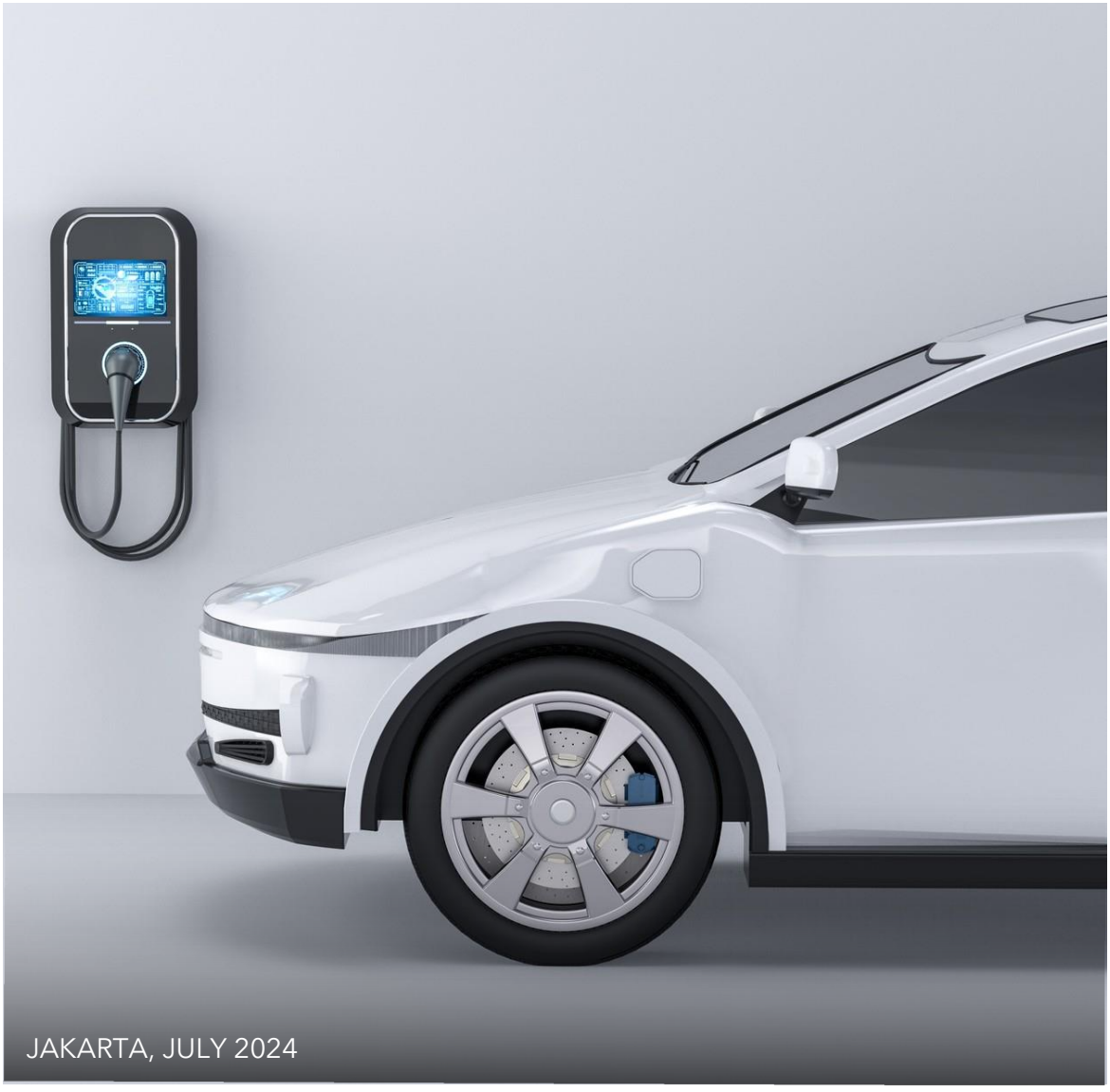
PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

CORE INDONESIA
CENTER OF REFORM ON ECONOMICS

POLICY BRIEF

IMPACT OF ELECTRIC VEHICLES ADOPTION AND DEVELOPMENT ON INDONESIA'S GREEN ECONOMY PROGRESS



JAKARTA, JULY 2024

Citation

PAGE (2024), Policy Brief: Impact of Electric Vehicles Adoption and Development on Indonesia's Green Economy Progress.

PAGE gratefully acknowledges the support of all its funding partners: European Union, Finland, Germany, Norway, Republic of Korea, Sweden, Switzerland and the United Arab Emirates.

