



*This document will explain the guideline to integrate electric two wheelers ride hailing fleets in urban traffic.*

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

**Electric 2W Integration to Urban Traffic Guideline**

18/03/2022

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## Executive Summary

*To equitably address traffic violence, climate change, and quality of life by improving conditions for E2W & E3W and shifting away from ICE motorcycles.*

Motorcycles constitute almost two-thirds of the motorised vehicles in Indonesia and are involved in almost three-fourths of traffic crashes. They are noisy, with their constant drone seeping into people's homes. They are stored, seemingly haphazardly, on almost any patch of sidewalk, blocking passage of people, especially those with disabilities.

This report is done in collaboration with UNEP, foresees an opportunity to shift away from internal combustion engine (ICE)-powered motorcycles and toward electric two and three wheeled vehicles. Two and three wheelers are enviable for their manoeuvrability and provide mobility for millions. They integrate well with transit as first/last mile options. An electric fleet of e-bikes, e-mopeds, e-rickshaws, and e-scooters can be safe, secure, inclusive, and livable.

The shift towards electric 2&3W is already happening. They are already used privately and commercially for passenger or cargo purposes. The Indonesian government incentivises their purchase with a lower vehicle tax. They support industry research and development. Charging infrastructure is being standardised and installed. Laws are largely in place to accommodate these vehicles, albeit with minor tweaks.

This report recommends nine action items to promote electric 2&3W in Jakarta and Indonesia, organised into four themes: street design and operations, street management, street users, and vehicles.

### 1. Modify Lane Assignments

- A concerted effort must be made to keep motorcycles off sidewalks and out of bike and BRT lanes. They simply do not belong in these spaces and negatively impact others tremendously. The general solutions are cubs, bollards, automatic bollards, and electronic enforcement.
- Allowing electric 2&3W to use the through lanes of multiway boulevards will equalise travel options. This will require a change in the law, which currently privileges higher speed vehicles. Simultaneously, the speed limit on the through lane would be reduced to 40 km/h (see below).

### 2. Lower Vehicle Speed

- The following speed limits are proposed, in accordance with global best practices. Some are lower than existing, so will require a change in regulation.
  - 15 km/h: streets without sidewalks
  - 25 km/h: bike lanes, cycle tracks

- 30 km/h: mixed traffic streets without a protected bicycle facility; access lane on multiway boulevards
- 40 km/h: mixed traffic streets with a protected bicycle facility; through lanes on multiway boulevards
- To self-enforce these speed limits, traffic calming and narrower lanes are proposed. Physical changes to the street (speed humps, raised crosswalks, etc.) are proven methods to reduce speed and manage drivers 24/7.

### 3. Reduce Conflicts

- A number of collisions involving motorcycles, and by proxy electric 2&3W, occur at intersections. Often these locations lack basic safety infrastructure such as raised crosswalks, pedestrian refuge islands, slower vehicle turns, and signal priority for people walking and cycling. It is proposed to retrofit high-conflict intersections and make them more “complete”.
- Interactions between 2-wheelers and buses at bus stops are a continuing issue. Buses need to stop while cyclists want to go. In order to prioritise both transit and cycling, it is proposed to install bus bulbs and cycle tracks behind the bus stop. The stops would be on the far side of signalised intersections, which makes for smoother bus/bike interaction.

### 4. Limit Through Traffic

- With the rise of ride-hail apps has come a commiserate rise in trips through neighbourhoods, often to avoid congested thoroughfares. To counter, the circulation network of each neighbourhood can be tweaked to limit through traffic. This generally involves traffic calming measures such as diagonal diverters, closed sections of street, 1-way schemes, and gates. Permeability is always reserved for non-motorised transport.

### 5. Manage Curb Use

- Consistent with keeping motorcycles off sidewalks, on-street parking should only be allowed where sufficient walking/cycling spacing exists.
- Where on-street parking is allowed, priority should be given to electric 2&3W.

### 6. Encourage last mile connectivity with transit

- In researching this project, it was discovered that a number of ride-hail trips paralleled transit routes - effectively competing with transit. It is proposed that ride-hail trips be encouraged to serve and integrate with the transit (MRT, LRT, BRT) system.
- Bike share is proposed within 3 km of all MRT, LRT, and BRT stations.

### 7. Clarify Minimum Age, Permit, and Safety Accessories

- The current registration model is not clear for lower speed e-vehicles. It is proposed to create a class of e-vehicles with a maximum speed of 25 km/h. Registration and helmets would not be required, similar to conventional bicycles.
- Registration and helmets would be required for vehicles that can exceed 25 km/h.

## 8. Require Speed Limiters

- To support lower speeds (see above), vehicles can be fitted with speed limiters. These would be reflected on licence plates, and gain privileges, such as the use of a bike lane and/or lower taxes.
  - 25 km/h for use in bike lanes
  - 40 km/h for general use on city streets

## 9. Require Noise Limiters and AVAS

- Electric vehicles are, by definition, quieter than ICE-powered vehicles. It is proposed to similarly limit motorcycle noise to 80 dB, the global best practice.
- Electric vehicles are often so quiet that they are hard to detect by people walking. To compensate, acoustic vehicle alert systems (AVAS) are proposed to be required in electric 2&3W, similar to that in EVs.

To better engage the reader, a series of illustrations are included in this report. They apply the physical interventions (cycle tracks, raised crosswalks, wider medians, and wider sidewalks) to streets typically found in Jakarta and Indonesia, from shared streets to multiway boulevards. They also detail specific recommendations such as intersection design, bus stop and bike lane design, and lay by design. It is imperative that streets in Jakarta become more “complete”, less dangerous, and more accessible to all Indonesians.



## 1. Introduction

### 1.1. Guideline Specifics

This guideline is composed under the UK PACT (Partnering for Accelerated Climate Transition) project of “Road Map and Timetable of Two-Wheeler Electrification in Greater Jakarta” in an effort to provide action plan to electrify two-wheeler in Greater Jakarta, starting with ride hailing fleets. One of the activities to be done by the project delivery team is to compose a guideline to prevent issues happening with current conventional 2W to occur again along with the uptake of electric 2W in the future. It was found that the UNEP (United Nations Environment Programme) is currently doing similar work on integrating electric 2W and 3W into urban traffics in Indonesia. Considering that results alignment between projects is important to increase support and buy-in from all relevant stakeholders, a collaboration was made between the two teams and resulted in this guideline.

This effort is in partnership with the primary regulators, Jakarta Transport Agency and Indonesian Ministry of Transport, to improve the safety of riding and air quality in urban mobility. The recommendations are presented for adoption and inclusion to current policies in national and regional level that considers the complete street design and E2W & E3W (both ICE and electric-based). The revision and addition are expected to be included in the current prevailing regulation and policy.

As the outcome, the recommendation is expected to be used as a guideline to implement the electrification of 2&3W. The regulation should accommodate all street users including ICE motorcycles, bicycles, and the “new” electric 2W and 3W, including the vulnerable. This will help the government to minimise the excessive presence of ICE motorcycles and promote the shifting to friendlier transportation means. This project will help significantly reduce greenhouse gas emissions (GHG) and improve air quality, while providing tangible benefits for low-income and marginalised communities.

### 1.2. Guideline rationale

Indonesia has one of the highest motorised mode shares in the world<sup>1</sup>. Commuting motorcycles powered by internal combustion engines (ICE) are the most popular motorised vehicle. For private usage, the mode share of motorcycles in the Jakarta Greater Area in 2019 is much higher compared to in the year 2004, although different methods used might apply. With 64.2% of the mode shares, the private motorcycle is the most preferred mode to commute by people, see

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<sup>1</sup> China (25%), Vietnam (15%), India (11%), Indonesia (9%), Thailand (9%), [from Legalising the illegal parking, a solution for parking scarcity in developing countries](#).

Appendix 4.1 for more details. In 2020 alone, it reached nearly 116 million units, and the average growth has been steady amounting to 5.4% per year in the last five years<sup>2</sup>.

Motorcycles are over-represented in crash statistics, largely due to their speed<sup>3</sup>. This implies a degrading level of safety despite the growing number of a favourite mode of transportation among Indonesians, for more details see Appendix 4.1.

Omnipresent motorcycle storage on streets, sidewalks, and plazas renders those spaces impassable and unusable for other activities. Motorcycle populations deteriorate the parking situation, roadways have remained unchanged and the construction of public parking spaces have been slowly developed and unable to cater the demand. As a result, illegal parking is breeding and consuming spaces<sup>4</sup>.

While motorcycles provide an unequalled level of economical access and convenience for many Indonesians, they are nevertheless killing them either directly via crashes or indirectly via pollution. This is to say nothing of the negative externalities that motorcyclists and motorcycles have on people walking, cycling, or simply being out in public.

A clear guideline that addresses the vehicle, policy, and street design aspects by considering the safety of riding and liveability will encourage people to shift to friendlier means. It can be done by raising awareness in terms of safety measures and the environmentally friendly approach in the design parameters of the E2W and E3W policy. In many countries that have been implementing such electrification, they can reap the benefit of space efficiency, less noise, and a considerable decrease in GHG emissions.

### **1.3. Guideline vision, objectives, and principles**

#### **1.3.1. Vision**

“To equitably address traffic violence, climate change, and quality of life by improving conditions for E2W & E3W and shifting away from ICE motorcycles”.

#### **1.3.2. Objectives**

##### **1. To reduce traffic violence and air/noise pollution caused by ICE motorcycles.**

The reduction of traffic violence will be attained by regulating street design, street management, street operations, street users, and vehicles. The metric is injury severity caused by traffic violence. A shift from ICE to electric-based vehicles will diminish air/noise

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<sup>2</sup> Growth of motorised vehicles based on unit type, [Central Bureau of Statistics Indonesia](#).

<sup>3</sup> Motorcycles make up 60% in the crash statistics in 2018, [Central Bureau of Statistics Indonesia](#).

<sup>4</sup> Thanh, T. T., & Friedrich, H. (2017). Legalising illegal parking, a solution for parking scarcity in developing countries. *Transportation Research Procedia*, 25. <https://doi.org/10.1016/j.trpro.2017.05.374>

pollution, as EVs produce fewer emission/noise. The metric is GHG emission and noise level.

**2. To improve conditions for electric powered 2- and 3-wheelers**

Currently, there are few specific regulations for 2- and 3-wheeler in Indonesian cities. This report contains a number of recommendations to address this deficit. The metrics are a) dedicated infrastructure built, and b) issuance of national- and regional-level policy.

**3. To increase quality of life on city streets**

Quality of life covers aspects including physical, social, economic, and psychological. Amid massive urbanisation coupled with an onslaught of ICE motorcycles, Indonesian cities have poor social inclusion for all street users, especially vulnerable groups, and poor behaviour of ICE motorcycle users. The metrics are a) shift from ICE to E2&3-wheelers, b) travel efficiency gains by coordinating first/last mile with transit, and c) a traffic comfort survey of users.

**4. To increase equity in the transport sector**

Equity implies all street users are entitled to use the space according to their purpose without discrimination. In practice, NMT users and newly existed electric fleets are an outlier as compared to ICE vehicles. The metric is a survey of vulnerable and disadvantaged people.

**1.3.3. Principles**

**Safe and secure**

- Allows people to protect themselves from danger, control recognisable hazards to achieve a tolerable level of risk
- Provides protection or resistance against possible harm perpetrated by others

**Inclusive and intuitive**

- Accommodates the needs of all users and all ability
- Provides clear and simple rules and guidance

**Shifts**

- Supports sustainable transportation system (prioritising NMT, supporting public transport)
- Encourages shifting to lower emission transport mode

**Liveable**

- Provides a healthy and happy urban living to people and good community wellbeing

## 1.4. Guideline definitions

This chapter summarises the definitions of terms used in this report. It includes technical, institutional, and legal terms. See Table 1 for more details.

*Table 1 Guideline Definitions*

Term	Definition
ICE Motorcycles	2-wheeler (also 3-wheeler) motorcycle powered by internal combustion engine (ICE)
Bicycle	A bike or bicycle is a non-motorized vehicle that uses a foot pedal as a propulsion system
Electric-two-wheeler (E2W)	Electric-powered vehicle that runs on two wheels. For instance, E-bike and E-motor.
Electric three-wheeler (E3W)	Electric-powered vehicle that runs on three wheels. For instance, electric tuk-tuk and auto-rickshaw.
Electric 2&3W	E2W and E3W
Electric bicycle (E-bike)	Electric-powered bicycle that can assist the foot pedal
E-motor	Motorcycle that is powered by an integrated electric motor to power the propulsion system. The electric scooter is one of the most common E-motor available in the market.
ROW	Right-of-way
AVAS	Acoustic vehicle alert systems
GHG	Greenhouse gas
ICE	Internal combustion engine
EV	Electric vehicle
NMT	Non-motorised transport
VTTS	Value of travel time saving
STNK	Vehicle certificate
SIM	Driving licence
SEV	Specific Electric Vehicle
NIK	Vehicle Identification Number
ETLE	Electronic Traffic Law Enforcement
UK PACT	United Kingdom Partnering for Accelerated Climate Transitions

UNEP	United Nations Environment Programme
Korlantas Polri	Traffic Corps of Indonesian National Police
PT PLN	Indonesian electric state-owned enterprise
Kemenhub	Ministry of Transportation Indonesia
Dishub	Transport Agency
Kementerian PUPR	Ministry of Public Works and Housings
Dinas PU	Public works agency
Jabodetabek	Jakarta, Bogor, Depok, Tangerang, and Bekasi area

## 2. Assessment of current situation

### 2.1. Operations

Two- and three-wheelers have been used for various purposes all over the world. From private to commercial use, these vehicles have transformed into essential transportation mode, which can be represented in trip typology in Figure 1.

