ENERGY TRANSITION PARTNERSHIP

Policy Brief

Accelerating Battery Supply Chain for RE and EV Development in Indonesia

2025

Comprehensive guide and roadmap to support stakeholders accelerating energy transition

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UNOPS AFD Federal Ministry for Economic Affairs and Climate Action Department for Energy Security & Net Zero Environment and Climate Change Canada / Environnement et Changement climatique Canada Australian Government Department of Climate Change, Energy, the Environment and Water CIFF CHILDREN'S INVESTMENT FUND FOUNDATION SEQUOIA CLIMATE FOUNDATION

UNOPS - Energy Transition Partnership

Policy Brief: Accelerating Battery Supply Chain for RE and EV Development in Indonesia

"Supply Chain Integration of Battery Value Chain for Energy Transition in Indonesia" - Project

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Acronyms

AEML	Electric Mobility Ecosystem Association
BESS	Battery Energy Storage Systems
CMEA	Coordinating Ministry of Economic Affairs
EV	Electric Vehicles
EPR	Extended Producer Responsibility
IBC	Indonesia Battery Corporation
INA	Indonesia Investment Authority
LCE	Lithium Carbonate Equivalent
LFP	Lithium Iron Phosphate Batteries
MEMR	Ministry of Energy and Mineral Resources *Kementerian Energi dan Sumber Daya Mineral*
MDB	Multilateral Development Bank
MIND ID	Mining Industry Indonesia
MoE	Ministry of Environment
MoF	Ministry of Finance
MoI	Ministry of Industry
MoInv	Ministry of Investment
MoT	Ministry of Transport
MoSOE	Ministry of State Owned Companies
NMC	Nickel Manganese Cobalt Batteries
PLN	*Perusahaan Listrik Negara*
RUPTL	*Rencana Usaha Penyediaan Tenaga Listrik* National Electricity Supply Business Plan
R&D	Research and Development
SPKLU	*Sistem Pengisian Kendaraan Listrik Umum* Public Charging Station

Policy Brief

Summary

Batteries are central for Indonesia's 2060 Net Zero Emissions target. They serve as the critical link that enables the electrification of transport and the integration of renewable energy into the power grid. Although the current framework is built on strong planning instruments and ambitious goals for renewable energy, electric vehicle production and charging stations deployment, further progress requires enhanced policy coherence and robust institutional coordination between Ministries—especially when it comes to implementing incentives for each supply chain segment. A clear strategic direction for Battery Energy Storage Systems (BESS) is also needed, as more integrated governance and recalibrated policies will ensure that national objectives translate into inclusive and sustainable outcomes.

This policy brief identifies key areas for developing a domestic battery supply chain in the country and presents targeted actions that need to be taken in each area, anchored to the country's targets. It calls for coordinated action among government organizations, state-owned enterprises (namely PLN and IBC), and financial institutions to mobilize the necessary capital and expertise, thereby positioning Indonesia as a global leader in the battery ecosystem.

From Targets to Transformation: Enabling Indonesia's Battery and EV Supply Chain

To meet its Net Zero Emissions (NZE) target by 2060, the Government of Indonesia has committed to a comprehensive decarbonisation strategy across multiple sectors. This involves ambitious targets and initiatives focused on reducing GHG emissions, particularly in the energy and transportation sectors—two of the country's highest-emitting sectors.

In transportation, which accounts for approximately 26% of Indonesia's total GHG emissions[1], the government is prioritizing electrification as a key pathway to decarbonization. Targets have been set for EV deployment and manufacturing, with a domestic production target of 943,764 EVs by 2030[2].

In the energy sector, the latest revision of the National Energy Policy (KEN) adjusted the renewable energy (RE) share targets downward—from an initial 23% by 2025 and 31% by 2030, to a revised range of 19%–22% by 2030[3]. Despite these revised figures, a significant gap persists between RE targets and actual achievements over the past five years, underlining the need for more robust implementation strategies.

