



Report on E-mobility Policies

Supporting Jakarta's Transition to E-mobility

June 2020

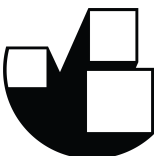


Table of Contents

Table of Contents	1
Executive Summary	3
Abbreviation	4
Introduction	6
Overview of Transport Policy	7
Policy Structure and Stakeholder	7
Transport Policy in Indonesia and Jakarta	8
General Policy	8
Environmental and Fuel	10
Fiscal	12
Non-fiscal	13
Charging Infrastructure	14
Gender Equality and Social Inclusion	15
Transport Data in Jakarta	19
General Overview	19
Private Vehicle	21
Transjakarta	22
Corridors, Routes, and Ridership	23
Fleets, Operators, and Depots	27
Feeder Services	29
GESI Analysis in Transjakarta	30
Rail-based Transportation	34
Mass Rapid Transit (MRT) Jakarta	35
Light Rail Transit (LRT) Jakarta	36
Urban Development in Jakarta	38
Discussion of Transport Policy	44
Institutional Setup	44
General Policy	45
Environmental and Fuel	46
Fiscal	48

Non-fiscal	49
Charging Infrastructure	50
Gender Equality and Social Inclusion	51
Policy Recommendation	53
Developing Supporting Policies in Indonesia	53
Institutional Setup	53
Environmental and Fuel	54
Fiscal	54
Non-fiscal	56
Charging Infrastructure	59
Gender Equality and Social Inclusion	61
Improving the Level of Services in Public Transport	62
Infrastructure Expansion	68
Transit Integration	70
Inclusive Infrastructure	74
References	75

Executive Summary

1. **The transport sector in Indonesia has contributed a significant impact on the GHG emission affecting millions of people.** Greenhouse gas (GHG) emission from vehicles and other transport modes became the highest for 46% in 2012 compared to other industries. In the national context, the transport sector accounted for 28% of the total emissions, the second-largest contributor to carbon emissions. Meanwhile, in its first Nationally Determined Contribution (NDC) Indonesia has pledged to reduce GHG emissions by 29%, unconditionally, from the business-as-usual (BAU) situation and up to 41% with international backing by 2030.
2. **Private vehicles still dominate the transport network in Jakarta, while public transportation is still struggling to increase its mode share.** Transjakarta as one of the main public transport in Jakarta has a huge role to play in increasing mode share of public transport with its wide network. Rail-based transportation, such as MRT Jakarta, LRT Jakarta, and Commuter Line, is also part of the public transport network to support mobility in Jakarta. The urban development in Jakarta may bring more movement in people to consider, especially in the future.
3. **A Presidential Regulation to accelerate battery electric vehicle (BEV) adoption has been issued (PR 55/2019) to mitigate GHG emission issues and to accelerate domestic BEV production. However, several derivative policies to enable the directives are still lacking:**
 - a. *On institutional setup policies:* A Coordination Team led by the Coordinating Ministry of Maritime and Investment (CMMI) has been established. Nevertheless, the institutional setup is still lacking dynamic coordination and communication between stakeholders.
 - b. *On national transport policies:* Both the Long Term National Development Plan ("RPJPN") 2005 - 2024 and Medium Term National Development Plan ("RPJMN") 2020 - 2024 have not covered the issues and targets of BEV adoption..
 - c. *On environmental and fuel policies:* BEV has yet to be included in GHG reduction policies, both at local and national level. The government also has yet to set a CO₂ emission standard or fuel economy standards for vehicles.
 - d. *On fiscal and non-fiscal incentive policies:* The fiscal policies seem to cover a limited amount of capital cost, also there is no significant non-fiscal policy available yet in the support of infrastructures.
 - e. *On charging infrastructure policies:* No clear support and targets yet, especially in capital investment.
 - f. *On gender equality and social inclusion (GESI) policies:* GESI are still unaddressed in almost every policy on electric vehicles and even in general transport policies.

4. **Based on the gaps, several recommended policies are required to fill the voids and to accelerate the program on the track.**

- a. *On institutional setup policies:* The inclusion of private and public institutions in the Coordination Team or other focus groups will give a lot of opportunities for discussion of electric vehicles. In support of the Coordination Team, at city levels, the city government should consider establishing the city coordination team of electric mobility deployment.
- b. *On national transport policies:* Electric vehicle targets should be included and aligned with national planning policies such as in RPJPN and RPJMN to provide a strong regulatory basis for the program.
- c. *On environmental and fuel policies:* A carbon tax also can become one of the effective options to reduce carbon emissions and boost BEV adoption. Setting continuous GHG emission and efficiency standards is also considered to be a priority since studies have proven that strict standards would force manufacturers to deploy more EVs in their fleet.
- d. *On fiscal and non-fiscal incentive policies:* Fiscal policies which could bring the capital cost of BEV in par with conventional fuel vehicles and lower BEV operational costs, such as electricity price reduction, should be introduced. City-level governments should explore non-fiscal stimulus, such as low-emission zones, lower parking fees, road toll charges reduction, and other incentives for BEVs. Manufacturing quota schemes and public transport fleet electrification mandates could also be explored.
- e. *On charging infrastructure policies:* Public charging infrastructure availability has a significant link to EV purchases. Developing better and more attractive business models for charging infrastructure development should be a top priority for the government since the existing models are considered unattractive for investment. Updating or drafting local building codes and zoning ordinances to support the “EV-Ready” infrastructure is necessary to address long-term planning considerations at the municipal, utility, or community level.
- f. *On gender equality and social inclusion (GESI) policies:* GESI issues should be addressed in each policy to provide inclusivity. GESI assessment should be held towards the current policy and regulation to identify individual needs, both male and female customers, and in particular people with disabilities.

Aside from these above aspects, the level of services and the infrastructure along with the integration are parts of the public transport improvement needed to achieve the desired target for electric transition.

Abbreviation

BAPPENAS	Ministry of National Development Planning
BAU	Business As Usual
BBN KB	Vehicle Ownership Transfer Fee
BEV	Battery Electric Vehicle
BPDPKS	Oil Palm Estate Fund Agency
BPPT	Agency for the Assessment and Application of Technology
BRT	Bus Rapid Transit
BUMD	Regional-owned Enterprise
BUMN	State-owned Enterprise
CBD	Center Business District
CNG	Compressed Natural Gas
EV	Electric Vehicle
GHG	Greenhouse Gases
GESI	Gender Equality and Social Inclusion
ITS	Intelligent Transportation System
NDC	Nationally Determined Contributions
PHEV	Plug-in Hybrid Electric Vehicle
PPnBM	Sales Tax of Luxurious Goods
PwD	People with Disabilities
RAN-GRK	GHG Reduction National Action Plan
RITJ	Greater Jakarta Transport Main Plan
RPJMD	Regional Mid-term Development Plan
RPJMN	National Mid-term Development Plan
RPJPN	National Long-term Development Plan
RTRW	Regional Spatial Plan
SDG	Sustainable Development Goal
SISTRANAS	National Transport System
SPM	Minimum Service Standard
TOD	Transit Oriented Development

1. Introduction

The transport sector in Indonesia has overgrown in recent years. Road transport is the highest mode share in Indonesia that accounts for 90% of the total modal share in 2012. In the road network, private vehicles, such as private cars and private motorcycles, have dominated the land transport sector in recent years. In 2011, there were a total of 90 million private cars and motorcycles on the Indonesian road network. On the other hand, public transport use is still low compared to private vehicles.

As a result, the transport sector in Indonesia has primarily contributed to the carbon emission and air pollution problems in Indonesia. In August 2019, Jakarta recorded the worst air quality in the world due to emission from several sectors, especially the transport sector. Greenhouse gas (GHG) emission from vehicles and other transport modes became the highest for 46% in 2012 compared to other industries. In the national context, the transport sector accounted for 28% of the total emissions, the second-largest contributor to carbon emissions.

The introduction of electric vehicles is one of the steps taken by the Indonesian government to address the emission issue. The massive practice of electric vehicles is expected to reduce tailpipe emissions significantly. Several policies have been introduced to accelerate the adoption of electric vehicles, such as Presidential Regulation No. 55/2019. Electric vehicles also may reduce the usage of fossil fuels that are much harmful to the environment.

In promoting the electric vehicle in Indonesia, the initiative electric vehicle program on public transport is required to introduce electric mobility to the public. Transjakarta, as one of the most extensive urban transportation in Indonesia, can become the role model of electric vehicles deployment on a massive scale. The first program will deploy 100 electric buses in the pilot project with the possibility of full-electric buses for Transjakarta fleets soon.

Gender Equality and Social Inclusion (GESI) policy in the transport sector is one of the critical issues that need to be covered to achieve inclusivity, including in this electric mobility program. Therefore, the accessibility issues of the vulnerable groups will be addressed by this project. Policy and regulatory reviews and gap analysis of current data and information will be conducted to provide the next steps for the project's recommendation. This report will assist in providing the baseline for future stakeholders' consultation and analysis.

2. Overview of Transport Policy

In the overview section, this report covers the general overview of transport policy both in national and city levels. The policy structure and stakeholder part give a basic understanding of the policymaking process also institutions involved in Indonesia and Jakarta. The rest of the overview section comprises a summary of transport policy, including policy related to electric mobility and electric buses.

Policy Structure and Stakeholder

The transport policy structure in Indonesia is a collaborative effort based on regulations from several stakeholders. The process of making transport policy refers to both national and city regulations. Transport policies are addressed in more detailed legislation, such as Laws, Government Regulation, Presidential Regulation, or Ministerial Regulation.

Several ministries are working and regulating the transport sector in Indonesia. The Ministry of National Development Planning (BAPPENAS) is one of the core ministries that sets the national plans, including the transport plans. The ministry provides a general development plan, such as the National Long-term Development Plan (RPJPN), that covers the transport development plan in Indonesia. The other ministry that strongly relates to the transport sector is the Ministry of Transport. As a ministry focusing on the transport sector, the Ministry of Transport gives regulatory guidelines for national policies and plans on transport.

Other national ministries and agencies also take part in the development of transport policy and plan. The Ministry of Public Work and Housing has the responsibility for the construction of national roads, bridges, toll roads, and other supporting infrastructure. Besides, The Ministry of Finance sets the state budgeting for transport plans, including infrastructure investments. Numerous ministries and agencies are supporting the transport sectors, such as the Ministry of Environment and Forestry and other related ministries.

Based on Presidential Regulation No. 55/2019, there is a dedicated team focusing on the acceleration program of battery electric vehicles called the Coordination Team. The Coordination Team will be responsible for coordinating, planning action plans, tackling barriers, and monitoring the acceleration program. The Coordinating Ministry of Maritime and Investment Affairs will lead the Coordination Team with help from other related ministries, such as the Ministry of Transport, Ministry of Finance, etc. The head of the Coordination Team may pick the vice head of the team and also establish the Working Group to support the work of the Coordination Team in more specific ways.

At the city level, the city government is responsible for setting regulations and plans. In supporting the work of the government, city agencies help the implementation of the

law on the field, such as the transport agency and public works agency. These agencies are also actively involved in implementing strategies and action plans based on the regional plans set by the government.

The transport agency, as part of the government, plays an important role both in the policymaking process and the implementation of policy in the transport sector. In the process, the operational and infrastructure aspects are several aspects of becoming the responsibility of the transport agency. These aspects include public transport, the road network, the capacity, and other issues about the transport issues.

In the effort to accelerate electric vehicles, the Government of Jakarta sets the regional focus group on e-mobility based on Regional Secretary Letter No. 538/-077.3/2020. The focus group comprises several government agencies about electric vehicle deployments, such as the economic bureau, transport agency, and cooperation bureau. The role of the focus group is mainly on the monitoring and evaluation of electric mobility projects in Jakarta.

Transport Policy in Indonesia and Jakarta

Transport policy in Indonesia, including in Jakarta, comprises several types of policies based on sectors and themes. General transport policy in Indonesia covers the overview of transport policy and plan in the national context and its broad strategies. Other topics of transport-related policies can vary from environmental aspects to gender issues. This section explores the existing policies regulated transport and mobility issues in Indonesia, precisely in Jakarta.

General Policy

Indonesia sets transport policies and plans based on national regulations and laws. Based on the policy structure, all national programs, including the transport sector, generally refer to the National Long-term Development Plan (RPJPN) produced by Bappenas. RPJPN is then defined into smaller and shorter-term plans called National Mid-term Development Plan (RPJMN), setting more specific and direct action plans incorporating transport sectors.

According to the RPJPN for 2005 - 2024, one of the development directions is urban revitalization, including the development of integrated public transport systems with intermodal services. The challenge in the Indonesian transport sector is to develop an integrated transportation system that is effective, efficient, affordable, eco-friendly, and sustainable. It is essential to build human resources and technology in transport that is functional, energy-saving, and environmentally friendly.

The RPJMN 2020 - 2024 as the shorter-term guideline also addresses several transport issues in Indonesia. The transport sector is one of the essential industries that have to start saving energy up to 30% of current energy demand. There is also an industrial acceleration plan that brings a potential value-added economy, including

transport based on electrical power. One of the disaster susceptibility and climate change targets is to reduce GHG emissions in several prioritized sectors, such as industrial, energy, and transport.

Concerning the RPJPN, the Ministry of Transport set the transport plans called National Transport System (SISTRANAS) in 2005 through Ministerial Regulation No. KM 49/2005. SISTRANAS covers all organized plans for transport sectors, including land, air, and water transport in the national, regional, and local levels. The transport issues related to sustainable transport also are addressed in SISTRANAS, including the high GHG emission, mainly produced in the transport sector. Energy conservation is one of the policy strategies included in SISTRANAS using alternative energy to reduce GHG emissions, such as gas energy for vehicles.

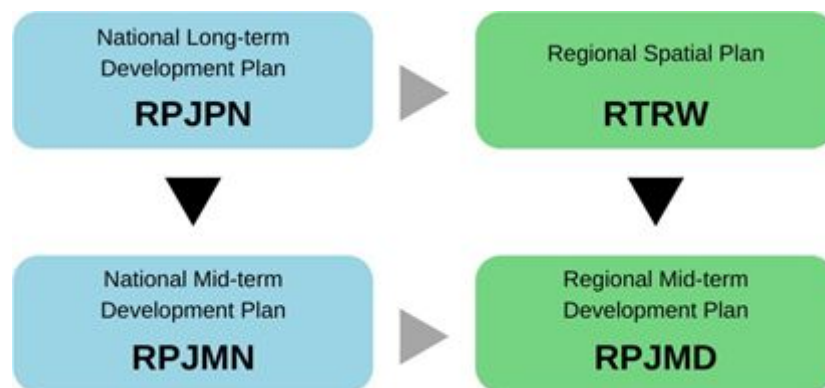


Figure 1 Development Plan Structures in Indonesia

In the local context, the Regional Spatial Plan (RTRW) 2030, based on Jakarta Government Regulation No. 1/2012, sets the guidelines for spatial planning in the Province of Jakarta. The Government of Jakarta commits through the regulation to reach 60% of the total modal share for public transport and to improve the velocity in the city streets to 35 km/h at minimum. This commitment also is supported by the strategy to put public transport as the backbone of transportation in Jakarta. The transport sector also needs to consider its energy conservation and diversification factors, including the development of energy systems and networks in electric power generation.

For shorter-term plans, the Regional Mid-term Development Plan (RPJMD) 2017 - 2022 has given more specific directions on several sectors, including the transport sector. The RPJMD generally refers to the Sustainable Development Goals (SDG) of the United Nations. Natural resources and environmental conservation strategies include the use of renewable energy for most public transport and multi-story buildings. Electric bus deployment for large, medium and small-sized transport is one of the possible alternative modes of transport that will be explored in Jakarta.

The Government of Jakarta also plans the transport sector referring to the regional transportation plan and policy based on the Presidential Regulation No. 55/2018. Greater

Jakarta Transport General Plan (RITJ)), according to the presidential regulation, is one of the core planning policies that conveys the transportation plans, including the transport model and the network expansion. One of the strategies in the development of sustainable transport written in RITJ is to introduce electric vehicles in several areas, such as the central business district (CBD) in Jakarta, Bogor, Depok, Tangerang, Bekasi, and other surrounding cities.

Environmental and Fuel

The current transport sector in Indonesia is highly associated with GHG emissions. Several variables, mainly energy use and vehicle travels, are the drivers of the emissions. If not regulated, Indonesia could bear immense economic and social costs from the soaring GHG emissions. Thus, environmental protection policies are integrated within the planning of the transport sector itself to mitigate the negative impacts. Since the fuel for the vehicles plays a significant role in generating the emissions, specific regulation concerning it is also crucial. These policies would lay the basis for the development of electric mobility in Indonesia as electric vehicles are one of the long-term solutions to bring down emissions and potentially decarbonize the transport sector 100%.

Several national and local environmental policies have already been instituted. One of the earliest and most essential strategies in reducing emission can be found in Presidential Regulation No. 61/2011. The regulation covers the GHG Reduction National Action Plan (RAN-GRK), becoming the guidelines of emissions reduction strategy in Indonesia. The overall target is to limit emissions to 26% below the business-as-usual (BAU) scenario by 2020 from all sectors. The transport sector is one of the industries included in the emission-reducing activities on RAN-GRK. Several plans outlined in the document for transport sector involved development of a Bus Rapid Transit (BRT) system, fuel switching to natural gas for public transportation, electrification of the railway system, improvement towards non-motorized transportation, implementation of the intelligent transportation system (ITS) in several cities, enactment of road pricing and eco-driving campaign and socialization.

Complementing with the action plan, Presidential Regulation No. 71/2011 sets the regulation for the inventory of GHG emissions in Indonesia. The inventory involves the gathering process of the data and information related to emissions in Indonesia, including emission sources and carbon sinks. The energy use and procurement inventory will be the focus of several sectors, such as power plant, industrial, and transport sectors.

Indonesia had also set an internationally recognized goal in First Nationally Determined Contribution (NDC) in November 2016. Indonesian NDC was released as the response of the Paris Agreement in 2015. Within the document, Indonesia has pledged to reduce GHG emissions by 29%, unconditionally, from the business-as-usual (BAU) situation and up to 41% with international backing by 2030. The support could come in the form of financing support, technology transfer, and capacity building. In the transport sector itself, the mitigation plan is only limited to fuel shifting to biofuel,

specifically B30 (blending 30% biodiesel and 70% diesel) and natural gas refueling station expansion. Electric vehicles were not included in the strategy.

Before the above documents were issued, the government has already put forward several emission reduction activities in the transport sector. Since 2005, the government has forced vehicle manufacturers to comply with Euro emissions standards. It started with Euro 2 emission standards to be met for light-duty and heavy-duty vehicles in 2005 (Ministry of Environment and Forestry Regulation No. 141/2003). Then it progressed until now the country is enforcing Euro 4 emission standards. It has been applied to gasoline vehicles since 2018, and it is scheduled to apply for diesel vehicles in 2021 (Ministry of Environment and Forestry Regulation No. P.20/MENLHK/SETJEN/KUM.1/3/2017). Indonesia is still behind Singapore, which has already used Euro 6 as standard and also Thailand, which is expected to have Euro 6 standard by 2023.

To further reduce the carbon intensity of fuel in the transport sector, the government mainly proposed biofuels as an alternative fuel for vehicles. The most recent targets for biofuels are stated in Ministerial Regulation No. 12/2015. Biodiesel is targeted to reach a 30% blending ratio with diesel (B30) by 2020, and bioethanol to achieve a 20% blending ratio with gasoline (E20) by 2025. The B30 program is also expressed as the main mitigation action for the transport sector in the NDC. Supporting the implementation of the biodiesel program, the government provided subsidies through the Indonesia Oil Palm Estate Fund Agency (BPDPKS) since 2016. Essentially, the allowance covers the price differential between fossil-based diesel fuel and biodiesel. Indonesia is currently implementing B30 in the transport sector, while bioethanol programs lagged, fulfilling only at a 2% blending ratio. Apart from this policy, the government has yet to set fuel economy standards for vehicles, which caused the erratic pattern of the average fuel economy in Indonesia over the years.

Automotive fuel tax in Indonesia has been set at 5% through Law No. 18/1997, but then it was changed to a maximum of 10%, allowing different rates to apply in different regions by Law No. 28/2009. However, it was changed again to 5% flat through Presidential Regulation No. 36/2011, making it unclear and ineffective as a tool to reduce fuel consumption.