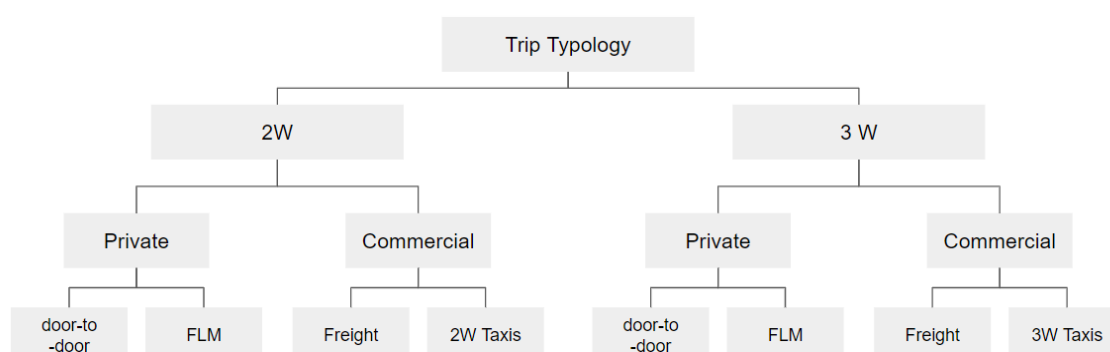


Figure 1 Trip Typology for Two- and Three-Wheeler Vehicles

#### 2.1.1. Two-wheeler

Due to the compactness and the competitive price, the two-wheeler has been one of the most favourable transportation modes in many countries, especially in developing countries. Two-wheeler is commonly used for private and commercial use, whether it is human-powered, electric motorised, or ICE motorised.

- Private

A two-wheeler is mainly used for transportation mode with two types of trips which are door-to-door and first and last mile trips. ICE motorcycles have been widely used in developing countries, replacing bicycles due to speed and longer distance range. However, due to being environment-friendly, the bicycle has been gaining popularity accompanied



by electric bicycles that support farther trips. Electric motorcycles and scooters are also replacing the ICE motorcycles with fewer emissions products.



*Figure 2 Bicycle and Motorcycle for Personal Use*

Source: Documentation of ITDP Indonesia

- Commercial

Two-wheelers are not only used for private transportation but also commonly occupied for commercial purposes such as cargo carriages and taxis. Ride-hailing service is one of the best examples where it covers passenger transportation, food order and delivery, and goods delivery service.

#### Passengers

Whether for door-to-door or first or last mile trips, a two-wheeler-based passenger transportation service has been widely used, especially in developing countries. With lower cost and more compact size, two-wheeler taxis are more preferred than car-based taxis. Bicycles were used for this purpose before being widely replaced by conventional motorcycles and the latest, electric motorcycles.

#### Cargo

Two-wheelers are also being used for cargo delivery services and mobile vendors. Like passenger transportation service, cargo delivery is also more favoured by motorcycles. However, with the rising awareness of transport emissions, bicycles and electric two-wheelers are gaining more popularity for this service. Mobile vendors which are popular in developing countries, mostly use motorcycles although the bicycle-based is still in sight.



Figure 3 Two-wheeler for Commercial Purpose (Left: Passenger, Right: Mobile Vendor)

Source: Documentation of ITDP Indonesia

## 2.1.2. Three-wheeler

Although not as popular as two-wheelers, three-wheelers are also used for passengers and cargo transportation, including informal transit in developing countries. Similar to two-wheelers, three-wheelers are also utilised for private and commercial use, both passenger and cargo transportation. Due to the larger capacity of the carriage, they are able to carry extra passengers or more cargo, hence serving different purposes than two-wheelers.

- Private

Three-wheelers are not very popular for private use, except for cargo bikes which have been gaining more popularity recently. With the ability to carry cargo, a cargo bike is suitable for carrying personal goods like groceries and even kids. However, the usage of cargo bikes, both human-powered and electric motor-powered, are still low and might be due to limited infrastructures.

Regular motorcycles and bicycles are often being modified to become three-wheelers to accommodate the needs of people with disabilities. It allows them to operate independently.



*Figure 4 Three-wheeled Bicycle for Person with Disability*

Source: Documentation of ITDP Indonesia

- Commercial

Wide range of three-wheeler vehicles has been commonly used for commercial purposes, both passenger and cargo transportation.

#### Passenger

In regard to passenger transportation, pedicabs and auto rickshaw are the two most common types of three-wheelers although the name may vary in different regions. Pedicabs are initially powered by humans but are now often seen combined with motorcycles and recently, electric motor-powered and pedal-assisted pedicabs are being used. These pedicabs are mainly occupied for tourism purposes or to transport passengers with extra passengers or cargo such as groceries. Similar to pedicabs, auto rickshaws are also used to transport passengers, but with better weather protection and speed.

#### Cargo

Transporting goods is the main purpose of three-wheelers. Many businesses utilise three-wheelers for transporting large size goods. The mobile vendors also use three-wheelers to be able to carry more goods. They are commonly using motorised three-wheelers due to the loads but electric-powered three-wheelers have been gaining popularity.



Figure 5 Three-wheelers for Commercial Purpose (Left: Passenger, Right: Mobile Vendor)

Source: Documentation of ITDP Indonesia

Based on the source of energy, the 2&3W are generally classified as follows (Table 2):

Table 2 Two- and three-wheelers classification based on energy source

Type	Wheels	Examples	Speed (up to- km/h)
Non-motorised	3W	Cargo Bicycle	20
	2W	Bicycle	20
Electric Motor	Pedal-assisted	3W	Electric Cargo Bicycle
		2W	Electric Bicycle
	Semi	3W	Electric 3W Moped
		2W	Electric Moped
	Throttle	3W	Electric Auto Rickshaw
		2W	Electric Scooter, Electric Motorcycle
ICE motor	3W	Autorickshaw, Cargo Motorcycle	70
	2W	Motorcycle	90

Details about advanced classification of two- and three- wheelers can be found in [Appendix 4.3](#).

## 2.2. Safety

ICE-powered motorcycles are overrepresented in crash data in Indonesia and Jakarta.

- 73% of all land transport crashes involve motorcycles<sup>5</sup>

<sup>5</sup> Korlantas Polri. 2019. *Potret Lalu Lintas di Indonesia 2019*. Jakarta: Kepolisian Republik Indonesia



- Significant growth in motorcycles has contributed to a higher rate of motorcycles' traffic crashes which involves around 2-3 casualties per day<sup>6</sup>
- Crashes involving women are reportedly higher than those involving men, with a ratio of 5:2<sup>7</sup>

These crashes have been attributed to a number of factors. First is speed. Motorcycles can be driven at speeds far and above the ability of the driver. Second is manoeuvrability. The manoeuvrability of motorcycles allows drivers to engage in risky behaviour. Third is street design. Streets that are designed like mini-highways allow higher speeds with less room for error. Poor infrastructure is also a cause of crashes, especially those involving motorcycles.

To better manage motorcycles and motorcyclists, policy instruments such as lane restrictions, area limitation, road pricing, and vehicle restrictions are needed<sup>8</sup>. Regulation of motorcycle special lanes, speed limit, and the use of helmets can reduce the impact of traffic crashes<sup>9</sup>. Another study<sup>10</sup> suggests that limiting travel distance of motorcycles could also reduce the risk of crashes.

As of this writing there is no crash analysis specific to electric 2&3W in Indonesia. A study from China identified factors related to increase injury severity of e-bike crashes: horizontal curves, high speed limits, unsignalised intersections, low street lighting levels, and heavy motorised vehicles<sup>11</sup>. A study from the Netherlands found no difference in hospitalisation rates between e-bike riders and conventional bike riders<sup>12</sup>. The higher speed of e-bikes, however, suggests more severe injuries and a higher crash risk<sup>13</sup>.

### 2.3. Policies, laws, and regulations

The current legal and regulatory situation is presented in this chapter. The content includes laws, government regulations, regulations of various ministers, and presidential regulations. They form the basis for the recommendations in the next section.

<sup>6</sup> Soehodho, S. 2017. Public transportation development and traffic accident prevention in Indonesia. *IATSS Research*. 40(2), pp. 76-80

<sup>7</sup> Setyowati, D. 2018. Queenriders, Startup Edukasi Aman Berkendara bagi Perempuan. Katadata. [Online]. 1 December 2018. [Accessed on April 2021]. Available from: <https://katadata.co.id>

<sup>8</sup> Lubis, H. 2009. Motorcycles Growth and Its Impacts to Urban Transportation. *Proceedings of the Eastern Asia Society for Transportation Studies*. 7, pp.329-342.

<sup>9</sup> Shibata, A. and Fukuda, K. 1994. Risk factors of fatality in motor vehicle traffic accidents. *Accident Analysis & Prevention*. 26(3), pp.391-397.

<sup>10</sup> Oxley, J., Yuen, J., Ravi, M.D., Hoareau, E., Mohammed, M.A.A., Bakar, H., Venkataraman, S., and Nair, P.K. 2013. Commuter motorcycle crashes in Malaysia: An understanding of contributing factors. *Annals of Advances in Automotive Medicine*. 57, pp.45-54

<sup>11</sup> Crash injury severity analysis of e-bike riders: a random parameters generalised ordered probit model with heterogeneity in means, <https://doi.org/10.1016/j.ssci.2021.105545>

<sup>12</sup> The Safety of E-Bikes in The Netherlands, [International Transport Forum OECD](https://doi.org/10.1080/01441647.2015.1069907)

<sup>13</sup> E-bikes in the mainstream: Reviewing a decade of research, <https://doi.org/10.1080/01441647.2015.1069907>



In addition, the summary of policies benchmark in some countries has also been added, see [Appendix 4.2](#) for more details.

### 2.3.1. Street design and operation

Three regulations pertaining to the physical design of the streets and affecting E2W & E3W have been identified. See Table 3 for detailed remarks.

- Law no 22 of 2009 covers road elements, safety prioritisation, and traffic rules, especially for motorcycles and bicycles. The law lists street requirements, exhibiting a hierarchy of road users to support the traffic operation (safety), which is a good foundation to develop a dedicated E2W & E3W regulation in a safe manner. In practice, however, the violations of motorcycles are still apparent, e.g., trespassing of pedestrian space and speeding on fast lanes<sup>14</sup>. In addition, the specific mention about electric-based motorcycles and bicycles is not there, despite the existence of E2W and E3W since the early 2000s<sup>15</sup>.
- Government Regulation no. 73 of 2013 covers the traffic network and road transport, including bike lanes. This regulation encourages the development of dedicated bicycle lanes including for e-bike and e-scooter. Nevertheless, at least in Jakarta, the allocation of such lanes is still an outlier, accounting for only two percent out of the total of 6,673 Km length of road<sup>16</sup>.
- Regulation No. 111 of 2015 regulates speed limits. In practice, speed limits are rarely adhered to. Typical highway design practices allow vehicles to be driven above the speed limit. In a pursuit to deter the overspeed riders, a total of 93 speed cameras (in Jabodetabek area) used for Electronic Traffic Law Enforcement (ETLE), was officially introduced nationally in March 2021<sup>17</sup>. ETLE is regulated under Law No. 22 of 2009 and Government Regulation No. 80 of 2012.

*Table 3 Current Policies Summary of Street Design and Operation Aspect*

Policies/Laws/Regulation	Related remarks
Law no 22 of 2009 - Road Traffic and Transportation	Road elements/facilities
	<ul style="list-style-type: none"> <li>• Every road used for public traffic must be equipped with road elements</li> <li>• the intended road elements are facilities for bicycles, pedestrians and people with disabilities</li> </ul>
	Safety prioritisation

<sup>14</sup> Jakarta's pedestrians jostle for space, navigate unsafe pavements, [Channel News Asia](#)

<sup>15</sup> History of electric motorcycles in Indonesia since 2007, [Mitra Elvindo](#)

<sup>16</sup> Jakarta's road length 2019, [Jakarta Statistics](#)

<sup>17</sup> A national ETLE is introduced nationally as of March 2021, [Jawa Pos](#)

- Every person who drives a motorised vehicle on the road must prioritise the safety of pedestrians and cyclists

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#### Traffic rules (operation)

- Slower two and three wheelers must use the leftmost traffic lane
- Motorcycles must use designated motorcycle lanes, indicated with markings and signages, whenever provided
- Motorcycle users must obey general traffic rules including: signages, lights, flow, and speed limits

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Government Regulation No. 73 of 2013 - Traffic Network and Road Transport

#### Infrastructure provision:

- Cycling lanes can be separated or as part of the road and must be separated from motorised vehicle traffic using physical separators or visual markings.

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#### Mechanism to determine speed limit

Minister of Transportation  
Regulation No. 111 of 2015 -  
Mechanism of Motor Vehicle  
Maximum Speed Limit

- Speed limit is provisioned according to road hierarchy that includes primary & secondary category upon arterial road, collector road, and local street, land use & activity level, and road geometry & lane configuration
  - Land use and level of activity determined by the characteristic such as activity centre, industrial area, residential/dense residential area, and school area
  - Road geometry and lane configuration alludes aspects such as the presence of road median, lane separator (motorcycle lanes, fast and slow lanes with or without median), and number of lanes (two or more lanes per direction and one lane per direction).
- 

### 2.3.2. Street management

Three regulations pertaining to street operational management and affecting E2W & E3W have been identified. See Table 4 for further details.