Batteries play a critical bridging role in meeting these decarbonization goals. They not only enable the electrification of transport but are also essential for integrating renewable energy into the power grid. Battery Energy Storage Systems (BESS) are

[1] According to Agus Nurrohim, Senior Researcher at PRKKE BRIN, the transportation sector accounted for approximately 26% of Indonesia's total greenhouse gas emissions. In 2022, the sector consumed 429 million SBM or 60 million TOE, equivalent to 36.74% of the country's final energy consumption. Link

[2] *Decree of the Minister of Energy and Mineral Resources of the Republic of Indonesia Number 24.K/TL.01/MEM.L/2025.* Link

[3] Government of Indonesia. (2024). Rancangan Peraturan Pemerintah Tentang Kebijakan Energi Nasional. Link.

especially crucial for addressing the intermittency of variable renewable energy (VRE) sources such as solar and wind, ensuring grid stability and reliability.

However, despite Indonesia's wealth of mineral resources, a clear mismatch remains between current battery production capacity and projected national demand. For example, assuming the average 4W electric SUV requires a 39 kWh battery[4], Indonesia would need a minimum battery production capacity of approximately 36.8 GWh to meet its EV targets. Currently, the country has only 10 GWh of NMC battery cell capacity (from PT HLI Green Power) and 100 MWh of LFP battery cells (from PT Gotion Green Energy Solutions Indonesia and PT International Chemical Industry)—less than half of the required capacity.

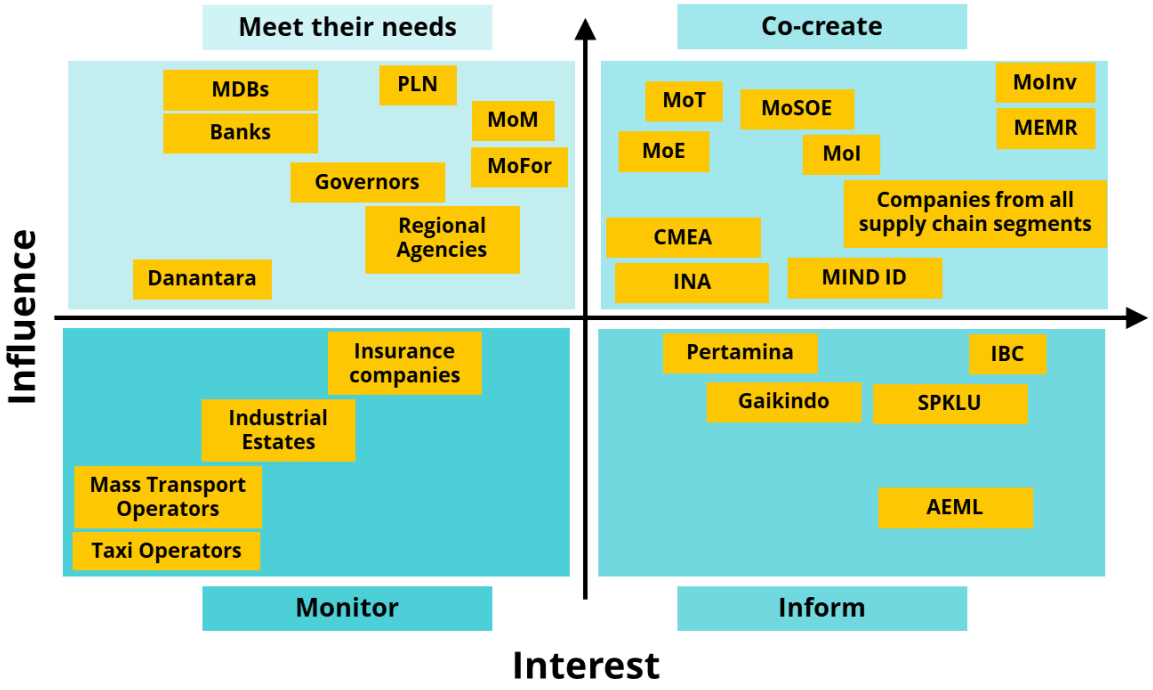
Globally, NCM (Nickel-Cobalt-Manganese) and LFP (Lithium Iron Phosphate) chemistries have emerged as the most widely adopted battery types, powering most new electric vehicles. For Indonesia, focusing on NCM chemistry presents a strategic advantage. As the world's leading producer of nickel and nickel derivatives, Indonesia is well-positioned to meet its own domestic demand and strengthen its industrial base in both EV and BESS production.