Subsequently, the government's plan to adopt electric vehicles in Indonesia has already been initiated with the issuance of Presidential Regulation No. 55/2019. The regulation serves as umbrella regulation to accelerate the adoption of battery electric vehicles in Indonesia and to also develop its industry. Several incentives and supporting instruments are outlined in the law, yet it still awaits derivative regulations from various ministries to build the Electric Vehicle (EV) ecosystem in the country. Different documents state different targets for electric vehicle adoption. However, the objectives indicated by the Ministry of Industry are often used as national benchmarks of electric vehicle development progress. It targets annual production of 400,000 for electric cars and 2 million electric motorcycles by 2025.

In the local context, the Government of Jakarta also has put a policy in response to environmental issues. Government Instruction No. 66/2019 is a strategic direction from the

Governor of Jakarta to limit the emission in Jakarta as it reached one of the worst emissions in 2019. One of the instructions is to restrict the age of public transport only up to 10 years and to initiate renewable energy sources in public assets. Renewable energy sources may be utilized by installing solar panels in several public buildings and restricting the use of fossil fuel.

Fiscal

To increase electric vehicle adoption, the government first needs to create an attractive market to bring together manufacturers and consumers. In this regard, financial support can be a potent tool to incentivize consumers to buy electric vehicles and create demand. Several studies have concluded that high upfront purchase is one of the most dominant factors that deter consumers from buying electric vehicles. Lowering that barrier would pull more consumers into the new market. Additionally, recurring financial support will also help to increase EVs' competitiveness compared to conventional vehicles. This aid will lower the operational costs throughout the EVs' lifetime.

The Presidential Regulation No. 55/2019 on Electric Vehicle Acceleration Program has already put out several potential financial incentives to support electric vehicle adoption. The possible incentives set in the regulation are wide-ranging, from import/entry fee incentives, tax incentives, purchase price incentives, research and development support, ease of certification, and others. However, only a couple of derivative regulations have been issued to implement those fiscal incentives.

Following the presidential regulation, Government Regulation No. 73/2019 marks the first financial incentive for electric vehicles at the national level. In the law, several types of electric vehicles, like plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV), are exempted from paying the sales tax of luxurious goods (PPnBM). The regulation also confirms that public transportation, as part of public services, is also free from PPnBM.

As mentioned before, automotive fuel tax has already been set in Indonesia, which currently is at 5% flat across the country. This tax could be a tool by the government to disincentivize the use of conventional vehicles and shift to electric vehicles instead of in the future. In reducing EVs' operational cost, the charging tariff needs also to be adjusted. As of now, the government has set the tariff at IDR 1,300/kWh. This tariff has to be assessed over time, whether it is attractive enough for the consumers.

On the city level, the Government of Jakarta also gives a tax incentive for BEVs to ease the financial burden of BEV potential users. Through the Jakarta Government Regulation No. 3/2020, there will be no vehicle ownership transfer fee (BBN KB) deducted from the BEV owners. It applies to all BEVs registered to the Province of

Jakarta from January 2020 to December 2024. For West Java Province, Ministry of Home Affairs Regulation No. 973-689/2019 revised the local regulation and set BBN KB for electric four-wheelers at 10% and 2% for electric two-wheelers.

Since the BEV industry is still under development in Indonesia, import options will be the key to initial deployment. The import fee will impact on the acquisition cost of the electric bus. Minister of Finance Regulation No. 132/2015 has set the import fee regulation for goods, including vehicles. Since the import of the electric bus will involve the chassis with the engine, the import fee will be deducted for 40% of the purchase price.

Relating to building the electric vehicle industry in Indonesia, incentives like tax holiday and tax allowance have already been laid out through the Ministry of Finance Regulation No. 150 /2018 to attract EV foreign manufacturers to establish local production facilities in Indonesia. Companies that invest in manufacturing electric vehicles or electric vehicle components with specific investment values would be granted a 100% tax holiday for up to 20 years (depending on the amount of investment).

Non-fiscal

Non-fiscal incentives do not have a direct monetary value to the consumer. Instead, these incentives save time and provide convenience, which is often more valued by consumers. Presidential Regulation No. 55/2019 on the Acceleration Program of Battery Electric Vehicles has stated some non-fiscal incentives to be used to accelerate electric vehicle penetration. It ranges from the ease of access for specific areas or lanes, priority in rights handover, and security provision on electric vehicle manufacturing.

These non-fiscal incentives will be regulated in detail by related ministries or local governments, such as the Ministry of Transport, the Ministry of Industrial, the Government of Jakarta, etc. Similar to fiscal incentives, there have been limited implementations of these non-fiscal incentives. Regulations from ministries based on the Presidential Regulation No. 55/2019 have not come to fruition.

The city of Jakarta has exempted electric vehicles from the odd-even policy through Governor Regulation No.8/2019. The governor is still developing parking incentives to give more chances of electric vehicles to blossom. Moreover, the police are in the process of legalizing a dedicated plate for battery electric vehicles to differentiate them with conventional vehicles, thus allowing them to reap the benefits. Outside of this, there are no significant non-fiscal incentives issued, even at the local level.

Based on the Presidential Regulation No.55/2019, incentives like the rights handover would also be bestowed. It should cover the production rights related to the production of electric vehicles. The transfer means that the agreed manufacturers may produce electric vehicles or their supporting components from the production rights owned by the government. These production rights should be owned either by the government of Indonesia or the local government.

Furthermore, in the same regulation, there would also be a security provision for electric vehicle industries. The arrangement will cover the security of operational activities and security development in industrial sectors. These kinds of non-fiscal incentives will help the electric vehicles industries to focus on the logistics and production process, especially

industries related to the national interest. However, they have not yet materialized through formal regulations, such as Ministerial Regulation, Regional Regulation, or other legal regulations.

Charging Infrastructure

Another critical factor affecting the adoption of electric vehicles is the availability of charging infrastructure. Since current electric vehicles do not match conventional vehicles in terms of driving range, there is a widespread “range anxiety” that exists among users. Several studies infer that range anxiety is best addressed by increasing charging opportunity rather than extending the EV range. Therefore, the development of the charging infrastructure becomes a crucial aspect of the electric vehicle's ecosystem.

Within Presidential Regulation No.55/2019, the government has appointed PLN as the state-owned electric utility to procure charging infrastructure initially. In implementing the mandate, PLN is allowed to cooperate with other state-owned companies or private business entities. Responding to the regulation, PLN came up with a roadmap for charging infrastructure development.

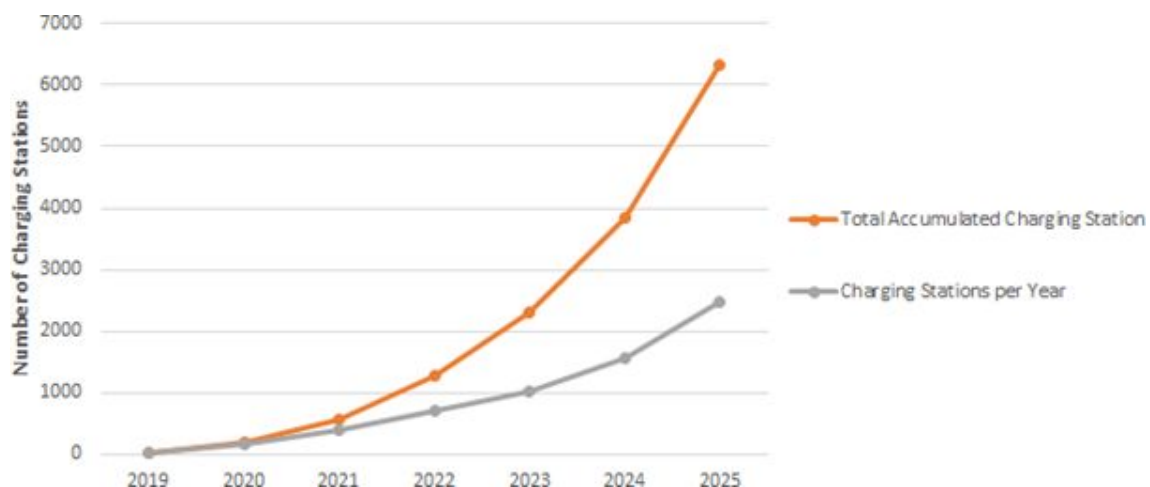


Figure 2 Charging Stations Development Plan by PLN in 2025

The most recent data suggest that there are 57 units of charging stations across Indonesia. The development still falls short to the target of 182 units in 2020. Out of all, PLN has developed 16 units distributed to 10 locations in Jakarta, Bandung, Tangerang, Semarang, Surabaya, and Bali. Agency for the Assessment and Application of Technology (BPPT) has also built three units spread in Jakarta and Bandung. State-owned companies like Pertamina and Angkasa Pura II have also contributed five units, mostly in Jakarta. Private sector contribution mainly comes from a major taxi company, establishing 15 units in its pool in Jakarta. Additionally, several vehicle manufacturers cover the rest and assemble them in their dealers.

The regulation also mentions several supporting instruments for charging infrastructure development. Apart from conducting research and development of efficient public charging infrastructures in Indonesia, there are several potential fiscal incentives related to charging infrastructures. Those include component manufacturing incentives, charging fee reductions, and financing support for its development. However, the incentives have not yet been implemented as it awaits further ministerial regulations.

Concerning electricity tariff imposed on public charging stations, the government has mandated the Ministry of Energy and Mineral Resources to set the appropriate amount. While currently the fare has been set at IDR 1,300/kWh, they have not issued a formal regulation regarding the tariff itself.

Gender Equality and Social Inclusion

Gender equality is an issue related to equal chances, rights, and responsibilities for women and men. It does not indicate that women and men are the same. Gender inequality is a consequence of unequal power distribution between women and men, exacerbated by constant discrimination, weaknesses in regulations, policies, and societies, and social relations that normalize inequality.

Social inclusion is a broader concept and is about ensuring that all members of society, including people with disabilities, are included in critical processes, including but not limited to decision-making, consultation, employment opportunities, or involvement in government service delivery. The United Nations (UN) defines social inclusion as the process of refining the terms of participation in society, particularly for people who are underprivileged through enhancing chances, access to capitals, voice, and respect for rights. In conclusion, GESI aims to improve the opportunities for all groups to participate in society, regardless of gender, disability, ethnicity, socio-economic status, sexuality, or other differences.

The Government of Indonesia has a clear commitment to gender equality and social inclusion in Indonesia. It can be seen from regulation, such as the Presidential Instruction No.9/2000, the National Medium Term Development Plan (RPJMN) for 2020-2024, Ministry of Home Affairs Regulation No. 67/2011, and the Ministry of Finance Regulation No.94/PMK.02/2017.

The Government of Indonesia has ratified the International Convention on People with Disability (PwD) through Law No. 19/2011. Afterward, as the Gol commitment, a LawNo. 8/2016 on People with Disability was enacted, which shifted the paradigm of Law No. 4/2011 on People with Disabilities. The Law on PwD now is using the human rights-based approach rather than a charity-based meaning that each development program/project and strategy should focus on how to fulfill, to protect, and to enforce PwD rights. This issue is also the main reason why this E-buses project should consider PwD rights.

By the end of 2019, to support and expedite the implementation of Law No.8/2016, Government Regulation No. 70/2019 was enacted. Government Regulation No. 70/2019 is an elucidation of Article 27 of Law No. 8/2016 on People with Disabilities, mainly related to the obligations of the

government and local governments concerning the planning, implementation of Respect, Protection, and Fulfillment of the Rights of Persons with Disabilities.

Law No. 8/2016 concerning People with Disabilities states that the government, city government, state-owned companies (BUMN), and city-owned companies (BUMD) must employ at least 2% of persons with disabilities from the number of employees or workers. Article 53 paragraph (2) of the same law states that private companies must employ a minimum of 1% (one percent) of persons with disabilities from the number of employees or workers. In other words, employers are required to employ workers with disabilities of at least 1% of workers in the company. It means TransJakarta is obliged to apply 2% of staff with the status of people with disabilities in the company.

Also, the Ministry of Public Works' Regulation No 14/2017 covers issues regarding building requirements. This regulation contains the technical guidelines related to the design of buildings that have two main principles, namely universal design and barrier-free principles. In this regulation, all public facilities, including transportation infrastructure, must comply with the technical requirements that have been set in this regulation

The government is in charge of and obliged to provide public transportation that meets the standard of safety, security, convenience, and affordability. To this end, the law requires each public transportation enterprise to meet the SPM (Minimum Service Standard) that covers: (a) security; (b) safety; (c) convenience; (d) affordability; (e) equality (Law No.22/2009 on Traffic and Road Transport, GR (Government Regulation) No.74/2014, MR (Ministerial Regulation) No.98/2013. SPM is a relevant policy for TransJakarta Buses users/passengers due to it containing services standards, including for the marginalized groups (the elderly, children, disabled, and pregnant women).

In operating traffic and road transports, the National and Sub-national Government and Public Transport Companies must provide special treatment or affirmative action to persons with disabilities, older people, children, pregnant women, and sick people. The special treatment includes accessibility, service priority, and service facilities (Art. 242 Law No.22/2009).

Although the current policy regarding inclusivity-related in electric mobility does not yet exist. At least three legal bases are discussing the rights and needs of people with disabilities in the transportation sector, such as Indonesian Law No. 8/2016, Ministry of Transport Regulation No. 98/2017, and Ministry of Public Works Regulation No. 14 of 2017. The latter regulates the obligations of public transportation providers in providing accessibility for users with special needs. This regulation mainly requires transport providers to offer proper convenience through the provision of accessible facilities and infrastructure for vulnerable groups, including women, elderly, children, and people with disabilities.

Both Governor Regulation No. 33/2017 and No.13/2019 regulate the SPM of TransJakarta Public Transports. These Government regulations define SPM as a standard used as a guide for the implementation of TransJakarta public services and a reference for assessing service quality in the framework of quality, fast, easy, affordable, and measurable services as stipulated in the Governor Regulation.

The SPM is divided by 3 (three) standards (Art.2 Government Regulation No. 13/2019): services (BRT and the feeders transportation), performance indicator and value, and annual realization/achievement. The feeders consist of Big and Medium busses; Small busses, and Trans Care.

Regulation	Description
Art.3 - Governor Regulation No.33 year 2017	The performance indicators of Transjakarta Public Transport Services include security, safety, comfort, affordability, equality, and regularity.
Art.5 - Governor Regulation No.33 Year 2017	Security is a minimum standard that should be met to ensure the passengers are free from unlawful acts and fear. Safety includes: • Security at the bus stop that consisting of security guards, information security breaches, closed-circuit television (CCTV), • Security on the bus includes vehicle identity, the driver's ID and vehicle crew uniform, emergency signal light, bus officers (on-board officers), the use of window film under the provisions, closed-circuit television (CCTV).
Art.6 - Governor Regulation No.33 year 2017	Safety is a minimum standard that must be met to avoid the risk of accidents caused by human factors, facilities, and infrastructure. Safety standards consist of: • Safety for passengers, consisting of: 1. Standard Operating Procedure (SOP) for vehicle operation 2. Standard Operating Procedure (SOP) for handling emergencies 3. The driver's break time • Safety on the bus, consisting of: 1. vehicle negligence 2. safety equipment 3. health facilities 4. complaint number information 5. service facility and user grip facility 6. exit and service user entrance
Art.7 - Governor Regulation No.33 year 2017	Convenience is a minimum standard that must be met to provide a comfortable, clean, beautiful, and neat condition that can be enjoyed by service users (passengers). This standard will consist of: • Convenience at the stop and stop support facilities, consisting of lighting, supporting facilities for air circulation, janitor, number of people per floor area, facilities for ease up / down service users • Comfort on the bus, consisting of lighting, load factor, room temperature control facilities.
Art.8 - Governor Regulation No.33 year 2017	Affordability is a minimum standard that must be met to make it easy for service users (passengers) to get Transjakarta Public Transport Services at affordable rates.

Art.9 - Governor Regulation No.33 year 2017	Equality is a minimum standard that must be met to provide exceptional treatment in the form of accessibility, priority services, and service facilities for users/passengers with disabilities, older people, children, and pregnant women. Equality consists of: • Priority Chair • Special room for wheelchairs
---	---

Table 1 Regulation on GESI aspects

The Governor Regulation No.33 Year 2019 provides a revised annexes on the above- mentioned GESI aspects in TransJakarta and its feeders.

3. Transport Data in Jakarta

In support of the policy review, the section of transport data in Jakarta gives a broader understanding of transport issues and development. The explanation of private transport issues as the dominating mode of transport is part of this section. As opposed to private vehicles, several types of public transport, including Transjakarta, MRT Jakarta, and LRT Jakarta, are also discussed in this section. About the transport situation, the end of this section covers the current urban development in Jakarta, affecting the transport sector in many ways.

General Overview

Jakarta is one of the cities which experienced rapid urbanization. Between 2010 and 2019, the annual population has grown with an average of 1,19% per year. In the year 2019, 10,557,810 people were recorded living in Jakarta, according to the Jakarta Statistics Agency. With a total area of 664.01 Km², the population density in this city has reached 15,900 people / km². As the major metropolitan area in the South East Asia region, Jakarta has to be able to accommodate all of the daily needs of its people. Considering this rapid urbanization, the national government, through Indonesia's National Medium Term Development Plan 2015-2019, has decided to accelerate infrastructure development to foster national economics and tackle inequality problems.

Although the national development plan has mentioned that the infrastructure development will be mainly focused on improving the social infrastructure in the countryside area, it can not be denied that Jakarta will also get the attention of both the National and Regional Government. Thus, in the last five years, Jakarta has experienced a massive development in the transportation sector. At that time, several new transportation services were introduced, such as MRT Jakarta, LRT Jakarta, and new BRT corridors.

Indeed, a proper public transport system has always been demanded by people in Jakarta to decrease the negative externalities which have been core problems over the past years in Jakarta. According to Jakarta Transport Agency, the average daily trips in the year 2019 were recorded at more than 24,900,000 trips. The share is still dominated by private vehicles (motorcycles and cars), while public transport only accounted for 9.86% of the total share.

Transport Mode Share in Jakarta (2019)

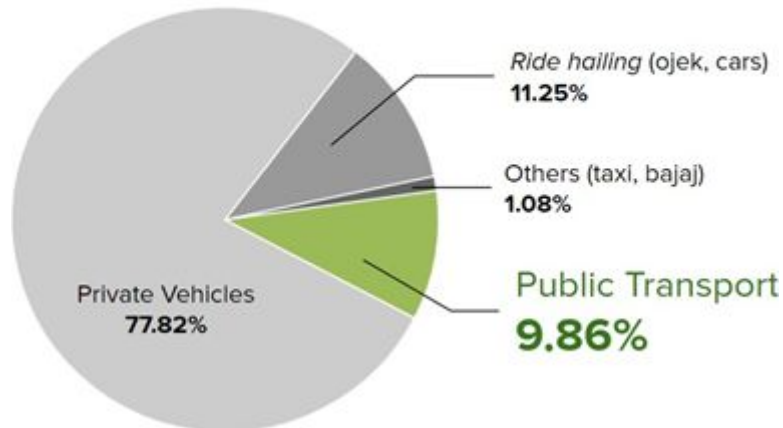


Figure 3 Transport Mode Share in Jakarta in 2019

Congestion problems can not be avoided as the consequences of having this sizable private vehicle share. This issue also leads to significant air pollution problems in Jakarta. According to the data from the Jakarta Environmental Agency, 55% of total GHG emissions in Jakarta came from the transport sector. The data also revealed that more than 61.2% of the transport GHG contributions are produced by motorcycles and bus emissions (15.5% and 45.7% for motorcycles and buses respectively).

