



*This document will explain  
recommendation of policies for  
national and local level government to  
support ride hailing electrification  
effort in Greater Jakarta.*

# Road Map and Timetable of Two-Wheeler Electrification in Greater Jakarta

## Policy Recommendation

31/01/2022

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## 1. Introduction

Stakeholders, especially the Government, should provide a supportive environment for electrification to accelerate the electric two wheelers (2W) adoption rate. However, from the Government perspectives, there are several policy gaps that would be the barriers to achieve the electrification roadmap. Indirect fiscal incentives, weak non-fiscal incentives, the absence of ride-hailing permit and vehicle specification regulation, and operational issues are some of the policy gaps that should be solved, both from the perspectives of national government and local government.

This report would discuss the policies needed to accelerate the two-wheeler electrification, especially for ride-hailing purposes. National-level policy would cover both fiscal and non-fiscal policy while local-level policy would focus more on the non-fiscal incentives policy. Regardless, both national and local policy would address GESI related strategies.

Indonesia has the basis to treat all persons equally based on human rights, as stated in its constitution. This position leads to the issuance of an overarching legal framework for the promotion of gender equality, women empowerment, and social inclusion that are actionable in all development sectors, including transportation sector. By ensuring the utilisation of the overarching legal framework for gender mainstreaming and social inclusion, the process of motorcycle electrification in DKI Jakarta will be and can be gender-responsive and inclusive. To guarantee this effort, gender and inclusion aspects are considered and integrated into recommendations presented in this report.

## 2. Policy Recommendations

There are nine policies that are being recommended to accelerate the ride-hailing electrification. These policies cover both national- and local-level policies to be implemented accordingly to increase the electric 2W adoption, especially by ride-hailing drivers.

On each policy, the first thing to be elaborated is the opportunities on why the policy was recommended. It was then followed by a brief overview on what the policy would look like. The next thing to be explained is the framework on how the policy would be implemented including which stakeholders are expected to take part in it. It would then be completed with a brief analysis on what potential challenges might be resulted from the policy implementation.

### 2.1. Set One Nationally Integrated and More Ambitious EV Adoption Target

#### 2.1.1. Opportunities

Currently, Indonesia has two different targets set by the Ministry of Industry (MoI) and Ministry of Energy and Mineral Resources (MEMR). The former plans to produce 750,000 units of LCEV (low carbon emission vehicle), which includes electric cars, and 2.45 million units of electric motorcycles in 2030. Meanwhile, MEMR sets the cumulative adoption of 2 million units of electric cars and 13 million units of electric motorcycles by 2030. This discrepancy hinders the collective effort to accelerate electric vehicles (EV) adoption in the nation. Hence, these targets first need to be adjusted to align with the government's commitment related to climate change mitigation, and also 2W ride-hailing electrification.

#### 2.1.2. Overview

The enactment of one unified target will help to synchronise the effort by all relevant government entities, ease tracking and monitoring by other stakeholders, including the public, and to eliminate overall confusion that might delay the adoption. This will help send the signal to not only the public, but all stakeholders that significant effort is needed to attain the ambitious target in order to align ourselves with the previously agreed Paris Agreement.

Additionally, provincial-level governments such as DKI Jakarta Province should also follow the examples of other progressive provinces or cities in the world, namely San Francisco, Amsterdam, Shenzhen, and Oslo among others, that lay down targets for EV sales among other supporting policies for EVs (Hall et al., 2020). The central government could also help push the local governments through regulations, such as nationwide EV pilot projects in major urban cities. An example could be observed towards the Government of China with their "Thousand Cities Thousand Vehicles" program.



### 2.1.3. Framework

Key stakeholders that would be involved in this policy recommendation are:

1. **Coordinating Ministry of Maritime and Investment Affairs (CMMIA):** As the leader of the Coordination Team for Battery Electric Vehicle (BEV) Acceleration Program, CMMIA holds a strategic position to oversee and organise the ministries under it in the team, including MoI and MEMR which each has its own roadmap. It can also help to put in perspective and analysis from other important ministries and institutions, such as the Ministry of Environment and Forestry (MoEF), Ministry of Transportation (MoT) and National Research and Innovation Agency (BRIN).
2. **Ministry of Energy and Mineral Resources (MEMR):** MEMR has the most recent/updated version of the EV adoption target/roadmap as outlined in the draft for Grand Strategy for National Energy (GSEN). This needs to be consulted with, especially on the basis of the roadmap (e.g., emission reduction as targeted in Net Zero Emission (NZE) by 2060?) and whether it has considered other ministries' perspectives and analysis into it.
3. **Ministry of Industry (MoI):** MoI had produced EV sales and production targets even before MEMR. It needs to be consulted whether these targets were still relevant in light of recent updates (especially on Indonesia target for NZE by 2060)
4. **Ministry of Environment and Forestry (MoEF):** Since it is very much involved in the NZE target by 2060, it needs to verify the transport sector emission reduction trajectory to achieve that, and weighs in on the EV adoption roadmap as proposed by MEMR

### 2.1.4. Potential Challenges

Collaboration among government entities to set a unified target would likely become a challenge. Since each government entity has their own agenda and goal to pursue, it would take effective communication and a decision maker/coordinator to synchronise the adoption targets.

With a much more ambitious target, the government will need to more effectively and constantly communicate this target to all stakeholders, and more importantly set more aggressive implementing regulations. This step is important to make sure that there is significant progress made and to gain trust and buy-in from the public and other stakeholders.

## 2.2. Provide Direct Incentive with Tax Exemption and Lower Interest for Electric 2W Ownership

### 2.2.1. Opportunities

The electric 2W price is still considered expensive by potential users, in particular among ride hailing drivers. The battery cost alone takes up to 30-40% of the vehicle price with most of the

components being imported from other countries. Upfront cost discount, lower interest rate, and tax incentives are required to attract more drivers. Currently, both local and national governments have set several regulations to reduce the cost of electric 2W, mainly through tax incentives and lower interest rates. However, these incentives are seen as not encouraging enough to accelerate the electric 2W adoption. With high ambition of 2W electrification, the government should provide more incentives to significantly increase the electric 2W adoption rate.

## 2.2.2. Overview

The Government of Indonesia has issued a roadmap for the development of BEV through the MEMR. However, fiscal issues were raised during the 2W ride-hailing drivers' interview. With higher upfront cost, as well as additional costs related to charging, drivers thought the electric 2W would be more expensive compared to the conventional motorcycle. To solve the fiscal concerns, there are several opportunities for government to lower the electric 2W cost through:

1. Cost of ownership
2. Taxes (import tax, income tax, VAT, and transfer tax/BBN-KB)
3. Interest rate for credit scheme

Current prices of electric 2Ws around IDR 20-25 million are seen to be less attractive by drivers as it is not much different from the conventional motorcycles. In China and Taiwan, the price of electric 2Ws is only around IDR 10 million. In the first three to five years, the government should intensively support electric 2W's manufacturers to reduce the overall production cost.