Policy Brief

Impact of Electric Vehicles Adoption and Development on Indonesia's Green Economy Progress

Jakarta, July 2024

Key messages

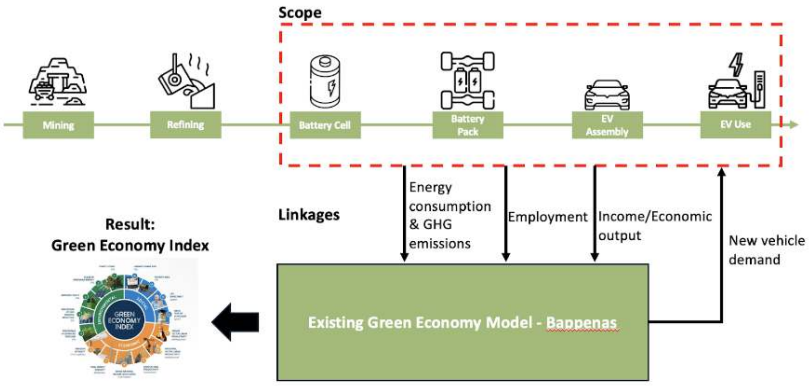
- Prioritizing domestic manufacturing of electric vehicles (EVs) and their components could boost Indonesia's GDP by up to 7% by 2060.
- Transitioning to EVs may disrupt jobs in traditional automotive sectors, but it could also generate new employment opportunities if domestic EV production is prioritized. Policy should focus on reskilling programs.
- EV adoption can be a tool to reduce greenhouse gas (GHG) emissions but a concurrent shift to low-carbon, renewable energy sources is essential.
- To accelerate EV adoption, recommended policy options include targeted financial incentives to users, development of charging infrastructure, and a supportive regulatory environment to encourage investments in the EV industry, through e.g. subsidies, tax credits, and public-private partnerships.

Key challenges addressed in this study

This study delves into the challenges associated with measuring and promoting Indonesia's transition to a green economy, encompassing economic growth, environmental sustainability, and social well-being. Central to this endeavor is the development of the Indonesia Green Economy Index (IGEI) (Figure 2), serving as a comprehensive tool to assess progress across these dimensions and provide insights for strategic planning. Utilizing the Green Economy Model (GEM) developed by PAGE and UNEP, and adapted by the National Development Planning Agency of Indonesia, this study employs causal loop diagrams to evaluate the impact of electric vehicle (EV) adoption on *Indonesia's Green Economy Index (GEI)* (see Figure 1 about the scope of the modelling exercise).

The analysis explores three scenarios: Business as Usual (BaU), Low Carbon Development Initiative (LCDI) with Net Zero Emission (NZE), and EV Impact, offering valuable insights into the role of EV adoption and development in Indonesia's green economy progression. In the BaU, neither electric vehicles (EVs) are used nor are they manufactured during the simulation period. The LCDI NZE scenario involves moderate adoption of EVs, which are imported fully assembled (CBU) due to minimal domestic production capabilities. Generally, the three scenarios employ the same assumption for variables outside the automotive sector, ensuring comparability. The divergence lies in the existence of EV usage policies and the prioritization of manufacturing industry deployment to meet EV usage targets (see Table 1).

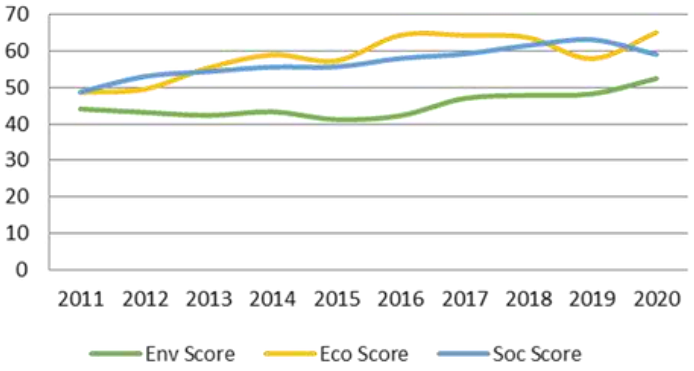
Figure 1 Scope of Modelling Exercise for Assessing Impact of EV Development



Source: Analysis by CORE Indonesia (2024)[1]

In the EV Impact scenario, there is substantial adoption of EVs, prompting Indonesia to establish local manufacturing facilities for EV components such as battery cells and packs to meet the rising demand.