- Law no 22 of 2009 governs where motorcycles may be parked, loaded and unloaded. It does not apply specifically to E2W & E3Ws.
- Government regulation no.73 of 2013 details where on-street parking may be provided, and that off-street parking should receive permits. In practice there is a lot of illegal parking, which renders the street impassable for people's activities.<sup>18</sup>
- Government Regulation no. 74 of 2014 governs non-motorized vehicles and dedicated areas thereof. However, in practice, it is still one-sided to ICE vehicles. For example, only two percent out of the 6,673 Km length of road is allocated for bicycle lanes<sup>19</sup>, and it is not rare that motorcycles enter dedicated bicycle lanes which pose a safety threat to cyclists.<sup>20</sup>

Table 4 Current Policies Summary of Street Management Aspect

Policies/Laws/Regulation	Related remarks
Law no. 22 of 2009 - Road Traffic and Transportation	Parking and stopping: <ul style="list-style-type: none"> <li>• Motorcycle users must obey general traffic rules including designated stopping and parking area, noise and visual warnings</li> <li>• If used as freight vehicles, motorcycles must park and load on designated spaces, operate at times that do not obstruct the safety, security, and traffic conditions.</li> </ul>
	Parking <ul style="list-style-type: none"> <li>• On-street parking can only be provided on local roads (local government's jurisdiction) i.e., two lanes minimum per direction for municipal, regency, and village roads</li> <li>• Off-street parking should obtain local government permits.</li> </ul>
Government Regulation No. 73 of 2013 - Traffic Network and Road Transport	Access restriction: <ul style="list-style-type: none"> <li>• The allowed operational areas of non-motorized transport, including bicycles, are regulated by local governments</li> </ul>

<sup>18</sup> Jakarta gets Rp 6 billion from illegal parking fines, [The Jakarta Post](#)

<sup>19</sup> Jakarta's road length 2019, [Jakarta Statistics](#)

<sup>20</sup> Motorcycles ticketed because of entering bicycle lanes, [Berita Jakarta](#)

## 2.3.3. Street users

Two regulations pertaining to E2W & E3W drivers and passengers have been identified. See Table 5 for further details.

- Law no. 22 of 2009 covers helmet use, lane assignment, and general traffic rules. When a motorcycle is being used as a freight vehicle, safety measures apply. In practice, many motorcycle operators are underage and do not have a proper licence<sup>21</sup>.
- Regulation no. 13 of 2020 covers charging infrastructure. PT PLN (state-owned electricity company) manages implementation nationwide. Street users are expected to have a standardised charging infrastructure and accessible battery swap facilities for certain vehicle types. Private entities are welcome to cooperate in providing such facilities, as long as certification and standardisation are met. A number of ministries are committed to support the development of electric charging infrastructure for street users<sup>22</sup>. This implies that street users should comply with the prescribed charging standard and use facilities that are standardised to ensure safety.

Table 5 Current Policies Summary of Street Users' Aspect

Policies/Laws/Regulation	Related remarks
Law no 22 of 2009 - Road Traffic and Transportation	Permits and licence: <ul style="list-style-type: none"> <li>• Drivers must have a valid driving licence</li> <li>• Motorcycle must be registered with licensed plate and vehicle certificate (STNK)</li> </ul>
	Traffic rules: <ul style="list-style-type: none"> <li>• Motorcycle users (drivers and passengers) are obligatory to wear helmet</li> <li>• Passenger limit is two riders including one driver and one pillion passenger per motorcycle</li> <li>• Slower two and three wheelers must use the leftmost traffic lane</li> <li>• Motorcycle users must use designated motorcycle lanes, indicated with markings and signages, whenever provided</li> <li>• Motorcycle users must obey general traffic rules</li> </ul>

<sup>21</sup> Umniyatun, Y., Nurmansyah, M. I., Purnama, T. B., & Hidayat, D. N. (2021). Motorcycle risky behaviours and road accidents among adolescents in Jakarta metropolitan area, Indonesia. International Journal of Injury Control and Safety Promotion, 28(3). <https://doi.org/10.1080/17457300.2021.1928229>

<sup>22</sup> Seven regulations that allows electric vehicles 'speeding' in Indonesia, [CNN Indonesia](#)

including: signages, lights, flow, designated stopping and parking area, noise and visual warnings, speed limits, connection to other vehicles/trailers

- If used as freight vehicles, motorcycles must comply with the following rules: safety compliance, have signs based on freight type, park and load on designated spaces, operate at times that do not obstruct the safety, security, and traffic condition

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#### Charging infrastructure

Minister of Energy and Mineral Resources Regulation No. 13 of 2020 - Provision of Electricity Charging Infrastructure for Battery Based Electric Motor Vehicles

- Technical requirements of the charging station and battery swap facility must include an electrical module that regulates and manages power, voltage, inter-communication, and security.
  - As a national electric provider, PT PLN sets out the charging tariff according to the prescribed factors (e.g., Q and N factors)
  - Electric charging companies should comply with safety standards, product certification, and certificates of competence, supervised and monitored regularly by PT PLN.
- 

#### 2.3.4. Vehicles

Four regulations pertaining to E2W & E3W vehicles have been identified. See Table 6 for further details.

- Law no 22 of 2009, which covers the standardisation of motorised vehicles, also applies to electric vehicles. In practice many motorcycles owners favour modifying their fleet, e.g., muffler modification, engine upgrades, and removal of safety accessories for aerodynamic purposes<sup>23</sup>. This law can be used to require speed and noise modifications.
- Regulation no. 8 of 2020 and Regulation No. 55 of 2019 cover financial aspects. They favour electric vehicles over motorised vehicles. The tax on ICE vehicles can be as high as 60% whereas the tax on an EV can be as low as 0% <sup>24</sup>. They incentivise research and development and import/export of EVs and prescribe lower parking and charging fees for EVs.

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<sup>23</sup> Five modifications to avoid so that riders don't get ticketed, [CNN Indonesia](#)

<sup>24</sup> Indonesia offers more aggressive tax perks for electric vehicles, [Bloomberg](#)



- Regulation No. 45 of 2020 covers requirements specific to electric 2&3W. It lists maximum speeds, requirement equipment, driver age, and lane assignment. It assigns regulation to local governments and municipalities.

Table 6 Current Policies Summary of Vehicles Aspect

Policies/Laws/Regulation	Relatable remarks
Law no. 22 of 2009 - Road Traffic	<p>Standardisation:</p> <ul style="list-style-type: none"> <li>• Every motorised vehicle, including motorcycle, must comply with standardised technical requirements</li> </ul>
Minister of Internal Affairs Regulation no. 8 of 2020 - Basic Calculation of Imposition of Motor Vehicle Tax and Vehicle Transfer Fee	<p>Vehicle tax</p> <ul style="list-style-type: none"> <li>• Non-electric is still considered the highest paying fleet, which accounts for 30%: public transport fleet for people, private person and goods, and 60%: public transport fleet for goods</li> <li>• Public transport fleet for persons and for goods respectively account for 20% and 30%, and 30% is for the private fleet for person or goods</li> </ul>
Presidential Regulation No. 55 of 2019 - Regulation on the acceleration programme for Electric-based vehicles for inland transportation.	<p>Incentive:</p> <ul style="list-style-type: none"> <li>• Target group includes manufacturers, industry, universities, research agencies, and private users. Incentive for enterprises/institutions is mostly about the various tax reduction, ease of import and export.</li> <li>• Reduced parking fee and lower charging fee for private users.</li> </ul> <p>Technical administrative:</p> <ul style="list-style-type: none"> <li>• 17 digits of vehicle identification number (NIK)</li> <li>• Roadworthy certificate</li> </ul>

## Types of specific electric vehicle (SEV)

- Electric scooter/e-scooter
- Electric hoverboard
- Electric unicycle
- Electric bicycle/e-bike
- Electric otopet

## Safety:

- SEV should be equipped with lamps, reflector, bell/horn
- Maximum speed up to 25 km/hours
- Minimum age of 12 years old and obligatory presence of supervisor for 12-15 years old users.
- Limitation of carrying additional passenger given the absence of passenger seat
- Prohibition on technical modification that can increase speeds

Minister of Transportation  
Regulation No. 45 of 2020 -  
Specific Vehicle with electric  
motor-based propulsion,  
including motorised and non-  
motorized vehicle

## Operation:

- Specific lanes are determined as for bike lanes and electric vehicles. With the obligation to equip roads with standardised furniture and marking
- Permits in certain areas including residential, car-free day areas, touristic places, public transport's spaces, office buildings' area, and off-street areas.

## Regulator:

- City and local municipalities are responsible to implement the regulation

### 3. Recommendations

#### 3.1. Action items & prioritisation chart

Table 7 Recommendation for action items & prioritisation

Topic	Recommendations	Regulator and/or Implementer				Prioritisation
		Indonesia Ministry of Transportation (Kemenhub)	Jakarta Transport Agency (Dishub)	Indonesia Ministry of Public Works and Public Housing (Kementerian PUPR)	Jakarta Public Works Agency (Dinas PU)	
Street Design and Operations	1. Modify Lane Assignment					Medium
	2. Lower Vehicle Speed					High
	3. Reduce Conflicts					High
Street Management	4. Limit Through Traffic					Medium
	5. Manage Curb Use					Low
Street Users	6. Encourage Last Mile Connectivity with Transit					Low
	7. Clarify Minimum Age, Permit, And Safety Accessories					Medium
	8. Require Speed Limiters					High
Vehicle	9. Require Noise Limiters and AVAS					Low

#### 3.2. Interventions

Following is a list of nine interventions - action items - to promote electric two-and three-wheelers in Jakarta and Indonesia. They are organised thusly: street design and operations, street management, street users, and vehicles. Background, opportunities, challenges, implementation, and regulation is discussed for each intervention.

##### 3.2.1. Street design and operations

#### Modify Lane Assignments (#1)

##### Background

Slower vehicles, such as 2- and 3-wheelers, are currently seen as safety hazards when operating in faster traffic. They are banned from limited-access highways and must use the “access” lanes on multiway boulevards. While speed differential is a factor, higher speeds correlate to higher crash rates. As such, these restrictions are more about a desire to facilitate faster through traffic of 4-wheelers, rather than increase safety for all users.

## Opportunities

Researchers, practitioners, and the public are coming to understand that complete streets with lower speeds are safer and available to all users - including electric 2- and 3-wheelers.

## Challenges

Public awareness of lane assignment is critical, especially amongst drivers. On larger streets, assigning lanes is possible. On narrower streets, users need to share the space, so speed management is paramount.

## Implementation

Ministry of Transportation to initiate the revision of Law No. 22 of 2009 with these lane assignments, see Figure 2.

- Sidewalk - exclusive to people walking, waiting, standing, talking, etc. Bicycles (regular and pedal-assist) may be used at “walking” speed or by designation (i.e., cycle track). Motorised vehicles, both ICE and electric, are prohibited.
- Bike lane, cycle track - available for pedal-powered and pedal-assisted two- and three-wheelers, including electric kick-scooter. Motorised vehicles, both ICE and electric, are prohibited.
- Multi-way boulevards - any vehicle may use either access or through lane as long as the driver adheres to the speed limit (see below)
- BRT lanes - No other vehicles are allowed

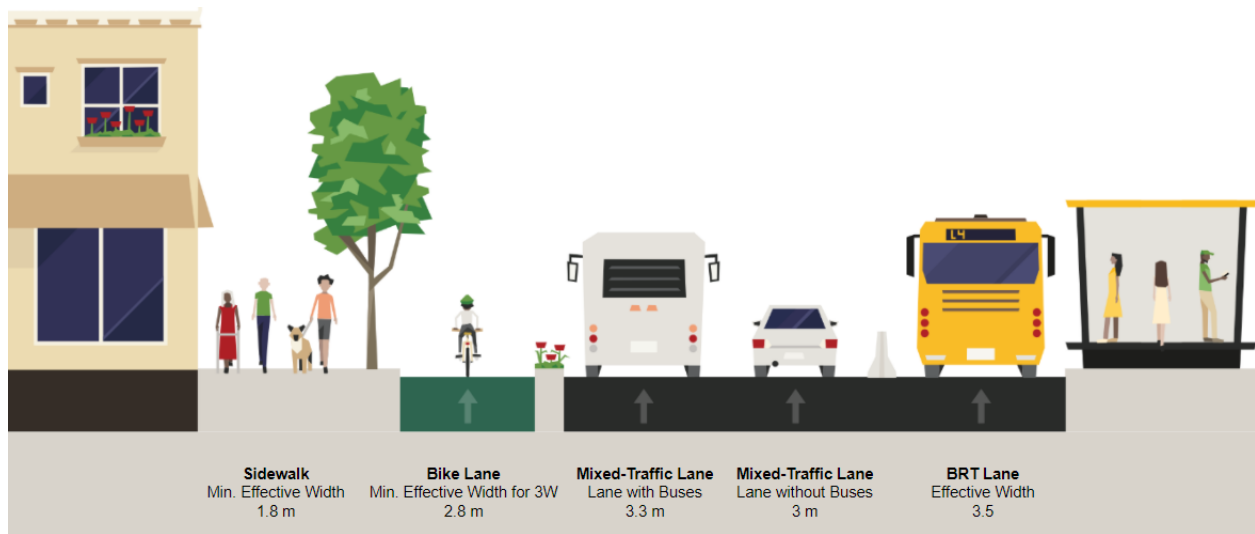


Figure 6 Lane Assignment and Width for Vehicles

## Regulation

Electronic licence plate readers and automatic ticketing of violators on sidewalks, bike lanes, access lanes, and BRT lanes.

## Lower Vehicle Speed (#2)

### Background

Vehicle speed is the primary consideration in street safety. Lower speeds contribute to lower crash rates, lower injury severity, and more accessible streets for all users. Current speed limits in urban areas are considered not safe enough considering the nature of Indonesian mixed traffic. Speeds should be low enough to keep vulnerable users safe.

### Opportunities

The introduction of electric two- and three-wheelers, which are generally slower than the conventional vehicles, is an opportunity to lower speeds universally. Traffic calming is a proven method to lower speeds. Narrower lanes make space available for other users.