The government has issued several regulations to provide tax incentives. With the import tax relaxation that is currently being provided, some of the tax components are being borne by the government. Yet, there are still other tax components, such as income tax and VAT, that are being paid by consumers. To accelerate the adoption of electric 2W, the Government should provide higher tax relaxation until local production could provide the demand sufficiently. On the other hand, local governments have also provided tax incentives as part of electric vehicles adoption policies. DKI Jakarta, West Java, and Bali are examples of local governments who have issued transfer tax (BBN-KB) reductions. DKI Jakarta has set the transfer tax fee to 0%, while West Java and Bali are imposing 1.5% and 5% respectively. These policies should be adopted by more local governments so that electric 2W would have a significantly lower price compared to conventional 2W in their respective area.

Table 1 below demonstrate how the transfer tax exemption and import tax relaxation for batteries would affect the total cost of ownership of electric 2W. In this calculation, the assumption for transfer tax fee is set to 0% and the battery price is reduced by 30%.



Table 1 Reduction in TCO by Implementing Relaxations on Taxes

Scenario	TCO (IDR)	Reduction on TCO
Business-As-Usual	55,696,179	0.00%
Transfer Tax Relaxation	54,534,291	2.09%
Import Tax Relaxation for Batteries	51,995,080	6.65%

By imposing tax relaxation in the form of transfer tax exemption, the TCO would decrease by 2.09%. Meanwhile, battery price reduction of 30% due to the relaxation on import tax would decrease the TCO by up to 6.65%. These are the types of incentives that should be implemented to further decrease the ownership cost of electric 2W to encourage higher adoption of electric 2W in Indonesia.

Tax incentives could also be set based on vehicle emission and performance. Based on the emission, electric 2W would be applied to the lowest tax possible. However, the incentives should also be designed to encourage the advancement of electric 2W performance. Learning from China, EV performance is crucial to accelerate EV adoption. China applies speed and range as technical requirements for the subsidy schemes. These technical requirements should be more advanced over time to ensure EV development to be in line with overall technology development.

Besides tax incentives, leasing schemes for electric 2W need to also be designed to attract more potential buyers. Minimum down payment, lower interest rate, and longer leasing period are financial parameters that could be adjusted by the Government. Although Bank Indonesia has released the regulation of 0% down payment for electric vehicles, leasing companies currently are still not following the regulation due to the lack of socialisation and structuring schemes from Bank Indonesia.

Last but not least, these fiscal incentives should be accessible for all. Currently, there is a lack of financial assistance or subsidies on electric 2W ownership specifically designed for vulnerable groups, such as persons with disabilities, women, and lower-income groups of people. It is important for the Government to provide fiscal incentives with simple and affordable terms and conditions so that they would be accessible for any groups of people.

### 2.2.3. Framework

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Finance (MoF): The MoF could be more progressive in giving incentives in terms of tax relaxations, particularly on import tax, income tax, and value-added tax. For a short-term period, MoF could provide 0% import taxes while reducing the number of taxes

related to VAT and income tax to further reduce the upfront cost of batteries, which are essential in the manufacturing of electric 2W. The policy should be applied until local productions could meet the demand for batteries.

2. Bank Indonesia: Currently, Bank Indonesia has issued the regulation specifically for EV financing. Therefore, Bank Indonesia should provide implementing regulations so that there would be no confusion among financial institutions on how to implement those incentives. Furthermore, the regulation on 0% down payment and lower interest rate should also be informed intensively to electric 2W distributors and financial institutions so that they can apply them accordingly. Robust information and massive promotions could also be applied by Bank Indonesia to inform end users as the potential electric 2W buyers.
3. Local Government: In Indonesia, there are several local governments that have policies to actively support the electrification campaign. Bali, Jakarta, and West Java are examples of those who already have policies to promote and accelerate EV ownership. Most of their policies are related to reducing transfer tax fee for EV, including electric 2W. The Jakarta Provincial Government has set the transfer tax fee to 0% of vehicle value, while the West Java and Bali Provincial Government has set the fee to be 2.5% and 5% respectively. This policy could encourage more electric 2W potential users to buy electric 2W as it would be imposed with a lower tax rate compared to ICE 2W. Therefore, this policy should be applied by other local governments as well so that the number of electric 2W usage would be increased all across Indonesia.

#### **2.2.4. Potential Challenges**

The first potential challenge is that some taxes are to be regulated by local governments themselves, including the annual vehicle tax (PKB) and vehicle transfer tax (BBN-KB). Referring to Presidential Regulation (PR) No. 55 of 2019, the Ministry of Home Affairs (MoHA) has issued MoHA Regulation No. 8 of 2020 to reduce the PKB and BBN-KB for BEVs as a direct incentive to customers. However, only a few local governments have complied with this regulation. Therefore, the MoHA needs to take persuasive actions, in particular towards local governments with sufficient fiscal capabilities, so that they would provide incentives for electric vehicles, including electric 2W, as governed through the MoHA Regulation stated above.

The next example is the Bank Indonesia regulation that governs the relaxation of down payment and interest rate for electric vehicles purchases. Currently, the majority of electric 2W distributors still do not realise the existence of the regulation due to lack of campaigns. Bank Indonesia should be more actively involved in promoting this incentive of 0% down payment and lower interest rate for electric 2W. The financial scheme and formulation should then be implemented by all financial institutions and electric 2W distributors.

Another potential challenge that would arise is the unclear recipient of tax relaxations. Although some local governments have implemented relaxations on transfer tax fees, such as DKI Jakarta

Province, the current tax reduction for Completely Built Up (CBU) units is not clear yet, particularly in terms of period and the number of incentives. This could be further mitigated by involving various stakeholders during the regulation development phase to include as many inputs as possible. Also, strong monetary incentives for electrification of mass transit, such as a national-level policy for vehicle registration and transfer taxes are required.

## **2.3. Set Solid Disincentives for ICE Through Fuel Economy Standard and Ban Regulation**

### **2.3.1. Opportunities**

As previously mentioned, electric 2W is currently not price competitive compared to its ICE counterparts. Besides providing incentives for electric 2W, disincentivizing ICE 2W is also needed to make ICE and electric 2W prices competitive with each other. Regulations such as fuel economy standard and ban on ICE vehicles should be enacted as early as possible to push vehicle producers and consumers to switch from conventional to electric 2W.

### **2.3.2. Overview**

Currently, the existing conventional automotive manufacturers in the country have not produced EVs on a massive scale yet. The government could provide disincentives, for example through an increase of annual vehicle tax, towards vehicles that produce more emission or consume more energy by implementing the fuel economy standard. The enactment of this policy will not only help to reduce transport emissions, but also pressurise conventional automotive manufacturers to consider EVs as the more cost-effective solution to be produced. Furthermore, strict banning regulation will attract conventional automotive manufacturers to invest more on electric vehicles, including 2W.