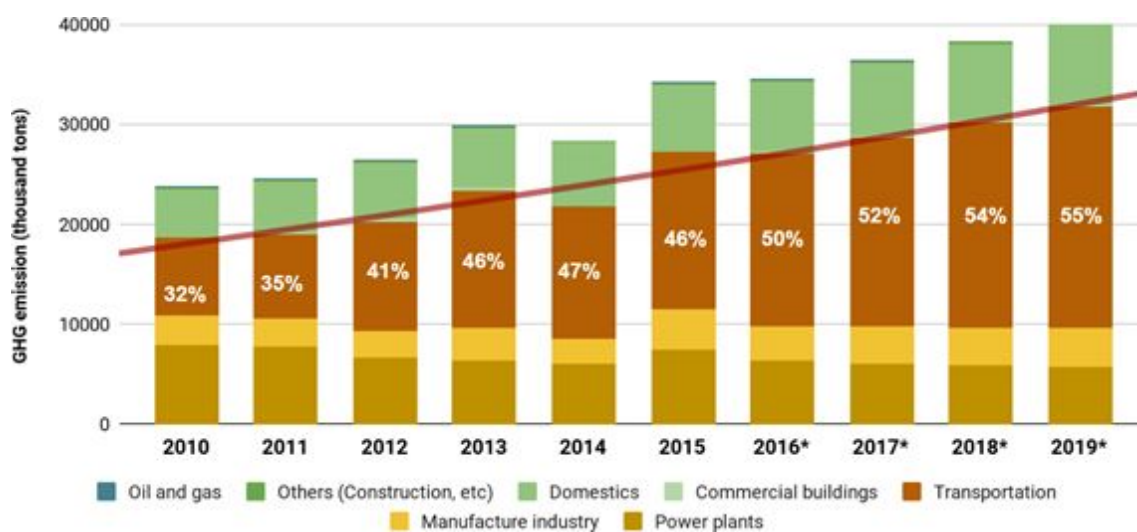


Figure 4 GHG Emission per Sector in Jakarta

Private Vehicle

Jakarta has long been a motorized transport city. It was proven by the million numbers of private vehicles that have been registered each year. According to data from Jakarta Statistics Agency, the number of registered private vehicles (cars and motorcycles) has increased by 24% between 2012 and 2016. The data also revealed that the share of private vehicles in Jakarta was still dominated by motorcycles. Around 20% of people in Jakarta own more than one motorcycle. With the existing trend and 5.5% annual growth, it is estimated that there are 15.6 motorcycles in 2019.



Figure 5 Vehicle Data in Jakarta

The prevalent trends of motorcycles in Jakarta have also opened the new source of business with this mode of transport. It was initially introduced by the appearance of motorcycle taxis or as it is traditionally known as “ojek” in Indonesia. The late 1960s was estimated as the year of first presence of ojek in Jakarta and Central Java. Since then, Ojek has become an accessible mode of transportation as it allowed the passengers to travel point to point. In 2010, the first online motorcycle taxi called Gojek was established in Jakarta. Many people see this as the modernization of motorcycle taxis where the people can order the service by using mobile phone apps. The service also extends to several products, such as food and freight delivery. The appearance of online ojek also changed the way people travel in Jakarta. About the public transport network, ojek online is seen as an active mode in supporting the first even the last mile of public transport trips in Jakarta. According to the study from Saffan & Rizky (2018), it was found that 28% of commuter rail passengers chose the ojek online as their onward modes after arriving at the destination stations.

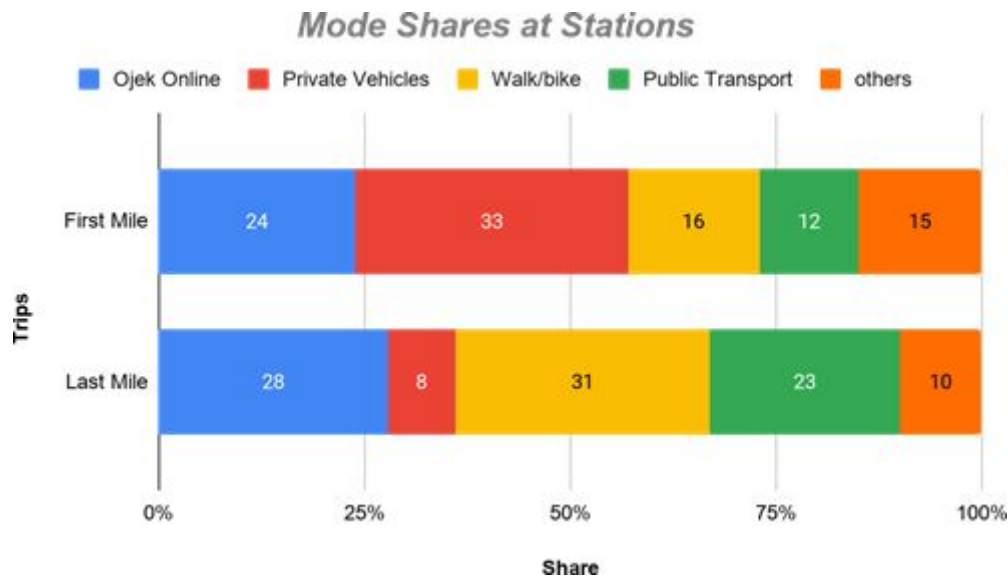


Figure 6 Mode Shares at Stations in Jakarta

Considering the high demand which is generated by the motorcycle, also the emissions issue which is coming from this mode, it is reasonable to find the bike as the potential market for electric mobility deployment in Indonesia. The national government also has mentioned this strategy in Rencana Umum Energi Nasional (RUEN) through Presidential Regulation No. 22/2017, which is stating the target of 2.2 million units of electric motorcycles deployment by the year 2025.

Transjakarta

Transjakarta was firstly introduced as a BRT system in 2004 to provide commuting options for people in the Jakarta Metropolitan Area (Jabodetabek). In that time, Transjakarta BRT was initially operated by Badan Pengelola Transjakarta (BP Transjakarta), a non-structural governmental body that was financed by the city budget. Since then, lots of transformation in terms of ownership happened in Transjakarta. In 2006, it changed to Badan Layanan Umum under Jakarta Transport Agency, which made Transjakarta had to be merged with its regulator. Finally, in 2014, Transjakarta officially became a regional-owned enterprise (ROE) and is still going until today. The transformation of becoming a regional-owned enterprise has made Transjakarta more flexible in managing some aspects such as finance, operational and institutional issues. In terms of operational management, Transjakarta adopted a route contract (gross contract) system with various bus operators in Jakarta. The contracted bus operators are paid to run a service in specific routes with an agreed service level agreement such as minimum headway, dwelling time, the air temperature on the bus, and many more.



Figure 7 Transjakarta Service Contract

Corridors, Routes, and Ridership

The term “corridor” is prevalent in defining the BRT system. According to the BRT standard, the corridor is defined as a section of road or adjacent roads provided by a bus route or numerous bus routes with a minimum length of 3 kilometers (1.9 miles) with dedicated bus lanes”. In Transjakarta's case, the corridor acts as the primary network on its BRT system. Stations and bus lanes are located in the median of the road, which is separated from mixed traffic lanes. On the other hand, the term “routes” refers to a broader concept of defining Transjakarta’s services, which consist of seven categories. The categories are namely BRT routes, border routes, direct service routes, Microtrans routes, Royal Trans routes, affordable housing routes, and tourism routes. Each route has its code, which represents the origin & destination of the services.

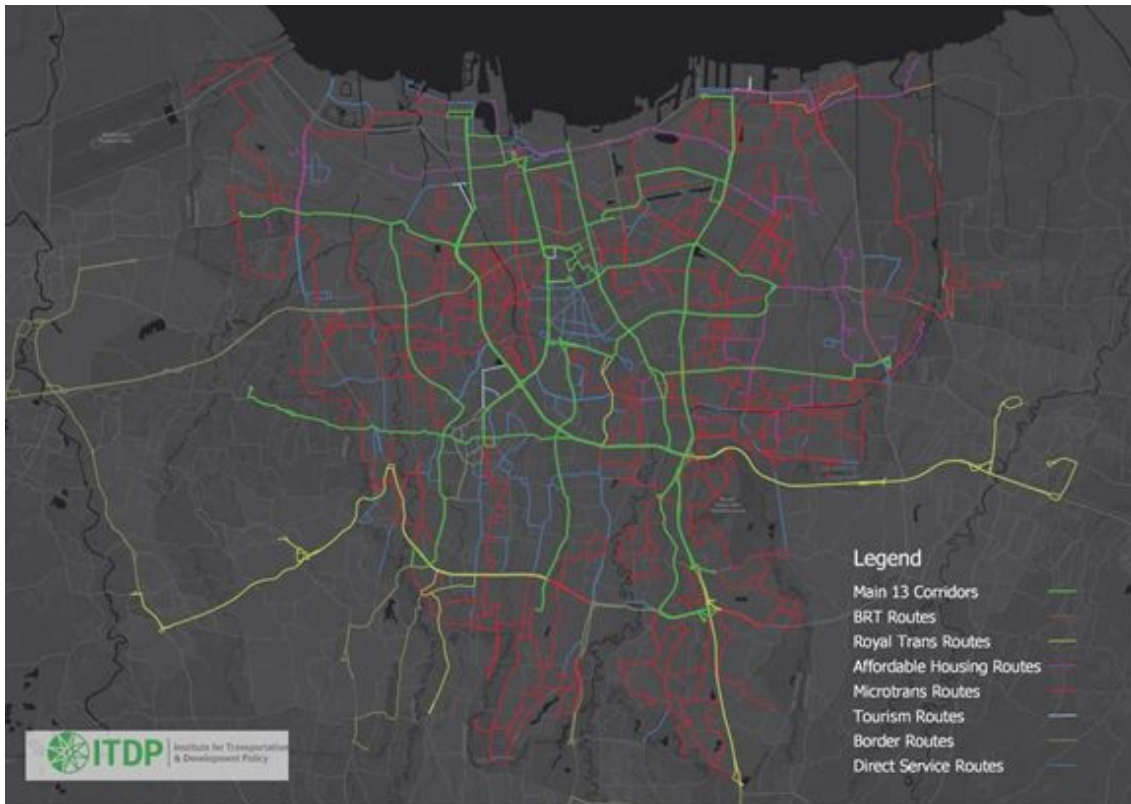


Figure 8 Transjakarta Network in 2019

Moreover, the development of Transjakarta's corridors and routes gradually increased from the early years until today. There are 15 corridors, according to the Regional Spatial Plan. Although Transjakarta only has 13 corridors in operation, massive development in terms of the number of routes have increased sharply over the years. Transjakarta sees the strategy of opening a new direct service route will be an effective solution to improve the supply of services with a cheaper investment compared to the investment in building a new corridor. From 2015 to 2020, total routes have increased by 850%, as the impact of the decision to implement a direct service system.

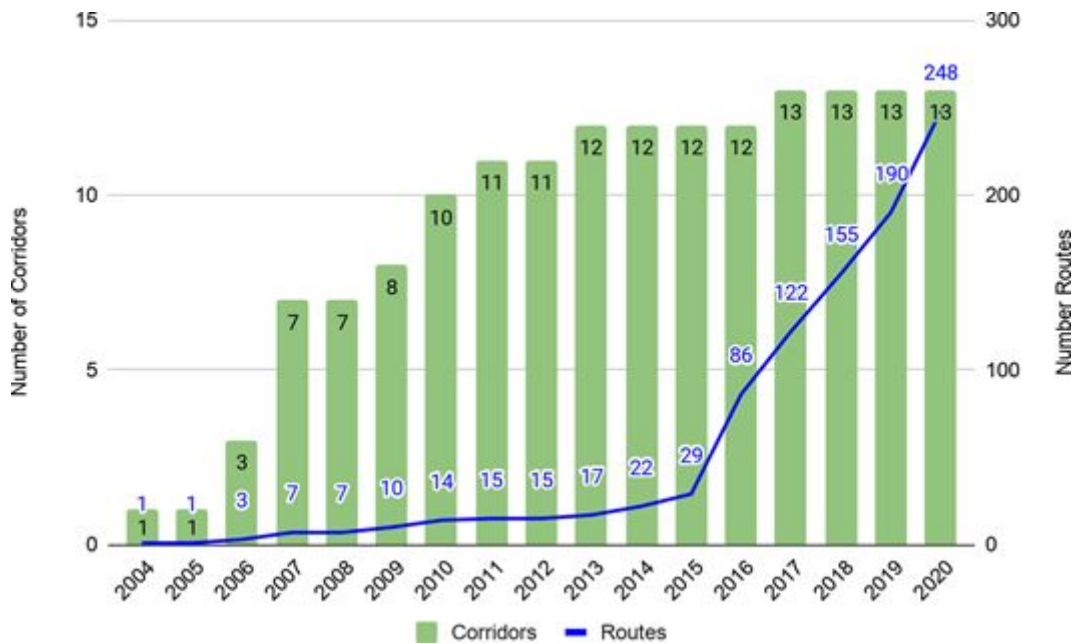


Figure 9 Number of Corridors and Routes in Transjakarta

Currently, the proportion of Transjakarta routes are dominated by the direct service routes and the Microtrans routes. These two services allow Transjakarta to reach more passengers in local areas and narrow routes as the fleet is more flexible because of its size. Other types of routes, such as border routes, tourism, and Royal Trans, also have gradually increased over the years. As a result of this improvement, currently, Transjakarta services have covered 83% of the population in Jakarta.



Figure 10 Proportion of Routes Type in Transjakarta

The increase of the Transjakarta routes plays a significant role in raising the Transjakarta demand. In February 2020, Transjakarta broke the record by achieving one million daily passengers. This achievement is inseparable from the role of operators, which is committed to improving its route coverage to encourage more people in using public transportation. As it is mentioned before that there was a significant route development since 2016, it shows the growth of Transjakarta's passengers in the same period.



Figure 11 Transjakarta Passenger Growth

The main corridors are the most successful services that carry more passengers in the system, which contributed to more than half of Transjakarta passengers. It can be seen that the integration with paratransit operators (Microtrans) also brought a significant contribution to abstracting more passengers, which accounted for around 25% of total daily passengers.

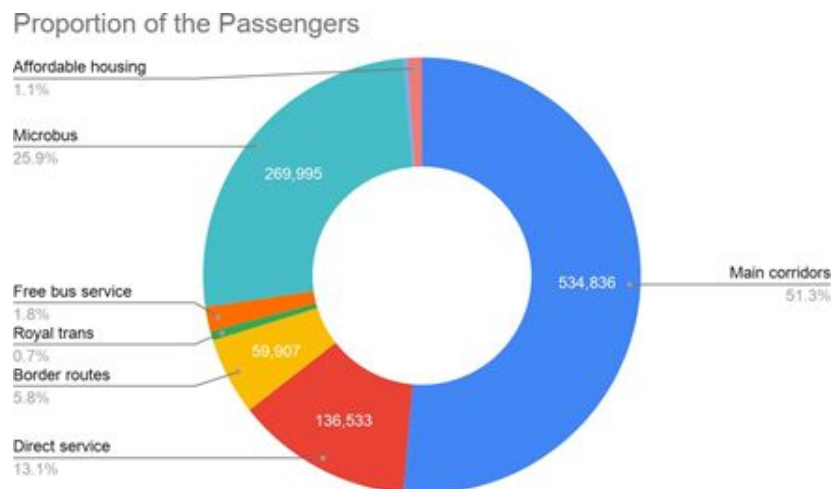


Figure 12 Proportion of Passengers in Each Transjakarta Route Type

Fleets, Operators, and Depots

Operators, fleets, and depots are the crucial parts of the Transjakarta BRT system to maintain the quality of daily operations. As Transjakarta adopts the gross contract system, it should be noted that the contracted operators run some services. This system also obligates the contracted operators to have their depots and maintain the fleets to comply with the minimum service standards agreement.

In the year 2019, Transjakarta operated 3,895 fleets that were owned by several operators. The single bus (12-meter bus) held the largest share in terms of fleet types, which accounted for 23% of the total fleets (901 buses). In general, the big buses would run on the main corridors. In contrast, the small and medium buses will serve the passengers outside BRT corridors as it is more suitable for the typical small bus stops, which are mainly located on the local roads.

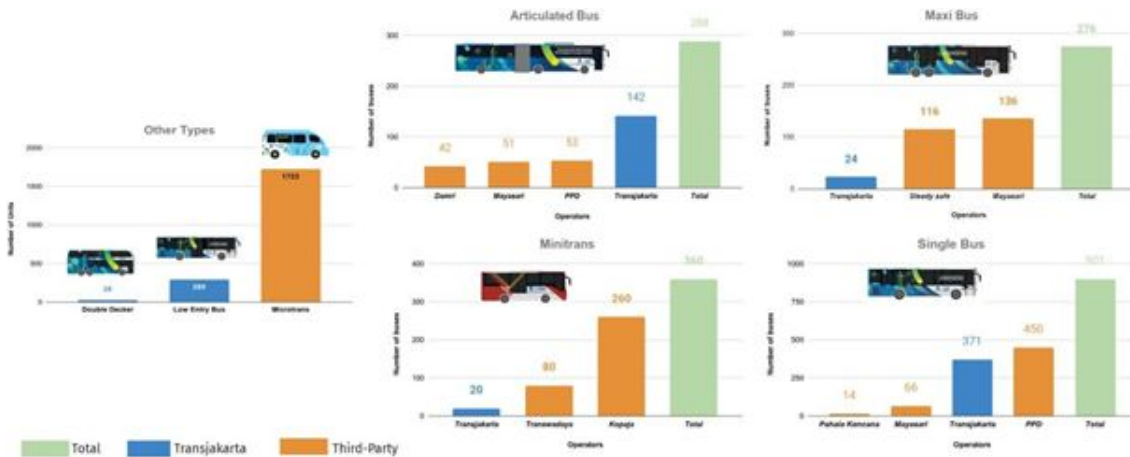


Figure 13 Number of Transjakarta Fleet Type

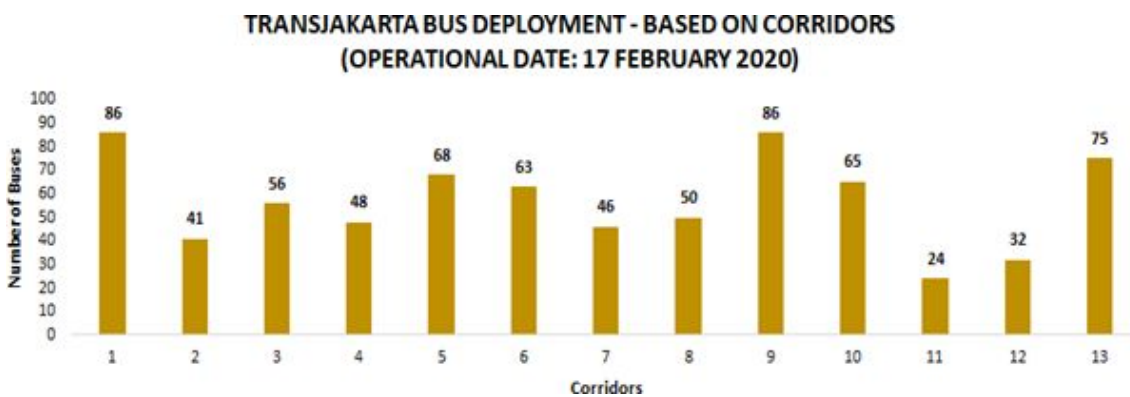


Figure 14 Number of Transjakarta Bus Deployed in February 2020

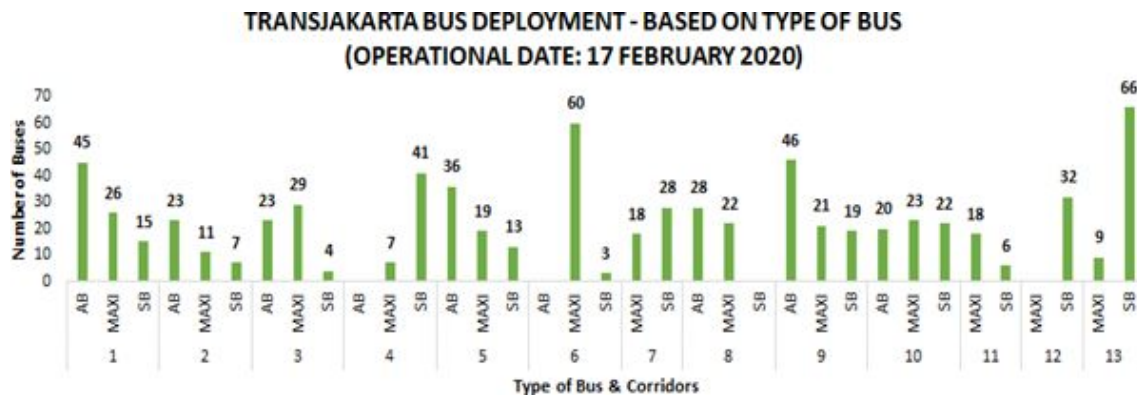


Figure 15 Number of Transjakarta Bus Deployed per Type of Bus in February 2020

Moreover, the route gross contract system also allows the third party operator to run the service on specific routes while Transjakarta will collect the fare revenue. In general, almost all corridors of Transjakarta are predominantly operated by the contracted operators, except the latest corridor in corridor 13, which is entirely run by Transjakarta. The gross contract model also requires the contracted operators to build and manage their buses. According to the Transjakarta operational team, there are 18 depots in operation, located across Jakarta. Most bus depots are located in East Jakarta, with proximity to the dedicated corridors. However, there are some corridors such as corridor 1 and 6, which are located apart from the bus depots. This situation leads to a higher dead km-traveled, considering the bus will run with the empty seats from the original depot to the starting point of the corridors.