### Challenges

Public awareness of the dangers of speeding are low. Moreover, there are few interventions from the government to enforce lower speed limits, not even speed limit signs in many major and minor roads.

### Implementation

Ministry of Transportation to adjust speed limits

- Streets without sidewalk: 15 km/h
- Bike lane, cycle track: 25 km/h
- Mixed traffic streets (where there is no protected bicycle facility): 30 km/h
- Mixed traffic streets (where there is a protected bicycle facility): 40 km/h

- Access lane on multiway boulevards: 30 km/h
- Through lanes on multiway boulevards: 40 km/h

Transport Agency and Public Works Agency to implement traffic calming measures

- Speed hump/table - install where prevailing speeds exceed the speed limit.
- Raised crossing - install at all zebra crossings not at traffic signals. Target schools, greenways, parks, shopping streets, bus stops, and transit stations.



*Figure 7 Speed Bump on the Left and Raised Crosswalk on the Right*

Source: JawaPos.com (Left), twitter.com/ScottOgilvieSTL (Right)

- Chicane, mini-roundabout, refuge island, and other devices.
- Textured street: Due to its uneven road surface, textured street is great to make drivers aware and slow down. These textures and materials should be permeable to allow water to infiltrate the soil below.



*Figure 8 Chicane (Left) and Textured Street (Right)*

Source: Left: [hmntransportationresearch.org](http://hmntransportationresearch.org), Right: [tripadvisor.com](http://tripadvisor.com)

Transport Agency to adjust lane widths

- Typical: 3.0 m. Maximum width of outside lane on truck or bus route: 3.3 m<sup>25</sup>
- Typical minimum bike lane: 2.8 m to accommodate three-wheelers with absolute minimum width: 2.2 m and ideal width of 3.5 m<sup>26</sup>

## Regulation

Speed cameras and electronic ticketing.

## Reduce Conflicts (#3)

### Background

Traffic crashes are overrepresented at locations of conflict, such as intersections, driveways, bus stops, loading zones, and other places where different directions, modes, and speeds meet. It is imperative to protect vulnerable users in these conflict areas.

### Opportunities

Many conflict locations have been designed for high-speed traffic and the rare large vehicles, under the outdated notion that more room for error produces safer streets. The introduction of electric two- and three-wheelers presents the opportunity to redesign conflict areas.

### Challenges

Moving from highway to street design challenges the prevailing engineering orthodoxy. Updating policies and re-training practitioners is necessary.

### Implementation

Public Works Agency to redesign streets

- See traffic calming above (in recommendation #2)
- Intersections (See Figure 9-13)
  - Crossing opportunities in all directions
  - Refuge island and median tips
  - Minimised turning radius and lower turning speeds
  - Priority to people walking and cycling at traffic signals
  - No driveways and minor streets within 15 m of a traffic signal
  - Waiting area for two and three wheelers
  - Raised intersections to slow traffic down especially in unsignalised intersections

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<sup>25</sup> Global Designing Cities Initiative. (2016). *Global Street Design*. New York: Island Press

<sup>26</sup> Adiazola-Steil, C., Perez-Barbosa, D., Batista, B., Luke, N., Li, W., Sharpin, A. B. (2020). *Safe Bicycle Lane Design Principles*. Responding to Cycling Needs in Cities during COVID and Beyond. Washington DC: WRI





*Figure 9 Signalised Intersection with Protected Bike Lane*



Figure 10 Signalised Intersection Without Protected Bike Lane

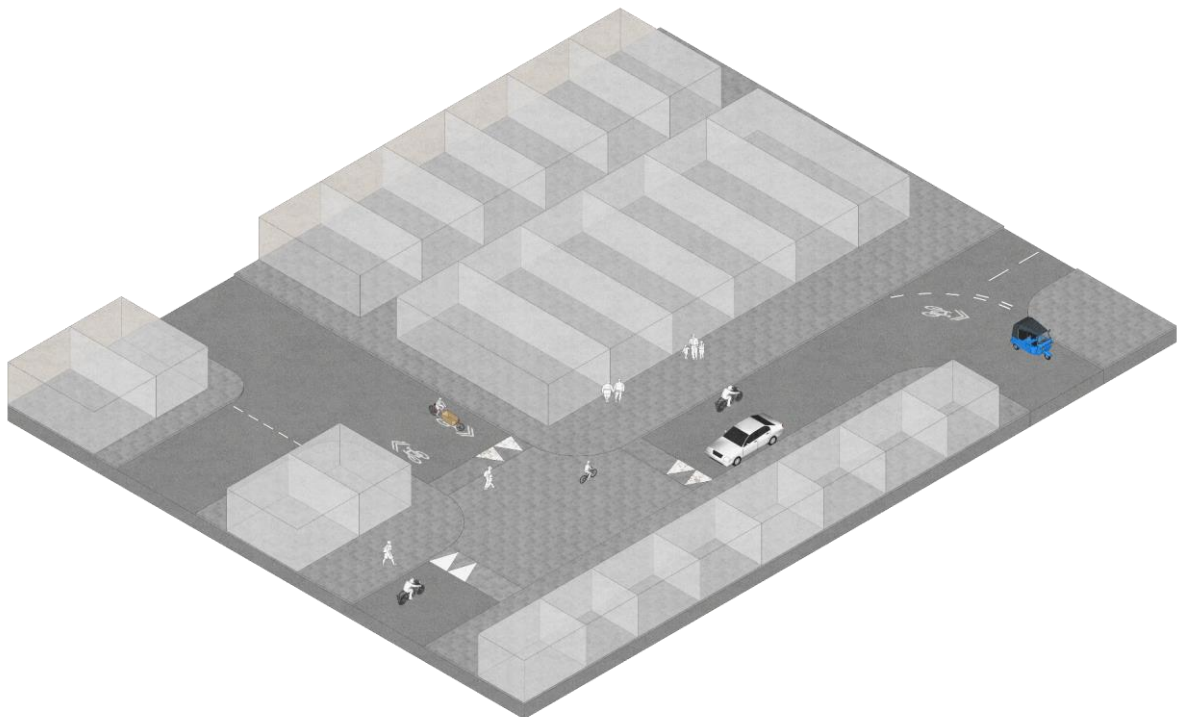
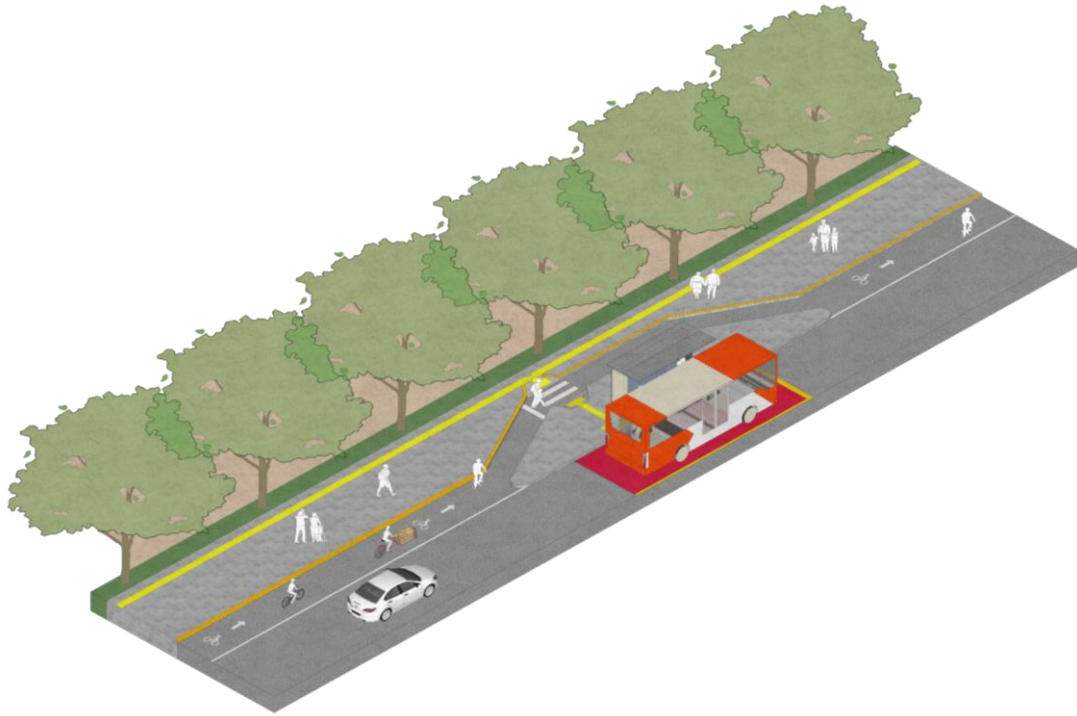


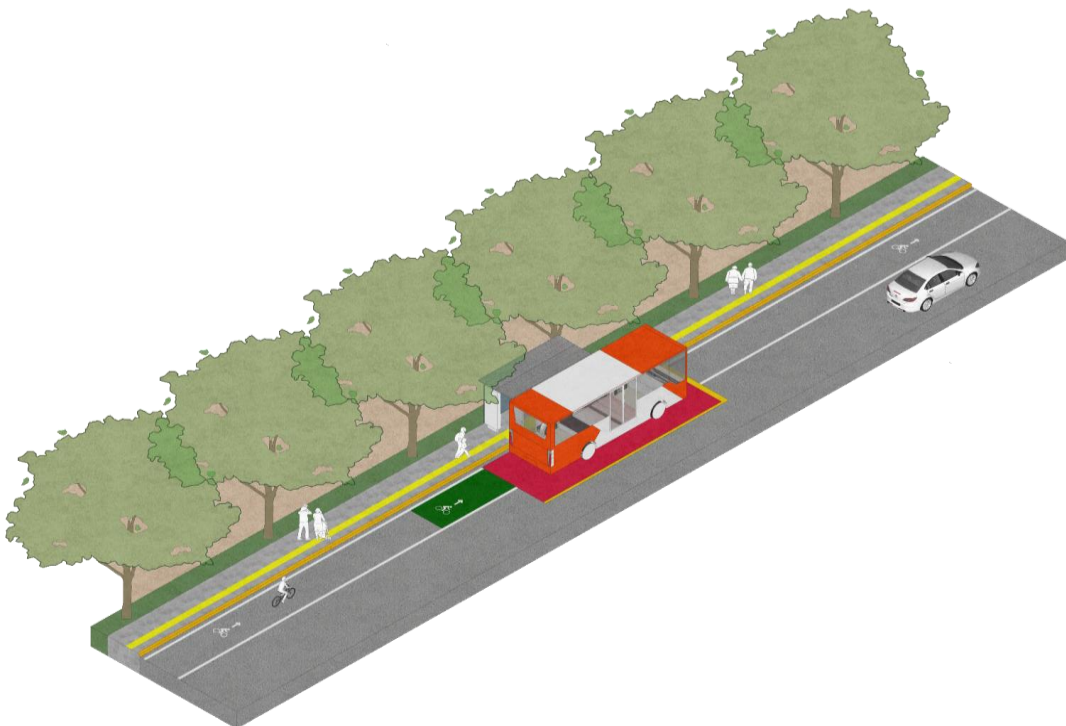
Figure 11 Raised Intersection

- Bus stops

- Bus bulbs so that the bus does not have to pull out of traffic. Bus bays and lay bys only at terminals.
- Far side bus stops at traffic signals
- Route bike lanes behind the bus stop, except where bus frequency is low, see Figure 6 and Figure 7.



*Figure 12 Bus Stop with Boarding Island*



*Figure 13 Regular Bus Stop*

### **Regulation**

Electronic licence plate readers and automatic ticketing of violators in bus stops and loading zones. Red light cameras and automatic ticketing of violators at intersections.

### **3.2.2. Street management**

## **Limit Through Traffic (#4)**

### **Background**

An unfortunate phenomenon of ride-hailing services has been increased through traffic in residential areas due to the routing algorithms of the apps. Increased traffic decreases safety, especially on residential shared streets, and increases negative externalities such as noise and air pollution.

### **Opportunities**

Limiting through traffic would provide safer streets for residents, including space to walk, cycling, exercise, or for kids to play. During the pandemic, many streets have been closed to traffic which has generated positive impacts to communities.

### **Challenges**

Limiting through traffic involves changes in the street network and potentially restrictions on entry to neighbourhoods.

### **Implementation**



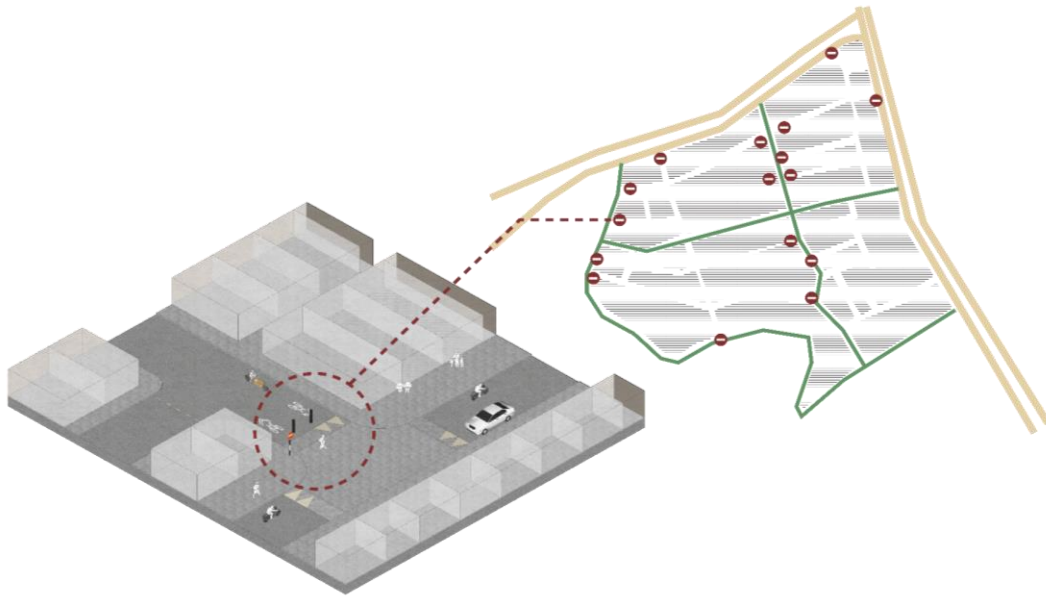


Figure 14 Limiting Motorised Access to Reduce Through Traffic

- Neighbourhood organisations or property developers to establish neighbourhood-specific circulation network which allows access to all properties, but make through routes circuitous and longer than staying on main roads.
- Neighbourhood organisations or property developers to install bollards, gates, or planter boxes to restrict larger vehicles.
- Maintain permeability for people walking and cycling (bicycle, E2W, E3W).