Putting conventional vehicles ban as regulation will also encourage the public to begin switching into electric, mainly for 2W. This will give a signal to the public that the government has prioritised low emission vehicles rather than the conventional vehicles. Followed with further discouraging measures implemented for ICE vehicles usage, this could be a powerful yet cost effective tool to encourage electric two wheelers adoption in the country.

China is currently the leading country on transport electrification, mainly for 2W type. As elaborated extensively on the previous report, China has banned conventional 2W usage in their cities since the 2000s (Gu et al., 2020). Learning from China, strong disincentives complemented with supporting financial incentives have proved to be effective in boosting the number of electric 2W adoption.

### **2.3.3. Framework**

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Environment and Forestry (MoEF): As both fuel economy standard and vehicle ban are policies to reduce emissions among other purposes, the MoEF should first be consulted. MoEF is in charge of regulating environmental impacts, thus, it must be clear whether those policies will be effective in reducing emissions. It will also assess the interplay between vehicle emission standards that it has created, and the fuel economy standard to control the carbon emissions.
2. Ministry of Energy and Mineral Resources (MEMR): Another impact that fuel economy standard and vehicles ban would make is in the energy aspect, in this case it is fuel consumption. MEMR has an agenda to improve national energy security, and one way to do it is by lowering gasoline imports. Enacting fuel economy standards and vehicles ban would align with MEMR's agenda. Therefore, MEMR's requirements need to also be considered.
3. Ministry of Industry (MoI): Fuel economy standard and vehicles ban would also significantly impact the automotive industry in the country. Thus, the MoI needs to be consulted to see if the transition roadmap would bring a positive impact overall to Indonesia's industry sector.
4. Ministry of Transportation (MoT): Since the fuel economy standard and vehicle ban are regulations imposed on vehicles, MoT should be consulted to see if there are concerns related to the safety of the vehicles and others (e.g., overall transport accessibility and connectivity). Since they are also responsible for vehicle certifications, then it is imperative that the regulations would be accepted and internalized.
5. Jakarta Governor: They can follow other progressive cities/provinces to set an ambitious target regarding transport electrification. For 2W, a lot could be learned from China. In order to align with NZE by 2060 target, Jakarta should have already banned conventional motorcycle usage completely by 2035, for example.
6. Jakarta Transport Agency (Dishub): The Jakarta Transport Agency has the responsibility to lay out provincial-level policies, guidelines, and technical standards, as well as carry out development, monitoring, and evaluation of the transport system, particularly on the vehicles. This department performs regular vehicle quality testing and inspection (KIR) of motorised vehicles and sets calculations and supervision of land, railway, water, and sea transportation fares.

#### **2.3.4. Potential Challenges**

Since the use of ICE vehicles still dominates the street landscape today, the initial implementation of disincentives for ICE vehicles such as ban on such vehicles is more likely to be challenging and public acceptance will be low. Moreover, if adequate EV infrastructure is unavailable and incentives are not strictly implemented, shifting from ICE vehicles to EV will be even more difficult. Therefore, the implementation of disincentives for ICE must be in line with the existence of a well-

designed policy and strict implementation to guarantee that EV is suitable to replace the current use of ICE vehicles and be a lot more advantageous to use.

## **2.4. Boost Charging Infrastructure Rollout for Electric 2W**

### **2.4.1. Opportunities**

Whether the electric 2W would be obtained through the market or ride-hailing operators, the drivers are still concerned with the limited charging infrastructure across the nation, and more specifically in Jakarta. Even though most of the time the charging will occur at home, there are still occurrences when the vehicles need to be charged within operational hours along the way.

Currently, there are two options available to charge electric 2W: plug-in charging and battery swapping. While both will help reduce range anxiety among drivers, each comes with its own benefits and challenges. Plug-in charging is already standardised in Indonesia through MEMR Regulation No. 13 of 2021 on Technical Regulations for Charging Stations and Battery Swap Stations. However, it takes longer to charge an electric 2W as compared to swapping batteries. On the other hand, while battery swap stations are able to cut down charging time significantly, it faces capital cost and standardisation issues if it is to serve mass electric 2W usage. Therefore, careful planning of these options needs to be conducted first by the government to provide an optimal solution that suppresses cost and is effective to draw consumers.

As of November 2021, there are 219 charging stations (SPKLU) and 266 battery swap stations (SPBKLU) across Indonesia according to the MoT. With the current pace of installation, the government's targets will not be achieved. In this early stage, the government needs to take the lead in building more of the charging infrastructure themselves and/or incentivizing the private sector (e.g., land leasing and purchase price discount) to help. Most recent IESR analysis found that the business of public charging stations is still unattractive with the current low utilisation rate of EV charging (IESR, 2021).

### **2.4.2. Overview**

The widespread development of charging infrastructures will be the key to accelerate EV adoption in the initial stage and also sustain its growth in the future. This policy includes revision of targets set by the government regarding charging infrastructure to align with the adjusted EV adoption targets. A complete breakdown of the adjusted number of public charging stations and battery swap stations, including clear targets for government entities or state-owned companies to fulfil. Robust planning is needed, particularly to determine the target number between charging station and battery swap station in order to suppress cost and ensure rapid progress. It should also include the strategic locations to deploy the charging infrastructure by considering several important factors, such as cost efficiency, area coverage, time spent for charging, and distance travelled by vehicles. In addition, the deployment of charging infrastructure should prioritise strategic locations that are also accessible to vulnerable groups, especially near residential areas

and other public facilities such as school, market, and public health facilities. Furthermore, this information of charging stations, including locations, price, and several technical aspects (e.g., charging capacity and duration) should be widely spread and publicly available.

The main beneficiaries will be the ride-hailing drivers, public, electric 2W/3W and charging infrastructure OEMs. With more charging infrastructure placed at optimal locations, it will directly lessen the range anxiety of the drivers and also gives wider coverage area to operate. Therefore, it is important to spread the charging infrastructure location information to the drivers.

Several countries have put much effort on the rapid development of charging infrastructure, including China. The Government of China had been trying to expand its charging station network since 2015 by setting up several supportive regulations, including ambitious targets, fixed charging prices based on area classification, and subsidies on charging stations installation costs. China currently has one of the most extensive charging networks with vehicle to charger ratio at 6.5:1 in 2019 and also has the world's biggest market share for EV in the past five years. China shows that having strong infrastructures is crucial to support the overall EV ecosystem and that directly affects the acceleration of EV adoption.

