

Policy Brief

Assessing the Impact and Opportunities of Electric Vehicles in Advancing Indonesia's Green Economy Index





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What are the Challenges We are Addressing?

Indonesia has established a comprehensive long-term development vision through Law 59/2024 (RPJPN 2025-2045) that positions green economy and electric vehicle adoption as key strategies for sustainable development. This transition is crucial as the transportation sector currently accounts for 36.7% of total energy consumption and 9.5% of national greenhouse gas emissions.

The government has set ambitious targets for 2030, aiming for electric vehicles to capture 44% of both four-wheeled and two-wheeled vehicle markets. However, current adoption rates remain significantly below these targets. As of 2023, electric cars represent only 1.69% of the market (17,051 units), while electric motorcycles account for just 0.95% (59,000 units).

The gap between targets and reality stems from several key barriers: limited charging infrastructure, high costs, and inadequate support services. Despite various incentives, sales continue to lag. The charging network is heavily concentrated in Jakarta and West Java, with significant gaps in other regions. On the manufacturing side, Indonesia struggles to meet Local Content Requirements (TKDN).

Limited domestic suppliers, inadequate R&D capabilities, and insufficient manufacturing expertise are hindering the development of a robust EV ecosystem, particularly for critical components like batteries, despite the country's abundant nickel resources.

This study aims to examine the economic, social, and environmental impacts of EV adoption, evaluate existing policy gaps, and formulate practical recommendations to enhance Indonesia's Green Economy Index and meet national EV targets.

What is the Current State of EV in Indonesia?

The current state of EV adoption in Indonesia reveals a significant gap between government targets and market reality. Electric cars have reached only 17,051 units (1.69% of market) versus the 5% target for 2023, while electric motorcycles account for just 59,000 units (0.95% of market) against the same target. The government aims to increase both segments to 44% market share by 2030, representing a massive scaling challenge.

Charging infrastructure development is similarly behind schedule, with only 1,620 public charging stations installed against the target of 2,960. These stations are heavily concentrated in Jakarta and West Java, creating significant regional disparities in access. Battery swapping stations, critical for two-wheeled EVs, number only 1,770 operational units versus the 9,000 targets, with plans to scale to 67,000 stations by 2030.

The manufacturing ecosystem struggles to meet local content requirements established by Presidential Regulation No. 79/2023. Battery components carry the highest weight in domestic content calculations (30% in 2020-2023, increasing to 35%), but Indonesia lacks sufficient technological expertise in this area despite its nickel resources. Overall TKDN targets are set at 40% for two-wheeled EVs and 35% for four-wheeled EVs by 2022-2026, rising ambitiously to 80% by 2030.

The regulatory framework includes various fiscal and non-fiscal incentives, but implementation remains inconsistent with some measures limited to short-term periods, creating uncertainty for both consumers and producers in the EV ecosystem.

What are the Policies and Regulations that Support the EV Development in Indonesia?

Indonesia has established a comprehensive regulatory framework to support electric vehicle (EV) development,

anchored by Presidential Regulation No. 55/2019 (amended by No. 79/2023). This foundational policy aims to reduce fuel dependency and greenhouse gas emissions by accelerating battery-based EV adoption through industry development, incentive programs, and infrastructure expansion. Presidential Instruction No. 7/2022 further strengthens this framework by mandating increased utilization of EVs in government fleets through purchase, lease, or conversion programs.

The regulatory ecosystem spans multiple domains to create a conducive environment for EV growth. In the fiscal realm, the government has implemented tax relief measures for electric vehicles (Government Regulation No. 73/2019), luxury goods tax (Ministry of Finance Regulation No. 38/2023), luxury goods tax exemptions (Ministry of Finance Regulation No. 9/2024), VAT incentives (Ministry of Finance Regulation No. 8/2024), and specialized financing schemes (OJK Regulation No. 16/POJK.05/2024). Technical aspects are addressed through standardization regulations covering vehicle testing, equipment certification, and charging facility requirements. The framework also includes provisions for infrastructure development (MEMR Regulation No. 13/2020), manufacturing standards with local content requirements (Ministry of Industry Regulation No. 6/2022), and public transportation electrification (Ministry of Transport Regulation No. 11/2024). This multifaceted approach demonstrates Indonesia's commitment to transforming its transportation sector while advancing its green economy objectives.