## Regulation

Communities or security workers could enforce the implementation.

## Manage Curb Use (#5)

### Background

In general, private vehicles should not be allowed to be stored long term (all day or overnight) within the ROW of streets (on-street parking). Ideally, most on-street parking would be removed and the sidewalk widened. That said, dedicating curb space (waiting zones) for electric 2&3 wheelers is a way to incentivise their use. The space would be for short term use only, as in waiting for, picking up and dropping off passengers and goods. Curb space should not be used for EV charging facilities

### Opportunities

Reserving waiting zones for electric vehicles could push forward EV adoption.

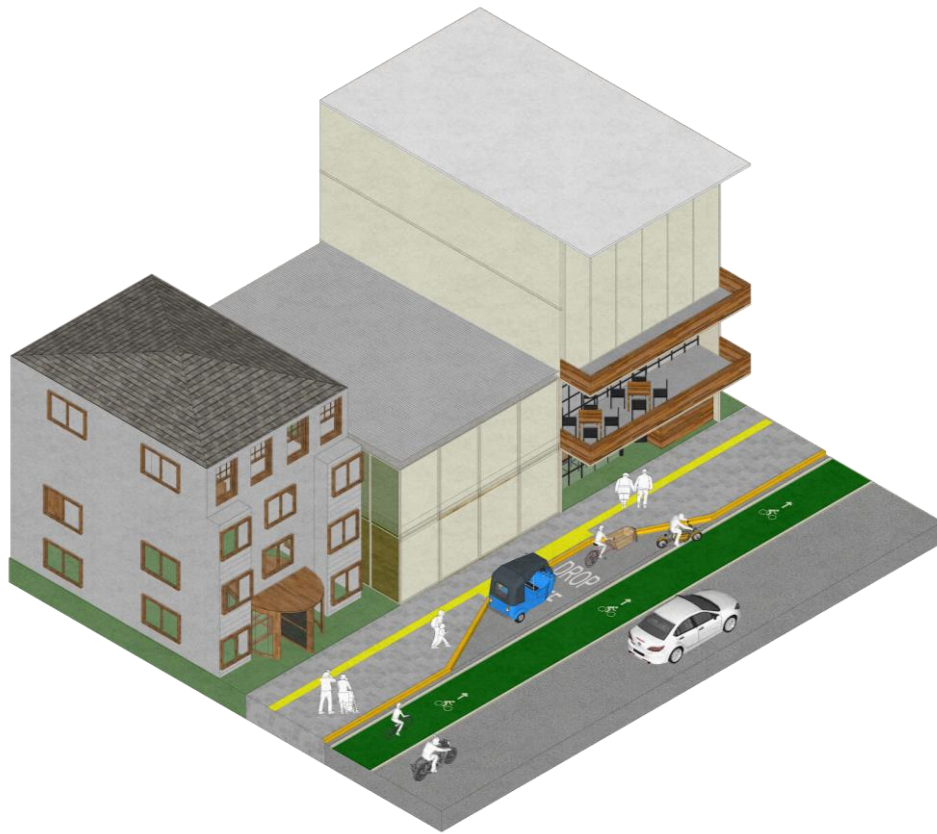
### Challenges

Providing a public good for one type of use (EV) and not others (ICE) sets up clashes between users. Given the ad-hoc nature of Jakarta streets, compliance would be an issue, except at well-

regulated locations such as shopping malls and transit hubs. A public campaign would assist in explaining that EVs are being privileged to save the environment. Also, there could be incentives for drivers to convert to EVs.

## Implementation

- Public Works Agency to clearly define waiting zones for E2&3 wheelers.
  - Only if there is sufficient walking and cycling space (see above)
  - Adjacent to the carriage way.
  - Near destinations, but not disruptive to people walking or cycling.



*Figure 15 Pick-up, Drop-off, and Waiting Bay for 2&3W*

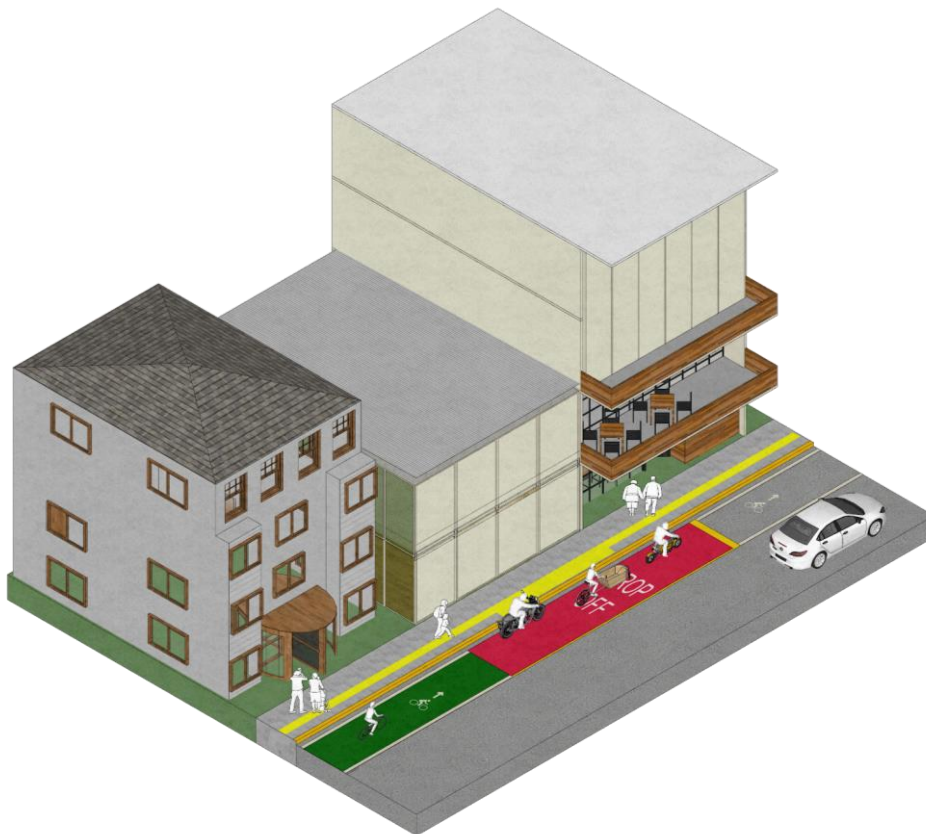




Figure 16 Pick-up and Drop-Off Zone for 2&3 Wheelers

- Non-motorised two- and three-wheelers parking should be made as close as possible to the main entrance, followed by the electric two- and three-wheelers and conventional, and last four wheelers.

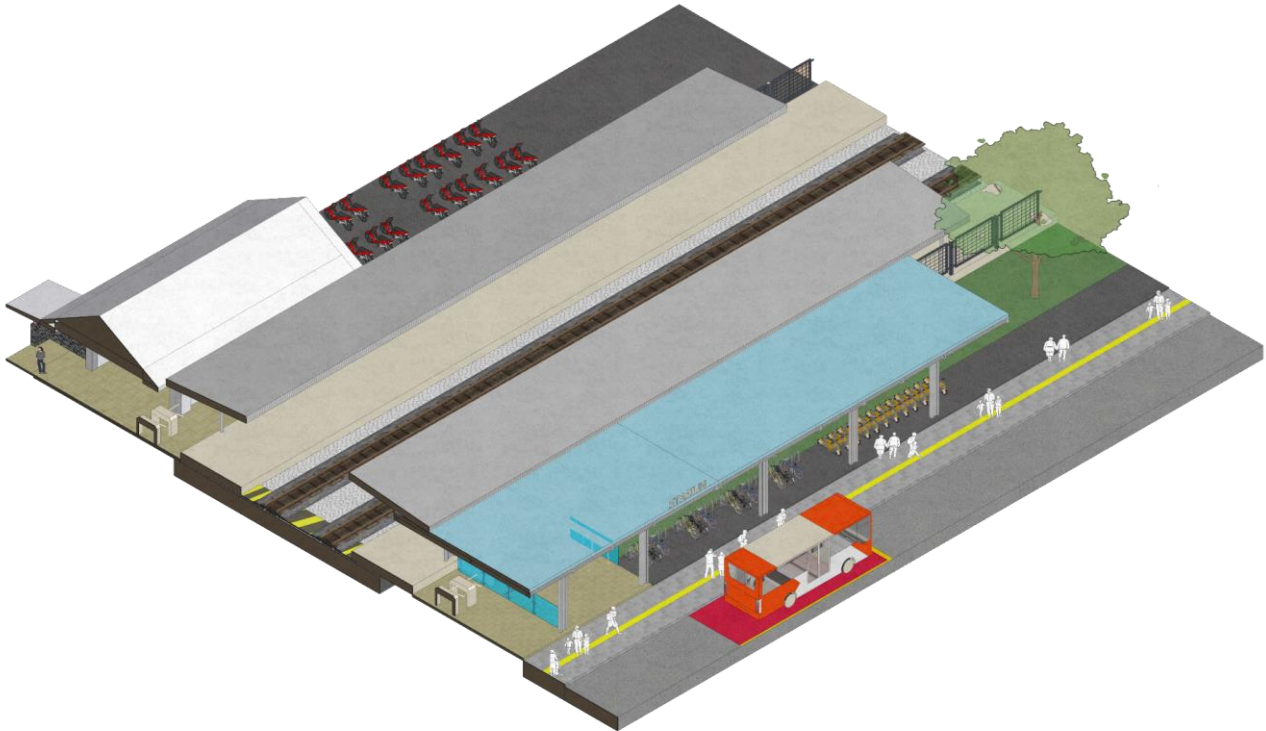


Figure 17 Prioritisation for Non-Motorised Transport Near Main Entrance

## Regulation

Local attendants or security workers.

### 3.2.3. Street Users

## Encourage last mile connectivity with transit (#6)

### Background

Ride-hailing services often compete with mass transit by operating along the same corridors. While they provide door-to-door service, they should be encouraged to integrate with transit and provide first/last mile connections.

### Opportunities

Organising ride-hailing services with mass transit would be more energy-efficient, reduce traffic, and ultimately lead toward an integrated system.

### Challenges

Non-ride-hailing trips would be difficult to be regulated as there is no monitor or enforcement option, except to restrict private vehicles in major streets where public transportation is available.

## Implementation

- Ministry of Transportation to limit the distance and destination of ride-hailing trips along transit corridors. The distance would be shorter than a 15-minute transit trip. Destinations off the corridor would not be affected.
- Transport Agency to provide bike share for trips within 3 km of transit stops and stations.

## Regulation

Through ride-hailing companies, however, clear regulation and penalties should be formulated first.

## Clarify minimum age, permit, and safety accessories (#7)

### Background

Electric 2&3W, being relatively new vehicles to the market, have thus far not been regulated by the government. They exist between a bicycle, which requires no vehicle registration or operator licence, and traditional motorised vehicles, which requires a vehicle registration and driver licence. There are a wide range of electric 2&3W models, with varying safety accessories.

### Opportunities

Clearly defining and regulating electric 2&3W will make it possible to implement the changes described in this document.

### Challenges

The market for electric 2&3W is growing and evolving. Any regulations passed today will need to be updated in the near term.

## Implementation

- No registration for pedal-assisted electric bicycle and electric mopeds as long as the maximum speed is 25 km/h or less. Helmets are not required.
- The Ministry of Transportation requires registration, driver licence and helmets for electric scooters and motorcycles.

## Regulation

Regulated by the Ministry of Transportation at licensing, collaborated and managed by the Traffic Corps of Indonesian police.

### 3.2.4. Vehicle

## Require Speed Limiters (#8)

### Background

Vehicle speed is the primary consideration in street safety. Lower speeds contribute to lower crash rates, lower injury severity, and more accessible streets for all users. Automatically regulating vehicle speed is a guaranteed method of managing speeds.

## Opportunities

The introduction of electric 2&3W with speed limiters would signal that the government is serious about traffic safety. Slower vehicles also support compact cities development and public transportation. Reserving certain parts of the street for slower vehicles (see lane assignment above) will incentivise conversion to EVs. The EU and UK are considering similar actions, see Appendix 5.4.

## Challenges

A vehicle with a speed limiter would primarily be used for intra-city trips, an unknown market.

### Implementation

- Ministry of Transportation to introduce two new classes of vehicle with speed limiters (or maximum speeds of).
  - 25 km/h for use in bike lanes
  - 40 km/h for general use on city streets
- Vehicle licence plates would indicate class. Users would receive tax discounts, and/or non-users could pay higher taxes.
- Intelligent Speed Assistance in the future to limit vehicles' speed according to the set speed limit.

## Regulation

Regulated by the Ministry of Transportation at licensing. Electronic licence plate readers and automatic ticketing of violators.