Building a robust domestic battery supply chain will require strong collaboration between government ministries and the private sector. Close coordination is especially vital between the Ministry of Investment, the Ministry of Energy and Mineral Resources, and the Ministry of Industry—each of which plays a critical role in shaping and implementing industrial policy due to their influence and interest in the sector, as shown in Figure 1. State-owned enterprises are also central to this effort. Notably, PLN (Perusahaan Listrik Negara), Indonesia's sole electricity provider, wields significant influence through its role in BESS deployment and grid integration.

Financial institutions, including commercial banks and sovereign wealth funds, will likewise be crucial enablers of this transition. While their direct interest in battery supply chain development may vary, their ability to mobilize capital and fund large-scale infrastructure projects positions them as essential stakeholders in Indonesia's energy transition. Ensuring their active engagement—through regulatory incentives, risk-sharing mechanisms, or blended finance strategies—will be necessary to close the investment gaps that currently hinder the sector's growth.

[4] Based on an ICCT study (2023) where the unit in question is a Hyundai Kona 2023 model that is available in the Indonesian market. This number does not account for other EV models mentioned in the study, such as A-segment or MPV models

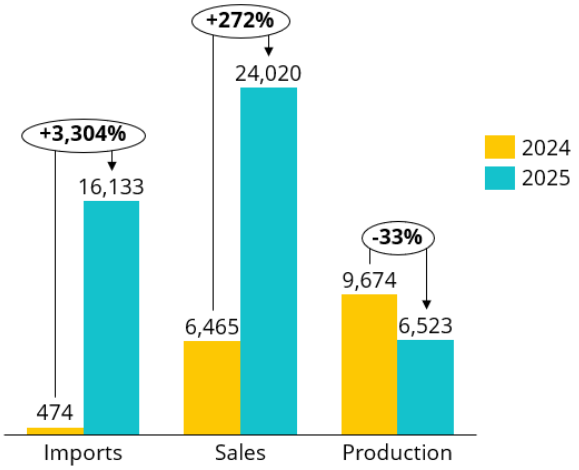
Figure 1. Influence/Interest stakeholder matrix for the battery supply chain in Indonesia



Indonesia's energy transition strategy, particularly in the battery and EV sectors, calls for stronger policy coherence and institutional coordination. Although numerous ministries and agencies are actively supporting the development of the battery ecosystem, their efforts often operate in silos or, in some cases, at cross-purposes. For instance, generous tax exemptions for EV imports have led to a surge in imports, but this may inadvertently undermine incentives designed to stimulate domestic manufacturing. Aligning sectoral policies, harmonizing targets, and establishing a centralized coordination mechanism—potentially within the Ministry of Investment or a dedicated battery authority—would foster a more predictable and conducive environment for investors and developers.

While Indonesia has introduced a wide array of fiscal and non-fiscal incentives across the battery and EV supply chain, these incentives remain uneven and often lack strategic alignment. A major focus has been on so-called downstreaming policies, with the nickel export ban being the most prominent tool. This policy has significantly shaped the industry: data from S&P Global show that following the renewal of the nickel export ban, prices surged in 2022[5]. Although the volume of exports decreased, their value increased, and the number of

EV Imports, Sales and Production for January-April of 2024 and 2025



Source: Data from Gaikindo[15]

[5] Guberman, D. et. al. "Export Restrictions on Minerals and Metals: Indonesia's Export Ban of Nickel" USITC (Feb 2024). pp.20 https://www.usitc.gov/publications/332/working_papers/ermm_indonesia_export_ban_of_nickel.pdf

operating nickel smelters rose from just two in 2016 to 54 by 2025.

Despite these gains, the impact of end-use incentives remains mixed. For example, while the VAT reduction for EVs that meet local content requirements is intended to encourage domestic production, its actual effect has been limited. As of early 2024, only two EV models in Indonesia meet the 40% local content threshold required to qualify for full government incentives. Meanwhile, import tax exemptions have fueled a rise in EV imports, yet domestic production has fluctuated with no clear upward trend. This suggests that incentives alone are insufficient without a supportive and coherent policy ecosystem that also addresses production bottlenecks and market development.