Table 1 The Indonesian Government Regulations on EV

Category	Regulation	Key Content
Basic Policy & Framework	Presidential Regulation No. 55/2019 (amended by No. 79/2023)	Accelerates battery-based EV adoption in Indonesia to reduce fuel dependency and greenhouse gas emissions, focusing on EV industry development, fiscal/non-fiscal incentives, and charging infrastructure.
	Presidential Instruction No. 7/2022	Instructs development of regulations and policies to accelerate EV adoption, budget allocation, and increased use of EVs as government vehicles through purchase, lease, or conversion.
Fiscal & Incentives	Government Regulation No. 73/2019	Regulates vehicle tax rates based on emissions, providing tax relief for EVs compared to conventional vehicles.
	Ministry of Finance Regulation No. 38/2023	Regulates luxury goods sales tax for four-wheeled vehicles and buses based on emissions, with special incentives for EVs.
	Ministry of Finance Regulation No. 9/2024	Provides 100% luxury goods tax incentive for CBU and CKD EVs.
	Ministry of Finance Regulation No. 8/2024	Regulates VAT incentives for EVs, including components and supporting infrastructure.
	OJK Regulation No. 16/POJK.05/2024	Regulates special financing schemes for EVs, including leasing and credit with special terms.
Technical & Standardization	Ministry of Transport Regulation No. 44/2020	Regulates EV type testing standards, including safety and emission aspects.
	Ministry of Transport Regulation No. 45/2020	Regulates technical specifications for specific EVs such as scooters and bicycles.
	MEMR Regulation No. 25/2024	Establishes standards and certification procedures for battery-based EV equipment and installations.
	BNSP Regulation No. 3/2024	Regulates competency certification schemes for EV-related professions.
	PUPR Regulation No. 8/2024	Establishes technical standards for buildings with EV charging facilities.
Infrastructure & Charging	MEMR Regulation No. 13/2020	Regulates the provision, operation, and tariffs of EV charging infrastructure.
	Ministry of Home Affairs Regulation No. 1/2021	Sets maximum 10% rate for EV Tax and ownership transfer fees.
Industry & Manufacturing	Ministry of Industry Regulation No. 6/2022	Regulates local content requirements (TKDN) and EV industry development roadmap.
	Ministry of Investment Regulation No. 1/2024	Provides investment incentives for EV manufacturing industry development.
Public Transportation	Ministry of Transport Regulation No. 65/2020	Regulates procedures and standards for converting conventional motorcycles to electric.
	Ministry of Transport Regulation No. 15/2022	Regulates conversion of non-motorcycle vehicles to EVs.
	Ministry of Transport Regulation No. 11/2024	Regulates standards and operational procedures for electric public transportation.

What are the Potential Maximum Benefits that Can be Achieved from EV Development in Indonesia?

We evaluate three scenarios for EV development and their impact on Indonesia's Green Economy Index (IGEI) as demonstrated by the Indonesia Green Economy Model (IGEM). Besides examining EV impact on economic, social, and environmental aspects, the study scrutinizes existing policy gaps and formulates practical recommendations to enhance IGEI and meet national EV targets.

The study employs three scenarios which consists of Business as Usual (BaU) scenario, the LCDI NZE, and the EV Impact scenario. BaU scenario assumes minimal EV adoption with continued reliance on conventional vehicles. The LCDI NZE scenario employs an import-focused approach to meet climate targets with limited domestic manufacturing. The EV Impact scenario emphasizes domestic manufacturing and complete ecosystem development within Indonesia.

Overall, the result analysis demonstrates that EV development positively impacts the country's green economic development trajectory. By 2060, the GEI score is projected to reach 95.47 in the LCDI NZE Scenario and 95.50 in the EV Impact Scenario, both surpassing the Business-as-Usual Scenario's score of 95.32. It means that the highest overall GEI score, or green economy development, will be achieved when developing local production

capabilities while maintaining environmental standards. Thus, to maximize the highest potential benefits from EV development, we suggest comprehensive and sustained policies and regulations as well as strong institutional policy and solid coordination to balance economic development with environmental protection and social equity considerations.