## Require Noise Limiters and AVAS (#9)

### Background

Silent vehicles are problematic as we rely on hearing to detect them. This is especially true for people with limited sight. EVs generally are equipped with some type of acoustic vehicle alert system (AVAS).

## Opportunities

Converting to an electric fleet offers the hope of quieter streets, which has been shown to improve quality of life. Ensuring that vehicles are not completely silent will assist those with limited sight. The EU and UK are considering similar actions, see Appendix 4.4.

## Challenges

Motorcycle riders generally resist noise limiters. AVAS is not currently widely available in electric 2 and 3 wheelers, so the government should make it mandatory.

### Implementation

- Ministry of Transportation to require noise limiters (80 dB) on motorcycles on urban streets.

- Ministry of Transportation to require AVAS for electric 2&3W
  - Noise increases as vehicles' speed increases.
  - Should be loud enough to warn street users, but should not be noise pollution.

## Regulation

Regulated by the Ministry of Transportation at licensing. Electronic noise readers and automatic ticketing of violators.

### 3.3. Interventions per street typologies

This section applies the physical interventions above to streets typically found in Jakarta and Indonesia. It covers shared streets; two-lane two-way streets; four-lane two-way streets (with and without cycle tracks); six-lane two-way streets (with and without cycle tracks); and multiway boulevard (with access and through lanes). The interventions include speed limits, cycle tracks, raised crosswalks, wider medians (safety islands) at crossings, and wider sidewalks.

#### 3.3.1. Shared Street

With no dedicated facilities for pedestrians or cyclists, shared streets should be kept under 15 km/h. Traffic calming such as speed bump, textured street, or chicane should be implemented to slow down the traffic. Bollard or gate to limit vehicular traffic.



*Figure 18 Interventions on Shared Street*

### 3.3.2. Two-lane, two-way street

Two-lane, two-way street without bicycle lane should be made safe enough for cyclist to share the street. Speed under 30 km/h are appropriate with the implementation of traffic calming such as speed table or raised crossing. Lane width should be no more than 3 m when no bus running through the streets.

Street with the same configuration but has higher volume or buses running through, should have conventional bike lane to allow motorised vehicle safely pass bike lane users.



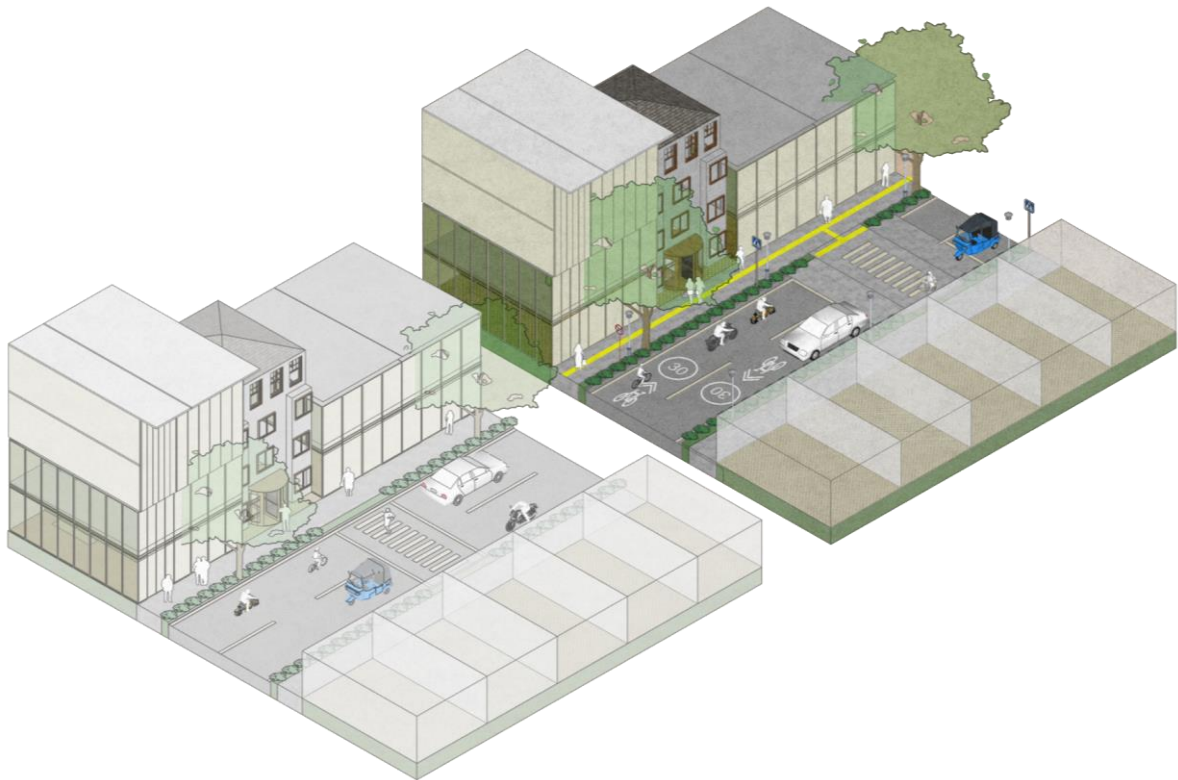


Figure 19 Interventions on Low Volume Two-lane, Two-way Street

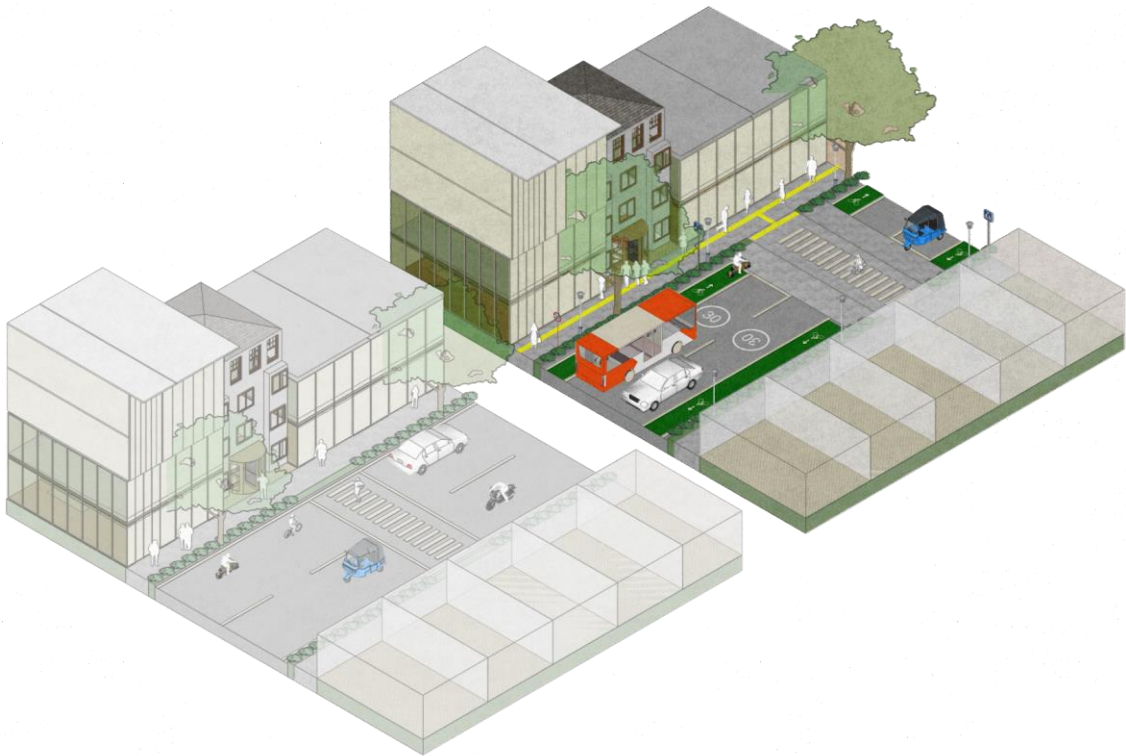


Figure 20 Interventions on Higher Volume Two-Lane, Two-way Street

## 3.3.3. Four-lane, two-way streets

### With separated bike lane

Four-lane, two-way street with dedicated bike lane should be kept safe enough for motorised and electric 2&3W with speed limit of 40 km/h. Traffic calming, raised crossing for instance should be installed and lane width should also be reduced.



Figure 21 Interventions on Four-Lane, Two-way Street with Bike Lane



## Without separated bike lane

Reallocating one lane to be used as separated bike lane should be prioritised. Median could also be removed if necessary.



*Figure 22 Reallocation of Four-Lane, Two-way Street to Two-Lane, Two-way Street with Bike Lane*

If reallocation is not possible, speed limit should be maintained to under 30 km/h to be safe enough for pedal-powered and -assisted 2&3W.



*Figure 23 Interventions on Four-Lane, Two-Way Street Without Bike Lane*

### 3.3.4. Six-lane+, two-way streets

#### **With separated bike lane**

Six-lane or more, two-way street are prone to traffic speeding. Bicycle lane are necessary and crossing should be equipped with traffic signal. Lane width should be not wider than 3 m and 3.3 m for buses lane to discourage speeding.

If separated bike lanes are currently not available, one lane should be converted for separated bike lane. Four-lanes, two-way would also be safer and easier to cross for pedestrians.



Figure 24 Interventions on Six-Lane, Two-way Street with Bike Lane

## Without separated bike lane



Figure 25 Reallocation of Six-lane, Two-way Street to Four-lane, Two-way Street

## Multiway boulevard (with access and through lanes)

In multiway boulevard, slower two and three wheelers should use the access lane with speed limit of 30 km/h and 40 km/h for the through lane. However, separated bike lanes should be implemented in higher traffic streets. Otherwise, a shared street in access lane could be implemented with speed limit enforcement.



*Figure 26 Reallocation of Access Lane on Multiway Boulevard for Bike Lane*



*Figure 27 Reallocation of Access Lane on Multiway Boulevard for Shared Street*

## 4. Appendix

### 4.1. All about motorcycles

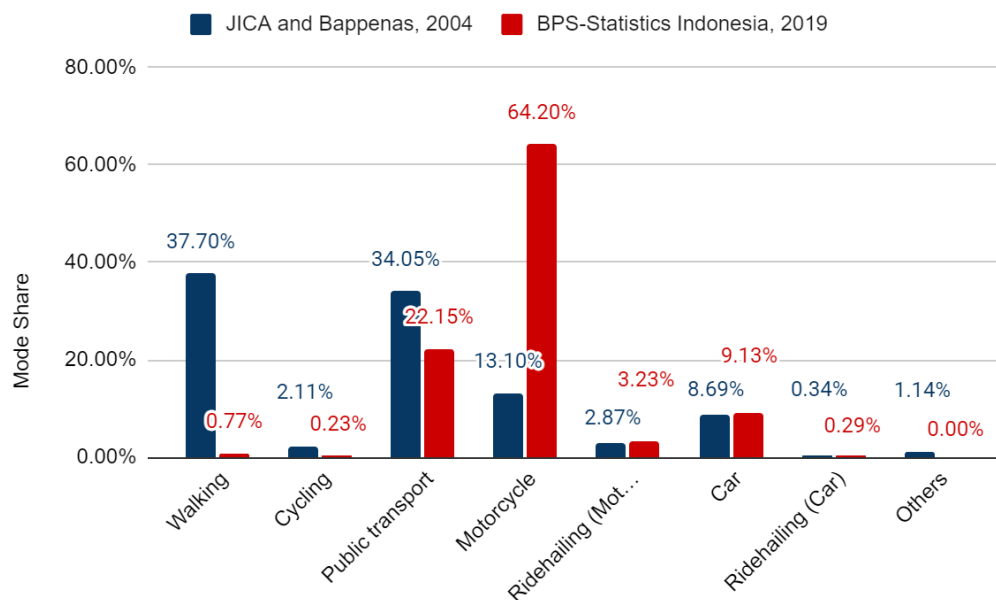


Figure 28 Mode Shares in Jakarta 2004 and 2019 from JICA, Bappenas, BPS Indonesia

