increases. For leasing, the Norwegian government has exempted VAT since 2015.[91]

4.4.3. Ownership Tax Exemption

Aside from national government policies, India, Malaysia, China, Norway provide incentives to reduce the ownership cost of EVs. Indonesia reduces the ownership cost of EVs at the national level by offering incentives through the regional tax mechanism. The government imposes a zero percent Motor Vehicle Tax (PKB) and Duty on the Transfer of Motor Vehicle (BBNKB) for EVs.[92]

Similar to Indonesia, road tax exemptions in Malaysia are applied at the national level. Road taxes play a relatively significant role in the cost of vehicle ownership in Malaysia, which is why their exemption has had a noticeable impact on EV adoption. The closest equivalent to Malaysia's road tax in Indonesia is the motor vehicle tax (PBBKB). However, the similarity extends only to the fact that both are annual taxes paid by motor vehicle owners. Malaysia's road tax is a fee levied for the usage of public roads and is tied to engine capacity (cc) or electric motor output (kW) of the levied vehicle.

The road tax rate scales progressively with the vehicle capacity. For example, in Peninsular Malaysia, a standard car with an engine capacity of 1500 cc is subject to an annual road tax of RM90 (around Rp 323,000 or US$ 20). A car with an engine capacity of 2000 cc in the same area would be levied a road tax of more than quadruple, around RM380 (equivalent to Rp 1.36 million or US$ 84).[93]

In India, local governments also provide various incentives to increase EV adoption across states. These local incentives include road tax exemptions, registration fee exemptions, congestion fee waivers, coupons, and interest subventions. In India, all car owners are required to pay road tax to the state government at the time of purchase. This varies across Indian states and depends on whether the car is for personal or business purposes. Based on the vehicle's cost and fuel requirements, the state road tax is further classified into slabs.

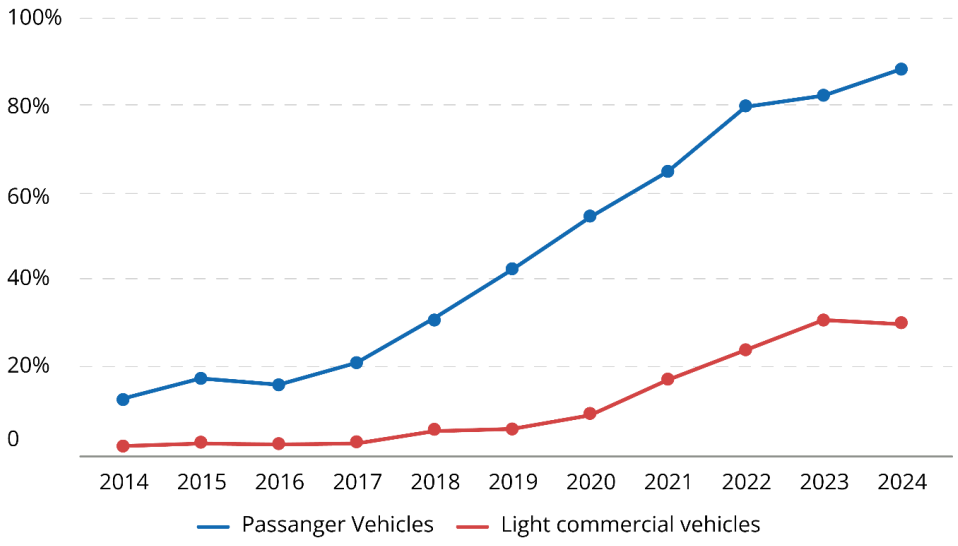
[90] Jiamei Tian, et.al., "Overview of Chinese new energy vehicle industry and policy development", 2, 2024
[91] Davood Qorbani, et al., "Ownership of battery electric vehicles is uneven in Norwegian households", *Communications Earth & Environment*, Vol.5 No.170 2024, https://tinyurl.com/mr338u8p
[92] Focus Group Discussion with Ministry of Finance on Mar.12, 2025.
[93] Oto Malaysia, Road Tax Calculator, https://tinyurl.com/4bhx8mz8

EVs are exempt from road taxes in most Indian states with EV-specific laws. This benefit is offered by states such as Telangana, Punjab, Delhi, and Uttar Pradesh. [94]

EVs are exempt from registration fees in most Indian states. Regardless of the car's value, the registration fee is INR 600. Similar to road tax, the registration fee is a one-time cost incurred upon purchasing a new car and varies based on the vehicle's purpose (personal or business).[95]

In Norway, the registration tax exemption is typically the most significant fiscal benefit, followed by VAT tax exemption. BEVs in Norway were also exempt from the annual road tax between 1990 and 2021. However, beginning in 2021, the exemption was replaced with a reduced annual road tax. Eligible BEV owners paid a lower annual motor vehicle tax of 435 kroner (about €52) compared to 3,060 kroner (about €367) for conventional vehicles. As of 2022, the Norwegian government withdrew the reduction and enforced full annual road tax.[96] [97] [98] However, these fiscal incentives have successfully increased EV adoption in Norway, reaching an all-time high EV sales share of 88.9 percent of new passenger car sales and more than 27 percent of all registered cars.[99] This figure has nearly doubled since 2014, when only around 14 percent of all registered cars were BEVs or PHEVs.[100]