Economic Pillar

The EV Impact scenario demonstrates superior economic outcomes across key metrics. GDP projections compared to BaU show positive growth of 0.01% by 2030, increasing to 0.60% by 2040, 1.65% by 2050, and 2.03% by 2060. In contrast, the import-focused LCDI NZE scenario shows consistent negative GDP impacts throughout the projection period (-0.03% by 2030, -0.82% by 2040, -0.34% by 2050, and -0.05% by 2060).

Furthermore, the EV Impact scenario shows promising potential in reducing final energy intensity compared to the BAU (No EV) scenario, though it falls between BAU and LCDI NZE scenarios. While LCDI NZE shows slightly lower energy intensity because it assumes all EVs are imported (requiring less domestic energy for manufacturing), the EV Impact scenario factors in energy requirements for domestic production of batteries and EVs. All scenarios show a consistent decreasing trend from about 80-83 BOE/Milyar IDR in 2030 to 30-32 BOE/Milyar IDR by 2060, with the BAU scenario consistently maintaining the highest energy intensity throughout this period. The EV Impact scenario also demonstrates marginally higher labor productivity in the long run compared to both BAU and LCDI NZE scenarios.

¹See CORE Indonesia (2024)

By 2060, labor productivity under EV Impact reaches USD 0.817 billions, outpacing LCDI NZE's 0.806 billions and exceeding BAU by 1.9%. This advantage stems from the EV Impact scenario's focus on domestic EV production, which develops local manufacturing facilities, supply chains, and workforce capabilities. In contrast, the LCDI NZE scenario, which relies on imported EVs, shows slightly lower labor productivity because it doesn't develop domestic manufacturing capabilities and associated skills development despite helping achieve environmental goals.

Social Pillar

The employment impact of EV transition in Indonesia varies significantly based on three distinct scenarios. The EV Impact scenario, which prioritizes domestic manufacturing, shows the most favorable employment outcomes, potentially reducing the unemployment rate to as low as 2.78% by 2060. This scenario projects substantial job creation—generating approximately 527,477 new jobs by 2030, expanding to 1.7 million by 2045, and reaching over 2 million by 2060 compared to the BaU scenario.

Conversely, the LCDI NZE scenario, which relies primarily on imported EVs, produces negative employment effects. Despite environmental benefits, this approach could result in cumulative job losses of 41,685 by 2030, escalating to 676,835 by 2045, and exceeding one million by 2060. These projections underscore a crucial policy insight that optimizing the employment benefits of EV transition fundamentally requires domestic industry development. Without local production capacity, particularly in manufacturing and battery production,

the phase-down of internal combustion engine vehicles (ICEVs) could lead to significant net job losses rather than the creation of green employment opportunities. This analysis aligns with global evidence suggesting that while EV production typically requires less labor per vehicle than traditional manufacturing, developing comprehensive domestic production capabilities—including battery manufacturing, components, and assembly—can create substantial employment across the automotive value chain.

Environmental Pillar

The environmental impact of EV development presents mixed but generally positive impacts. The EV impact scenario—the domestic-based EVs, potentially achieves higher final energy consumption 3.43 BOE, compared to import-based EVs—LCDI NZE scenario of 3.20 BOE. It means that if produced domestically, the net reduction in final energy consumption would be even smaller compared to the BaU or No EV Scenario, ranging from -0.05 to 0 BOE. The EV Impact scenario also shows the slightly lower cumulative GHG emission reduction compared to the import-based EVs scenario. The EV Impact scenario achieves the lowest cumulative GHG emission reduction by 2060 at 63.3%, compared to import-based EVs scenario to 63.8% by 2060.

Its primarily due to additional energy consumption related to domestic battery manufacturing and higher GHG emissions from domestic manufacturing in the EV Impact scenario. Life Cycle Indonesia (2025) found that the battery production is the highest emissions hotspot contributing 38.3% from all the E4W parts.