### Commuting Distance (BPS, 2019)

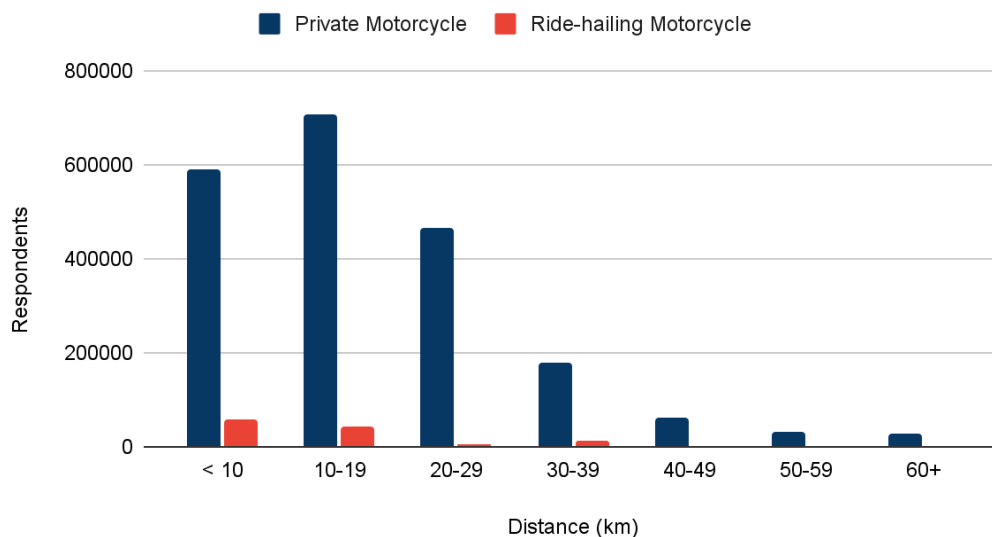


Figure 29 Commuting Distance of Private and Ride-hailing Motorcycles, BPS



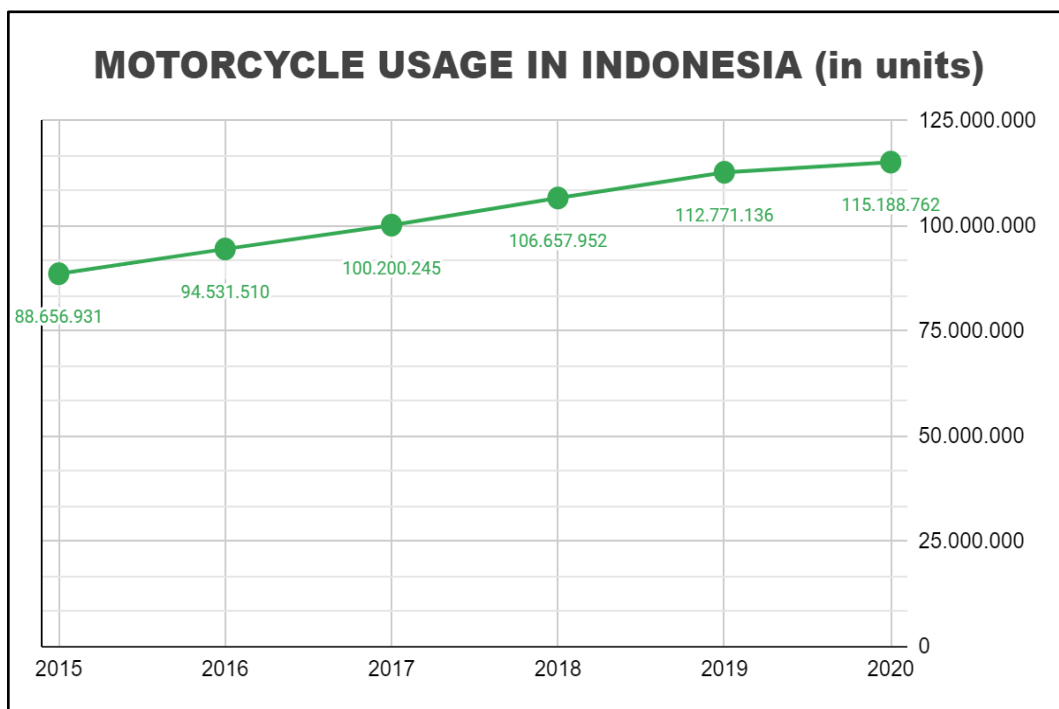


Figure 30 Motorcycle Usage Growth Bini 2015-2020, BPS

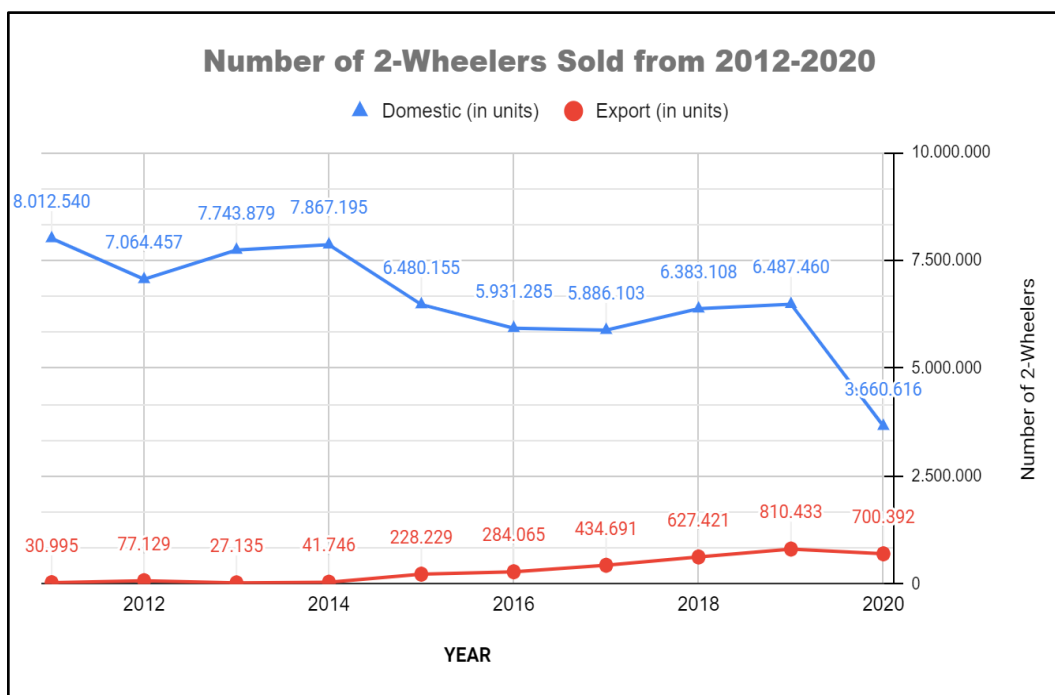


Figure 31 Number of Two-wheelers Sold in Indonesia from 2012-2020, BPS



## Jakarta Crash Statistics based on Vehicle Type in 2018

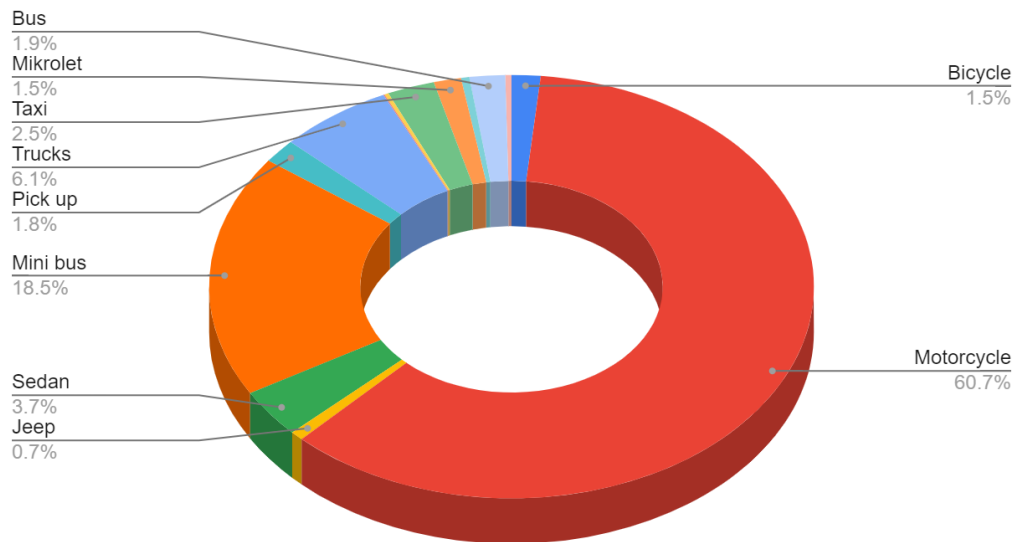


Figure 32 Jakarta Crash Statistics Based on Vehicle Type in 2018, BPS

The tables below benchmark policies related to E2W and similar vehicles in Indonesia and comparable countries. The policies cover vehicle dimension and power, speed limitation, driver age and licensing requirement, safety equipment, vehicle registration (licence plate), vehicle insurance, road usage, annual road tax, vehicle standards. The vehicles include bicycles, motorised 2-wheelers, non-motorized 3-wheelers (rickshaws), motorised 3-wheelers, e-bikes, e-2-wheelers, and e-3-wheelers. The countries include Indonesia, Brazil, India, México, Philippines, Singapore, Taiwan, Thailand, and Vietnam, where there is specific information available (N/A indicates either not available, not applicable, not assessed, and not answered).

#### 4.2.1. Bicycle

*Table 8 Bicycle Policies Benchmark*

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Indonesia <sup>27</sup>	Not regulated	Wearing a helmet is optional  cyclist must wear footwear  at the night, cyclist must turn on the headlights and wear attributes/clothes that reflected light  for disabilities, there must be a symbol/identifier that	Not regulated	Not regulated	Allowed to operate on road bike lane	N/A	N/A

<sup>27</sup> Transportation Minister Regulation Indonesia no. 59 of 2020

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
		placed on the bicycle for an identification					
Thailand <sup>28 29</sup>	N/A	<p>Tinkle of bicycle must be audible minimum 30 meters as a sound signal</p> <p>Headlight is required for a bicycle and it must be in white light shining to be clearly seen at least 15 meters away</p> <p>There must be a taillight installed with red light shining backward</p>	N/A	N/A	<p>Cycling must be on bike lanes</p> <p>If there are no bike lanes provided, cyclist must ride as near as the edge of the road or road shoulder</p>	N/A	<p>It is forbidden to ride without handling the handlebars</p> <p>It is forbidden to load or hold goods, parcel, or anything in the manner obstructing the handling of handlebars</p>

<sup>28</sup> Road Traffic Act, B.E. 2522, [The Government of Thailand](#)

<sup>29</sup> Road Safety Institutional and Legal Assessment Thailand, [WHO International](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Philippines <sup>30</sup> <sup>31</sup>	N/A	<p>helmet is required to wore properly</p> <p>bike rider is required to wear bright clothing or reflectorized vest</p> <p>bicycle must be installed with reflectors or safety lights for riding during night and day</p> <p>breathable face mask is required</p> <p>bike rider is recommended to wear protective eyewear, bicycling gloves and closed shoes</p>	Not required	N/A	<p>cyclist must be required to ride on a bike lane, unless no bike lane have been designated yet</p> <p>it is required to ride on the right side or on the same direction as other traffic</p>	N/A	<p>it is prohibited to use headphones, mobile devices, unless for navigation and work purpose</p> <p>bicycle lanes are only allowed for bicycles and LMVs/PMDs weighing no more than 100 kg</p> <p>maximum speed on bike lane is 25km/h</p>
India	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vietnam <sup>32</sup>	N/A	<p>Advise to use standard helmet</p> <p>required to use bright</p>	N/A	N/A	Cyclist rides on right-most lane, drive in dedicated lane is necessary when it's	N/A	N/A

<sup>30</sup> Bike-Friendly Communities Act, [Senate of Philippines](#)

<sup>31</sup> Prescribing Guidelines on The Design of Bicycle Facilities Along National Roads, [Department of Public Works and Highways, Republic of Philippines](#)

<sup>32</sup> Road Traffic, Socialist [Republic of Vietnam](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
		clothing or reflective vest			available		
Singapore <sup>33 34</sup>	N/A	<p>Helmet is obligatory</p> <p>Switch on front white and rear red light in the dark</p>	N/A	N/A	<p>Always use bicycle lane when available</p> <p>Always ride on left-most lane</p>	N/A	<p>Not use mobile communication devices while riding</p> <p>Not cycle on expressways, road tunnels and selected viaducts</p> <p>Keep to a maximum length of 5 bicycles when riding in groups</p>
China	N/A	<p>Helmet is obligatory</p> <p>Switch on front white and rear red light in the dark</p> <p>Required to use reflective clothing during night ride</p>	N/A	N/A	<p>required to ride on bicycle road</p> <p>bicycle roads are divided to three types; special bicycle road, segregated bicycle lane and painted bicycle lane</p> <p>If there is no bicycle lane, they shall run on the right side of</p>	N/A	N/A

<sup>33</sup> Active Mobility Regulations 2018, [The Government of Singapore](#)

<sup>34</sup> Rules and Code of Conduct of Active Mobility Act, [The Government of Singapore](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
					the motor vehicle lane.  bicycle lanes have maximum speed limit of 20km/h		
Rwanda <sup>35 36</sup>	N/A	Helmet is mandatory  Reflective light is mandatory between 6 PM - 6 AM	N/A	N/A	left-hand drive	N/A	N/A
Taiwan <sup>37</sup>	N/A	brakes, bells, lights, or reflective devices must be kept intact and in good condition  it is required to turn on the light while driving at night  it is forbidden to be pulled by other vehicles	N/A	N/A	must be operated on slow-moving vehicle lanes  must be operated on the designated route	N/A	N/A

<sup>35</sup> Final Report: Policies for Sustainable Accessibility and Mobility, [SSATP](#)

<sup>36</sup> National Transport Policy and Strategy for Rwanda, [Ministry of Infrastructure Rwanda](#)

<sup>37</sup> Road Traffic Management and Penalty Act, [Taiwan Bike](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
		or pulling other vehicles					
Mexico	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brazil <sup>38</sup>	N/A	wearing helmet is required	N/A	N/A	allowed to ride on public roads, bicycle path and cycle lanes	N/A	it is prohibited to carry a passenger, animals or cargos  vehicle standard; Brazilian Standard NBR 9050/2004

<sup>38</sup> Decree No. 58,750, [The Government of São Paulo](#)



Table 9 Motorised 2W policies benchmark

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Indonesia <sup>39</sup>	driver licensing is required Age minimum to ride is 17 years old	wearing a helmet is required it is forbidden to carry more than one passenger turning on headlights at the night and the day	motorcycle must be registered motorcycle that operated on the road must be accompanied by a vehicle number certificate (STNK) and vehicle number sign	N/A	The regulation on the road usage is regulated by the local government	annually tax is required  Annual ownership tax for first ownership of private vehicle is minimum 1% and maximum 2%  another motorbike will be charged a progressive rate or an additional 2.5% rate for the second motorbike, and so on following a multiple of 0.5% for the third motorbike and so on.	it is forbidden to using phone or gadget while driving  It is forbidden to drive under influence of alcohol
Vietnam <sup>40</sup>	minimum age to drive is 18 years old driver license is required	wearing helmet is required	motorcycle must be registered	two-wheeled motorcycles insurance is required	motorcycle lane is segregated	N/A	N/A