One critical gap lies in the policy treatment of BESS. While recent updates to the regulatory framework have introduced incentives for EVs and upstream battery materials, there is a growing opportunity to extend similar support to BESS, which are not yet fully included in the current incentive structure. The latest Electricity Supply Business Plan (*Rencana Usaha Penyediaan Tenaga Listrik* or RUPTL) 2025–2034 has a target of 6 GW of BESS by 2034, under the Accelerated Renewable Energy Development (ARED) scenario, which is aligned with the target of having Net Zero Emissions in the Energy sector by 2060. Although the current RUPTL 2025-2034 also includes a *strategy for developing VRE (Variable Renewable Energy) with BESS*[6], the targeted capacity is planned until 2034 and targets beyond that year are not yet available. In the absence of defined, long-term targets or incentives, industry growth in this area is likely to remain fragmented and uncoordinated.

Moreover, although many policy instruments were introduced with the goal of promoting national interest and downstream industrial development, their implementation has often benefited companies with existing operational capacity and investment readiness—many of which are foreign-owned. This reality points to a disconnect between policy intent and actual outcomes, particularly in the processing and refining segments of the supply chain. Without corrective measures to ensure broader local participation and value capture, the long-term benefits of Indonesia's industrial strategy may not be equitably distributed.

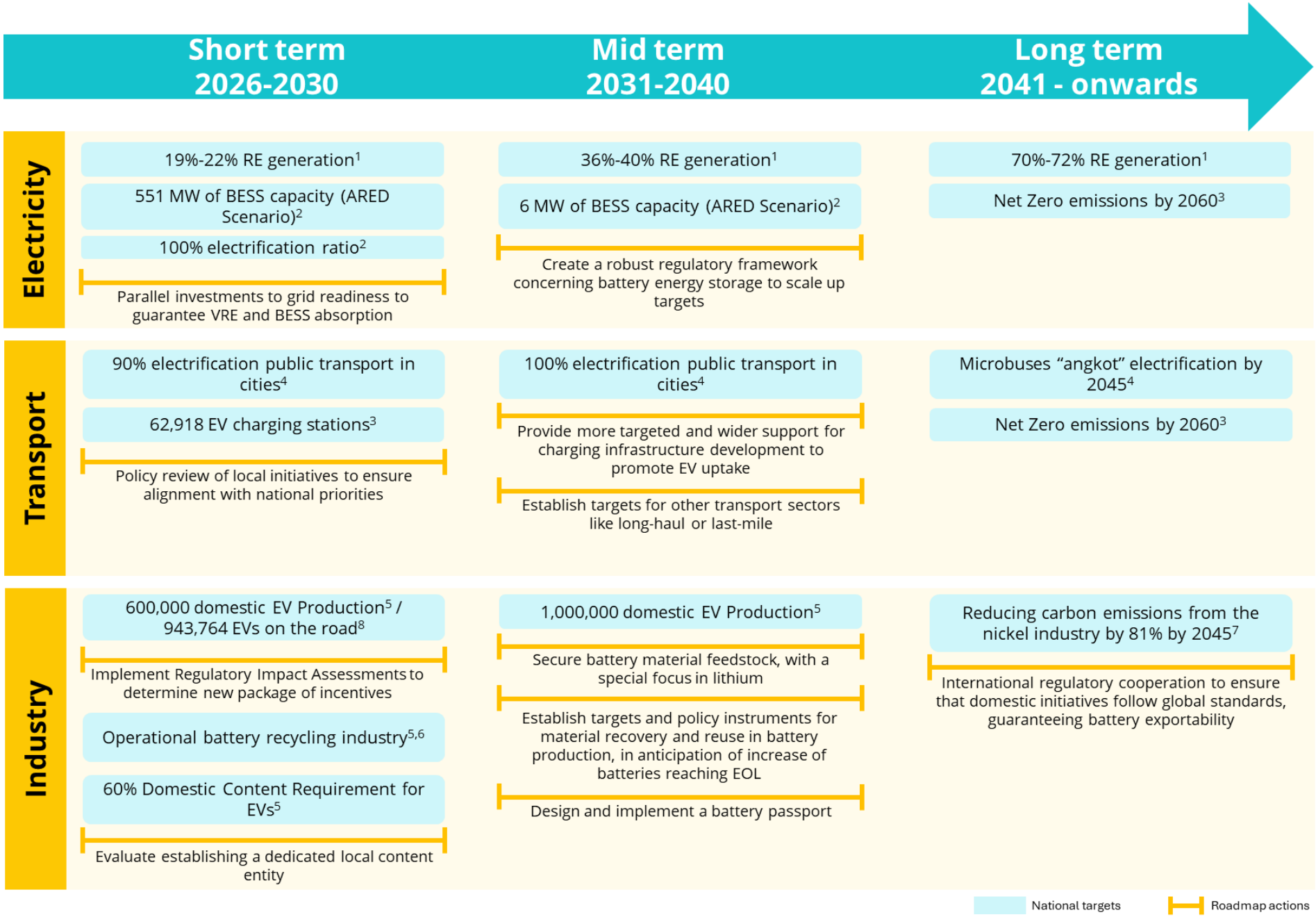
In summary, the current policy landscape reveals a strong foundation of incentives and industrial ambition, but one that requires more integrated governance, clear strategic direction—especially for BESS—and a recalibration to ensure that national objectives are effectively translated into inclusive and sustainable outcomes.