The NMC or nickel-based battery that more common in Indonesia also shows the higher cumulative energy demands than the LFP battery, reflecting more resource-intensive production process. Thus, these projections underscore the comprehensive policy intervention that support the resource-efficient and technological advancement, including the battery waste management technology.

What are the Key Challenges that May Hinder the EV Development in Indonesia?

Environmental Pillar

Consumer adoption of EVs faces several persistent barriers in Indonesia. High upfront costs compared to conventional vehicles remain a major deterrent despite global battery price reductions. Range anxiety, charging time concerns, and unstandardized battery types (particularly for two-wheelers) create hesitation among potential buyers. Financial incentives remain limited and often time-bound, creating market uncertainty, while practical benefits for EV owners such as special lanes or reduced parking fees are largely absent.

Indonesia's research and development capacity remains insufficient to keep pace with the rapid global advancement of EV and battery technology, posing a significant challenge to indigenous innovation. Limited collaboration between academia, industry, and government hinders innovation and

technological advancement in the EV sector. Addressing these interconnected challenges through comprehensive policy interventions is essential to unlock the maximum benefits projected in the EV Impact scenario and achieve Indonesia's ambitious EV adoption and localization targets.

Social Pillar

Indonesia's EV transition faces workforce challenges that could impede industry growth, primarily centered on the substantial skills gap between current workforce capabilities and emerging EV requirements. This gap spans specialized areas such as battery technology, electrical systems, and digital manufacturing processes, and is widened by the formal education system's struggle to keep pace with technological advancements. The transition demands a comprehensive transformation of worker competencies beyond mechanical expertise to include analytical thinking, continuous learning capabilities, and specialized technical knowledge, while managerial roles increasingly require advanced capabilities in systems analysis and resource optimization, particularly in emerging sectors like battery production.

While the EV Impact scenario projects creating approximately 500,000 new jobs by 2030, this positive outcome depends critically on developing robust local production capacity, especially in battery manufacturing, where European analysis indicates a significant redistribution of jobs from OEMs to battery sectors. Without proper planning, traditional ICE vehicle sectors could face significant job losses, particularly affecting lower-tier suppliers and service workshops, with small and medium

enterprises being especially vulnerable due to resource constraints and limited access to specialized training. Negative employment impacts would occur primarily under rapid transition scenarios that give the industry insufficient preparation time, highlighting the need for a strategic, gradual approach to workforce development during Indonesia's EV transition.

Environmental Pillar

Several key environmental challenges could significantly hinder EV development in Indonesia, despite the potential benefits. These gaps collectively hinder the full realization of EVs' environmental benefits and could potentially undermine Indonesia's progress toward improving its Green Economy Index through EV adoption.

The current electricity supply remains predominantly fossil-based, with coal contributing 62.7% to total national electricity production in 2023. This heavy reliance on coal for electricity generation means that EVs in Indonesia are primarily powered by fossil fuels, significantly reducing their environmental advantages compared to ICEVs. The "well-to-wheel" emissions of EVs remain high when the electricity generation mix is dominated by coal.

The nickel mining industry, crucial for EV battery production, generates substantial emissions and environmental impacts, with each ton of nickel produced resulting in 4.61E+04 kg CO₂ equivalent of global warming impact (Wahyono et al., 2024). Indonesia's position as the world's largest nickel producer (50% of global production) comes with serious environmental consequences, including freshwater

ecotoxicity from heavy metals in tailings and health impacts from pollutant emissions. These environmental costs partially offset the benefits gained from EVs' reduced operational emissions.

Additionally, there is limited infrastructure for battery recycling and second-life applications, while sustainable mining practices are not yet widely implemented. Without proper end-of-life management systems for EV batteries, there's a risk of creating new environmental problems through improper disposal of hazardous materials. The lack of circular economy practices for batteries and sustainable mining standards further exacerbates these challenges.

What Do We Recommend for the EV Development in Indonesia?

Based on a comprehensive analysis of the EV ecosystem in Indonesia, here are 10 priority recommendations to accelerate EV adoption in the country. These recommendations are prioritized based on their potential impact, implementation feasibility, and strategic importance in building a robust and sustainable EV ecosystem in Indonesia. For more comprehensive recommendations, please see Table 3.