#### **2.4.3. Framework**

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Energy and Mineral Resources (MEMR): MEMR, especially the Directorate General of Electricity plays an essential role in regulating charging infrastructure development and determining electricity tariff and business models as well as issuing electricity supply business permits (IUPTL) for charging station operators. It is also responsible for developing the standardisation for the public charging infrastructure together with BRIN. MEMR is also highly engaged with PLN as the nation's electricity provider.
2. State-Owned Utility Company (PLN); PLN UID: As of now, they are still mandated to help build public charging infrastructure to accelerate EV adoption. They have produced two roadmaps regarding public charging and battery swap stations across Indonesia. Therefore, it first needs to be consulted to increase its figures in the roadmap and also better plan the development of both plug-in charging stations and battery swap stations. More specifically, PLN UID should also focus on DKI Jakarta to accelerate urban E2W adoption.
3. Ministry of Finance (MoF): MoF is part of the BEV acceleration program task force and plays a role in preparing state budgeting, as well as providing fiscal incentive facilities for BEV import duties and BEV registration. MoF could give fiscal incentives such as subsidies, land leasing, and purchase price discount for private sectors in terms of charging infrastructure provision and installation costs.



4. National Research and Innovation Agency (BRIN): BRIN could help to adjust the roadmap of charging infrastructure, including assessment of optimal locations for public charging infrastructures to be developed.
5. National Standardisation Agency (BSN): BSN manages government affairs that are related to national standardisation, including determining, developing, and maintaining Indonesian National Standard (SNI) and international standards. Therefore, regarding EV development, BSN plays a role in specifying national standards on batteries and charging stations as well as certifying institutions eligible to issue the standard certification (e.g. PLN is now eligible to issue charging station certification).
6. Jakarta City Planning Department (DCKTRP): They would be involved in assessing potential land/area to build public charging infrastructures.
7. Jakarta Transport Agency (Dishub): They would be involved in assessing potential area for public charging infrastructures based on traffics on the catchment area

#### **2.4.4. Potential Challenges**

Developing this policy would require a detailed and strategic planning, that requires primary surveys and data gathering (e.g., land allocation) from relevant stakeholders, mainly local government entities, OEMs and the public. With data availability has almost always been an issue for the government, rigorous data collection could potentially be one of the challenges. Besides, budgeting will be a huge burden, since the development would require significant capital investment.

Several ways could be performed to mitigate the above-mentioned challenges. Firstly, there needs to be an appointed entity to do the overall planning, preferably a group of professionals who have advanced knowledge in techno-financial modelling. This team might consist of various entities, and then it needs to collaborate with several entities for data support. Following that, an EV acceleration task force as the monitoring unit might need to be assembled to ensure that there is significant progress over time that is on track with the plan.

Battery standardisation will eventually be needed to avoid fragmentation in the future that can cause cost inefficiencies and confusion among consumers, and thus, could also be a potential future challenge. However, if done prematurely, it might slow down the rate of charging infrastructure rollout.

## **2.5. Put Enhancement on After Sales Market for Electric 2W**

### **2.5.1. Opportunities**

The economic efficiency of vehicle's maintenance is one of the aspects that is highly considered when deciding whether to buy an ICE or electric 2W. The maintenance of electric 2W is easier than

maintaining an ICE bike. McKnight (2021) explained that electric 2W's owners can do daily maintenance by themselves.

However, most motors and batteries are either sealed or not serviceable. Thus, if some problem happened to the motors and/or batteries, they would need to be replaced rather than be repaired (Brown, 2013).

### **2.5.2. Overview**

Many components of the electric 2W are imported. Therefore, the Indonesian government could decrease the import tax for electric bike spare parts, in particular for motors and batteries. According to the Ministry of Finance Decree No. 34/PMK.010/2017, the import tax for motors and batteries is equal to 7.5% of the overall import value. By implementing this policy, it would reduce the final price of the electric 2W spare parts which would be felt directly by electric 2W owners.

This relaxation on import tax for electric 2W spare parts policy has actually been implemented in India. According to Notification No. 03 of 2019-Customs by the Department of Revenue, Ministry of Finance Government of India, a 10% of import duty was levied on a knocked down kit which contains necessary components such as disassembled battery pack, motor, motor controller, charger, power control unit, energy monitor contractor, brake system, and electric compressor, which are not mounted on chassis. Meanwhile, about 15% of import duty was levied on the pre-assembled kit.

At the same time, the government could also provide incentives for investors, preferably from countries with advanced EV knowledge and technology, to build spare parts factories in Indonesia. This Foreign Direct Investment (FDI) would create jobs and help reduce unemployment in the country, which translates to increased incomes, and equips the population with enhanced buying power. In addition, FDI would allow for resource transfers and the exchanges of knowledge, technologies, and skills.

In addition, the government needs to also provide competent human capital to support the EV industry. The human capital is an engine for business growth, the success of the EV industry would depend on the ability to develop, organise, and use the human capital.

### **2.5.3. Framework**

Reducing, or even waiving, the import tax for EV spare parts would have a lesser effort among all policies proposed above. The Government of Indonesia has issued several tax reduction policies, such as the Government Regulation No. 73 of 2019 that relaxes the luxury tax regulation for EV and the Minister of Home Affairs Regulation No. 8 of 2020 that relaxes the annual vehicle tax and transfer tax fee for EV. Decreasing the import tax for electric vehicle spare parts would be a next step to further reduce the cost of ownership of EV for the consumer.

Indonesia is blessed with abundant nickel deposits that can be used as the main material for EV batteries. As of 2020, the total global nickel reserves amounted to approximately 94 million metric tons. Of that amount, Indonesia held the world's largest share, at 21 million metric tons (Garside, 2021). Because of this, the Indonesian government established the Indonesian Battery Corporation (IBC), a holding company for producing batteries, that was founded by four major state-owned companies: electric utility company (PLN), oil and gas giant (Pertamina), nickel mining company (Aneka Tambang), and Inalum, a holding company for the national mining industry. Together with Contemporary Amperex Technology Co., Limited (CATL) from China and LG Chem from Korea, IBC planned to build a battery factory with an expected total capacity of 140 GWH in 2030 (CNN Indonesia, 2021).

To accelerate the development of the EV battery industry in Indonesia, the Indonesian Government needs to attract more investors from abroad. Several incentives can be utilised to attract the FDI in the electric vehicle spare parts industry. The electric vehicle components and accessories industries could obtain additional corporate tax facilities following the Government Regulation No. 9 of 2016 and Minister of Industrial Regulation No. 1 of 2018. If the company conducts research and development activities, they could obtain a corporate tax deduction of up to 300% of their research and development expenses as regulated in Government Regulation No. 45 of 2019 and Minister of Finance Regulation No. 153 of 2020.

To further boost the policy, preparing competent human capital in the EV industry could also be pursued. So far, intensive research and development studies of EV and their components were led by 5 universities, which are University of Indonesia, Bandung Institute of Technology, Gadjah Mada University, Surabaya Institute of Technology, and Sebelas Maret University. However, the research was done primarily in EV development and belongs to particular majors, such as electrical engineering, mechanical engineering, etc. In preparing competent human capital in the EV industry, the government should develop a comprehensive curriculum and establish electric vehicles engineering study at universities and vocational high schools' level. Moreover, more workers would be needed for EV maintenance. The government could also establish training centres to train and certify technicians for EV. These technicians could then repair EV components and parts, thus there would be no need to do replacement for every failure of the parts.