[6] Projections for additional and new BESS projects, including PLTS (Solar Power Plants) and BESS, are included for various regions in both the RE Base scenario and ARED scenario.

Key challenges and recommended actions to address them

	Challenge	Action	Key Area
	**Ensuring that the national legislative framework is thoroughly reviewed and aligned with current national priorities and objectives:** to ensure long-term success, further work is needed to improve coherence across sectors. End-use and end-of-life segments are strongly intertwined with other sectors like waste management, transport, and power. Therefore, battery incentives, targets and regulations must align with the instruments from these sectors.	1. Policy review and impact assessment of current measures to ensure alignment with national priorities	Policy and Regulation
	**The policy favouring importers of fully assembled EVs may have distortive effects on the markets:** The policy has increased EV market share and investment but favours fully assembled imports, potentially disadvantaging local producers. Manufacturers -including potential entrants- may focus on assembling imported components rather than investing in domestic production capabilities	2. Implement Regulatory Impact Assessments	
	**As of early 2024, only two electric vehicle (EV) models in Indonesia meet the required local content (40%) threshold to qualify for full government incentives**: Hyundai IONIQ 5Wuling Air EV. No other models have been reported to comply with the new threshold	3. Evaluate and revise incentive mechanisms as the market develops	
	**Limited local government initiatives:** Only some areas have adopted them to support EV uptake, such as Jakarta and Bali	4. Strengthen and harmonize local and regional incentive mechanisms with national policy goals	
	**There is no long-term strategy for BESS**: RUPTL 2025 has progressive targets for BESS until 2034. However, there is no target clearly anchored to the Net Zero by 2060 target, or to the RE generation targets.	5. Create a robust regulatory framework concerning battery energy storage	
	**As of today, Indonesia has no viable lithium reserves, which translates into an import dependency**: mainstream LIB technologies depend on a limited set of critical materials, many of which have few viable substitutes. Lithium cannot be avoided for EVs, since both NCM and LFP technologies rely on lithium chemicals	6. Secure battery material feedstock	Production Capacity and End-of-life management
	**There are no stockpiling strategies for critical minerals for batteries**: although Government Regulation No. 79/2014 (GR 79/2014) on National Energy Policy considers stockpiling for coal, Indonesia has not adopted specific laws or regulations concerning the stockpiling of those minerals for which the country is reliant in imports, namely lithium, graphite and manganese.	7. Implement strategic stockpiling measures	
	**There are no recycling initiatives or targets, no circular economy instruments applied, weak end-of-life management for batteries:** Currently, Indonesia does not have specific legislation in place that would be solely focused on the end-of-life management of batteries. The country has one battery recycling facility located in Morowali, which imports black mass from China due to lack of sufficient materials for battery recycling. In addition, Indonesia Battery Corporation plans to develop a nickel-based EV battery recycling plant by 2031.	8. Establish targets and policy instruments for material recovery and reuse in battery production	
	**The lack of detailed provisions for stakeholder engagement and transparency in the implementation of local content policies has caused issues, particularly when it comes to compliance with ESG standards:** Regulations set by other countries can pose investment and export challenges, as demonstrated by the withdrawal of BASF and Eramet from the Sonic Bay nickel and cobalt refinery project due to ESG-related concerns.	9. Design and implement a battery passport to keep track of EV components	Traceability for Compliance and Export Readiness
	**While there are electrification targets for other transportation sectors like public transport, there is no comprehensive regulatory framework for how to reach the 90% electrification of urban mass public transport by 2030. Other sectors like long-haul or last mile services have no incentives or targets.**	10. Establish targets for other transport sectors	Expansion of End-use segments
	**Limited support for charging station infrastructure development:** the lack of battery and EV infrastructure leads to range anxiety by prospective consumers and hinders domestic EV adoption. Current efforts are centred around urban centers	11. Provide more targeted and wider support for charging infrastructure development	
	**The lack of detailed provisions for stakeholder engagement and transparency in the implementation of local content policies has caused issues, particularly when it comes to compliance with ESG standards:** Regulations set by other countries can pose investment and export challenges, as demonstrated by the withdrawal of BASF and Eramet from the Sonic Bay nickel and cobalt refinery project due to ESG-related concerns.	12. Ensure compliance with global standards to guarantee batteries can be exported worldwide	Financing and Bankability
	**Indonesia needs enough domestic demand across all the segments of the supply chain, not only for end-use.** This means creating demand for refined products, LIB cells, etc. Otherwise, the country can end up like Europe or the US, with incentives but no real market.	13. Establish a Supply Chain Tracking Platform for Indonesia's Battery Industry	
	**Project finance is facing significant challenges due to low commodity prices:** Large capital requirements for mining and refining projects hinder their development. Strong off takers are needed in the contracts, like governments or automakers.	14. Implement financial schemes for derisking investments	