Figure 2 The Indonesia Green Economy Index[2]



Source: Bappenas (2022)

Current dynamics

Indonesia's green economy trajectory shows improvement, notably in integrating economic, environmental, and social sustainability, as indicated by the Green Economy Index (GEI) from 2011 to 2020. However, the environmental aspect still demands our attention, with indicators like forest cover, renewable energy share, GHG emissions, waste management, and peatland degradation highlighting areas needing attention. To tackle these challenges, Indonesia has implemented a robust policy framework aimed at accelerating the Electric Vehicle (EV) industry, targeting 15 million EVs adoption by 2030. Presidential regulations and ministerial directives provide incentives, infrastructure, and regulations to support EV adoption, aligning with national goals of industrial transformation and energy resilience. Yet, success hinges on transitioning the primary energy mix away from fossil fuels to support decarbonization effectively.

How does EV adoption impact current and future economic, social and environmental indicators?

Economic Impact: The adoption of electric vehicles (EVs) is expected to significantly influence Indonesia's economic indicators. By targeting the production of 15 million EVs by 2030, including 1.97 million electric cars and 12.90 million electric motorcycles, Indonesia aims to enhance its industrial output and economic resilience.

This transition is anticipated to create substantial value-added opportunities, particularly through the establishment of domestic EV manufacturing industries.

[1] CORE Indonesia. (2024). *Impact of Electric Vehicle Adoption and Development on Indonesia's Green Economy Progress.* Jakarta: CORE Indonesia.
[2] *Ministry of National Development Planning*. (2022). *Green Economy Index: A Step Forward to Measure the Progress of Low Carbon & Green Economy in Indonesia.* Jakarta.

Table 1 Assumptions in Each Simulation Scenario

Policy	BaU/No EV	LCDI NZE	EV Impact
Policy related to EV use	Share of EVs is assumed to be zero throughout simulation time frame	E4W (% of total 4W fleets) - 2030: 16% - 2045: 40% - 2060: 58% E2W (% of total 2W fleets) - 2030: 40% - 2045: 100% - 2060: 100%	
Policy related to EV manufacture	No EV production	All electric vehicles (EVs) are imported in completely built-up (CBU) form, given that domestic production is presumed to stay at current level, hence negligible.	- Indonesia builds its own manufacturing plants for battery cell, battery pack, and EV production. - Domestic production is pushed to meet the demand caused by EV on the road targets.
Other policy	**AFOLU:** - Deforestation are gradually declining to reach zero in 2060 - Massive ecosystem restorations, including in peatland - Sustainable rice and palm oil intensification **Waste:** - Implementation of 3R, waste-to-energy, and expansion of sanitary landfill and municipal WWTP **Energy:** - Ambitious energy efficiency, electrification, and fuel switching both in commercial and domestic sectors - Rapid energy transitions, including coal phase out and development of renewables		

Source: Derived from various sources

If domestic production of EV components and vehicle assemblies is prioritized, GDP could potentially increase by up to 7% by 2060. Conversely, relying on imports may reduce GDP by up to 3.7%.

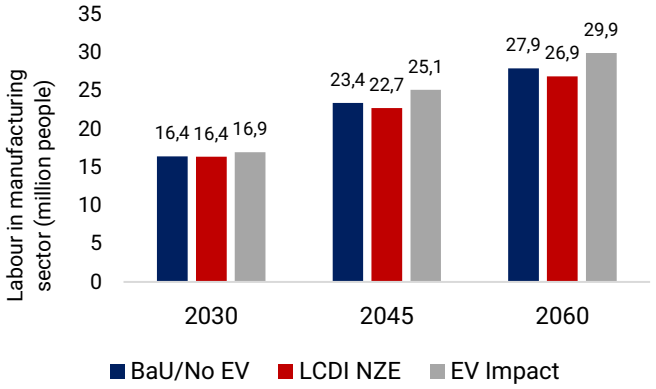
Additionally, the rise in Gross National Income (GNI) per capita is projected to vary. By 2060, projections indicate that in the EV Impact Scenario, GNI per capita could increase by 1.95% compared to the Business as Usual (BaU) scenario. In contrast, the LCDI NZE Scenario shows a more modest increase of 0.14% compared to the BaU scenario. This economic growth is driven by the development of new sectors related to EVs, such as battery production and associated components, enhancing overall industrial productivity and economic output.