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Finance (MoF): MoF will be involved in assessing national budgets for providing incentives in the form of import tax relaxation for a short-term period. They would also provide overarching regulation on this policy.
2. Ministry of Industry (MoI): MoI will be involved in providing analysis on what type of fiscal incentives are needed to attract more FDI to help develop domestic industry further. They would also help assess the workforce profile needed to further enhance the domestic EV industry.

3. Ministry of Education, Culture, Research, and Technology (MECRT): MECRT will be involved in developing a comprehensive curriculum for university and vocational high school level that would be suited for EV industry needs.

#### **2.5.4. Potential Challenges**

Attracting FDIs has never been an easy task for the government. Patunru and Surianta (2020) explained that the Government of Indonesia is falling behind in attracting FDIs due to a complex regulatory system. The Government of Indonesia has passed Law No. 11 of 2020 on Job Creation that revokes or revises over 1,200 articles in 79 laws deemed problematic for investors. However, they argued that passing the bill alone is not enough. The government should exert tighter control over ministerial regulations and conduct periodic review of regulations.

In the vocational education landscape, Suharno et al. (2020) explained that some of the challenges faced were inadequate facilities, teachers, and industry support. To tackle these challenges, the government needs not only to extend the budget to strengthen the vocational curriculum, but also needs to establish a supporting regulation that links and matches the vocational institutions with the industry.

### **2.6. Set More Campaign on EV's Benefits Through Media and Usage by Government Institutions**

#### **2.6.1. Opportunities**

There needs to be more literacy campaigns on Indonesia's pledge for climate change mitigation and stress the importance of EVs adoption to decarbonize Indonesia's energy system. This would allow the public to become more aware towards climate change issues and also recognizes EV as one of the solutions for decarbonization. Eventually, this would in turn lead to companies being more attracted to invest in the EV landscape as well. This will create more demand, while also ensuring that there is always supply of various electric vehicles models.

#### **2.6.2. Overview**

In this early stage, focusing on electric 2W adoption is a viable strategy, mainly due to its purchase price competitiveness with their ICE counterparts. In order to draw more ride-hailing drivers to switch to electric 2W, the government would need to provide a more practical campaign on the usage of EVs, highlighting the performance, model and its characteristic that it is hassle-free. One of the strategies is to do more public procurement of electric 2W for ministries and/or other government institutions. As for the public, there must also be a more gender-responsive and inclusive campaign on various media, such as through broadcast, print, internet, and social media, about the benefits of EV in general (including electric 2W), its technical advantages, and the currently available models on the market. In addition to the wider community, the EV campaign

needs to be targeted at women and persons with disabilities, to support their economic activities and promote independent living.

### **2.6.3. Framework**

Key stakeholders that would be involved in this policy recommendation are:

1. National Procurement Board (LKPP): They are in charge of procuring things for national government institutions. Therefore, they would be involved in coordinating EV procurement for ministries and other national agencies.
2. Jakarta Procurement of Goods/Services Agency (BPPBJ): They would help the Jakarta Provincial Government by creating guidelines and technical standards for the procurement of goods and services along with supervising and facilitating the implementation. Hence, BPPBJ can support in planning and conducting procurement for electric 2W along with their needed infrastructures, such as battery swap stations, for provincial government institutions.
3. Ministry of Environment and Forestry (MoEF): They would be able to provide content for campaigns that contain issues such as climate change, decarbonization and EV environmental impacts.
4. Ministry of Energy and Mineral Resources (MEMR): They would be able to provide content for campaigns that contain issues such as decarbonization, EV role in improving energy security, and EVs adoption target in the future.
5. Ministry of Communication and Informatics (MoCI): They would work with ministries to promote EV through various media (broadcast, print, internet, and social media) on national level.
6. Jakarta Communications, Informatics, and Statistics Agency (Diskominfo): They would work with ministries and provincial governments to promote EV through various media (broadcast, print, internet, and social media) on province and city level.

### **2.6.4. Potential Challenges**

Setting more campaigns on EV benefits through printed media and social media, as well as public procurement will cost a lot of money. Another challenge is ensuring all people from various socio-economic groups have access to such campaigns. Also, making the right and effective gender-responsive and inclusive campaign is not an easy thing to do, so the government will have to be more aware of this.

## **2.7. Strengthen Domestic Electric 2W Industry through Better Support on R&D, Multi-Stakeholders' Collaboration, and LCR Relaxation**

### **2.7.1. Opportunities**

The EV industry is a new thing in Indonesia. Manufacturers of electric 2W in Indonesia consist of many emerging new domestic players that previously did not take part in the conventional 2W landscape. In the medium to longer term, Indonesia will need support from the domestic industry to supply EV. The existence of the EV industry will lower the production cost of EV and also contribute to the overall economy of the nation. The benefits will be even greater if Indonesia manages to develop its own homegrown EV technologies and commercialise it on the national and international markets.

### **2.7.2. Overview**

In order to achieve this, more R&D financial support is needed to develop EV and battery technologies that are more suited to the Indonesian market. This should also be followed by more participatory consultations and collaboration between the government, research institutions, local EV producers, and representatives of communities or users, including women and persons with disabilities, as part of the program to strengthen and commercialise these homegrown EV technologies.

However, at the same time, before Indonesia is ready to market its own EV products, they need to attract more EV and battery foreign manufacturers to supply the market, lower the overall cost of production, and to learn from them. Therefore, the government needs to have a mechanism to loosen up the local content requirement (LCR) regulation, which is currently scheduled to be implemented in 2023. Otherwise, the price for EV will go up, thus limiting the adoption rate.

### **2.7.3. Framework**

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Finance (MoF): MoF could allocate a budget for the government and research institutions who have a role in developing EV products, as well as giving incentives for the research and development of EV.
2. National Research and Innovation Agency (BRIN): BRIN could help coordinate all research institutions in related sectors to develop suitable EV technology for Indonesia. They could also coordinate all research institutions to prevent redundancy in their works.
3. Ministry of Industry (MoI): MoI could analyse domestic EV industry readiness so that suitable LCR could be imposed in a timely manner that would not make domestic EV players to rely heavily on foreign suppliers.



#### 2.7.4. Potential Challenges

Financial support, as well as collaboration among stakeholders, would be a challenge in developing homegrown EV production in Indonesia. While allowing foreign manufacturers to supply the market, knowledge transfer should be intensively done and planned clearly to accelerate the homegrown EV production development. To find the right balance of foreign manufacturers' involvement to support the homegrown manufacturers growth is critical. The presence of foreign manufacturers should support the development of homegrown manufacturers, and not to be overly relied on.