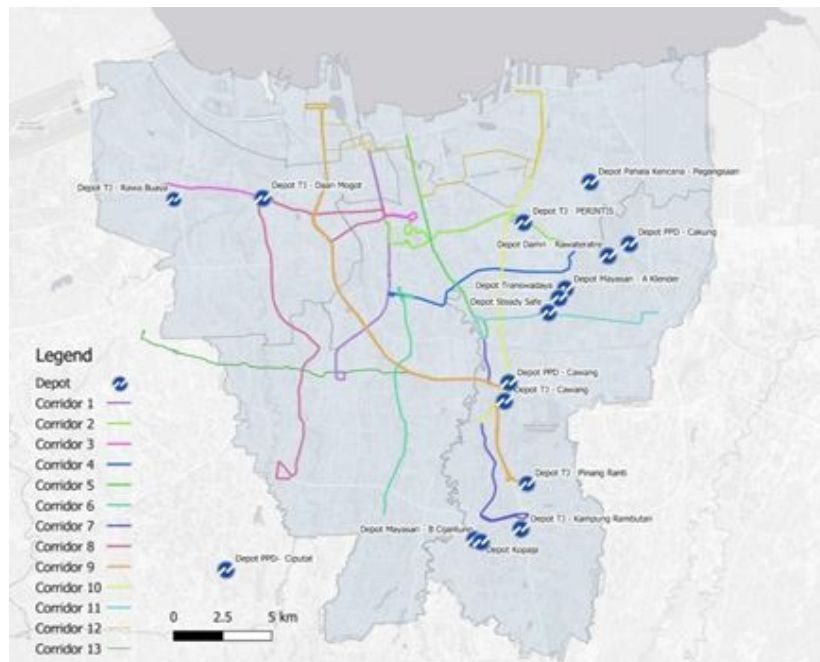


Figure 16 Transjakarta Corridors and Depots

Feeder Services

Another Transjakarta's service, which has played a significant role in increasing Transjakarta daily passengers, is the minibuses service or as it is called "Microtrans." Starting in January 2018, Transjakarta decided to integrate its services with the existing paratransit operators under a system called Ok-Otrip (now Jak-Lingko), which incorporated the fare and payment scheme. By using a 4-meter fleet that can carry up to 11 passengers, it allows the service to run on narrow roads and reach more passengers in the local area.



Figure 17 Microtrans in Operation

Since the early year of its operation, an effort to convince the existing minibuses operators to join the Transjakarta system has always been the challenge for Transjakarta and Transport Agency. Nowadays, ten operators have joined the Microtrans system, and the total fleets account for more than 1,723 units. In terms of ridership, Microtrans carried 47,366,369 passengers in 2019, which accounted for 17,9% of the total passengers. On the supply side, Microtrans routes have evolved over the years, and currently, it has 69 routes in operation.

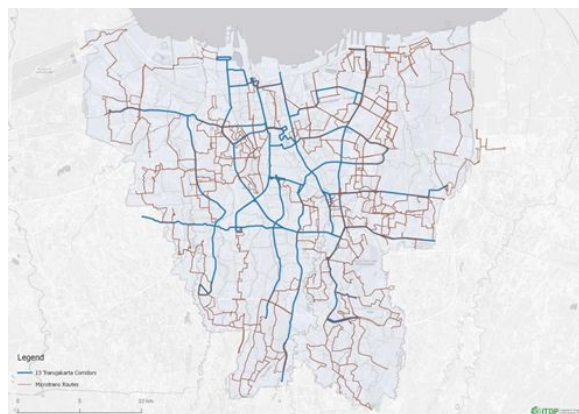


Figure 18 Microtrans Route Network

GESI Analysis in Transjakarta

Generally, the current Transjakarta corporate culture is not yet gender-responsive. The current Board of Directors and Board of Commissioners are all males, meaning that no female staff is in leadership positions under Transjakarta corporation. At the moment, it is challenging to conduct a gender analysis of the current employment data under the Transjakarta organization due to no sex-disaggregated data are available. The available sex-disaggregated data form Transjakarta are minimal, and cannot represent the overall picture of corporate culture on gender equality and social inclusion. Also, Transjakarta does not have an employee database that contains the percentage of people with disabilities. As discussed above, a government-corporate subsidiary, Transjakarta, is obliged to employ at least 2% of staff with the status of people with disabilities.

Transjakarta Staffs – TOTAL	Female	Male
8662	1276 (14.37%)	7386 (85.26%)

Table 2 Number of Transjakarta Staff Disaggregated by Sex

Transjakarta Drivers	TOTAL	Female	Male
Regular Buses	1184	25	1159
Transjakarta Cares	20	1	19
Tourism Buses	35	9	26
TOTAL	1204	35 (2.9%)	1239 (97.1%)

Table 3 Number of Transjakarta Driver Disaggregated by Sex

Generally, as indicated above, the percentage of female staff and female drivers are really low. The table above shows a (very) small percentage of female staff and drivers in Transjakarta corporation. Female drivers are only 2.9% or 35 people, and male drivers are 1239 people or 97.1%. Meanwhile, the overall leadership position database, such as Division Unit and Department Heads, are not sex-disaggregated, let alone indicating disabilities. Therefore, it would be challenging to do GESI analysis upon it.

Most recent Transjakarta customer satisfaction surveys (2018) indicated the increased customers (passengers) satisfaction compared to the year 2017. Some aspects were questioned during the study, such as going to the bus stop, getting into Transjakarta bus stop,

ticket purchase, waiting time, bus arrival, travel to the destination, reaching the destination, and going out from the bus stop. The survey found out that most TransJakarta customers are young females aged between 20 and 30 years old, and they are mostly working for private sectors.

Generally, customers are satisfied with the availability of facilities for disabled, elderly, and pregnant mothers to reach the bus stop. The survey identified issues on accessibility for vulnerable groups (people with special needs), among others, the most significant gap is observed in bus stop accessibility for special needs passengers. Also, the survey indicated that comfort for passengers with special needs achieved a lower score, even though it is considered essential.

Based on the statistics, TransJakarta services are improving year by year. However, the survey also captured unique and different needs of male and female customers and especially customers with special needs such as people with disabilities. The survey does not necessarily reflect the opinion of the customers' group with special needs. Therefore, a specific survey for women and people with disabilities should be held soon. It will be contributing to the more comprehensive information on the special and different needs between male and female customers as well as persons with disabilities.

As a BRT system, most of TransJakarta stations are located in the road median with a dedicated bus lane, especially for the BRT services. Due to the heavy traffic, which is dominated by private vehicles, most of the TransJakarta stations are facilitated with the footbridge facilities rather than direct level crossings. It is common to witness that many footbridges in TransJakarta stations are not built by considering the needs of people with disabilities, particularly for those who have physical impairments. Some footbridges are installed with stairs, and often it is not provided with lifts or any ramps. Therefore, to cater to the needs of people with disabilities in accessing TransJakarta services, 53 stations are made for people with disabilities. While the concept of disabled-friendly stations may be broader than just removing physical barriers in the station, these stations are claimed as disabled-friendly stations because of its accessibility. These disabled-friendly stations have more direct access to the station, and often it is provided with a ramped bridge and direct crossing facilities. Below is the location of the TransJakarta disabled-friendly stations.

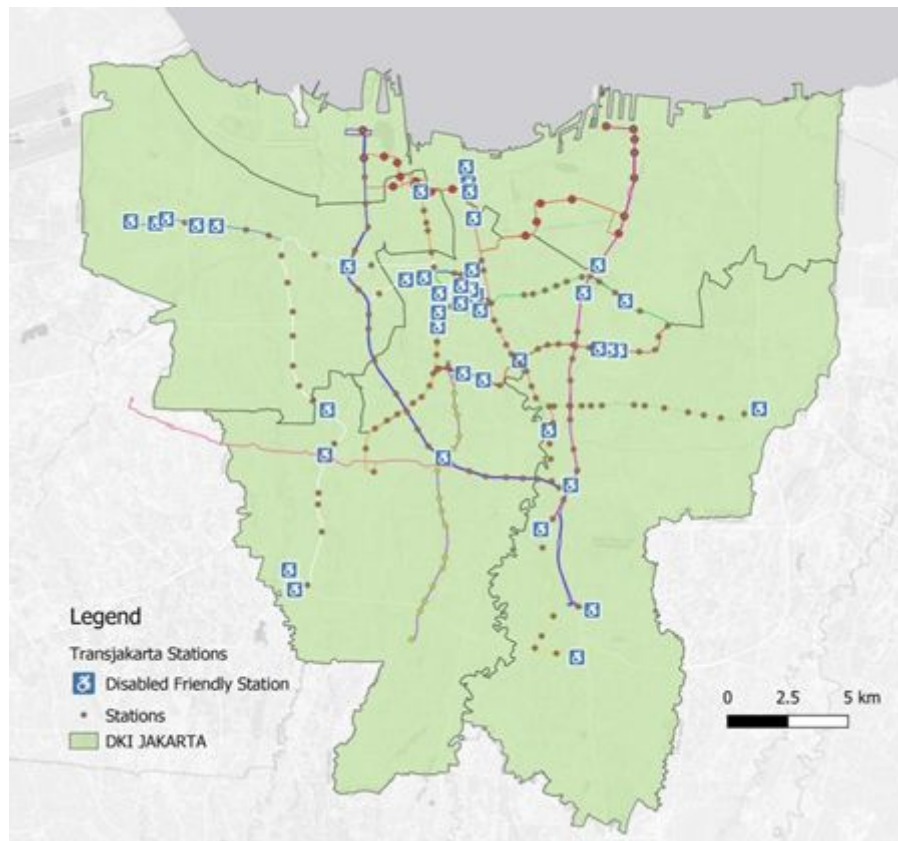


Figure 19 Location of Disabled Friendly Stations in Transjakarta

In 2016, Transjakarta launched a special transport service called Transcare. This service aims to help people with disabilities to access Transjakarta stations with a minibus without any cost. To use this service, the customer has to book the service one day before. Transjakarta will provide the minibus with the dedicated staff, which will help the customers to get into the minibus. Currently, Transjakarta has equipped Transcare with 26 units of the fleet. The service becomes more accessible for people with disabilities, and in 2019, the Transcare was recorded to carry more than 51,400 customers.

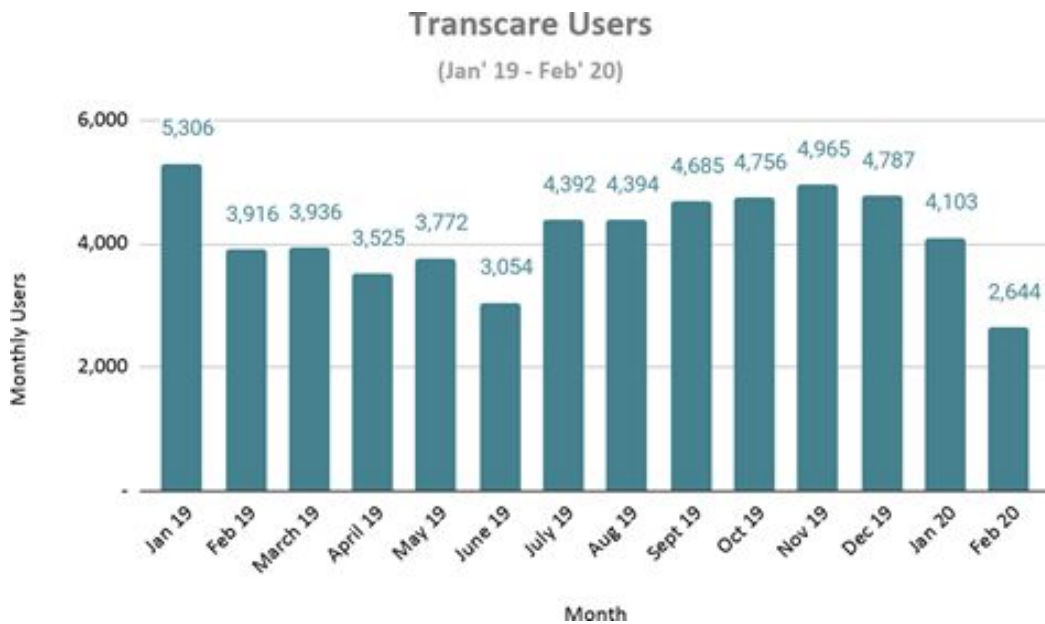


Figure 20 Number of Transcare Users in 2019

To achieve social inclusion in the city, the Government of Jakarta has issued the Governor Regulation No 160/2016 regarding the Transjakarta free services. This regulation initially targeted ten categories of people who are eligible to access Transjakarta services without any cost. Currently, the law has been updated with Governor Regulation No 133/2018. The number of categories of people who are entitled to receive the Transjakarta free card has increased to 15 groups. Those who are eligible to receive this card are stated in the regulation, including people with disabilities, affordable housing inhabitants, elderly, civil servants, and low-income groups. This intervention has successfully encouraged more people to use public transport, especially for those who have financial constraints. Transjakarta recorded 6,862,533 usages of this card in the year 2019. This number has increased by 21.6% compared to the data in 2018.



Figure 21 Number of Transjakarta Free Card Users

Rail-based Transportation

Currently, two institutional bodies are responsible for managing the rail-based transportation system in Jakarta. The first one is PT Kereta Commuter Indonesia (KCI), a subsidiary of PT Kereta Api Indonesia (KAI), which is managed by the National Government. Established in 2008, PT KCI has operated the largest rail network in Greater Jakarta called the Commuter Line. The Commuter Line is a rail network in the Jakarta Metropolitan Area and some neighboring areas, such as West Java and Banten, stretching more than 418 km with 80 stations.

The second one is the systems that are owned by the Government of Jakarta. Currently, there are two rail networks under the Government of Jakarta, namely MRT Jakarta and LRT Jakarta. These two railway systems are seen as the modernization of railway development in Indonesia.



Figure 22 Current Rail-based Transport Network in Greater Jakarta



Figure 23 Future Rail-based Transport Network in Greater Jakarta

Mass Rapid Transit (MRT) Jakarta

MRT Jakarta and LRT Jakarta have their operators who are responsible for complying with the minimum service standards which are set by the Government of Jakarta through Jakarta Transport Agency. MRT Jakarta is operated by PT MRT Jakarta, a regional-owned enterprise which was established in June 2008. The construction took around six years since its first groundbreaking in October 2013 and finished in March 2019. The North-South corridor was chosen as the first phase of MRT Jakarta. The entire line is 15.7 km, which consists of seven elevated stations and six underground stations, serving people from the South of Jakarta to the Central Business District (CBD) area in city central.

MRT Jakarta Information	
Operator	PT MRT Jakarta
Route Length	15.7 KM
Number of Stations & Depot	Seven elevated stations Six underground stations One depot
Operational Hours	05:00 - 24:00
Headway	Peak: five minutes Off-peak: ten minutes
Number of Trainsets	16 train sets Six carriages for each train sets
Operational Speed	80 - 100 kph
Train Capacity	1,800 / train sets
Fare	Station-based IDR 4,000 - 14,000

Table 4 Basic Information of MRT Jakarta

The first commercial operation of MRT Jakarta started on the 1st of April 2019. Since then, the daily ridership has fluctuated between 73,000 and 94,000, which has passed the target ridership of 65,000 regular passengers. Unfortunately, due to Covid-19 outbreaks, the MRT Jakarta is also suffering the sharp fall on its ridership level. The Graph shows the number of MRT Jakarta from April 2019 - April 2020.

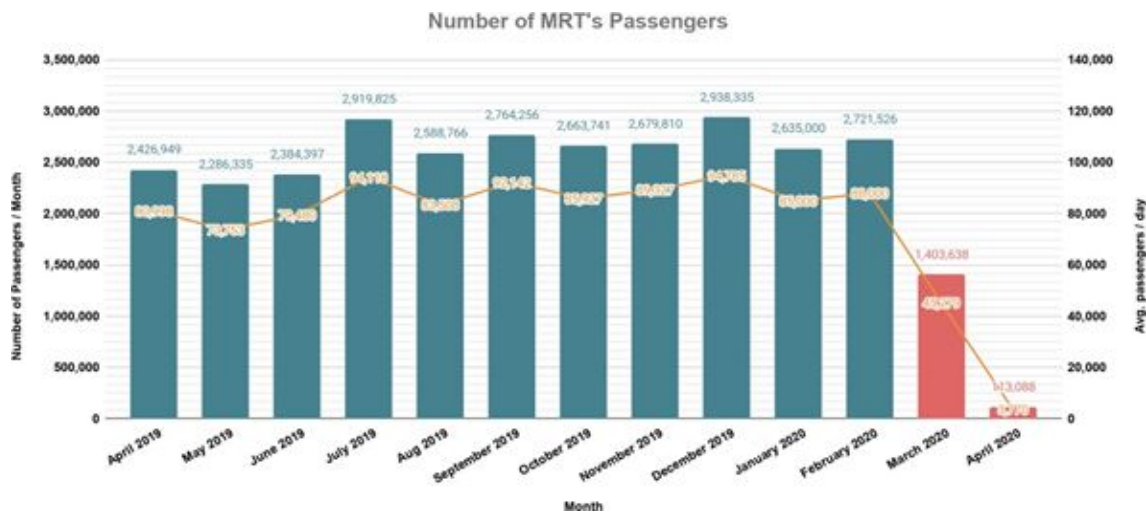


Figure 24 Number of Passengers in MRT Jakarta

In the year 2017, the Government of Jakarta issued Governor Regulation no 53 of 2017, regarding the assignment of PT MRT Jakarta in implementing the infrastructure and facilities of mass-rapid transit. This regulation becomes the legal basis of PT MRT Jakarta to build, operate, maintain, and expand the business of MRT Jakarta. In particular, the law will also clarify the role of PT MRT Jakarta in regards to their responsibility to manage the future development of MRT Jakarta. According to the Regional Spatial Plan, the future of MRT Jakarta will expand to East-West corridors which connect Ujung Menteng and Kembangan.

Light Rail Transit (LRT) Jakarta

Another rail-based transport system which is owned by the Government of Jakarta is LRT Jakarta. Adopting the light rail transit (LRT) system, LRT Jakarta was built to tackle congestion problems in the suburban area of Jakarta, especially in East Jakarta. In the year 2017, PT Jakarta Propertindo, a regional-owned enterprise which was established in the year 1960, was chosen to implement the LRT project in Jakarta under Governor Regulation no 154 of 2017. The construction of the first phase was started in June 2016 with the initial target to be finished before the Asian Games 2018 event. However, the construction phase was not running smoothly due to several issues such as land acquisition and weather conditions, this project failed to be launched in August 2018, and it was delayed until June 2019.

The first phase of 5,8 Km line has six elevated stations that connect commuters in Kelapa Gading and Pulo Gadung. Considering the network is still limited in terms of operational coverage, both LRT Jakarta and Transjakarta operators agreed to integrate the LRT services with Transjakarta routes by creating a direct connection such as a footbridge in Velodrome stations. In total, 17 Transjakarta routes overlap with LRT Jakarta stations.