Roadmap to support the integration of the battery supply chain in Indonesia (2026-2040)



Action Plan and role of stakeholders

R: Responsible, A: Accountable, C: Consulted, I: Informed.

Recommended actions	Timeframe			Stakeholder Role											
	Short-term 2026-2030	Mid-term 2030-2040	Long-term 2041-onwards	MoInv	MEMR	MoE	MoI	MoT	MoF	MoSOE	Regional agencies	PLN	Battery Manufacturers	EV Manufacturers	Financial institutions
1. Policy review of current measures to ensure alignment with national priorities	✓			R/A	A	C	A	R	C	I	I	-	-	-	-
2. Implement Regulatory Impact Assessments	✓			R	R	R	R	R	R	R	C	-	-	-	-
3. Evaluate and revise incentive mechanisms as the market develops	✓			R/A	R	C	C	C	R	C	C	C	C	C	-
4. Strengthen and harmonize local and regional incentive mechanisms with national policy goals	✓			A	C	C	C	C	C	C	R	C	I	I	-
5. Create a robust regulatory framework concerning battery energy storage		✓		C	R/A	C/R	C	-	I	I	I	R	I	I	-
6. Secure battery material feedstock		✓		C	R/A	C	A	-	I	C	I	-	I	I	I
7. Implement strategic stockpiling measures		✓		R	A	C	C	-	C	C	I	-	I	I	C
8. Establish targets and policy instruments for material recovery and reuse in battery production		✓		C	R	R/A	R	-	-	I	I	-	I	I	-
9. Design and implement a battery passport to keep track of EV components		✓		C	A	R	R	C	-	I	I	I	I	I	-
10. Establish targets for electrification of other transport sectors in regulatory instruments		✓		I	A	C	R	A	-	I	-	R	I	I	-
11. Provide more targeted and wider support for charging infrastructure development		✓		C	R	C	R	R/A	C	I	-	R/I	I	I	-
12. Ensure compliance with global standards to guarantee batteries can be exported worldwide	✓		✓	R/A	I	R	R/A	-	C	I	-	-	R	R	I
13. Establish a Supply Chain Tracking Platform for Indonesia's Battery Industry		✓		A	C	C	C	-	C	C	C	-	I	I	C
14. Implement financial schemes for derisking investments		✓		R	C	-	C/I	-	R/A	I	-	-	C	C	I

Priority Recommendations

1. **Conduct a comprehensive review of existing incentive schemes:** As markets mature, incentive schemes should evolve to reflect shifting economic conditions and policy priorities. While Indonesia's current fiscal and non-fiscal incentives were designed to promote national interests and support downstream industrial development, their implementation has, in many cases, disproportionately favored companies with established operational capacity—most of which are foreign-owned. This highlights a growing misalignment between policy intent and actual outcomes. For example, the 0% import tax for fully assembled EVs[7] could contrasts with limited uptake of VAT discounts for domestically produced EVs[8], potentially undermining the growth of local manufacturing. Similarly, delays in announcing mining quotas under the domestic nickel ore pricing policy have occasionally forced smelters to seek alternative imports, reducing the effectiveness of the policy. These examples underscore the need for a thorough review and recalibration of the incentive framework to better support domestic value creation and national industrial objectives.