Table 2 Top 10 Priority Recommendations for Driving EV Adoption in Indonesia

No.	Recommendation	Period ²	Rationale for Prioritization
1.	Formulate a comprehensive roadmap with key milestones, defining measurable targets and timelines for each phase of the EV supply chain.	Short-term	Prioritized as it forms the foundation for implementing all EV strategies. A comprehensive roadmap with clear milestones provides guidance for all stakeholders in developing the EV ecosystem and ensures a measured and directed transition.
2.	Maintain and expand financial incentives like purchase subsidies and tax rebates in gradually reduced schemes until 2030 to make EVs more affordable for consumers.	Short-term	Price remains the main barrier to EV adoption. Short-term financial incentives are essential to drive market demand and create a critical mass of EV users while the industry is still developing.
3.	Develop a mapping plan and construct EV charging stations (SPKLUs) and battery swapping stations (SPBKLU) based on population, density, and public space availability.	Long-term	Charging infrastructure is a fundamental need that addresses "range anxiety" - consumers' primary fear regarding EV adoption. Proper planning ensures efficient and equitable infrastructure development.
4.	Create more attractive investment packages beyond current incentives for private companies to build public charging stations.	Mid-term	Private sector participation is crucial to accelerate charging infrastructure development. Attractive investment packages will expedite infrastructure development without solely relying on government budgets.
5.	Develop specialized and vocational training programs for EV manufacturing jobs, focusing on key technical skills.	Mid-term	Human resource development is a critical factor for the sustainability of the EV industry. Specialized EV training prepares skilled workers needed by the industry and prevents talent shortages that could hamper growth.

Table 2 Top 10 Priority Recommendations for Driving EV Adoption in Indonesia

NO	Recommendation	Period ²	Rationale for Prioritization
6.	Establish a sectoral skills council comprising industry and academic representatives to foster stronger partnerships between educational institutions and EV companies.	Short to Mid-term	Multi-stakeholder collaboration ensures educational curricula relevant to industry needs and accelerates knowledge transfer.
7.	Implement targeted incentives for sustainable public transport, for instance by offering tax breaks or subsidies for electric or low-emission buses.	Long-term	Electrification of public transportation has a large-scale impact on emissions reduction and can showcase EV technology to the wider community. Incentives for electric buses not only drive EV adoption in the mass transportation sector but also introduce EV technology to the general public, creating a strong demonstration effect and building an inclusive EV ecosystem.
8.	Implement a comprehensive strategy to optimize Indonesia's battery industry by prioritizing nickel-based batteries, enhancing NMC R&D, and exploring LFP for diversification.	Long-term	Indonesia has a competitive advantage in mineral resources for batteries. A comprehensive battery industry development strategy maximizes the added value from natural resources and drives industrialization.
9.	Establish and implement specific regulations for EV battery recycling infrastructure, including its fiscal and non-fiscal incentives.	Long-term	Environmental sustainability and circular economy are crucial for the long-term success of the EV industry. Battery recycling regulations reduce environmental impact and increase the availability of critical materials.
10.	Support the integration of affordable and reliable renewable energy in upstream processes, the EV supply chain, and EV charging stations through targeted incentives.	Long-term	Clean energy integration ensures that the entire EV value chain is sustainable from upstream to downstream, strengthening the environmental argument for transportation electrification.

²Period definition: implementation period of policy including its preparation process.
Short-term: 1-2 years; Mid-term: 3-5 years; Long-term: >5 years.