### 2.8. Gender-Responsive and Inclusive Vehicle Specifications for E2W

#### 2.8.1. Opportunities

Currently, motorcycles are still not considered yet as a legal mode to carry passengers commercially as stated on Law No. 22 of 2009 on Traffic and Road Transport. Therefore, based on the MoT Regulation No. 12 of 2019 on the Safety Protection for Users of Motorcycles Used for Public Interest, the Indonesian Government does not regulate 2W ride-hailing drivers to have a special ride-hailing permit. Those regulations also do not include the penalty for disobeying the rules stated on the same regulation, for both ride-hailing drivers and operators. It has been said that both Law No. 22 of 2009 and MoT Regulation No. 12 of 2019 would be revised to accommodate those gaps. However, it was still unclear by the time this report was made.

On the other hand, several countries have required specific permits for ride-hailing drivers to be able to operate in their respective countries. To gain the permit, vehicles to be used as ride-hailing vehicles would need to comply with the specifications or requirements set by the governments. These specifications could also determine the suitable type of services for the drivers such as passengers only, foods only, goods only, and combinations. Through MoT Regulation No. 12 of 2019, the government has regulated 2W specifications for ride-hailing purposes, especially for passenger transport services. However, the regulation is deemed to be too shallow. Ride-hailing operators have also regulated vehicle specifications that could be used for ride-hailing services, by specifying the maximum engine capacity, maximum vehicle age, and so on. However, this does not cover the required specifications for electric 2W to be used as ride-hailing vehicles.

The existing policy, such as the MoT Regulation No. 44 of 2020 on Physical Testing on BEV, has described the overall electric 2W specifications and testing methods, such as emission standards, speed limit, and minimum noise level. However, it has not covered specifications related to GPS-based tracking system, brightness of headlamp, additional cues for horn, and other specifications that are important to accommodate vulnerable groups' needs captured from the previous FGD conducted with representatives of people with disabilities. Specifications such as lightweight body and a low seat might also be needed to cater smaller size adults, including women and persons with disabilities.

### 2.8.2. Overview

The ride-hailing permit policy will allow the government to calculate the number of active ride-hailing drivers, as well as to make it easier for the government to ensure their vehicle specifications meet the safety, security, comfortability, and emission level standards set by the government. Implementation examples could be observed from India and China. Some states in India require ride-hailing drivers to have contract carriage permits from their relevant transport authorities. 2W used as ride-hailing vehicles should also be registered using the yellow number plate with black lettering. China has also required a permit for car-based ride-hailing drivers. It has been effectively done since 2019 where ride-hailing operators started to ban drivers without such permits.

The existence of ride-hailing permits would also enable the government to require all ride-hailing vehicles to be electric, similar to what happens in some states in India and China, thus allowing a higher electrification rate on ride-hailing vehicles. London also has required vehicles to be zero-emission capable, which means they need to have a minimum of 10 miles of electric range, emit less than 75 g CO<sub>2</sub>/km, and comply with the Euro 6 emission standard (TfL, 2021). In France, 10% of taxis and ride-hailing vehicles need to emit less than 60 g CO<sub>2</sub>/km by 2020, whereas in the city of New York, only electric vehicles are allowed to get a permit for ride-hailing vehicles after July 2019 (Hall et al., 2021).

Besides the permit and emission level, other required vehicle specifications such as minimum noise level would be useful as a reference for electric vehicle OEMs to design electric 2W that at least make a sound or provide a special alarm for alerting purposes, as well as prevent potential accidents and ensure road users' safety and comfort. Learning from India, China, and Vietnam, GPS based tracking systems are a required feature of ride-hailing vehicles to ensure the safety and security of the passenger. The minimum standard for brightness of the headlight and provision of additional visual cues for the horn would also be useful to help road users aware of electric 2W passing by, especially for pedestrians with visual disabilities and/or hearing disabilities.

### 2.8.3. Framework

Key stakeholders that would be involved in this policy recommendation are:

1. Ministry of Transportation (MoT): MoT will be in charge of policy formulation. The activities consist of legalising 2W to support the overall public transport system, such as to be used as connectors for first and last mile, by revising Law No. 22 of 2009 on Traffic and Road Transport. Then, they would need to regulate detailed electric 2W specifications for ride-hailing by formulating new ministerial regulations, or revising MoT Regulation No. 12 of 2019 on the Safety Protection for Users of Motorcycles Used for Public Interest. They would also need to formulate policy regarding electric 2W specifications testing procedure for ride-hailing, as well as formulating policy regarding ride-hailing driver's permit and ban on vehicles without such permits.

2. Jakarta Transport Agency (Dishub): Along with Ride-hailing Operators, they will be in charge of vehicle specifications testing which consists of electric 2W specifications testing for ride-hailing and driving experiences test for ride-hailing drivers.

#### **2.8.4. Potential Challenges**

The number of changes in revising a policy and the development of a new policy will require extensive efforts from all related stakeholders. It would also need a costly awareness campaign about the implementation of the proposed changes to minimise confusion among ride-hailing operators and drivers.

### **2.9. Operational Guidance for E2W**

#### **2.9.1. Opportunities**

Providing safe and convenient infrastructures is crucial to accelerate the electric 2W adoption. Electric 2W in general currently are slower than conventional motorcycles and the overall vehicles in the mixed traffic. Drivers' interviews and consumers' surveys show that due to this lower speed of electric 2W, using electric 2W in the mixed traffic is seen to be riskier compared to using conventional 2W. Therefore, eliminating the safety issues should be done to encourage drivers and also consumers to shift from conventional 2W towards electric 2W.

Electric 2W has tricky characteristics of speed that may fall into grey areas between bicycles and motorcycles. It is faster than a bicycle, yet generally slower than a conventional motorcycle. With current mixed traffic that mostly exceeds the speed limit of 50 km/h in the urban area, putting electric 2W, especially electric moped and bicycle, would expose them to dangers. Yet, allowing electric 2W on the bike lane, if any, would shift the danger to the cyclists, who are currently being more vulnerable among street users along with pedestrians. The mix traffic operation should be changed such as speed limit and lane assignment to safely integrate electric 2W, and accommodating all street users' needs.

While the classification of electric 2W might not be clear enough yet, the requirements to operate electric 2W should also be highlighted since they are easier to use. There is a need for clear policies regarding electric 2W classification and operation requirements, including maximum and minimum speed limit for electric 2W on the road, as well as electric 2W users' minimum age limit and operational equipment.

Another concern that arises is the way to gain a special driving licence for persons with disabilities. Even though the governments have provided opportunities for persons with disabilities to use vehicles and gain driving licences, the regulation is still unclear for people with hearing impairments. Based on the Law No. 22 of 2009 on Traffic and Road Transport and the Indonesian National Police Regulation No. 9 of 2012 on Driving Licences, it was regulated that persons with disabilities could gain type D driving licences (SIM D). However, those are only implemented in

some regions of Indonesia. Moreover, to gain the type D driving licences people with disabilities should pass one of the health requirements which is the capability to hear. Therefore, this regulation regarding driving licences for people with disabilities, especially hearing-impaired people, should be reviewed and revised to facilitate a much more detailed safety requirement.