2. **Ensure strategic policy alignment across government levels:** Fragmentation between national, regional, and local governance structures risks undermining the effectiveness of Indonesia's energy transition agenda. A formal coordination platform or inter-ministerial task force should be established to align targets related to EV production, local content, and fiscal incentives. This platform should facilitate harmonization of responsibilities, enable the exchange of implementation best practices, and provide a unified monitoring framework. By doing so, Indonesia can enhance policy coherence and ensure all stakeholders are working toward shared national goals with measurable, coordinated outcomes.

3. **Develop long-term targets and a roadmap for utility-scale BESS:** Although national legislation now acknowledges the role of stationary energy storage, Indonesia lacks clear operational mandates, targets, and regulatory instruments specific to BESS deployment. Establishing a national roadmap linked to the Net Zero Strategy for 2060 with defined roles for BESS in grid operations—such as peak shaving, frequency regulation, and renewable integration—is essential for market clarity. Given its role as the country's sole electricity provider, Perusahaan Listrik Negara (PLN) should be centrally involved in the planning and scaling of BESS infrastructure. The roadmap should include procurement guidelines, performance standards, and integration pathways aligned with PLN's planning projections.

4. **Establish a strategic procurement framework for critical minerals:** Ensuring long-term access to key minerals—particularly lithium—is essential for the sustainability and resilience of Indonesia's battery value chain. This can be achieved through a mix of stockpiling, secondary material recovery, and securing long-term supply agreements. Strategic stockpiling during periods of price volatility can offer

[7] PMK No. 10 Tahun 2024. https://peraturan.bpk.go.id/Details/279874/pmk-no-10-tahun-2024
[8] PMK 38 TAHUN 2023. https://jdih.kemenkeu.go.id/dok?id=ebe3b714-edb1-4392-0198-08db30cc711a

short-term supply security and stabilize domestic markets during global disruptions. However, as stockpiling is ultimately a buffer mechanism, Indonesia should prioritize longer-term measures that offer broader systemic benefits. These include diversifying investment in critical mineral processing and negotiating bilateral or multilateral agreements focused on mineral security and responsible sourcing.

5. **Design and implement a National Battery Passport Framework:** With digital battery passports poised to become a global requirement, Indonesia should proactively examine how such systems can be integrated into its national regulatory framework. The battery passport—developed by the Global Battery Alliance and formally adopted under the EU's Sustainable Batteries Regulation—acts as a digital twin of the physical battery, containing information on material provenance, chemical composition, manufacturing history, and environmental and social performance. Incorporating this system will not only enhance transparency and traceability but also ensure Indonesia's compliance with emerging international trade standards. Regulatory alignment and technical capacity building will be necessary to support effective implementation.

6. **Introduce targets and instruments for material recovery and recycled content in batteries:** Reforming Indonesia's legislative framework to recognize battery waste as a valuable resource is critical for unlocking a viable market for secondary raw materials. Policy instruments should include mandated recovery targets, minimum recycled content thresholds for new batteries, and product design standards that facilitate disassembly and recycling. Extended Producer Responsibility (EPR) policies should require manufacturers to participate actively in collection and recycling systems. In parallel, public education campaigns and investments in R&D should focus on improving recycling technologies and resource recovery efficiency. Such measures would enhance supply chain sustainability, reduce reliance on primary materials, and support the development of a circular battery economy in Indonesia.

7. **De-risk investments through innovative financial mechanisms:** To unlock new financing streams for battery supply chain development, the Indonesian government should take an active role in de-risking investments. Viable mechanisms include the creation of Special Purpose Vehicles (SPVs), as well as price floor and ceiling contracts that offer investors predictable revenue streams. These structures help mitigate market risk and increase the bankability of large-scale projects. Additionally, advance purchase agreements (pre-payment models) can secure liquidity upfront by forward-selling output at a discount. This model, particularly when coupled with investment incentives, could attract major global trading houses and long-term capital providers.