Table 3 Policy Recommendations for Driving EV Adoption in Indonesia

Aspects	Target Contribution	Policy Recommendation	Period ³	Stakeholders
Economy	Consumer Market Development	Maintaining and expanding financial incentives like purchase subsidies and tax rebates in gradually reduced schemes until 2030 to make EVs more affordable for consumers.	Short-term	Ministry of Finance, Ministry of Transportation
		Disincentivizing the adoption of conventional vehicle (ICEV) such as increasing conventional vehicle tax, progressively ban the use of older & high mileages vehicle.	Mid-term	Ministry of Finance, Ministry of Transportation
		Introducing practical benefits like discounted parking rates and toll fees & permission to use line bus to make EV ownership more attractive.	Mid-term	Local Government, Ministry of Transportation
		Support flexible leasing and purchasing options like free interest for EV credit purchasing and grant for leasing or purchasing used EV to help more consumers access EVs.	Mid-term	Financial Services Authority, Ministry of Finance
		Implement targeted incentives for sustainable public transport, for instance by offering tax breaks or subsidies for electric or low-emission buses.	Long-term	Ministry of Finance, Ministry of Transportation, Ministry of Energy and Mineral Resources
	Manufacturing & Industry Development	Implementing a comprehensive strategy to optimize Indonesia's battery industry by prioritizing nickel-based batteries, enhancing NMC R&D, and exploring and investing in LFP for diversification and risk mitigation.	Long-term	Ministry of Industry
		Establish a robust and scalable battery manufacturing sector through incentives for companies adopting advanced manufacturing tech and joint ventures with global battery manufacturers.	Long-term	Ministry of Industry, Ministry of Investment and Downstream Industry, Ministry of Higher Education, Research and Technology, EV Related Companies
		Strictly implementing local sourcing mandates and increasing incentives for companies who fulfill the local content regulation.	Long-term	Ministry of Industry, Ministry of Finance
		Establish clear quality standards for EV manufacturing including battery and its components while supporting research and development.	Mid-term	Ministry of Industry, Ministry of Transportation
		Build a resilient local supplier network including supporting SMEs in developing capabilities, adopting advanced technologies for EV components, and creating opportunities to supply parts and services to larger EV manufacturers.	Long-term	Ministry of Industry, Ministry of MSMEs
		Create Special Economic Zones with tax breaks and streamlined processes for EV mineral processing, clustering all EV-related activities, from manufacturing to parts production, to facilitate growth in this sector.	Long-term	Ministry of Industry, Ministry of Trade
		Facilitate partnerships with countries to bring advanced processing technology to Indonesia through strategic collaborations with global companies, including joint ventures, technical assistance agreements, and R&D partnerships, supported by training programs, and investment incentives to enhance domestic technological capabilities in EV manufacturing.	Long-term	Ministry of Industry, Ministry of Investment and Downstream Industry, Ministry of Higher Education, Research and Technology, Ministry of Manpower, Ministry of Finance
		Develop innovation hub by establishing R&D centers or in partnership with state-owned enterprises, universities, and private companies to advance EV and battery manufacturing technology.	Long-term	Ministry of Industry, Ministry of Manpower, Ministry of Higher Education, Research and Technology, Universities, EV Related Companies
	EV Infrastructure Ecosystem	Create more attractive investment packages beyond current incentives (e.g. electricity rate discounts) for private companies to build public charging stations by offering comprehensive fiscal incentives (including tax exemptions and installation subsidies) and non-fiscal benefits (simplified licensing procedures, land provision and planning, and priority grid access).	Mid-term	Ministry of Finance, Ministry of Energy and Mineral Resources, Ministry of Investment and Downstream Industry, State Electricity Company, Local Government
		Develop a mapping plan and construct EV charging stations (SPKLU) and battery swapping stations (SPBKLU) based on population, density, and public space availability to establish a high-quality charging infrastructure system, ensuring comprehensive city-level coverage, linear highway coverage, and targeted rural coverage.	Long-term	Ministry of Energy and Mineral Resources, Ministry of National Development and Planning, State Electricity Company, Local Government