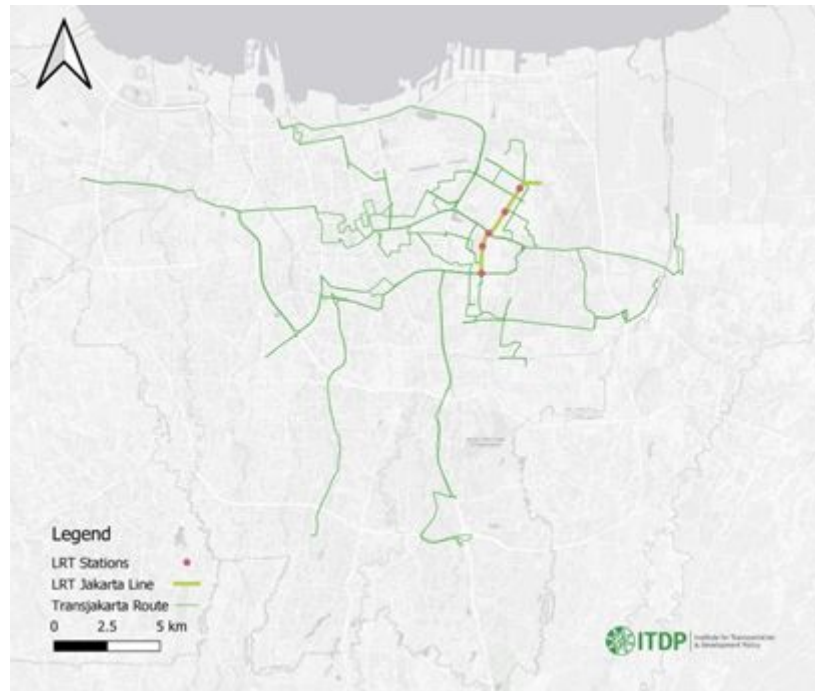


Figure 25 LRT Jakarta Network

In December 2019, LRT Jakarta was opened commercially with a flat fare based system (IDR 5,000). In the first month, it was recorded that 145,897 people used the service. The data trend in the first three months tended to be stable in around 4000 passengers per day. However, due to the Covid-19 pandemic situation, the passengers' data has decreased by about 95%.



Figure 26 Number of Passengers in LRT Jakarta

According to Regional Spatial Plan 2030, the future LRT corridor will be extended to connect West Primary Center Area (Kawasan Sentra Primer Barat) in Joglo and East Primary Center Area (Kawasan Sentra Primer Timur) in Pulogebang.

Urban Development in Jakarta

As it is mentioned in the Regional Spatial Plan 2011 - 2030, the Government of Jakarta has estimated that there will be 12,500,000 people living in Jakarta in the year 2030. To equally share the distribution of people across all Jakarta regions, the Government of Jakarta has set the share target of people distribution in Jakarta, which will become as follows:

- 9,2% will be distributed in Central of Jakarta
- 18,6% will be distributed in North of Jakarta
- 24,1 will be distributed in East of Jakarta
- 22,6% will be distributed in South of Jakarta
- 25,3% will be distributed in West of Jakarta
- 0,2% will be distributed in Kepulauan Seribu

In this plan, the Government of Jakarta highlighted the main components of the Regional Spatial Plan that will be separated into two central activity categories, namely primary and secondary central activities area, which are directly connected to transit points.

No	Area	Central Activities Area		Land Use
		Primary	Secondary	
1	Medan Merdeka	√		Government Area
2	Mangga Dua	√		Trading Center
3	Bandar Kemayoran	√		Exhibition Center and Business Information
4	Tanah Abang	√		Trading Center
5	Dukuh Atas	√		Offices, Trading, and Service Center, Transit-Oriented Development (TOD)
6	Setiabudi	√		Offices and Financial Service Area

7	Manggarai	v		Offices, Trading, and Service Center, Transit-Oriented Development (TOD)
8	Sentra Primer Barat	v		Government, Offices, Residential, Trading, and Services
9	Sentra Primer Timur	v		Government, Offices, Residential, Trading, and Services
10	Tengah Pantura Zone	v		New Commerce Centre, Trading, MICE and Financial Services
11	Special Economic Zone Marunda	v		Industrial Area and Warehouse connected with Port
12	Glodok		v	Electronic Trading Zone
13	Harmoni		v	Offices, Trading, and Service Center Transit-Oriented Development (TOD)
14	Senen		v	Offices, Trading, and Service Center Transit-Oriented Development (TOD)
15	Jatinegara		v	Trading and Services Zone
16	Kelapa Gading		v	Trading and Services Zone
17	Blok M		v	Central Transit Hub Transit-Oriented Development (TOD)
18	Grogol		v	Central Transit Hub Transit-Oriented Development (TOD)
19	Pramuka		v	Government and Tourism Zone

Table 5 Development Areas in Regional Spatial Plan

According to the plan, it is stated that Transit-Oriented Development (TOD) will be playing an essential role in reshaping Jakarta's urban development. As it is commonly known that Jakarta has been suffering massive congestion for the past two decades, it is believed that TOD can help the cities to reduce the congestion level by centralizing the city's economic area in the mass transit points. Eight TOD principles are highlighted by ITDP, to achieve a thriving TOD city, namely walk, cycle, connect, transit, mix, densify, compact, and shift.

To accelerate the implementation of TOD programs, both national policymakers and the Jakarta government have set up the policy packages regarding the implementation framework of the TOD program in the Greater Jakarta Area. In total, there will be 25 mass transit stations which are proposed by the National Government and Jakarta Government through Presidential Regulation No. 55/2018 and Governor Regulation No. 140/2017.

No	Locations	Legal Basis	Responsible Body
1	TOD Kampung Rambutan	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
2	TOD Blok M	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
3	TOD Lebak Bulus	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
4	TOD Dukuh Atas	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
5	TOD Tanjung Priok	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
6	TOD Grogol	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta

7	TOD Rawa Buaya	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
8	TOD Jakarta Kota	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
9	TOD Cawang – Cikoko	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
10	TOD Pasar Senen	Presidential Regulation No 55 of 2018	Ministry of Transportation Ministry of Spatial Planning Government of Jakarta
11	TOD Tanah Abang	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
12	TOD Tanjung Barat	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
13	TOD Stasiun Juanda	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
14	TOD Harmoni	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
15	TOD Mangga Dua	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
16	TOD Manggarai	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta

17	TOD Cibubur	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
18	TOD Pancoran	Presidential Regulation No 55 of 2018	Ministry of Transport Ministry of Spatial Planning Government of Jakarta
19	TOD Bunderan HI	Governor Regulation No 140 of 2017	PT MRT Jakarta
20	TOD Dukuh Atas	Governor Regulation No 140 of 2017	PT MRT Jakarta
21	TOD Setiabudi	Governor Regulation No 140 of 2017	PT MRT Jakarta
22	TOD Bendungan Hilir	Governor Regulation No 140 of 2017	PT MRT Jakarta
23	TOD Istora Senayan	Governor Regulation No 140 of 2017	PT MRT Jakarta
24	TOD Blok M (MRT station)	Governor Regulation No 140 of 2017	PT MRT Jakarta
25	TOD Lebak Bulus (MRT station)	Governor Regulation No 140 of 2017	PT MRT Jakarta

Table 6 Transit Oriented Development Plans in Jakarta

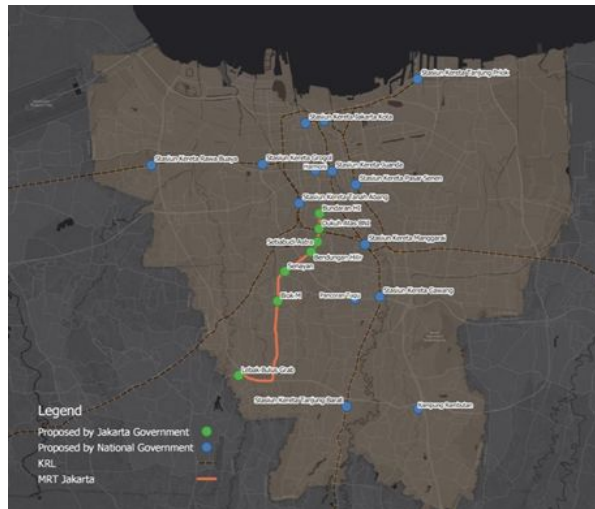


Figure 27 Proposed TOD Locations in Jakarta

To follow up on this plan, in December 2019, there was a Memorandum of Understanding (MoU) signed between the National Government and Jakarta Government through PT KAI and PT MRT Jakarta. In the agreement, both parties have decided to collaborate in the implementation of station revitalization with TOD concepts. The agreement also established PT Moda Integrasi Transportasi Jabodetabek (PT MITJ), a joint venture which has a role in executing these TOD programs.

Four stations are chosen as the first implementation projects, namely Tanah Abang, Sudirman (Dukuh Atas), Juanda, and Pasar Senen. This project focuses on improving intermodal integration facilities within the station areas such as improvement of Transjakarta bus stops, online motorcycle taxi shelter points, auto-rickshaw layby, and pedestrian pathway improvement. Currently, the construction phase of these four stations has been finished, and the government of Jakarta is in the process of discussing future development in other stations.



Figure 28 Pasar Senen Station

4. Discussion of Transport Policy

Based on the previous section, several gaps are needing to be addressed by the government and other stakeholders. This discussion section focuses on gaps and critical reviews from transport policies and situations in Indonesia, especially related to e-mobility. It discusses several issues considered in the current policies and circumstances, such as institutional setup, general transport policy, environmental and fuel policy, fiscal policy, non-fiscal policy, charging infrastructure policy, and gender and inclusivity policy.

Institutional Setup

According to the institutional review above, there is a significant gap in the institutional setup for electric vehicles in Indonesia. Although there are some initial steps, the Coordination Team regulated in Presidential Regulation No. 55/2019 has not made any noteworthy progress since its inception. The Coordination Team is supposed to initiate development on electric vehicles, such as policy-making in ministerial levels or city levels. However, the progress of the Coordination Team has not been significant enough to support the deployment of electric vehicles, especially electric buses.

As a result, there is no national ministry that has introduced any specific regulations to give more understanding of the acceleration program of electric vehicles. There is a plan from the Ministry of Industrial introducing Ministerial Regulation to help the inception of electric vehicles, yet there is no formal regulation published. The Ministry of Finance also should have added more fiscal incentives or fiscal-related facilities to boost electric vehicle deployment. This problem is due to the lack of institutional setup and coordination.

Based on the lesson learned from China, governments at all levels attach great importance to the promotion and progress of electrification. The city of Shenzhen set up a leading group for the development and application of new energy vehicles headed by the Mayor, the Mayor directly oversees the electrification program, and various departments within the municipality are involved in the planning and implementation. The leading electrification group held regular meetings to report the transition to electric vehicles, and discuss the key issues.

- The Expansion and Reform Commission of Shenzhen Municipality has a direction from the National Development and Reform Committee of China and coordinates local execution.
- Urban Planning, Land and Resources Commission of Shenzhen Municipality classifies suitable developed and underdeveloped land and supervises locations of the charging points and stations.
- The district government supports the provision of land permits for the charging points and charging stations.

- The Transport Commission of Shenzhen Municipality facilitates the e-bus movement by granting preferential road access.
- The Financial Bureau of Shenzhen Municipality provides e-bus procurement and operational subsidy.
- Bus operation companies, Shenzhen's three public transport operators, have fully cooperated with the municipal government and actively organized the study and training of employees and drivers to complete the electric transformation.
- Grid Company. Power Grid Company Actively Transforms Distribution Network to Realize Charging Demand of Electric Buses in the City.

Compared to the institutional setup in China, there is still limited institutional commitment at the national level in the deployment of electric vehicles, let alone electric buses. The Coordination Team does not include many layers of institutions, such as public and private sectors, offering potential opportunities. Private industries, such as bus manufacturers and grid providers, are not yet being involved in the institutional setup; thus, the private sectors cannot have much impact on the deployment of electric vehicles.

In comparison to the national level, the Government of Jakarta has made a promising move in establishing a focus group since the end of June 2020. This focus group can help to monitor the development of electric mobility projects and evaluate the projects periodically. However, since the focus group only consists of government officials, no public or private sector is involved in the monitoring and evaluation process. The composition of these groups has not considered the involvement of public and private parties that can offer numerous impacts.

General Policy

Transport policy in Indonesia can be found from the national development plans. These documents have not provided enough information or direction for electric vehicle development. Both RPJPN 2005 - 2024 and RPJMN 2020 - 2024 have not covered the issues of electric vehicles in more specific ways. As a result, electric vehicles are not part of priority issues in the current planning documents.

The RPJPN set the transport sector plan to be more eco-friendly and sustainable. However, there is no clear indication that it will involve electric vehicles instead of other types of low emission transport, such as more efficient diesel vehicles and gas- powered vehicles. In the RPJMN, there is also no clear plan on how electric vehicles will take part in transportation in the coming years. Compared to the RPJPN, only a few points in the RPJMN mentioned that electric power would be involved in some ways in transportation, yet there is no exact direction.

Also, SISTRANAS produced in 2005 following the guidelines from the RPJPN has not given the right direction to electric vehicles deployment. In the effort to reduce emissions in the transport sectors, SISTRANAS prefers gas-powered vehicles as alternatives. Although SISTRANAS may not be relevant after the massive development of electric vehicles in recent

years, it has not provided a chance for electric power to be implemented in the transport sector in Indonesia.

For a local regulation, RTRW 2023 has become the main guidelines for spatial planning in Jakarta, including transportation plans. One of the positive notes written on the RTRW is that it gives a focus on the public transport sector by setting a target of 60% of the total mode of share. This target will help the Government of Jakarta to improve public transport, including Transjakarta buses. While it provides consideration for energy conservation and diversification, the document seems to lack a clear direction specifically on electric mobility.

As a shorter-term plan, RPJMD 2017 - 2022 also has provided more details on the transportation sector, even electric buses. The planning document is one of the documents directly bringing the issues of electric buses as alternatives. The plan also gives more information about the size of electric buses that will be deployed. However, there is no exact target when and how electric buses can be introduced in Jakarta. The fact that no clear goal is set indicates that the deployment of electric buses is still out of sight.

Nevertheless, RITJ, as the transportation guidelines in the Greater Jakarta area, has provided more detailed information on transportation and electric vehicles. One of the strategies included in the RITJ is to develop the dedicated electric vehicles area in the CBD areas. Even though there is no exact target of deployment date or plan, the strategy can be a good starting point. The local government, such as the Government of Jakarta, Bogor, Depok, Tangerang, Bekasi, and surrounding areas, should follow up on this strategy to be implemented soon.

Environmental and Fuel

Electric mobility issues have not been a strong focus for the Indonesian government. The umbrella regulation on electric vehicle development acceleration has only been issued recently. Even then, minimal progress has been made. Specifically concerning environmental policies, the topic of electric vehicles has been missing in most of the formal national planning and regulations. Since the government has made it clear that they are pushing towards electric vehicles adoption, integration of electric vehicles in environmental policies will add more support to its development.

Indonesia has committed to curb GHG emissions as stated in formal documents like RAN-GRK in 2011 and the NDC November in 2016. While the transport sector is listed as one of the industries for mitigation actions, electric vehicles are not mentioned as a potential solution in both documents. For instance, in the submitted NDC, the only transport-related mitigation action is the implementation of biofuels. Similarly, RAN- GRK also does not cover electric vehicle adoption as a potential measure to reduce emissions. This reality might indicate that the deployment of electric vehicles is not seen as the main alternative by the government to bring down emissions.

The same pattern is shown at the local level. For example, the government of Jakarta has introduced the Government Instruction No. 66/2019 as a strategic direction on reducing

emissions. Renewable energy sources are in line to be incorporated in the public assets, such as official buildings. Yet, this instruction does not discuss electric vehicles (including electric bus) adoption as part of solutions. Although there is a restriction for fossil fuel usage, the direction for alternative energy is still unclear since it can come from compressed natural gas (CNG). Incorporation of electric vehicles in national and local-level strategies to reduce emissions will provide a good foundation and guidance towards accelerated adoption.

In conjunction with that, supportive policies related to fuel could also put pressure to disincentivize fossil fuel usage, thus favoring cleaner fuel or technologies, including electric vehicles. In general, fuel-related policies could aim for emission intensity reduction or energy efficiency improvement. For the former, a shift towards less emissive fuel is an alternative. In that aspect, both biofuels and electric vehicle development have already been initiated by the government. However, the government has yet to issue a fuel economy standard for the latter.

The EURO 4 emission standard adopted by the government would cover most of the emission of pollutants, including nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbon (HC), and particulate matter (PM). However, it does not directly measure carbon emissions. Thus, the CO₂ emission standard or fuel economy standard needs to be established separately from the Euro standard. Several studies have concluded that the implementation of fuel economy or CO₂ standards in the EU and the United States would significantly increase EV market uptake. As electric vehicles possess considerable fuel economy advantage over conventional vehicles, ambitious fuel economy targets would force manufacturers to introduce more electric vehicles in the fleet. For Indonesia, this instrument could impact two fronts: oil consumption saving and GHG emission reduction.

In the United States, federal and California GHG emission and efficiency standards that get progressively more stringent are perhaps among the essential general drivers for electric vehicles over the long term. As the standards gradually lower carbon dioxide (CO₂) emissions by approximately 4% per year, new vehicles are pushed toward greater efficiency and eventually — from 2020 and beyond — toward advanced technologies, and potentially electric-drive. Automakers are motivated to sell electric vehicles because of their very low carbon emissions, as well as additional regulatory

incentives like zero gram-per-mile CO₂ accounting and “multiplier” credits that count each of these vehicles as more than one vehicle. The adopted regulations are projected to require that electric vehicles make up about 2% of new 2025 sales for fleet-wide compliance. To date, almost 90% of the global light-duty vehicle market is already subject to fuel economy regulation.

In summary, this study attempted to answer the question of whether or not the implementation of CAFE regulation would help the transformation of the U.S. transportation sector by encouraging greater EV adoption. For this purpose, the focus of this study was primarily on the modeled consumer agents and their behaviors. Given the results of the analyses, it can be concluded that the CAFE regulation, whether implemented alone or in conjunction with another policy, e.g., government incentives, is indeed an effective policy

solution that does increase the adoption of EVs. The findings of the study reveal that CAFE standards enable the volume expansion of the AFV market in the US.

Based on historical manufacturer CO₂ emission data and assumptions about technological potentials for conventional vehicles, we measured the impact of the European fuel economy standard on EV market uptake. Our results show that ambitious CO₂ reduction targets will require significant EV sales share.

Based on the findings from the US above, the deployment of electric vehicles will improve the reduction of carbon emissions with the help of stringent emission control. However, there is no significant advancement in these issues, particularly on the regulatory sides and emission control.

Fiscal

The government of Indonesia has only introduced limited fiscal incentives on electric vehicles. Presidential Regulation No. 55/2019 has given a lot of opportunities for electric vehicle development by setting an acceleration program of battery electric vehicles. Yet, supporting policies focusing on the program details are far from sufficient. Additionally, there is no detailed guidance on how to develop electric vehicle industries from related ministries.

On the national level, Government Regulation No. 73/2019 sets the luxury sales tax exemption for battery electric vehicles. The Government of Jakarta also has moved forward in helping electric vehicle deployment. In Jakarta, Governor's Regulation No. 3/2020 states that there will be no vehicle ownership transfer fee (BBNKB) for battery electric vehicles. This incentive is quite significant since BBNKB in Jakarta is 12.5% of the vehicle price.

Although there are already several incentives put in place, as mentioned above, more financial support is still needed, especially for consumers. Several manufacturers are currently waiting for more derivative regulations, especially related to financial incentives to come. Thus, other implementing regulations are necessary to bring down the upfront purchase price of electric vehicles mainly. For example, additional taxes, such as import duty, annual vehicle tax, and value-added tax (VAT) could also be removed or reduced. This type of charge is crucial since the estimated purchase price of electric vehicles in Indonesia could be around three times the price of average conventional vehicles. According to a forecast model developed by IESR, the purchase price of electric vehicles would need to be cut down 45% to achieve the penetration target set by the government by 2025. Therefore, an exemption from sales luxury tax and BBNKB will not suffice, more fiscal incentives would be required. The government could implement exemption from import duty, VAT, and annual vehicle tax in the early years. Afterward, to make up for the lost revenue, the fees for EVs could be incrementally reintroduced while at the same time increasing the taxes for conventional vehicles.

In addition to that, incentives to cut down the operational cost of EVs would also attract consumers. Apart from pressing the high upfront purchase price, providing a financial incentive for daily use of EVs is also found to be effective in increasing EVs sales]. Therefore,

charging tariff discounts or reduced off-peak charging tariffs could also be introduced by the government. As a supplement for the automotive fuel tax imposed by the government, carbon pricing for fuel could leverage EVs' position in the market. High-emitting fossil fuels would be penalized with a higher price from this measure. As a benchmark, ICCT already has a recommended figure, which is USD 50/ton CO₂ by 2030.