Figure 39. EV Market Shares, Norway



Source: Norsk elbilforening (2025)

[94] Centre for Enery Finance, "Financial incentives for electrical vehicle buyers in India", 2021, https://tinyurl.com/2erh8rpu
[95] Centre for Enery Finance, "Financial incentives for electrical vehicle buyers in India", 2021, https://tinyurl.com/2erh8rpu
[96] Norsk elbilforening, "Norwegian EV policy", https://tinyurl.com/3fj3d4tr
[97] Uwe Tietge, Peter Mock, Nic Lutsey, Alex Campestrini, "Comparison of leading electric vehicle policy and deployment in Europe", 2016, https://tinyurl.com/564cycxv
[98] Uwe Tietge, Peter Mock, Nic Lutsey, Alex Campestrini, "Comparison of leading electric vehicle policy and deployment in Europe", 2016, https://tinyurl.com/564cycxv
[99] Norsk elbilforening, "Norwegian EV policy", https://tinyurl.com/3fj3d4tr
[100] Uwe Tietge, Peter Mock, Nic Lutsey, Alex Campestrini, "Comparison of leading electric vehicle policy and deployment in Europe", 2016, https://tinyurl.com/564cycxv

China has provided EV drivers with non-monetary incentives, primarily at the city level. Major Chinese cities, such as Beijing, Shanghai, Guangzhou, Shenzhen, Tianjin, Hangzhou, Shijiazhuang, and Hainan, have banned license plates for ICE vehicles to curb pollution and traffic congestion. Beijing uses a lottery system, while Shanghai uses auctions. Guiyang, which had previously imposed such restrictions, lifted them in 2019. EV buyers in Beijing are largely exempt from the lengthy wait times and vehicle registration plate rationing. From 2018 to 2024, Beijing allocated an additional 100,000 license plates, of which 80% were reserved for EVs in 2024. Between 2021 and 2024, the EV quota increased from 60,000 in 2021 to 80,000 in 2024.[101] [102] In Shanghai, the local government grants free license plates for NEVs (BEVs, PHEVs, fuel cell vehicles). This incentive remains in place until Dec.31, 2025.[103]

4.4.4. Corporate Procurement

In 2022, Malaysia implemented a tax incentive that allowed companies renting electric vehicles (EVs) for non-commercial purposes to claim tax deductions on rental costs. This policy significantly lowered the financial barriers for businesses to explore EV usage beyond commercial operations. As a result, it normalized EVs in everyday business contexts and increased their visibility on the roads, thereby fostering broader public awareness and acceptance of electric mobility.

More importantly, the incentive laid the groundwork for a broader EV ecosystem in Malaysia. As more companies adopted EVs through rental schemes, public awareness, and familiarity with EVs increased. Furthermore, the growing demand highlighted the need for supporting infrastructure, spurring on discourses, and planning around critical elements such as expanding EV charging networks, increasing the availability of qualified EV technicians and mechanics, and enhancing policy frameworks to support long-term EV growth.

The increased visibility and adoption of EVs also triggered a ripple effect across the market, generating demand for services and products tailored to electric mobility. In doing so, the incentive not only facilitated short-term uptake but also initiated systemic changes essential for developing a robust, future-ready EV ecosystem in Malaysia.

4.4.5. Financing Incentive

Financing is a key aspect of EV adoption, as easier access and lower-cost financing options reduce the opportunity cost for consumers. In India, the financing incentive has been given in certain regions through income tax exemption for interest paid on loans to purchase EVs. Consumers can recover up to INR 150,000 (USD 2,020) in tax savings on interest paid on loans taken out, especially for the purchase of electric vehicles. To claim the 80EEB deduction, however, several limitations and requirements pertaining to the lender and the

[101] Abdul Latif Jameel, "How China rose to lead the world in electric vehicles", Apr.17, 2024, https://tinyurl.com/4w566zby
[102] CNEV Post, "Beijing offers extra 20,000 EV quotas in 1st relaxation of car purchase policy since 2011", Jul.19, 2024,https://tinyurl.com/5fxp8yc9
[103] CNEV Post, "Shanghai to continue offering free license plates for BEVs in 2025", Dec.31, 2024, https://tinyurl.com/3y8y8abz

electric vehicle must be adhered to. The consumer could only take advantage of tax deductions if the loan were granted between January 1, 2019, and March 31, 2023.[104]

In Indonesia, EV financing incentives are provided in the form of lower down payment requirements. This policy is crucial given that most car purchases are made through instalments.[105] Bank Indonesia has introduced Green Loan-to-Value (LTV) / Financing-to-Value (FTV) ratios for green vehicle financing. For EVs, minimum down payment requirements, previously ranging between 5 percent to 20 percent, have been significantly reduced.[106]

[104] Cleartax, "Section 80EEB of Income Tax Act: Electric Vehicle Tax Exemption, Benefits and Deduction", Nov.19, 2024, https://tinyurl.com/yz3zy8kf
[105] Focus Group Discussion with Wuling on Mar.13, 2025.
[106] Banque de France, "Green finance in the Asia-Pacific region: mobilisation spearheaded by central banks and supervisory authorities", 2021.