Social Impact: The social implications of transitioning to EVs are multifaceted, particularly concerning job creation and employment stability. The Indonesian automotive sector, which currently sustains millions of jobs, faces potential disruption due to the redundancy of components essential in conventional vehicles, such as engines and fuel systems, which are not required in EVs. However, if EV adoption is driven by domestic production, it could lead to substantial labor absorption, positively impacting employment rates and societal standards.

The development of EV-related industries, such as battery cell production, inverters, motors, and chargers, is projected to increase labor productivity and generate new employment opportunities (Figure 3). In the EV Impact Scenario, industrial labor productivity could reach 0.817 billion IDR per person by 2060, compared to 0.806 billion IDR in the LCDI NZE scenario and 0.801 billion IDR in the BaU scenario. However, if the transition relies heavily on imports, it may

not offset job losses in conventional vehicle manufacturing, leading to potential unemployment challenges.

Figure 3. Industrial Labor Projection Based on Three Scenarios



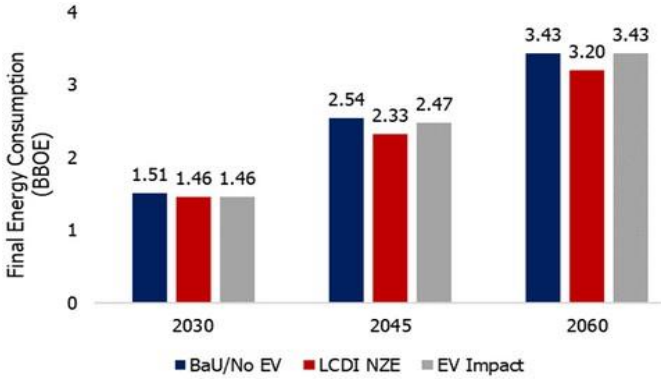
Source: Analysis by CORE Indonesia (2024)

Notes: BaU (Business as Usual)/No EV scenario, LCDI NZE (Low Carbon Development Initiative Net Zero Emissions) scenario

Environmental Impact: The electrification of transportation is crucial for Indonesia's environmental sustainability, notably in reducing greenhouse gas (GHG) emissions and enhancing energy efficiency. EVs demonstrate significantly lower energy consumption than internal combustion engine vehicles (ICEVs). This efficiency results in a projected final energy consumption of 31.84 BOE/Billion IDR by 2060 in the EV Impact scenario, compared to 32.44 BOE/Billion IDR in the BaU scenario, leading to an expected decrease in GHG emissions. However, the cumulative emissions reduction is slightly lower in the EV Impact scenario than in the LCDI NZE scenario due to higher annual emissions from production (Figure 4).

In addition, without a concurrent shift to renewable energy sources, increased EV electricity consumption may inadvertently raise emissions if fossil fuels remain dominant in electricity generation.

Figure 4. Projected Final Energy Consumption Across Scenarios



Source: Analysis by CORE Indonesia (2024)

Recommended Policies, Financial, and Investment Changes for EV Adoption in Indonesia

Indonesia is actively promoting electric vehicle (EV) adoption through various incentives. Cash subsidies of 7 million IDR for purchasing electric two-wheelers and VAT reductions of 11% for four-wheeled EVs with a minimum 40% domestic content are among the measures. Import tax exemptions and super tax deductions for EV-related research further encourage industry growth.

Other countries have also started adopting policies to encourage EV adoption and development, with some success. Table 2 sums up incentives adopted in the United States.

To further enhance EV adoption, additional incentives have been proposed for manufacturers, consumers, and ecosystem development. For manufacturers and importers, extending tax and duty exemptions will provide more certainty. Emission reduction policies can limit the production and import of high-emission vehicles. For consumers, extending financial incentives beyond one year will provide stability. Additional benefits could include

registration charge exemptions, purchase rebates, and toll fee discounts for Zero Emission Vehicles (ZEVs). Non- financial incentives might include, but are not limited to, free or discounted parking and lane access privileges.

Table 2 Type of Electric Car Incentives in the United States

Type of Electric Car Incentives	Incentives
Tax Credit	Providing a tax credit for either new or used EVs and PHEVs. It means that you will be able to subtract a certain amount from the total you owe in taxes.
Rebates	Getting rebates for multiple purchases can result in saving an extra $1,000 or more on the purchase and set up of a new or used EV.
Electricity Credits	Numerous electric companies extend credits towards your electricity bill or reduced rates for individuals who consent to charge their EVs during off-peak periods.
Exemption	Certain states might opt to grant exemptions from particular taxes or procedures, such as annual vehicle inspections, instead of providing a tax credit or rebate.