A successful international experience like in Norway also puts a significant amount of incentives forwards before the market could finally shift towards electric vehicles. As more manufacturers get more interested in investing, the market would be ready to absorb the supply of EVs with sufficient incentives prepared. The Government of Norway provides fiscal incentives in the form of registration tax exemptions, VAT exemptions, exemptions from road toll charges and reduction of annual vehicle licensing fee. Norway's total incentives amount to around USD 12,600 - 21,000 per vehicle. Similarly, China also managed to cut down up to 50% of EVs purchase price by introducing a subsidy scheme based on different EVs driving range. The United States also put up fiscal incentives for its consumers, mainly as a tax credit of up to USD 7,500. Overall, it can be inferred that significant financial incentives are paramount, especially for new electric vehicles adoption. Therefore, the Government of Indonesia has to invest in more fiscal incentives early on if it is to accelerate EVs adoption.

Non-fiscal

Non-fiscal policies have been proven to be impactful for electric vehicle penetration if implemented correctly. In some cases, it could even be the key factor driving the success of EVs adoption. However, until now, the provision of which is still scarce at both national and local levels. Choosing the correct non-fiscal incentives will be essential for the early stage of electric vehicle development. There is no current specific national policy covering the non-fiscal incentives following the Presidential Regulation No. 55/2019. However, on the city-level, Jakarta has allowed battery electric vehicles to pass through odd-even zones. Besides that, no other non-fiscal policy instruments have been issued.

In other countries that have started adopting electric vehicles before Indonesia, this type of incentive could include access to special lanes, access to zero emissions areas, exemptions from toll charge, free parking, and others. When used effectively, it can be an influential tool to shift consumers towards electric vehicles. For instance, in China, where there is a strict quota on the number of registered vehicles, electric vehicle registration is given priority. Several cities in China impose lotteries on vehicle license plates. Thus the chance to own a vehicle is quite small. With the high demand for passenger vehicles, many consumers shift to EVs given the preferential license plate registration that it possesses. Other than that, Norway also allows free parking and exemption from toll charges for EVs. All of these non-fiscal incentives amount to around USD 2,500 per year for EV users. Access to special lanes is also enjoyed by EV users in several cities in the United States. More specifically, electric vehicles are allowed to use the high-occupancy vehicle (HOV) zones. This measure, along with free parking, manages

to attract more consumers into buying electric vehicles. Studies suggest that 25% to 50% of increased EV sales in the respective regions is caused by access to HOV lanes.

Learning from the experiences from several countries above, Indonesia should also introduce non-fiscal incentives as they do not cost as much as fiscal incentives, yet they can be very impactful. Local/city governments have to play more part in this since every region has its characteristics. The policymakers would need to look at local travel patterns, regulatory environment, and consumer preferences to determine the most suitable non-financial incentives for the region. Jakarta has already made a good start by exempting EVs from odd-even policy, but they could look to add other potential alternatives to make EVs more compelling. Options like putting a ban on conventional vehicles and prioritizing EVs, free parking, and creation of zero-emission zones could be assessed further by the city officials. Other cities could then learn and strategize based on their conditions.

Additionally, public education could also be considered as an incentive to drive consumers' awareness of electric vehicles, as mentioned before. In the current situation, there are no educational plans to promote the awareness of electric vehicles among the public in Indonesia. No formal education covering exclusively on electric vehicles technology and development is also available in Indonesia as the means of boosting the positive perception of electric vehicles.

Charging Infrastructure

The Government of Indonesia has set several charging infrastructure policies for electric vehicles. Based on Presidential Regulation No. 55/2019, the government can bring incentives for charging infrastructures in many forms, including manufacturing incentives, fee reduction of charging, and financing support. Unfortunately, none of these incentives is discussed further in detail. There is no other supporting policy explaining extensively on any incentives for charging infrastructures. Furthermore, this target set by PLN is considered inadequate according to a study conducted by IESR to achieve the desired electric vehicle level of penetration as planned by the Ministry of Industry.

PLN calculated the number of needed charging stations based on the estimated number of electric vehicles that might be around in the future. They predicted approximately 25,000 electric vehicles might be sold in 2025, thus arriving with 2,465 new charging stations that must be developed in that year. This figure is considerably lower than the target set by the Ministry of Industry, which expects around 400,000 electric vehicles to be sold in 2025. Hence the planned number of charging stations is still far from reaching the original target. PLN needs to reassess the plan and match the target set by the government. Charging infrastructure has been proven to be a determining factor in eliminating range anxiety within consumers, thus ramping up EVs sales. A significant number of charging stations need to be built, especially in the early stages of EVs development. A ratio below 16 for the amount of EVs to the number of refueling stations could be used. IESR also recommends this figure in the ambitious scenario in achieving the targeted penetration.

Several impeding factors still currently exist in the development of the charging infrastructure. One of the most striking factors would be the high upfront cost of charging infrastructure, particularly for DC fast chargers. This condition hinders PLN and primarily private sectors in investing in charging stations. Furthermore, the current business models offered by PLN to the private sectors are still unattractive. Tariff setting and incentives play a vital role in that. Charging tariff needs to be optimal for both investors and consumers. It needs to be high enough to draw in investment, yet not too high as to keep out consumers. One solution to this could be tariff subsidy or upfront grants provided by the government for private sectors looking to invest. Another supporting factor would be to develop innovative business models to elevate the economic benefits of the investment.

In addition to the current problem, there is still no consensus for the charging standard to be used in public charging stations. This issue correlates to the costs of the investment itself. The more charger types allowed in the charging stations, the more fees it is going to have. However, sticking to a particular standard could impact the overall adoption of electric vehicles, since several EV brands could be charged only with specific criteria. The government needs to optimize those factors before coming into a decision.

Finally, there is simply a lack of public awareness regarding electric vehicles and their charging infrastructure in Indonesia. To tackle this problem, the government could use public transportation as a way to introduce electric vehicle technology to the public.

Therefore, bus electrification pilot programs could be pushed to be implemented in many major cities across the country. In conjunction with that, with the growth and potential of ride-hailing platforms, the government could also incentivize them to adopt electric vehicles into their fleet.

Gender Equality and Social Inclusion

Gender equality and social inclusion topics will always be taking part in transport development. Laws No. 8/2016 stated that it is mandatory in Indonesia to provide proper accessibility and remove all potential barriers in all public facilities, including transport infrastructure. While these sets of GESI-related policy packages are still rare in the implementation, the needs of putting GESI aspects in the future e-mobility policy is highly reasonable.

The other policy gap in GESI aspects is the lack of national-level regulations supporting the issues. The fact that the Presidential Instruction No.9/2000 is still the primary national policy reference is worrying since it may not have a relevant context to the condition of GESI aspects today. Ministerial Regulations, such as the GESI-related regulation produced by the Ministry of Finance and other ministries, will not be enough to provide intense supervision to get awareness from stakeholders.

The GESI related policy gaps were identified in the above discussions. National and subnational regulations merely mentioned general gender and social aspects of women,

elderly, and people with disabilities in TransJakarta and the feeders. However, a different needs approach in meeting the specific needs of these groups is not yet provided in the current regulation and policies. At the corporate level, TransJakarta is not, however, a GESI responsive corporate due to no female in the BoD and BoC and no sex-disaggregated data in the HRD database to monitor the gender equality level.

Moreover, no data of people disabilities are hired in TransJakarta as laws require it. In this discussion, it is right to say that e-mobility deployment in Indonesia will bring lots of benefits to reducing transport emissions problems. However, the government of Indonesia also needs to consider the broader social impact that can be achieved with this intervention, such as more access to jobs, improving accessibility for people with reduced mobility, and reducing gender inequality issues.

5. Policy Recommendation

After reviewing the gaps in the policies and data, several recommendations can be implemented by stakeholders in Indonesia. The government in Indonesia, both at national and city levels, will be the most influential stakeholders in implementing the recommendations. The support from the public and private sectors is crucial to be incorporated into the implementation.

Local and national government organizations in Indonesia have a massive opportunity to accelerate electric vehicle adoption by developing a suite of e-mobility policies. In this report, e-mobility policies are categorized as fiscal, non-fiscal, charging infrastructure-related, and gender and inclusivity related. Each of these policies is explored in more depth below.

Developing Supporting Policies in Indonesia

Based on the policy gaps explained above, there are several supporting policies needing to be introduced in electric mobility deployment. All supporting policies vary from institutional issues to gender aspects. Existing policies should not be enough without the introduction of these supporting policies recommended in this section. The recommended supporting policies should be in place to accelerate the implementation of electric mobility in Indonesia.

Institutional Setup

The policy structure should have a robust system to support electric vehicles. It will be helpful to start the institutional setup encouraging development of electric vehicles. Institutions can be from the government or the authorities that will exclusively focus on electric vehicle deployment.

The Coordination Team regulated on Presidential Regulation No. 55/2019 is a good starting point, yet there is still more to do from the team. The team should start to create more detailed policies, especially encouraging ministries to bring specific laws and regulations, develop a roadmap of implementation, and set more specific goals. The inclusion of private and public institutions in the Coordination Team or other focus groups will give a lot of opportunities for discussion of electric vehicles.

In support of the Coordination Team at city levels, the city government should consider establishing the city coordination team of electric mobility deployment. The city coordination team has local advantages and experiences to implement the electric mobility concept at the city level. Regional public, private, and governmental sectors should take part in the city coordination team to achieve the city's electric mobility goals also targets.

In Jakarta, the city government has introduced the focus group that can help in monitoring the development of electric mobility. Nevertheless, the focus group should be open for public and private institutions instead of government officials only. Public and private institutions,

including communities and local industries, will potentially bring more experiences and knowledge to maintain and evaluate the deliverables of the electric mobility projects.

Environmental and Fuel

According to the national fuel regulations, the Government of Indonesia is still reluctant to pursue transportation electrification. Instead, the government's focus on CNG utilization as the alternative to petroleum is apparent in numerous legislative documents, such as KEN and RUEN. Electric vehicles should become the top of the mind in the transition to a sustainable mode of transportation. The transition from fossil fuels to electric vehicles does not have to be instantaneous, but it must be included in every legislation covering sustainable energy for the transport sector. The use of gas energy in the transport sector will not be viable enough compared to electric power.

A carbon tax also can become one of the effective options to reduce our carbon emissions. Currently, there is no carbon tax involved in the fossil fuel industry, creating a dependent market on this type of energy source. By introducing a sufficient carbon tax on fossil fuels, electric energy can be a sensible alternative to the market; thus, it will boost the usage of electric power, including in the transport sector. A carbon tax can bring less incentive for the public and the industry to use fossil-fuel-based vehicles in the transition to more sustainable vehicles, such as electric vehicles.

Setting continuous GHG emission and efficiency standards is also considered to be a priority since studies have proven that strict standards would force manufacturers to deploy more EVs in their fleet. Using this instrument would then create a supply of electric vehicles that could further entice consumers to shift towards electric vehicles. As have been previously experienced by other countries, the availability of different electric vehicle models is a reliable driver of EVs adoption. As of now, the Government of Indonesia does not have a fuel economy standard for vehicles. Introducing it would create another driving force for electric vehicles as well as controlling oil consumption of the nation.

Fiscal

From existing regulations, fiscal policies have been introduced, yet there are gaps to be filled, especially by the government. The introduction of sales tax incentives and vehicle ownership fee incentives are useful for electric vehicle users, but other fiscal aspects are needed. Electric vehicles have high upfront costs compared to their internal combustion engine (ICE) counterparts. High upfront costs often deter new car buyers from purchasing EVs, as upfront costs are the primary consideration for vehicle purchases. Numerous studies indicate fiscal e-mobility policies play an essential role in encouraging customer adoption of EVs.

Vehicle purchase incentives are a fiscal e-mobility policy that reduces the upfront costs of EVs. These incentives include rebates, income tax credit, waivers on fees, or VAT tax. Several studies conclude that vehicle purchase incentives are most effective when applied at the time of the

vehicle purchase, rather than at a later date. For example, rebates are more effective than income tax credits because they can be claimed immediately.

Vehicle purchase incentives vary across countries, with each country framing their policies in unique ways. For example, India adopted the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) policy, which offers subsidies based on the battery capacity of the vehicle, ranging from buses and cars to three-wheelers and motorbikes. The allowance is only for vehicles costing less than 1.5M Indian rupees (\$21,177 US Dollars) and only for vehicles with advanced batteries using lithium-ion or other new technologies. In Iceland, vehicle excise duty on passenger cars is based on CO₂ emissions, measured in grams per km driven. Additionally, zero-emissions vehicles, powered by electricity and hydrogen, are exempt from VAT, which reduces the cost of EVs further. Vehicles that emit less than 80 g CO₂/km do not have to pay an import tax.

Similarly, many island nations offer 0% on the import tax of electric vehicles. However, they are still subject to the full VAT, which could keep costs higher than comparable petrol vehicles. In the United States, electric vehicles are eligible for a federal income tax credit up to \$7,500, based on the size of the battery.

As with other public policies, a vehicle purchase incentive will be more effective the longer it provides a given level of stimulus. Several policies and industry analyses from the renewable energy sector note that incentives subject to inconsistent funding streams cause markets to spike and crash.

In Indonesia, the procurement of EVs will depend on international manufacturers since there is no strong electric vehicle industry in-country yet. The import fee is one of the key elements in the cost of an electric vehicle, which can be as high as 50% of the unit price. Import fee exemption, similar to the policies in Iceland and Seychelles, can reduce the cost of EVs significantly and ease the burden on capital investment.

The VAT plays a significant impact on the cost of an EV. Although the costs are not as high as the import fee, the VAT can contribute an additional tariff of up to 10% of the unit price. Reducing or waiving the VAT would significantly lower the acquisition cost of EV, especially for potential buyers. Annual vehicle tax exemption will also be needed to attract consumers.

As have been previously, these tax exemptions should be implemented as soon as possible in this early development stage. After 2025, the taxes could then be reintroduced incrementally, including the VAT, registration tax (BBNKB), and luxury tax. Furthermore, to compensate for the lost revenue, fees could be raised by around 2.5 times for conventional vehicles, thus increasing their purchase price by about 40%. These taxes would create disincentives for standard vehicles while maintaining EVs' competitiveness.

Overall, existing fiscal incentives in Indonesia, such as sales tax and transfer fee incentives, will not be sufficient to reduce the acquisition price of EVs. Although these incentives will give a good start, other incentives have to be addressed, such as the import fee, the value-added tax, and vehicle annual tax.

Reducing operational costs of charging is another form of fiscal e-mobility policy. Any operational cost negatively affects the decision to purchase a given vehicle. Several countries have begun offering incentives at the charger to offset operational costs, including reduced rates or free charging in public areas. For example, the City of Reykjavik in Iceland offers free charging. Some companies and retailers offer free charging for employees and customers. Recently, El Salvador implemented its first EV charging station and offered free charging for the first six months. Following the first six months, the program will be re-evaluated, and higher costs may be introduced.

Electric tariff adjustment can reduce the operational cost of EVs. Currently, the electric bus operators are required to pay as much as Rp1,400/kWh (\$0.1/kWh). At this rate, for eight years of electric bus operation per unit, the operational electricity cost is Rp440,389,091 (\$31,203). The Indonesian government still has not decided on a national-standard electricity tariff that can be implemented by privately-owned charging stations. The State Power Company (PLN) currently offers a special tariff called the 'L-rate' of Rp 1,644 (\$0.12) per kilowatt-hour [kWh]. An optimal tariff needs to be determined to attract private investment in charging stations, but also keep consumers shifting towards buying electric vehicles.

Dynamic electricity pricing could be a way to draw in consumers to buy EVs. The government should look into establishing an attractive off-peak charging tariff. IESR has recommended 50% charging tariff reduction during off-peak hours in the ambitious scenario to push EVs adoption. This setting would attract more consumers as well as lowering the investment needed by PLN to upgrade their infrastructure (e.g., power capacity) due to the local power overload from the simultaneous charging of EVs during peak hours.

Carbon pricing would be an alternative to disincentivize the use of conventional vehicles and increasing EVs attractiveness. While the government has imposed 5 % of automotive fuel tax, the amount is not enough to shift consumers away from traditional vehicles. Therefore, carbon price could be imposed to account for the social costs associated with fossil fuels. For comparison, ICCT has recommended a carbon price of USD 50/ton CO₂ to be used by 2030 for the use of fossil fuels.

Another alternative would be a feebate mechanism, where the carbon price is imposed on the vehicle itself instead of the fuel. This scenario will increase the purchase price of conventional vehicles and lower the price for low-emission vehicles, including electric vehicles.

Non-fiscal

Presidential Regulation No. 55/2019 has set the non-fiscal incentives for electric vehicles. The incentives can be a form of free access, production rights, and security. However, these incentives may not bring significant benefits to the deployment of electric vehicles without more detailed programs from ministries or agencies. The government should start exploring non-fiscal incentives on electric vehicles in more practical manners.

Non-fiscal policies are policies, programs, and incentives that do not directly reduce the operation costs of EV operation but can still encourage EV adoption. Even without a direct financial benefit, any reduction in the price of travel can act as an incentive towards EVs. Some non-fiscal policies include binding EV targets, privileges at airports, and discounted tolls, parking, and ferries.

In the United States, free HOV lane access to EVs is one of four policy types that are statistically significant predictors of EV market share in the US. In Europe, free parking is a statistically significant predictor of EV adoption. Free parking is attractive for some consumers, though financial incentives and freeway charging stations are more effective in promoting EV sales. Based on an extensive range of various findings, jurisdictions should have multiple non-financial policies to provide the most impact in increasing EV adoption.

Electric vehicle deployment targets are publicly-stated targets related to the total number or fraction of new vehicle sales in a future year. Several countries have set electric vehicle targets. Malaysia set a goal of 100,000 electric cars, 125,000 charging stations, 2000 electric buses, and 100,000 electric motorcycles by 2030. The Government of India (GoI) launched the National Electric Mobility Mission Plan (NEMMP) 2020, which sets a firm target of 6-7 million sales of hybrid and electric vehicles 2020 onwards.

By 2025, in the National Energy Plan (RUEN) document, Indonesia set an ambitious target to have 2.1 million electric motorcycles and 2,200 electric vehicles on the road. However, there is a target set by the Ministry of Industry, hoping to achieve a 20% market share of EVs in 2025. This existence of different goals confuses stakeholders.

Moreover, the targets are not considered binding as of now, which reduces its power. Therefore, Indonesia can further encourage and enforce EV adoption by making these targets binding. Binding EV deployment targets can send a strong signal to automakers, utilities, investors, and consumers, providing the certainty necessary to attract investment and grow the EV market.

The odd-even policy exemption for EVs in Jakarta is already a good start. The odd- even policy has been a considerable measure to reduce the usage of private cars in Jakarta. Thus it will be better if electric vehicles can be part of the steps. Users of electric vehicles will get the incentives to use the areas regulated in the odd-even policies without any zonal restriction.

Furthermore, more creative policies are needed to attract potential EV buyers. Creating new low-emission zones that are designed for EVs and other low-emission vehicles could also be useful. Low emission zones, as regulated in RITJ 2030, is one of the programs that could be helpful to be initiated soon. CBD areas can be first places that can be expanded to other regions with packed private vehicles, such as commercial, market, or school areas. In parallel, other city governments should also start promoting electric vehicles and come up with their own set of non-fiscal policies that are suitable for their conditions.

Other potential incentives could also be explored, especially for the city-level governments, to increase adoption. This type of stimulus includes free parking, road toll charges exemption, and other incentives. While Jakarta has planned to introduce free parking for EVs, it has not

come to realization yet. Free parking has been proven to work in several countries promoting EVs, like Norway, the United States, and other European countries.

Another alternative that is proven to be important is the enactment of quota for electric vehicles for vehicle manufacturers. This supply-side incentive would be necessary to be adopted by Indonesia as EVs deployment becomes more prevalent. This policy instrument has been used by a lot of other countries, including China, the United States, and several European countries. Essentially, this policy sets a target or quota for vehicle manufacturers to have a certain percentage or number of electric vehicles in their fleet. This policy could be in the form of a mandate and has specific penalties for noncompliance manufacturers, or it could also be voluntary and that manufacturers who manage to achieve the targets would get some rewards. Studies have shown that this policy significantly increases EVs sales in China, the United States, and the EU countries. In the early stage, Indonesia could focus more on market-pull strategies to create initial demand, and then as the market becomes more ready, this policy instrument could be imposed.