5. Recommendations

5.1. Demand Side

To increase EV adoption, incentives need to be given to auto dealers, considering that they are the primary channel for educating consumers about EV technology. Since commercial EV sales only began gaining traction around three years ago, various misconceptions persist among consumers, particularly regarding EV batteries, their lifespan, and maintenance costs. This issue has persisted due to a lack of incentives for auto dealers to promote EVs to the public, thereby slowing sales growth.

Other countries, such as the United States, have worked for years to promote EV adoption through dealerships. Most states, such as California and Oregon, provide funds that allow dealers to offer rebates to EV buyers. However, other states, particularly Connecticut, provide direct cash bonuses to dealers for each EV sold under the Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) Program.[107]

To reduce the cost burden of EV ownership, the government should introduce targeted financing incentives. Around 70 percent of EV buyers in Indonesia rely on credit schemes, yet the interest rates for EVs remain the same as for ICE vehicles – despite EVs presenting lower maintenance risks due to their advanced technology. To improve affordability, the government could subsidize interest rates. Additionally, regulations should encourage insurance providers to offer lower premiums – or even waive them for an initial period – given the lower mechanical risk associated with EVs.

In addition to financing incentives, charging infrastructure should be integrated into urban development policies. Drawing lessons from countries like Singapore and China, where 30 percent of new buildings are required to provide EV charging-ready parking, Indonesia can mandate similar provisions for residential and commercial developments. This would significantly improve access to charging facilities, especially in urban areas, and help normalize EV ownership in daily life.

Tax deduction for companies that rent EVs for business purposes should also be implemented to increase both sales and awareness of EV technology. Malaysia's experience shows that such policies can help employees become familiar with and aware of EV technology. Increased awareness through EV adoption in corporate operations will help expand consumer demand for EVs. In Indonesia's case, this initiative can begin by mandating the State-Owned Enterprises (SOEs) to adopt EVs for their operational activities. As public acceptance of EVs grows, the initiative can be gradually extended to other companies.

5.2. Supply Side

Indonesia must strengthen its participation across the entire nickel supply chain through tax incentive differentiation based on the content used in the battery. By engaging in every stage—from mining to battery-grade materials—the country can ensure all critical inputs are sourced domestically, optimize downstream processing, and generate economic multipliers through increased value-added activities, job creation, and industrial

[107] CT.gov "CHEAPR implementation manual" https://tinyurl.com/mshpxcxm

growth. The Ministry of Industry should also specify the local content requirement (TKDN) with the critical mineral that Indonesia has, considering the country's strong potential for nickel-based battery production. This update should include a higher incentive for the nickel-based battery that provides greater benefit for Indonesia.

In addition to nickel, the government should expand its downstream policies to include other critical minerals beyond nickel. Materials such as cobalt and copper foil are essential for battery production, and leveraging Indonesia's reserves through downstream development will strengthen domestic manufacturing capacity and reduce reliance on imports.

Furthermore, Indonesia must address supply chain gaps in key EV components, particularly motors and inverters, to support local manufacturing. These components are crucial for EV production and are currently heavily imported. By attracting investment in the domestic production of these critical parts, Indonesia can improve its sourcing capabilities, improve industrial competitiveness, and unlock broader economic benefits through increased value-added activities and job creation.

To increase the value added in the economy, Indonesia should enhance the manufacturing industry through the quota system of the CBU car that use LFP battery. To complement industrial policy, the government should introduce a quota system on CBU EV imports using LFP battery if the relaxation policy is extended. While CBU imports can help build early market demand, without proper mitigation, they risk undermining domestic manufacturing. This is especially relevant for LFP-based CBU imports, which offer limited support for Indonesia's downstream industrial goals. A quota system would provide a balanced mechanism, permitting market exploration while protecting the long-term interests of Indonesia's automotive industry.

In parallel, Indonesia's EV industrialization must adopt a strong export orientation with fiscal incentives. With the economic potential of the investment in the EV ecosystem, the government should provide fiscal incentives such as longer tax holiday to lower their cost and expand toward the exporting market. Additionally, this requires the value chain to meet the sustainability criteria in the exporting market. Sustained industrial growth means domestic EV production should aim to meet international standards for sustainability and ethical sourcing. This includes traceable supply chains, responsible mining practices, and low-emission production processes. Regulatory guidance and consistent support from the government are crucial to ensure that locally produced EVs can compete on the global stage.

The government should focus on improving the quality of human capital to scale up production and enhance efficiency. Human capital is essential for the development of Indonesia's EV industry. Given the complexity of the EV value chain, the government can start by inviting EV-related specialists from abroad to facilitate knowledge transfer. This initiative can be further developed by supporting domestic EV players in establishing research and development centres by partially covering R&D costs. These R&D centres play a critical role in driving innovation and expanding the availability of EV technology and products in Indonesia.

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