Source: Derived from various sources

Public transportation policies could promote electric bus adoption through competitive tenders, green procurement programs, and purchase subsidies. Mandates could require city and intercity buses to transition to ZEVs or biogas by 2030. Public transportation fleets, including taxis and ride-sharing cars, could be required to transition a portion of their fleets to electric vehicles, with specific targets for government fleet electrification.

For charging infrastructure, providing tax credits for EV charging station installation and allocating government funds for infrastructure development is crucial. Enhanced standards for charging infrastructure and operators will ensure quality and accessibility. Supporting research and development in EV industries, along with incentives for domestic battery and car manufacturing, will attract investment in Indonesia and promote domestic production and job creation.

Moreover, during the shift from producing combustion vehicles to electric vehicles (EVs), job roles will change, reducing traditional automotive jobs while increasing demand for EV-related positions. To manage this transition effectively, robust training programs should focus on skills like battery technology, electric drivetrain assembly, and software integration crucial for EV production. Partnering with educational institutions for job reskilling and upskilling will be vital.

Governments can support by providing incentives to retain and retrain the workforce, ensuring a smooth adaptation to the evolving automotive industry.

Projected impacts of EV adoption on GEI indicators

The EV Impact scenario shows relative improvements across GEI indicators compared to the BaU scenario, highlighting its role within a broader mix of policies aimed at ecological transition. By 2060, the GEI score reaches 99.96 in the EV Impact scenario, compared to 99.55 in BaU. Economically, the Economic (ECO) indicator demonstrates consistent growth with scores of 86.64 in EV Impact versus 86.41 in BaU. Socially, the Social (SOC) indicator indicates enhanced benefits, scoring 86.766 in EV Impact compared to 86.413 in BaU. Environmentally, the Environmental (ENV) indicator suggests reduced emissions and improved sustainability, with scores of 95.47 in EV Impact and 95.32 in BaU.

The high numbers achieved in the three scenarios tend to show that the impact of EV-

related policies alone is not particularly large on the Green Economy Index (GEI), compared to the effect of diverse sectoral policies, ranging from forestry and land used to energy and waste sectors, which drive in these scenarios the high GEI performance in 2060.

Encouraging EV production and adoption aligns with long-term sustainable growth objectives, yet optimizing policy incentives and accelerating the shift to renewable energy sources remain critical for maximizing environmental benefits within the GEI framework.

Way forward

Moving forward, Indonesia should implement targeted policy interventions to accelerate EV adoption, focusing on three strategic areas: financial incentives, infrastructure development, and industry support. In terms of financial incentives, the government can expand current measures, including subsidies for private EV purchases and incentives for low-emission vehicles, alongside initiatives like tax rebates, reduced registration fees, and preferential parking rates for EVs. The government can allocate revenue obtained from the fossil energy sector, primarily coal, oil, and natural gas, to support the financing of EV adoption and its ecosystem. Infrastructure development requires specific budget allocations from central and local governments over a five-year period to establish a nationwide charging network. With a government budget of IDR 5 trillion per year and assuming the investment cost of an electric vehicle charging station is IDR 1 billion, it is feasible to add 5,000 new charging stations annually. This network should aim for a public charging station, at least every 10 kilometers in urban areas. Creating a public-private partnership framework can further stimulate private sector investments in charging infrastructure, supported by incentives such as land-use rights and streamlined permitting processes. Mandating that a percentage of parking spaces in new commercial and residential developments be EV-ready will also be crucial. In addition, the government needs to accelerate the shift to renewable energy sources to ensure cleaner energy for the EV ecosystem and reinforce Indonesia's commitment to sustainable development.

Industry support demands a thorough analysis of the EV supply chain, focusing on critical raw materials to assess domestic availability and sustainability. Evaluating local production capacities for components like battery cells, electric motors, and power electronics is essential to identify gaps in production capabilities, local expertise, and technological advancement. Addressing potential bottlenecks, including logistics challenges, skilled labor shortages, and regulatory obstacles, is equally critical. For instance, to anticipate skilled labor shortages, the government should incentivize EV-specific vocational training programs aligned with production targets. Collaboration with educational institutions is key for effective reskilling from combustion to EV workers.

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This policy brief summarises the methodology, analysis, findings and policy recommendations from the PAGE / CORE Indonesia report: *Impact of Electric Vehicles Adoption and Development on Indonesia's Green Economy Progress*.
To read the full report, please visit:
https://www.un-page.org/knowledge-hub/

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