In addition to the manufacturing quota, operational fleets also have impacts on the electric bus deployment. Bus operations rely on the number of buses to cater to the services to the users. The type of fleets varies depending on the requirement of the operation. In an electric bus operation, the number of fleets will impact how the operator runs the services. The government should consider the size of electric bus deployment to bring the momentum for electric mobility in Jakarta and Indonesia.

As an example, there is a lesson learned about the impact of massive electric bus fleets from China. In 2017, the city of Shenzhen electrified all public buses and all taxis by 2018. Today, China owns the largest fleet of electric buses worldwide. China began electrification as the government started to take serious action against air pollution. One electric bus is estimated to prevent the equivalent of emissions from thirty-three gasoline vehicles and save sixty tons of carbon emissions annually. Electric buses not only reduce emissions, but they also offer high-cost savings. Thanks to its electric fleet, China is estimated to save \$5 billion on oil imports each year. In California, the Antelope Valley Transit Authority saves an average of \$46,000 per electric bus compared to its diesel counterpart.

Other countries are also starting to electrify their public fleets. Several transit agencies across the United States have also begun incorporating EVs into their transportation fleets. While it seems that only developed nations have made plans for all-electric fleets, electrification has not been limited to developed economies. Several island countries, including Jamaica and Barbados, have made strides to electrify their fleets. While Jamaica is currently exploring options, Barbados will begin to operate by the end of 2019. Additionally, Barbados announced plans to have an all-electric fleet by 2030.

Fleet electrification could have major potential to increase the pace of vehicle electrification. For many, riding an electric bus could be the first electric vehicle they ride and encounter. Furthermore, the government could have little roadblocks in implementing electric fleet policy

as it could be easier for the government to support public fleet electrification through legislation.

As discussed in previous sections, education can play a significant role in the deployment of electric vehicles. Lack of educational programs in Indonesia has to be responded to by systemic strategies from the government. Education and awareness policies include a variety of different supporting programs, such as EV and charging planning programs, marketing and communication initiatives, community support programs, and other relevant policies or programs.

Even in leading regions, many people remain unaware or misinformed regarding electric vehicle availability, operation, incentives, and benefits. Leading cities, in conjunction with regional and national governments, utilities, manufacturers, and advocacy organizations, have created consumer awareness and education programs to improve knowledge and generate greater interest in electric vehicles. Since 2011, Shanghai has been designated an EV Demonstration City. It hosts an EV Demonstration Zone where businesses and visitors can learn about electric vehicles, take test drives, and discover emerging technologies. The zone is supported by manufacturers, the State Grid, universities, and the national government. Amsterdam has taken a more broad-based approach, including the promotional campaign “Amsterdam elektrisch,” electric vehicle events, highly publicized integration of electric buses and taxis at the Schiphol Airport, and a comprehensive city website with real-time information about the city’s charging network.

Proper dissemination of information increases consumer awareness of and knowledge about a policy or program that can have a more permanent impact on consumer behavior than incentive programs alone. Frequently drivers may be confused about how EVs operate and when it needs to be plugged in. In Indonesia, survey respondents indicated that they were unlikely to purchase an e-motorcycle even though 63% of respondents were aware of them. Among reasons stated, they noted a negative perception of the model, size, and readiness of charging infrastructure for e-motorcycles.

Charging Infrastructure

Charging infrastructure policies facilitate the adoption of electric vehicle supply equipment (EVSE), either through direct incentives for EVSE installation or by helping the business case of EVSE. President Regulation No. 55/2019 has stated that the government is keen to provide incentives for charging infrastructure, including installation and financing. The next step is to introduce the legal binding regulation that gives definite options for charging infrastructure providers. This regulation should also cover the operational sides, such as drivers and charging habits.

From operational sides, EV drivers can experience mild or intense range anxiety depending on the vehicle range, charging routines, and drivers’ driving patterns. For many, the lack of charging infrastructure and the cost burden for financing EVSE installation are two of the

biggest concerns regarding EV adoption. Widespread EVSE availability could help alleviate those anxieties.

Implementing policies that reduce the cost of or facilitate the installation of public or private EVSE could lessen the cost burden on individual drivers. The average price of one charging station can be as high as \$50,000. The cost of installation would further increase costs. Given this, the government or utilities can provide financial incentives to relieve the cost of EVSE. For example, in India, FAME offers funds up to 100% of project costs for charging station proposals.

The figure below shows the number of charge points per million people (left axis) and the number of electric vehicles per charge point (right axis). As shown, cities vary widely in these numbers, suggesting there is not a “best” amount of charging.

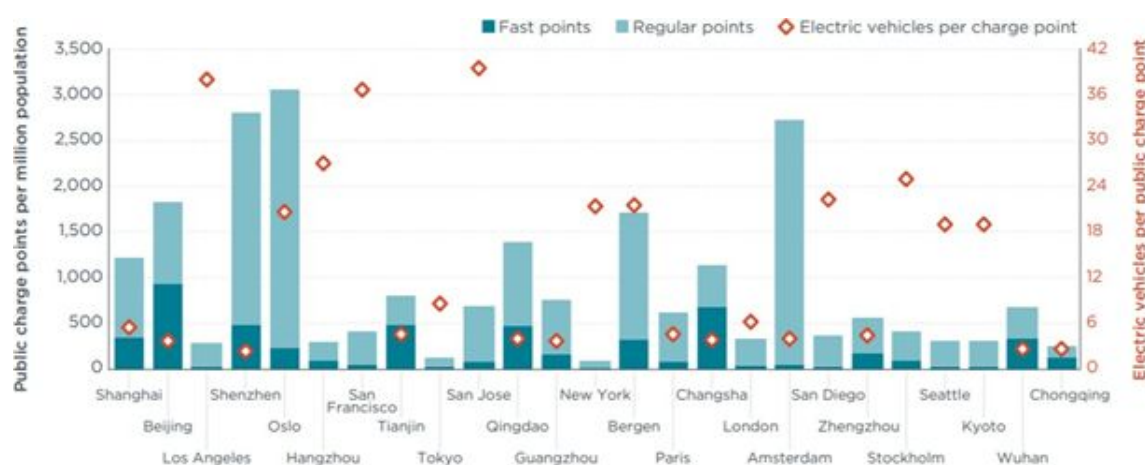


Figure 29 Electric Vehicles per Charge Point in Countries

Furthermore, public charging infrastructure availability has a significant link to EV purchases. Greater EVSE availability is related to greater EV adoption. Studies show that customers are keener to purchase an EV if they can see stations around town. In 2017, Indonesia had 1,300 electric recharging stations across 24 cities. At least 71% of them were located in Jakarta. However, this figure mainly indicates those slow chargers that are more suitable for electric two-wheelers and other electronic devices. A survey of 100 motorcycle owners showed that 81% of respondents were not confident in the readiness of charging infrastructure, and those owners were unlikely to purchase an e-motorcycle. For electric vehicles, primarily cars, there are around 57 units of charging stations installed across the country. However, this figure is not nearly adequate to facilitate the charging of targeted numbers of electric vehicles in 2020 and to increase awareness of the public.

Increasing the availability of charging stations in public places could increase the number of EV purchases. First and foremost, PLN, as the state-owned utility mandated by the government to initially provide charging stations, needs to reassess its current development target and match the target set by the Ministry of Industry. According to the study by IESR, significantly more charging stations need to be installed than what is planned by PLN to eliminate the range anxiety. However, since it would also incur a massive investment cost, cooperation with

private sectors would be crucial. Thus, developing better and more attractive business models should be a top priority for the government since the existing models are considered unattractive for investment. This issue is mainly due to the low tariff and high upfront capital cost that charging stations entail. The government could give subsidies, grants, and financing opportunities for private sectors looking to invest.

The International Energy Agency (IEA) published a report stating the need for policies to support updating building codes to promote EV readiness. An “EV Ready” building is one that has the necessary wiring and electrical capacity to sustain the future installation of EV charging stations. Countries and localities are working on implementing these code changes. For example, Iceland plans to update building codes that require charging outlets for EVs in new and renovated buildings.

Updating or drafting local building codes and zoning ordinances to support the “EV- Ready” infrastructure is necessary to address long-term planning considerations at the municipal, utility, or community level. Studies show that one of the four key barriers to widespread adoption of EVs is the permitting and construction of new electrical systems in neighborhoods and buildings.

One of the arguments surrounding “EV-Ready” codes is that in existing buildings, adding wiring to deliver electricity to a parking stall represents over half of the cost of installing an electric vehicle charger. Therefore, installing the necessary infrastructure components at the time of building construction prevents the need for post hoc trenching and repaving or increasing the electric capacity.

Gender Equality and Social Inclusion

Based on existing situations, gender and inclusivity policies are often overlooked, including in the transport sector. Presidential Instruction No. 9/2000 is arguably the only national-level regulation becoming the sole reference for gender and inclusivity issues, particularly for women. The government should put more gender and inclusivity aspects of its policy and plan to give a fair chance for everyone.

The discussions and findings in this policy paper concluded that a GESI assessment should be held towards the current policy and regulation to identify individual needs, both male and female customers, and in particular people with disabilities. TransJakarta’s corporate culture concerning GESI implementation should be improved. This move also should be initially made by a GESI assessment of the current internal policy, regulator, and HRD procedure (for recruitment and training).

The transport sector should consider bringing more inclusive infrastructure for women, children, and other vulnerable groups. Inclusive infrastructures may include more convenient access to the station, safer environment preventing sexual harassment, fair chance to work in the transport sector, etc. Easier access to the station can be the improvement of transport facilities, such as an accessible ramp, elevator, proper wayfinding, or other measures. Since sexual harassment is one of the crucial issues in the gender aspects, the provision of

transport facilities should give more security measures for women, such as lighting provision, security personnel, etc. One of the key issues in bringing women into a fair chance of work is to include women's participation in every corporate and activity.

Improving the Level of Services in Public Transport

With the support of proper policies discussed previously, the deployment of electric buses will be more impactful to the public. However, the current level of service in public transport should be improved to support the operational needs of electric buses. Electric buses are more sensitive to operations, and stakeholders need to pay more attention to the level of service in Transjakarta before the deployment.

Transjakarta has their level of service as a standard to assess the performance of the service. The table below shows the breakdown of the level of service for the Transjakarta BRT system in 2019. The Jakarta Transportation Agency annually hires a consultant to assess the performance of Transjakarta. The result for each aspect for Q4 2019 term is shown in the table below.

Aspect	Item	Criteria	Q4 2019 Score	Target
1. Security				
Station/stop and supporting facility	Security officer	2 for type A facility 1 for type B facility	100.00%	100.00%
	Security information	At least 2 stickers/information	100.00%	100.00%
	CCTV	At least 1 unit	98.89%	100.00%
Bus	Fleet identity	Route information on body Body number	99.91%	100.00%
	Driver identity and uniform	Identity card Uniform	99.48%	100.00%
	Emergency lamp	1 unit	99.94%	100.00%

	On-board officer	At least 1 person	94.70%	100.00%
	Tinted window	Maximum 60%	100.00%	100.00%
	CCTV	2 for articulated buses 1 for medium/single/maxi buses	99.26%	100.00%
2. Safety				
Human resource	Fleet SOP	Document availability	99.87%	100.00%
	Emergency SOP	Document availability	99.76%	100.00%
	Driver rest time	At least 30 minutes after 4 hours of driving	47.91%	100.00%
Bus	Fleet worthiness	Manual book, proof of test	99.96%	100.00%
	Safety equipment	Glass-breaking hammer Fire extinguisher Automatic door opener button Flashlight	96.30%	100.00%
	Health facility	First aid kit	94.40%	100.00%
	Complaint number information	Sticker information in the inside and outside	99.91%	100.00%
	Handrail facility	Available and function well	100.00%	100.00%
	Entry and exit door	Automatic operation	100.00%	100.00%

3. Convenience				
Station or stop and supporting facility	Lighting	100 lux intensity	99.26%	100.00%
	Air conditioner/fan	1 unit	99.26%	100.00%
	Cleaning staff	1 person	100.00%	100.00%
	People density	Maximum 4 people/m ² during peak hour Maximum 2 people/m ² during off-peak hour	100.00%	100.00%
	Platform gap	Minimum 10 cm	100.00%	100.00%
Bus	Lighting	Function well	99.76%	100.00%
	Load factor	Maximum capacity	99.52%	100.00%
	Air conditioner	Maximum 25 degrees of Celsius	71.81%	100.00%
4. Reachability				
Mode integration availability	Availability of the next mode of transport	At least 1 next route	100.00%	100.00%
5. Equality				
Priority seat	Availability	At least 4 for single/maxi/articulated	100.00%	100.00%

		bus At least 2 for medium bus		
Space for the wheelchair user	Availability	At least 1	100.00%	100.00%
6. Regularity				
Headway	Time arrival between bus	5 minutes during peak hour 10 minutes during off-peak hour	71.83%	100.00%
Speed	Bus speed operation	Maximum 50 km/hour	100.00%	100.00%
Stopping time at station/stop	Stop duration	Maximum 60 seconds	100.00%	100.00%
Information system	Station	Station name Current location information Queueing direction Network map	99.85%	100.00%
	Bus	Audio and visual information		
Arrival time and disruption information	Electronic display	Clear and accurate	94.94%	100.00%
Payment system	E-ticketing	Available	69.26%	100.00%
Bus journey document	Driving license Vehicle registration Test book Monitoring card	Available	99.31%	100.00%

GPS	Kilometer record Integrated with the command center	Available	99.45%	100.00%
Staging location	Availability	At least 1 for each route	90.55%	100.00%

Table 7 Aspect Scores of Transjakarta Services in Q4 2019

The level of service of Transjakarta is officially mandated in Governor Regulation 13/2019 and grouped into several service types, which include the BRT system, feeder system (big, medium, and small buses), and Transjakarta Cares. The assessment for each group consists of security, safety, convenience, reachability, equality, and regularity. The Jakarta Transportation Agency applies fine to Transjakarta when some of the aspects do not meet the target.

Q4 2019 Transjakarta BRT Level of Service Achievement

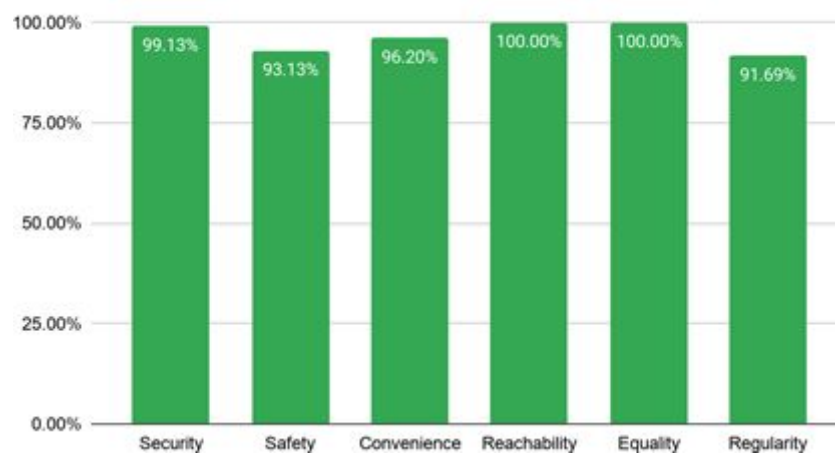


Figure 30 Transjakarta Level of Service

Based on the table and chart, the lowest achievement is on the regularity aspect, with 91.69% on average. Transjakarta needs to have an improvement in managing the headway and make less waiting time for the passengers. In addition to that, the e- ticketing system should also be gradually implemented in the non-corridor system.

The BRT Standard is also globally used to evaluate the performance of the corridor based on international best practices. It defines the essential elements of BRT and acts as a planning tool, a scoring system, and a guideline to reach a true definition of BRT. In the end, the corridor is certified as basic BRT, bronze, silver, or gold as the hierarchy. The scoring system includes the BRT essential elements, service planning, infrastructure, stations, access & integration, and communications. There are also point deductions when bus operations suffer from design failures or performance weaknesses.

1. BRT Basics Dedicated right-of-way Busway alignment Off-board fare collection Intersection treatments Platform level Boarding	2. Service Planning Multiple routes Express, limited-stop and local service Control center Located in top 10 corridors Demand profile Hours of operations Multi-corridor network	3. Infrastructure Passing lanes at stations Minimizing bus emissions Stations setback from intersections Center stations Pavement quality
4. Stations Distance between stations Safe and comfortable stations Number of doors on the bus Docking bays and sub stops Sliding door in BRT stations	5. Access and Integration Universal access Integration with other public transport Pedestrian access and safety Secure bicycle parking Bicycle lanes Bicycle-sharing integration	6. Communications Branding Passenger information
Point Deductions Commercial speed below 20 km/hour Top passengers per hour per direction (pphpd) below 1,000 Lack of enforcement of right-of-way The significant gap between the bus floor and the station platform Overcrowding Poorly preserved busway, buses, stations and technology systems Low peak frequency Low off-peak frequency Permitting unsafe bicycle use Lack of traffic safety data Buses running parallel to BRT corridor Bus bunching		

Table 8 Matrix of BRT Standard

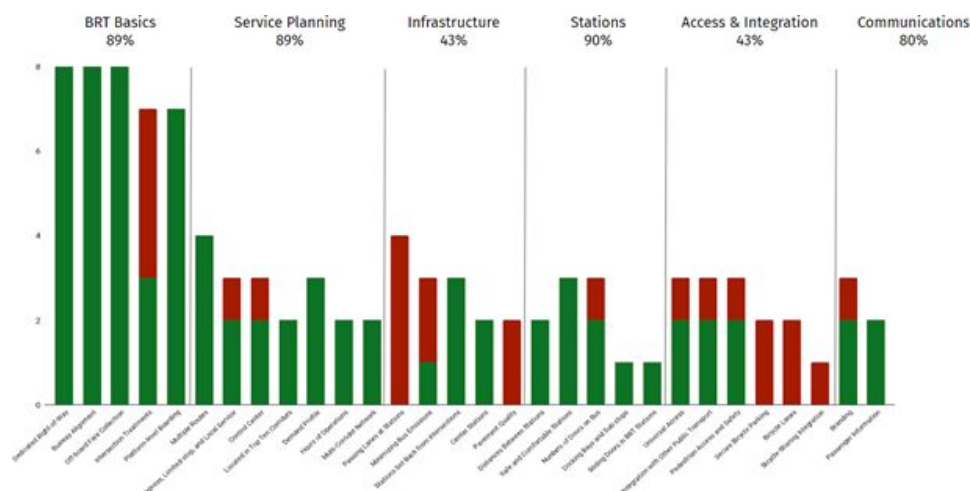


Figure 31 Aspects in BRT Standards

ITDP Indonesia regularly and independently gives the scoring for every existing Transjakarta corridor. The chart above shows the example of scoring for corridor 6 Transjakarta based on the BRT Standard. The red columns show the score that has not been achieved to the maximum. Corridor 6 also experiences point deductions in busway lack of enforcement, significant platform gap, and bus bunching. The points from infrastructure and access & integration are still low and need to be improved. There are rooms for improvements in station expansion, mass transit integration, and busway sterilization.

Currently, there are 13 corridors, but only Corridor 1 is considered as a silver tier BRT while the rest are bronze or even basic BRT. The principal elements to increase the level of service are infrastructure capacity expansion, mass transit integration, and inclusive infrastructure.

The electric buses will soon be most likely an integral part of the existing Transjakarta corridors and operations. Therefore the improvement areas mentioned earlier are essentials to ensure the bus service runs with fewer hassles and create ease of usage for the passengers. Apart from charging technology that will be used later, several operational factors can be considered and taken into account to select the potential corridor for electric bus deployment.

- Daily passengers. The more passengers carried by electric buses, the more coverage to the society and have more benefits to the environment.
- Daily bus operation. The bus deployment is relatively in line with the passenger demand on every corridor.
- Productive kilometers. This criterion reveals the number of kilometers that carry the passengers. It can be on a monthly or daily basis.
- Dead kilometers. It is the distance between the bus depot and the corridor. It is also called empty kilometers due to no passengers being carried. Some bus depot locations determine the length of the corridor.
- Average speed. The number varies from 20 to 30 kilometer per hour. This data is obtained from GPS that is installed on every bus.
- Land-use. The land-use type is generally divided based on density, workplaces, commercials, and residential areas.
- The number of operators. One or more bus operators serve every Transjakarta corridor.