## 2.9.2. Overview

Policy regarding lanes, minimum speed limit, and minimum age restrictions that accommodate electric 2W's operation on the road could potentially increase road safety, road comfort, as well as make it easier for road users to differentiate electric 2W from conventional 2W. Several cities in China have allowed electric cars to have access to bus lanes. However, this case would not be suitable for electric 2W due to safety and comfort issues that the electric 2W's users might get if the vehicles are allowed to operate in bus lanes. In New Zealand, Auckland has an EV related program that aims to allow road controlling authorities to give EV access to special vehicle lanes such as bus lanes and transit lanes. However, based on the initial evaluation, it was concluded that it is too risky and has the potential to undermine the rollout of the New Bus Network (Auckland Transport, 2016).

Under New York State law, e-bikes are now classified in the same category as regular bicycles and it is currently permitted to travel up with a speed limit no greater than 30 miles per hour, the same as the speed limit for cars in New York City. Age restrictions are also applied for electric 2W's operation, which is restricted for 16 years old and above. Meanwhile, e-moped and e-motorcycle are not allowed to use bike lanes as concerns arose regarding pedestrian and conventional bike users' road safety. Several resolutions were introduced, such as keeping e-bikes out of bike lanes and calling for more enforcement of vehicle and traffic laws.

Since there are quite a lot of ride-hailing drivers who are hearing impaired, a special driving permit for persons with disabilities would also be useful for drivers to avoid traffic tickets and a sign for legal driving. Learning from India, the Delhi High Court in 2011 permitted deaf persons to legally drive a vehicle with an added precaution that there should be a display of a sign indicating the driver is hearing impaired. All such applicants also need to take a stringent driving test under the actual road condition circumstances as is the case for normal individuals (MoRTH, 2016). This also applies in most countries in Europe and America. People who are deaf are permitted to drive after taking a test, and their vehicles are required to be fitted with extra-large side view mirrors, light signals, and a sign at the back of the vehicle indicating that the driver was deaf (SLIC, 2011).

## 2.9.3. Framework

Key stakeholders that would be involved in this policy recommendation are:

1. The Ministry of Transportation (MoT): MoT will be in charge of further consultation and assessment with Academics and Research Institutions. They need to classify the types of electric 2W to be allowed to operate in special lanes (bike lanes), as well as assessing the

costs, benefits, impacts, and legal implications of allowing electric 2W in special lanes (bike lanes, etc). Concerns from road users, especially bike users, should also be considered before the development of awareness and enforcement campaigns.

2. Indonesian National Police (POLRI): POLRI will implement regulations that would allow persons with disabilities to get special driving licences with additional relevant requirements.
3. Jakarta Transport Agency (Dishub): Along with MoT, Dishub would then be in charge of policy formulation. The activities consist of formulating national and local-level policy regarding electric 2W special lanes. This should also be integrated with bike lanes and conventional motorcycles access prohibition regulation. They would also need to formulate national and local-level policies regarding electric 2W operational guidance including minimum speed limit on the road and users age limit.
4. Jakarta Highway Agency (DBM): In collaboration with Academics and Research Institutions, Dinas Bina Marga will be in charge of providing adequate bike lanes. They will plan and develop protected bike lanes, develop awareness and enforcement campaigns, and conduct pilot testing or potential trials along with the deployment of electric 2W for ride-hailing.

#### **2.9.4. Potential Challenges**

Several challenges regarding the electric 2W classification and lane assignment would be revolving around the standardisation of the lane. For instance, if an electric bicycle is allowed to use a bike lane, it would be important to decide whether all bike lanes or only selected bike lanes are allowed to be used. This also includes the problems with the currently limited bike lane, in length and width. It will also require an extensive and costly awareness campaign about the implementation of the proposed changes to minimise road users' confusion.

Furthermore, one thing that should be considered is concerns from bike users regarding the potential accidents, crashes, and near-misses that will probably occur. As the number of electric 2W increases in the future, it will become an issue for bike users and the purpose of bike lanes. Enforcement of lane assignment and intervention such as speed limit would also be one of the biggest challenges as it is already being a challenge in present days.

## 2.10. Summary

To summarise, here is the list of recommended policies elaborated in this report:

*Table 2 Summary of Policy Recommendations*

No.	Policy	Opportunities	Overview	Framework	Potential Challenges
1	Set One Nationally Integrated and More Ambitious EV Adoption Target	Existence of several EV adoption and/or production targets, including E2W	<ul style="list-style-type: none"> <li>- To synchronise every EV adoption and/or production target, resulted in a single integrated national target</li> <li>- To make the national target more ambitious to achieve NZE by 2060</li> </ul>	<ul style="list-style-type: none"> <li>- <b>CMMIA</b> to initiate discussion with ministries under the coordination team</li> <li>- <b>MEMR</b> and <b>Mol</b> to synchronise their current target</li> <li>- <b>MoEF</b> to analyse EV adoption rate needed to achieve NZE by 2060</li> </ul>	<ul style="list-style-type: none"> <li>- Each government entity has their own agenda and goal</li> <li>- More aggressive implementing regulations will be needed</li> </ul>
2	Provide Direct Incentive with Tax Exemption and Lower Interest for Electric 2W Ownership	Electric 2W are still considered to be more expensive than conventional 2W	<ul style="list-style-type: none"> <li>- To provide further tax relaxations for EV</li> <li>- To provide more attractive leasing or credit scheme for EV compared to conventional vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoF</b> to formulate further tax relaxations for EV</li> <li>- <b>Bank Indonesia</b> to provide implementing regulations on attractive leasing scheme for EV and inform them to financial institutions</li> <li>- <b>Local government</b> to issue implementing regulation on local tax relaxations</li> </ul>	<ul style="list-style-type: none"> <li>- Tax relaxation implementation often is up to the local governments, despite of the provision of overarching regulation issued by the national government</li> <li>- Recipients of tax relaxations might not be clearly stated, thus creating confusion for public</li> </ul>
3	Set Solid Disincentives for ICE Through Fuel	Electric 2W are still considered to be	<ul style="list-style-type: none"> <li>- To formulate tax fees based on fuel economy standard</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoEF</b> to provide environmental impact analysis in order to formulate suitable disincentive</li> </ul>	Public acceptance is expected to be low