Table 3 Policy Recommendations for Driving EV Adoption in Indonesia

Aspects	Target Contribution	Policy Recommendation	Period ³	Stakeholders
Social	Strategic Workforce Planning & Transition	Adopt a gradual and managed transition approach by implementing phased strategies, encouraging companies to prioritize retraining existing workers over layoffs, and supporting targeted workforce upskilling programs to minimize job displacement while facilitating the shift to a sustainable economy.	Mid-term	Ministry on Manpower, Ministry of National Development and Planning, Ministry of Industry
		Introduce practical measures like training programs, standardizations and certifications, and collaboration between ICEV and EV industries to help workers smoothly switch jobs and make the most of their existing skills.	Mid-term	Ministry on Manpower, Ministry of National Development and Planning, Ministry of Industry
	Skills Development & Specific Focus Areas for Training	Develop specialized and vocational training programs for EV manufacturing jobs, focusing on basic skills like analytical thinking and active learning, technical skills such as equipment operation, troubleshooting, technology design, service and maintenance, systems skills including analysis, informatics, and project management, and resource management skills for managerial roles.	Mid-term	Ministry of Manpower, Ministry of National Development and Planning, Ministry of Higher Education, Research and Technology, Ministry of Industry, EV Related Companies
	Multi-stakeholder Collaboration for Human Capital Development	Establish a sectoral skills council comprising industry and academic representatives, foster stronger partnerships between educational institutions and EV companies to align curricula with industry demands, and promote industry-led skilling programs through targeted incentives.	Short to Mid-term	Ministry of Manpower, Ministry of National Development and Planning, Ministry of Higher Education, Research and Technology, Ministry of Industry, Universities, EV Related Companies
	Standardization & Certification	Develop a comprehensive National Work Competence Standards (SKKNI) by incorporating review, revision, and public awareness initiatives to ensure alignment with the evolving skill requirements and technological advancements of the EV industry.	Short-term	Ministry of Manpower, Ministry of National Development and Planning, Ministry of Higher Education, Research and Technology, Ministry of Industry, Universities, EV Related Companies
		Develop clear certification pathways for EV-specific technologies, ensure better recognition of qualifications across sectors, and create a standardized qualification framework to enhance skill transferability and workforce adaptability.	Short-term	Ministry of Manpower, Ministry of Industry, EV Related Companies
Environmental	Clean Energy Integration	Support the integration of affordable and reliable renewable energy in upstream processes (e.g. raw materials extraction and mining processing), the EV supply chain, and EV charging stations through targeted incentives.	Long-term	Ministry of Finance, Ministry of Industry, Ministry of Energy and Mineral Resources, State Electricity Company
		Support the development of smart electrical grids that can integrate renewable energy and handle increased EV charging.	Long-term	Ministry of Energy and Mineral Resources, Ministry of Investment and Downstream Industry, State Electricity Company
	Sustainable Manufacturing	Promote the adoption of green industry standards (Standar Industri Hijau) including clean energy adoption across the entire value chain of the EV industry.	Long-term	Ministry of Energy and Mineral Resources, Ministry of Industry, Ministry of Environment, EV Related Companies
	Circular Economy Implementation for EV Battery	Establish and implement specific regulations for EV battery recycling infrastructure, including its fiscal and non-fiscal incentives, financing scheme, certification standards, and maintain integrated monitoring and reporting systems.	Long-term	Ministry of Environment, Ministry of Energy and Mineral Resources, Ministry of Industry, Ministry of Finance, Ministry of Investment and Downstream Industry, EV Related Companies
		Enforce the implementation of second-life EV batteries for solar and wind energy storage, including its requirement for manufacturers to take back end-of-life batteries under Extended Producer Responsibility, and its circular business models—such as product-service systems or battery leasing.	Long-term	Ministry of Environment, Ministry of Energy and Mineral Resources, Ministry of Industry, Ministry of Investment and Downstream Industry, EV Related Companies
	Mineral Extraction	Develop Green Mining Standard for sustainable mining materials needed across the entire value chain of the EV industry.	Long-term	Ministry of Environment, Ministry of Energy and Mineral Resources, Ministry of Industry
Institution and Transition Period	Roadmap	Formulate a comprehensive roadmap with key milestones, defining measurable targets and timelines for each phase of the EV supply chain.	Short-term	Ministry of National Development and Planning, Ministry of Investment and Downstream Industry, Ministry of Trade, Ministry of Industry, Ministry of Manpower, Ministry of Energy and Mineral Resources
		Establish strategic international agreements to ensure access to essential EV-related technologies.	Short-term	Ministry of National Development and Planning, Ministry of Investment and Downstream Industry, Ministry of Trade, Ministry of Industry

³Period definition: implementation period of policy including its preparation process
Short-term: 1-2 years; Mid-term: 3-5 years; Long-term: >5 years.

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