Infrastructure Expansion

Transjakarta service currently covers 83% of the population or 72% of the area. The number of routes, bus frequency, and passenger carried per hour has been increasing, as shown on the table above for corridor 1 data. However, the increase is not sufficiently complemented by the station infrastructure. Many of Transjakarta stations could not bear the overwhelming number

of buses and passengers anymore. As a result, it is common to witness bus bunching (bus queueing when approaching the station) and passenger overcrowding during peak hours.

Year	Number of routes	Frequency (bus/hr)	PPHPD (passengers per hour per direction)
2013	7	40	3,448
2019	48	105	5,766
Increase	585.7%	162.5%	67.2%

Table 9 Passenger per Hour per Direction in Transjakarta Services

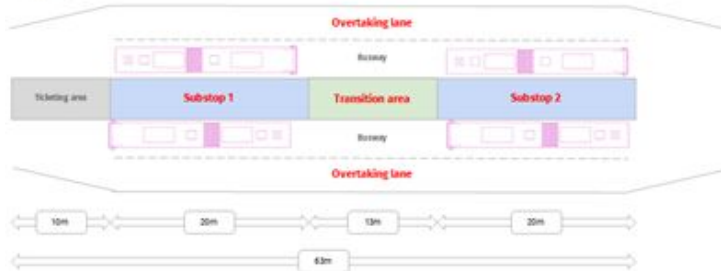
The BRT Standard suggests there should be no more than three people in one square meter in a BRT station to ensure convenience. Transjakarta has refurbished some of its stations, but none comply to be regarded as high-capacity stations. The station expansion is beyond making the station larger and longer. There are design features that need to be met accordingly.

In general, Transjakarta stations were only designed with a length of 25 to 50 meters and can only accommodate one bus for passenger boarding and alighting. This initial design faces tremendous operational challenges both from bus operation and passenger.



Figure 32 Existing Transjakarta Station Design

Design 1



Design 2



Figure 33 Proposed Transjakarta Station Design

The main differences between the existing and the design are the availability of sub stops (with the proper length of the transition area) and overtaking lane. Some Transjakarta stations are extended into Type 2, but it still fails to make the operation better because the transition area is too short and the lack of overtaking lanes. The length of the transition area should be at least 0.7 times the bus length to accommodate the bus maneuver to overtake.

Design 1 is 63 m and suggested to be the minimum implementation while Design 2 is intended for higher demand stations and requires a more extended space. The plan should be implemented entirely on every station along the corridor. This infrastructure design is expected to ease significant operational challenges, particularly minimizing the bus bunching and overcrowding. The plan will also be beneficial for the future electric buses that will also run on the corridor.

Transit Integration

Integration holds a key role in attracting more people to use public transport. The intention of integration to make the trip faster, easier, and more affordable. There are several different modes, both road-based and rail-based, in Jakarta, including Transjakarta, LRT, MRT, and other bus services.

In essence, the integration consists of physical, payment/fare, and operational. Some stations between transport modes are located nearby so that it is essential to have a

connection between the two. The direct link shortens the walking distance and creates more convenient access under one system.

The lack of coordination can make each operator work in silos and neglect the importance of station integration. There are 51 locations across Jakarta, where the stations are essential to be integrated, as seen on the map. The typical physical integration is the connection between stations that can be located underground, on the median, or elevated or area integration within a 500-meter radius from the station by improving sidewalk and signage quality.

All public transport users are pedestrians. The first and last-mile connectivity around transit stations should be the top priority of improvement, particularly where the area consists of several transport stations. It is recommended to have area integration by sidewalk network improvements within a 500-meter radius, not just on the main road, because most people start or end their journey not precisely next to the transit station.

Another potential measure is the provision of bike-share. The bike-share system provides an integrated connection to and from transit stations with greater range than walking. It makes it easier for people to travel without the need of bicycle ownership. It is ideal for replacing motorized two-wheelers, particularly for a short distance, and considered an active mode to stimulate active mobility participation.

In total, ITDP has assessed more than 200 potential bike-share stations and 2,000 bikes in Jakarta, which are connected with transit stations along Sudirman-Thamrin as the pilot project. The bike-share stations can be put adjacent to transit stations, prayer houses, shopping areas, schools, parks, gas stations, and health facilities.

The next key component of integration is integrated payment and fare. The most common is using universal electronic payment, and the fare can be based on time or distance. In this way, it will be possible to apply the package fare for daily, weekly, monthly, or even annually across the platforms. At the same time, the concession fare for particular groups such as students, elderly, tourists, and the disabled can be developed to have a more affordable transport system.

The effort to integrate the payment and fare in Jakarta was initiated in 2017. The newly appointed governor pledged to integrate all public transport in Jakarta, starting from the microbus or commonly known as angkot. It took more than a year of discussions and negotiations with the existing stakeholders to integrate these operators as part of the Transjakarta service. The branding of this policy was initially named Ok-Otrip and later on changed to Jaklingko.

Jaklingko scheme allows people to use angkot as the feeder and continue with Transjakarta buses with the capped fare of IDR 5,000 under 3 hours for one journey. It is still limited to road-based transport and using one specific electronic payment. The angkot routes gradually integrate with Transjakarta and contribute to more than 250,000 daily passengers. The scheme is a first good step toward broader integration with other modes such as commuter line, MRT, and LRT, especially in terms of fare bundling.

Stored value	Time-based	Distance-based
● Higher flexibility based on the stored deposit ● Flexibility for promotion or fare adjustment for operators	● Flexibility on number of the journey in one time for passengers ● Additional revenue for operators if the typical journey is relatively made in short time	● Upfront cost based on the number of trip or distance ● Other income for operators when some of the stored journeys are no used

Table 10 Type of Fares in Public Transport

Santiago in Chile is one of the best practices in the global south in implementing integrated payment and fare. The city uses a dedicated card which can be easily obtained in all metro stations, vending machines, and certain supermarkets and convenience stores. The card can be used for bus, metro, and metro trains. The city applies a package combination when using one or more modes of transport during the morning and peak hour with the capped fare.

Task	Transjakarta	Commuter Line	Jakarta MRT	Greater Jakarta LRT	Jakarta LRT
Planning					
Construction and infrastructure financing			 	 	
Operational subsidy					
Monitoring and evaluation					

Table 11 Stakeholders of Public Transport in Greater Jakarta

Jakarta has implemented the integrated payment system, but it still needs some time to have the fare integration due to the current institutional setting. There is a need for an institutional framework for synergy for planning, operational, fare, and financial sustainability regardless of the administrative boundaries. From the user's point of view, passengers demand integrated fare and payment with excellent quality of service when they need to move from one place to another using public transport. However, due to the responsibility segregation, the city faces limitations in managing the whole system as one integrated network in terms of planning, financing, operational and monitoring, and evaluation. The task responsibility for each mass transit operator is scattered between the city and national level, which currently makes the coordination longer.



Figure 34 Relationship between Stakeholders in Public Transport

There is a distinct partition between the city and the national level in the existing situation in Greater Jakarta. Even between transport, city-owned companies have no collective target and synergy. The institutional rearrangement is fundamental to integrate service management, financial and policy support. Robust strategic planning, asset management, and KPI and goal alignment under one umbrella are expected to make the mobility improvement face faster.

Aspect	Phase 1 (Mode Integration)		Phase 2 (Administrative Area Integration)
	Short-term	Mid-term	Long-term
Institutional setup	Business entity integration between Transjakarta, MRT, LRT, Greater Jakarta LRT and commuter line with corporate action. Holding company setup under Jakarta City Government	Physical asset diversion and debt payment obligation of Greater LRT Jakarta and PT KCI from PT KAI to Jakarta City Government	Shareholding with other administrations: City government: Bekasi, Bogor, Tangerang, Tangerang Selatan District government: Bogor, Bekasi, Tangerang
Fare and financial	Payment and fare integration through Jaklingko scheme for small buses (angkot) and medium buses	Payment and fare integration is applied to all modes in Jakarta	Payment and fare integration is applied to all modes including trunk and feeder in Greater Jakarta
Service and asset management	Integrate existing service of small and medium buses with Transjakarta	Asset management and development for commuter line and Greater Jakarta LRT	Expansion of small and medium buses integration as feeder service of mass transit from Bodetabek area. Development of new stations and network for rail-based

Table 12 Integration Aspects in Greater Jakarta Public Transport

The way forward for institutional integration is divided into two phases. The first phase is about transport mode management transfer, including small buses, medium buses, big buses, Transjakarta, LRT, MRT, and Commuter Line to be under Jakarta City Government. The phase one process can take 18 to 24 months. The second phase involves the neighborhood area surrounding Jakarta to be part of the shareholders of the institution. The existing Jaklingko system can be applied to all trunk and feeder commuter modes in Greater Jakarta. The future road and rail-based mass transportation network are also developed in this phase. It might take 2 to 3 years to finish the second phase integration.

Inclusive Infrastructure

Inclusive infrastructure is another critical element for public transport. The provision of inclusive components rarely follows the development of mass transit systems. Public transport users are often experiencing uneven sidewalks to the stations, steep ramp facilities, lack of real-time and friendly passenger information systems, and significant platform gaps. Reducing these barriers and ensuring both audible and visual passenger information will be beneficial for all, including for women, children, the elderly, and people with disabilities. This improvement should also be made by involving vulnerable groups in the planning process.

Transjakarta has done several interventions to make its service more inclusive.

- Disabled-friendly stations. Transjakarta claims 53 out of 248 stations are adopting the inclusive measures to be friendly for the disabled people.
- Concession fare. There are 15 categories of people that are eligible to receive a concession fare based on Governor Regulation No. 133/2018 to use the Transjakarta service without any charge. The annual passengers of these categories increased from 5.6 million to 6.8 million from 2018 to 2019.
- Transcare. It is a particular transport service which aims to help people with disabilities to access the nearest Transjakarta station. People need to book one day in advance to use the service. There are around 2,000 to 5,000 monthly users of Transcare.

The policy framework with a dedicated committee should be set up to reduce potential barriers in accessibility through public consultation. The committee has a role in assessing the application of the framework and ensuring the concept of universal design is adopted in the existing and future public transport infrastructure. In the implementation phase, the idea should be fully applied in the field where direct supervision is during construction is needed.

In addition to the hard infrastructure, there are soft measures that need to be applied. Regular training should be regularly conducted to ensure the operator staff understands how to handle each type of disability appropriately. To raise public awareness, education for all passengers and society by giving informative explanations in the stations or fleets to understand the rights of people with disabilities.

References

2013. Transitions To Alternative Vehicles And Fuels. Washington: National Acad. Press.

2018. PEV Policy Evaluation Rubric: A Methodology For Evaluating The Impact Of State And Local Policies On Plug-In Electric Vehicle Adoption. [ebook] National Association of State Energy Officials and Cadmus. Available at: <https://naseo.org/Data/Sites/1/pevpolicyrubricmethodology_naseo.pdf> [Accessed 29 June 2020].

Asian Development Bank, 2012. Indonesia: Transport Sector Assessment, Strategy, And Road Map. [online] Mandaluyong City, Philippines: Asian Development Bank. Available at: <<https://www.adb.org/sites/default/files/institutional-document/33652/files/ino-transport-assessment.pdf>> [Accessed 29 June 2020].

Barradale, M., 2010. Impact of public policy uncertainty on renewable energy investment: Wind power and the production tax credit. Energy Policy, 38(12), pp.7698- 7709.

Blanco, S., 2019. The U.S. Just Spent \$84M On Electric Buses. [online] Forbes. Available at: <<https://www.forbes.com/sites/sebastianblanco/2018/08/31/84-million-electric-buses/#4f383e515e40>> [Accessed 29 June 2020].

Coplon-Newfield, G., and Devine, S., 2015. New Report: How Northeast & Mid-Atlantic States Stack Up In Getting Electric Vehicles On The Road. [online] Sierra Club. Available at: <<https://www.sierraclub.org/compass/2015/10/new-report-how-northeast-mid-atlantic-states-stack-getting-electric-vehicles-road>> [Accessed 29 June 2020].

Davis, V., 2019. Electric Buses – Driving Into Jamaica’S Future - Jamaica Information Service. [online] Jamaica Information Service. Available at: <<https://jis.gov.jm/electric-buses-driving-into-jamaicas-future/>> [Accessed 29 June 2020].

Deaton, J., 2019. Everybody Wants EV Charging Stations, But Barely Anyone Is Building Them. [online] Fast Company. Available at: <<https://www.fastcompany.com/90321889/everybody-wants-ev-charging-stations-but-barely-anyone-is-building-them>> [Accessed 29 June 2020].

F. Belgiawan, P., Schmöcker, J., and Fujii, S., n.d. Understanding Car Ownership Motivations Among Indonesian Students. [online] Department of Urban Management, Kyoto University, Japan. Available at: <<https://bit.ly/2CyhZL1>> [Accessed 29 June 2020].

Forum, 1., 2019. El Salvador Inaugurates Its First EV Charging Station - New Energy Events. [online] New Energy Events. Available at: <<http://newenergyevents.com/el-salvador-inaugurates-its-first-ev-charging-station/>> [Accessed 29 June 2020].

Forum, 4., 2019. Barbados Government Commits To Electric Buses And All-Electric Fleet By 2030 - New Energy Events. [online] New Energy Events. Available at: <<http://newenergyevents.com/barbados-government-commits-to-electric-buses-and-all-electric-fleet-by-2030/>> [Accessed 29 June 2020].

Franke, T., Neumann, I., Bühler, F., Cocron, P., and Krems, J., 2011. Experiencing Range in an Electric Vehicle: Understanding Psychological Barriers. *Applied Psychology*, 61(3), pp.368-391.

Frommer, M., 2018. Cracking The Code On EV-Ready Building Codes. [online] SWEEP. Available at: <<https://www.swenergy.org/cracking-the-code-on-ev-ready-building-codes>> [Accessed 29 June 2020].

Fueleconomy.gov. 2020. Federal Tax Credits For Electric And Plug-In Hybrid Cars. [online] Available at: <<https://www.fueleconomy.gov/feg/taxevb.shtml>> [Accessed 29 June 2020].

Gallagher, K., and Muehlegger, E., 2008. Giving Green to Get Green: Incentives and Consumer Adoption of Hybrid Vehicle Technology. *SSRN Electronic Journal*.

Gay, D., Rogers, T., and Shirley, R., 2018. Small island developing states and their suitability for electric vehicles and vehicle-to-grid services. *Utilities Policy*, 55, pp.69- 78.

Hanggoro, H., n.d. Mengorek Sejarah Ojek. [online] *Historia - Majalah Sejarah Populer Pertama di Indonesia*. Available at: <<https://historia.id/urban/articles/mengorek-sejarah-ojek-DB9B6>> [Accessed 29 June 2020].

Hardman, S., 2017. Reoccurring And Indirect Incentives For Plug-In Electric Vehicles

–A Review Of The Evidence. [online] Davis: UC Davis. Available at:

<<https://phev.ucdavis.edu/wp-content/uploads/2017/10/reoccurring-incentives-literature-review.pdf>> [Accessed 29 June 2020].

Iyer, E., and Kashyap, R., 2007. Consumer recycling: the role of incentives, information, and social class. *Journal of Consumer Behaviour*, 6(1), pp.32-47.

Jaramaya, R., and Masyrafina, I., 2018. LRT Jakarta Can't Support Asian Games 2018: Kalla | Republika Online. [online] Republika Online. Available at:

<<https://www.republika.co.id/berita/en/national-politics/18/04/12/p71n4e414-lrt-jakarta-cant-support-asian-games-2018-kalla>> [Accessed 17 June 2020].

KRL. 2020. Home. [online] Available at: <<http://www.krl.co.id/>> [Accessed 12 June 2020].

Lüthi, S., and Prässler, T., 2011. Analyzing policy support instruments and regulatory risk factors for wind energy deployment—A developers' perspective. *Energy Policy*, 39(9), pp.4876-4892.

Mariska, D., 2020. The Long And Winding Road For Indonesia's Electric Vehicle Ecosystem. [online] Jakarta Globe. Available at: <<https://jakartaglobe.id/business/the-long-and-winding-road-for-indonesias-electric-vehicle-ecosystem>> [Accessed 29 June 2020].

Market research indonesia. 2019. Indonesia To Boost EV Adoption. [online] Available at: <<https://www.marketresearchindonesia.com/insight/indonesia-to-boost-ev-adoption#!>> [Accessed 29 June 2020].

McFarland, M., 2017. A City Scraps Its HOV Lanes. Disaster Ensues. [online] CNNMoney. Available at:

<<https://money.cnn.com/2017/07/06/technology/culture/jakarta-hov-lanes/index.html>> [Accessed 29 June 2020].

Mida.gov.my., 2017. Plan Targets To Make Malaysia Marketing Hub For Evs By 2030. [online] Available at: <<https://www.mida.gov.my/home/4234/news/plan-targets-to-make-malaysia-marketing-hub-for-evs-by-2030/>> [Accessed 29 June 2020].

Ministry of Heavy Industries & Public Enterprises, 2015. National Electric Mobility Mission Plan.

n.d. Iceland's Second Biennial Report To The UNFCCC. [ebook] Available at:
<https://unfccc.int/sites/default/files/iceland_biennial_report_2nd.pdf> [Accessed 29 June 2020].

OFFICE of ENERGY EFFICIENCY & RENEWABLE ENERGY., 2016. Fact #910:
February 1, 2016 Study Shows Average Cost Of Electric Vehicle Charger Installations. [online]
Available at: <<https://www.energy.gov/eere/vehicles/fact-910-february-1-2016-study-shows-average-cost-electric-vehicle-charger>> [Accessed 29 June 2020].

Plautz, J., 2019. 6 US Regions Leading The Way On Electric Buses. [online] Smart Cities Dive.
Available at: <<https://www.smartcitiesdive.com/news/6-us-regions-leading-the-way-on-electric-buses/564710/>> [Accessed 29 June 2020].

S. Kurani, K., Caperello, N., TyreeHageman, J., and Davies, J., 2014. I Am Not An Environmental Wacko! Getting From Early Plug-In Vehicle Owners To Potential Later Buyers. [online] Davis: Institute of Transportation Studies, University of California, Davis. Available at:
<https://its.ucdavis.edu/research/publications/?frame=https%3A%2F%2Fitspubs.ucdavis.edu%2Findex.php%2Fresearch%2Fpublications%2Fpublication-detail%2F%3Fpub_id%3D2502> [Accessed 29 June 2020].

Shah, A., 2019. India Approves \$1.4 Billion Electric Vehicle Incentive Scheme. [online] U.S. Available at: <<https://www.reuters.com/article/us-india-electric-policy/india-approves-14-billion-electric-vehicle-incentive-scheme-idUSKCN1QH29F>> [Accessed 29 June 2020].

Sharma, N., 2019. How To Take India Towards An Electric Vehicles Future. [online] Quartz India. Available at: <<https://qz.com/india/1703720/how-to-take-india-towards-an-electric-vehicles-future/>> [Accessed 29 June 2020].

Sierzchula, W., 2014. The influence of financial incentives and other socio-economic factors on electric vehicle adoption. Energy Policy, 68, pp.183-194.

Transjakarta. 2020. Dewan Direksi. [online] Available at:
<<https://www.transjakarta.co.id/tentang-transjakarta/struktur-organisasi/dewan-direksi/>>
[Accessed 29 June 2020].

Transjakarta. 2020. Dewan Komisaris. [online] Available at:
<<https://www.transjakarta.co.id/tentang-transjakarta/struktur-organisasi/dewan-komisaris/>>
[Accessed 29 June 2020].

Uranie, S., 2015. Seychelles President Announces Removal Of Import Duty On Electric Cars.
[online] Seychellesnewsagency.com. Available at:
<<http://www.seychellesnewsagency.com/articles/3237/Seychelles+President+announces+removal+of+import+duty+on+electric+cars>> [Accessed 29 June 2020].

Wappelhort, S., 2018. Iceland Is One Of The World's Most Interesting Electric Vehicle Markets | International Council On Clean Transportation. [online] Theicct.org. Available at:
<<https://theicct.org/blog/staff/iceland-ev-market-201807>> [Accessed 29 June 2020].