No.	Policy	Opportunities	Overview	Framework	Potential Challenges
	Economy Standard and Ban Regulation	more expensive than conventional 2W	<ul style="list-style-type: none"> <li>- To implement conventional vehicle usage ban</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MEMR</b> to provide energy impact analysis in order to formulate suitable disincentive</li> <li>- <b>MoI</b> to provide analysis of impact towards automotive industry in order to formulate suitable disincentive</li> <li>- <b>MoT</b> to implement non-fiscal disincentive through TDM at national level</li> <li>- <b>Jakarta Governor</b> to set roadmap for 100% conventional vehicles ban</li> <li>- <b>Dishub</b> to implement non-fiscal disincentive through TDM at local level</li> </ul>	
4	Boost Charging Infrastructure Rollout for Electric 2W	Range anxiety is present between potential electric 2W users, including ride hailing drivers	<ul style="list-style-type: none"> <li>- To formulate a detailed charging infrastructures and BSS deployment plan, including the number of plug-in chargers, the number of BSS, and suitable locations for both types of charging infrastructures</li> <li>- To make the deployment plan more ambitious, aligned with revised EV adoption rate target</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MEMR</b> to provide supporting regulations for charging infrastructures deployment</li> <li>- <b>PLN</b> to adjust the roadmap for charging infrastructures deployment plan and build them at identified locations</li> <li>- <b>MoF</b> to provide fiscal incentives to attract more private investors</li> <li>- <b>BRIN</b> to support in formulating detailed deployment plan and assessing optimal locations for charging infrastructures</li> <li>- <b>BSN</b> to specify standards on batteries and charging and/or battery swap stations</li> <li>- <b>DCKTRP</b> and <b>Dishub</b> to help assessing potential area for deploying public charging infrastructures</li> </ul>	<ul style="list-style-type: none"> <li>- Data to compose detailed deployment plan might not be available yet</li> <li>- Battery standardisation might slow down charging infrastructures deployment effort, if done prematurely</li> </ul>

No.	Policy	Opportunities	Overview	Framework	Potential Challenges
5	Put Enhancement on After Sales Market for Electric 2W	Most electric motors and batteries used in EV currently are not serviceable and would need to be replaced when failure happened.	<ul style="list-style-type: none"> <li>- To decrease import tax for electric 2W spare parts, in the short term</li> <li>- To provide incentives for investors to build spare part factories in Indonesia</li> <li>- To prepare competent human capital to support EV industry</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoF</b> to help assessing national budget for incentive provision</li> <li>- <b>MoI</b> to provide analysis on which incentives are needed for industry players</li> <li>- <b>MECRT</b> to develop comprehensive curriculum for EV industry needs</li> </ul>	<ul style="list-style-type: none"> <li>- Attracting more FDIs could be difficult</li> <li>- Inadequate supporting system to develop needed human capital</li> </ul>
6	Set More Campaign on EV's Benefits Through Media and Usage by Government Institutions	Current demand for EV is too low to attract more investors on EV landscape	<ul style="list-style-type: none"> <li>- To do more public procurement of electric 2W for government institutions</li> <li>- To create inclusive EV's benefit campaign through various media</li> </ul>	<ul style="list-style-type: none"> <li>- <b>LKPP</b> to coordinate EV procurement for government agencies on national level</li> <li>- <b>BPPBJ</b> to coordinate procurement for government agencies on local level</li> <li>- <b>MoEF</b> to provide campaign content on environmental benefit of EV</li> <li>- <b>MEMR</b> to provide campaign content on energy benefit of EV</li> <li>- <b>MoCI</b> to coordinate campaign through various media on national level</li> <li>- <b>Diskominfo</b> to coordinate campaign through various media on local level</li> </ul>	Ensuring all socio-economic groups have equal access to such campaigns might be difficult
7	Strengthen Domestic Electric 2W Industry through Better Support on R&D, Multi-Stakeholders'	Domestic EV industry just only emerged and still in the early phase	<ul style="list-style-type: none"> <li>- To provide more financial support on R&amp;D related to EV and battery technology</li> <li>- To implement LCR relaxation until domestic EV industry is</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoF</b> to provide further financial supports for research institutions that develop EV technologies</li> <li>- <b>BRIN</b> to coordinate research institutions in developing suitable EV technologies</li> </ul>	<ul style="list-style-type: none"> <li>- Cost efficient financial support might be challenging to develop</li> <li>- Foreign manufacturers presence might hinder domestic EV industry readiness</li> </ul>

No.	Policy	Opportunities	Overview	Framework	Potential Challenges
	Collaboration, and LCR Relaxation		ready to provide sufficient supplies	- <b>MoI</b> to provide analysis on domestic EV industry readiness	
8	Gender-Responsive and Inclusive Vehicle Specifications for E2W	Lack of instruments for the government to regulate the minimum specifications for ride hailing vehicles, including permitting low-emission 2W only to be operated as ride hailing vehicles	<ul style="list-style-type: none"> <li>- To acknowledge 2W as one of the modes used for transporting passenger and supporting the overall public transport system as a first and last mile connectors</li> <li>- To implement ride hailing permit for both drivers and vehicles</li> <li>- To set a detailed gender-responsive and inclusive vehicle minimum specifications for electric 2W, including those to be used as ride hailing vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoT</b> to create new or revise existing regulation to acknowledge 2W in overall public transport system as a first and last mile connectors</li> <li>- <b>MoT</b> to implement ride hailing permit and formulate inclusive electric 2W vehicle specifications on national level</li> <li>- <b>Dishub</b> to formulate inclusive electric 2W vehicle specifications, including those to be used as ride hailing vehicles, on local level</li> </ul>	Comprehensive changes to existing regulation will require extensive efforts from all stakeholders

No.	Policy	Opportunities	Overview	Framework	Potential Challenges
9	Operational Guidance for E2W	<ul style="list-style-type: none"> <li>- Electric 2W currently fall into grey area between bicycles and motorcycles</li> <li>- Ambiguity on special driving licences for persons with disabilities</li> </ul>	<ul style="list-style-type: none"> <li>- To create a comprehensive electric 2W operational guidelines, including which lane to use, minimum and maximum speed limit, and minimum age for the drivers</li> <li>- To create inclusive requirement that would allow everyone with every ability to gain driving licences</li> </ul>	<ul style="list-style-type: none"> <li>- <b>MoT</b> to provide comprehensive background study on electric 2W usage and its implications towards other road users</li> <li>- <b>MoT</b> to provide clear classifications for electric 2W on national level</li> <li>- <b>POLRI</b> to provide implementing regulations to allow persons with disabilities to obtain driving licences</li> <li>- <b>Dishub</b> to provide clear classifications for electric 2W on local level</li> <li>- <b>DBM</b> to provide suitable bicycle lanes accommodating certain types of electric 2W</li> </ul>	<ul style="list-style-type: none"> <li>- Further adjustments on current bicycle lanes might be needed to accommodate electric 2W</li> <li>- Comprehensive enforcement of the operational guidelines might be difficult to be done</li> </ul>

\*Notes: Texts in **green** are **national level** institutions, while texts in **blue** are **local level** institutions.

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