<sup>39</sup> National Act No. 22 of 2009, [Ministry of Transportation of Indonesia](#)

<sup>40</sup> Road Safety Performance, [Vietnam Trade Portal](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Singapore <sup>41</sup>	Minimum age to drive is 18 years old driver license is required for locals and foreigners	wearing helmet is required  wearing protective clothing is advised, including jacket, raincoat, gloves  Safety lights must be equipped; headlights, tail lights, signal lights, brake lights  horns and side mirror are mandatory accessory to have	motorcycle must be registered  License are classified by engine capacity	Compulsory Third-Party Liability insurance/CTPL  Also, a prerequisite for road tax renewal	motorcycles should drive in left-most lane	Road tax (6-monthly) is calculated based on motorcycle engine capacity (EC) - $EC \leq 200 \text{ cc} = S\$40 \times 0.782$ - $200 < EC \leq 1,000 \text{ cc} = [S\$40 + S\$0.15(EC - 200)] \times 0.782$ - $EC > 1,000 \text{ cc} = [S\$160 + S\$0.3(EC - 1,000)] \times 0.782$  People can expect to have S\$30, S\$50, and S\$100 for 6-month road tax for low, medium, and high-capacity engine	it is forbidden to using phone or gadget while driving  Driving under influence of alcohol is prohibited  Electronic road pricing applies to motorcycles which costs from S\$0.25 to S\$3 (depends)
Thailand <sup>42</sup>	driver license is required for locals and foreigners	wearing helmet is required  wearing protective clothes is recommended	motorcycle must be registered	N/A	motorcycles should drive in left-most lane	Required to pay taxes which is around 300 - 400 baht (\$ 10 - 12)/year	it is forbidden to use phone or gadget while driving

<sup>41</sup> One motoring, [LTA Singapore](#)

<sup>42</sup> Motorbikes and Scooters in Thailand: [The Rules and What You Should Know](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Philippines <sup>43</sup> <sup>44</sup> <sup>45</sup>	<p>minimum age to drive is 16 years old to get a student permit for driving and minimum 18 years old to get an actual driver license requirement</p> <p>driver license is required</p>	<p>wearing helmet is required</p> <p>enclosed footwears are required</p> <p>safety lights must be equipped; headlights, tail lights, signal lights, brake lights.</p> <p>motorcycle must be equipped with horns and side mirror</p>	motorcycle must be registered	Compulsory Third-Party Liability insurance/CTPL	right-hand drive	required to pay taxes Fee: TBD	it is forbidden to using phone or gadget while driving
India <sup>46</sup>	<p>Driver licensing is required</p> <p>Age minimum to ride is 16 years old</p>	wearing helmet is required	motorcycle must be registered	Compulsory Third-Party Liability insurance/CTPL	N/A	N/A	<p>It is such a crime to driving under the influence of alcohol</p> <p>It is forbidden to be on the phone while driving</p>

<sup>43</sup> A Guide to Motorcycle Laws in The Philippines, [Bed&Go Real Estate](#)

<sup>44</sup> How To Get a Motorcycle Licence in The Philippines, [MD](#)

<sup>45</sup> Compare the BEst Motorcycle Insurance in the Philippines, [Monexmax](#)

<sup>46</sup> Traffic Rules in India That Every Two Wheeler Ride Should Know, [Policy Bazaar](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
China <sup>47 48</sup>	Driver license is required	wearing helmet is required  it is prohibited to carry an overload cargo  Cargo motor vehicles are prohibited from carrying passengers	motorcycle must be registered	motorcycle insurance is required to get a license plate  Compulsory Third-Party Liability insurance/CTPL	in some cities, motorcycles are banned to ride on a downtown	N/A	it is prohibited to person who drinks alcohol, or takes psychotropic substances or narcotic drugs which are under State control, or suffers from diseases to ride a vehicle
Rwanda <sup>49 50</sup>	minimum age to drive is 18 years old  driving license is required	wearing helmet is required	motorcycle must be registered	N/A	lef-hand drive	required to pay taxes Fee: TBD	it is forbidden to using phone or gadget while driving  It is forbidden to drive under influence of alcohol
Taiwan <sup>51 52</sup>	driver license is required	wearing helmet is required	motorcycle must be registered  motorcycle licences are classified by engine capacity	Compulsory Third Party Liability insurance/CTPL	motorcycles required to ride on exclusive lane  motorcycle lanes are segregated painted lines	annual vehicle tax is collected directly by local governments  motorcycle tax rates classified by cylinder displacement	It is forbidden to driving under the influence of alcohol

<sup>47</sup> How To Get a Motorbike Licence in Cina, [China Cities](#)

<sup>48</sup> Law of the People's Republic of China on Diplomatic Personnel Stationed Abroad, [The Government of China](#)

<sup>49</sup> Ownership Transfer, [The Government of Rwanda](#)

<sup>50</sup> Rwanda Standards, [Rwanda Standards Board](#)

<sup>51</sup> Regulation and Design of Motorized and Non-Motorized Two-and-Three-Wheelers in Urban Traffic, [Hook and Fabian](#)

<sup>52</sup> Driving in Taiwan, [American Institute in Taiwan](#)

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
53 54							
México	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brazil	N/A	N/A	N/A	N/A	N/A	N/A	N/A

<sup>53</sup> Changes in Traffic Safety Policies and Regulations in Taiwan, [International Association of Traffic and Safety Sciences](#)

<sup>54</sup> Vehicle License Tax, [Local Tax Bureau Hsinchu City](#)

Table 10 Non-motorised 3W Policies Benchmark

Country	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Other
Indonesia <sup>55 56 57</sup> Note: regulations may differ between regions	Some regions (e.g. Bogor) requires rickshaw drivers to have license and permits	Some regions (e.g. Bogor and Yogyakarta) require rickshaws to have several equipment e.g. bells, lamps, reflective devices, and rear view mirrors. Different regions have different levels of details on the safety equipment specifications.	Some regions (e.g. Bogor) require rickshaws to be registered, have vehicle identification numbers, and install license plates on the vehicles	N/A	Some regions prohibited rickshaws to pass on certain roads (usually the main roads) or have rickshaw-free zones marked by specific signages. Some regions (e.g., Yogyakarta) have designated parking areas for rickshaw	N/A	In Bogor and Yogyakarta, issuance of vehicle identification numbers and driving permits are subject to vehicle quality tests conducted by the transport agency
Vietnam	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Singapore <sup>58 59</sup> (Trishaw - used for tourism purposes only)	Trishaw rider to hold vocational licence	Must have bell, efficient brake and suitable front lamp (white) and rear lamp (red), or rear red reflector	very travel agent, being the owner of any trishaw, who intends to use the trishaw for the purpose of any tour conducted by him shall apply to the	N/A	Should use cycling lane whenever provided Must use the left-most side of the road (if there is no cycling lane)	N/A	No trishaw shall at any time carry more than 2 adult passengers, or one adult and 2 children passengers if the children are not more than one metre in height.

<sup>55</sup> A glance on the differences in becak banning rules in Jakarta and partner cities, [Kompas](#)

<sup>56</sup> Mayor's Regulation on the Implementation of Pedicab Transportation in Bogor City, [City Government of Bogor](#)

<sup>57</sup> Provincial Regulation no. 5 of 2016 on Tradisional Transportation Modes of Becak and Andong, [Provincial Government of Yogyakarta](#)

<sup>58</sup> Road Traffic Act (Chapter 276, Section 140) on Road Traffic (Bicycles) Rules, [Government of Singapore](#)

<sup>59</sup> Road Traffic Act (Chapter 276, Sections 10, 34 and 140) on Road Traffic (Registration of Trishaws) Rules, [Government of Singapore](#)



			Registrar for the registration of the trishaw  The Registrar may require a licensee to affix such plate or identification mark on the trishaw				
Thailand (samlor - mostly used for tourism purposes)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Philippines <sup>60</sup> (triskad - regulation may differ between cities)	For passenger triskad, all drivers should have IDs issued by local (district) triskad association	Should be equipped with a bell, horn or other devices capable of giving a signal for a distance of at least One Hundred (100) feet except siren or whistle.  Every triskad being operated at night shall be equipped with light on the front which shall emit a white light from a distance of at least Two Hundred (200) feet to the front and with a rear red reflex mirror or reflectorized tape visible for a distance of Two	Triskad should be registered annually. The registration plate number of a triskad shall be prominently displayed at the rear portion of the triskad clearly visible at a distance of fifty (50) feet and the driver/operator shall always carry his/her photocopy of the registration papers.	Insurance with a time coverage of one (1) year for third (3rd) party liability, property damage and physical injuries shall be required upon registration or renewal of triskads.	Triskad should comply with all traffic rules  In some cities (e.g., General Santos) triskad operations are limited at residential areas, only allowed to be operated in designated areas, or prohibited from the national highway  The triskad driver can deliver passengers outside of his/her designated barangay (district) but cannot pick up passengers		The total number of passengers of triskad shall be limited to three (3) persons including the driver;  Parking areas for triskad (triskad terminals) are established by district authorities and should be located 7-10 meters away from the main road or highway, street corner or from the edge of pavements.  The site of the proposed terminal and

<sup>60</sup> Title 32 - Traffic and Transportation, [General Santos City](#)

		Hundred (200) feet to the rear.			with fifty (50) meters away from the existing terminal of that barangay.		the trisikad routes shall be identified by the respective barangay (district) councils with proper sketch plans subject to the concurrence of the City Council.  The dimensions of trisikad are regulated.
India <sup>61</sup> <sup>62</sup> (may differ between municipalities)	Every driver must have a rickshaw driver license	Must have lights turned on during dark hours	Rickshaws must be licensed. One person is granted one Cycle Rickshaw license, except widows and handicapped, who can be granted up to a maximum of five licenses each pursuant to directives of the Honorable Supreme Court of India in order to earn their livelihood	N/A	In Delhi, cycle rickshaws can use cycle track whenever provided	N/A	In Delhi, cycle rickshaws are acknowledged as a sustainable NMT mode, particularly with reference to short and medium trip lengths.  The dimensions of cycle rickshaws are regulated.
China	N/A	N/A	N/A	N/A			
Rwanda	N/A	N/A	N/A	N/A	Left-hand ride (leftmost lane)	N/A	N/A

<sup>61</sup> Rules and Regulations Governing the City Permits for Cycle Rickshaw in Delhi, [New Delhi Municipality](#)

<sup>62</sup> Master Plan for Delhi-2021, [Delhi Development Authority](#)

Taiwan <sup>63</sup>	N/A	brakes, bells, lights, or reflective devices must be kept intact and in good condition  it is required to turn on the light while driving at night  it is forbidden to be pulled by other vehicles or pulling other vehicles	N/A	N/A	must be operated on slow-moving vehicle lanes  must be operated on the designated route	N/A	N/A
México <sup>64</sup> (bicitaxi / ciclotaxi/ taxi ecológico)	In Mexico City, drivers are required to register and have permits	In Mexico City, the ciclotaxi should comply with the technical guidelines issued by the local government, such as having seat belts, disc brakes, lights and roofs, among others.	In Mexico City, ciclotaxis should be registered	N/A	In Mexico City, ciclotaxis are only permitted to operate in the city's historic center	N/A	In Mexico City, the ciclotaxis must adhere to a regulated vehicle design and colors
Brazil	N/A	N/A	N/A	N/A	N/A	N/A	N/A

<sup>63</sup> Road Traffic Management and Penalty Act, [Taiwan Bike](#)

<sup>64</sup> Regulation of the Mobility Law of the Federal District, [Government of Mexico City](#)

Table 11 E-bikes Policies Benchmark

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
Indonesia <sup>65</sup>	N/A	25 km/h	Min. 12 years old to drive. No Licensing Requirement needed.	<p>bicycles must be equipped with headlights, reflectors on the back and left and right, horn and a functioning brake system</p> <p>the driver must wear a helmet</p> <p>prohibited to carry passengers unless it is equipped with a passenger seat</p> <p>prohibited to modify the motor power</p>	N/A	N/A	<p>Allowed on cycling lanes with max speed of 25km/h</p> <p>Allowed in certain areas: residential areas, car free day areas, tourist areas, areas around public transportation facilities, office areas</p>	N/A	SNI	N/A

<sup>65</sup> Transportation Minister Regulation Indonesia no. 59 of 2020

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
Vietnam <sup>66 67</sup>	The weight is no greater than 40 kg and it has including the battery	Maximum designed speed of no more than 25 km/h	Not required	Helmet is advisable	registration is required	Not required to be registered	Allowed to operate in the bicycle lane	N/A	Vietnam's national standard system (TCVN)	N/A
Singapore <sup>68</sup>	Max. weight: 20 kg (to reduce risk of serious injuries) Max. width: 70 cm (to allow passing each other safely) The	Motor power is cut off at max. 25 km/h	Min. 16 years old. Need to pass a theory test to obtain a competence certificate	Compulsory to wear bicycle helmet when cycling on the road	Yes, and need to have a registration plate at the rear side	Third party liability insurance is compulsory for delivery riders (burdened to the delivery companies)	Prohibited on footpath  Allowed on cycling lanes and roads (except highways and road tunnels)  Max. cycling two abreast, but must cycle	N/A	European Standard EN 15194:2017	Illegal to using/hold mobile phones while riding  Illegal to carry a passenger under 16 years old  Must switch on front white and rear red lights while riding in the dark

<sup>66</sup> Service Issues overview of electric vehicles use in Vietnam, [Xuan Truong Nguyen, Quang Hung Nguyen](#)

<sup>67</sup> Vietnamese standard TCVN 7448:2004 on Electric bicycles, [Vietnam Standard](#)

<sup>68</sup> Rules & Code of Conduct, [Government of Singapore](#)

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
	maximum continuous power output must not exceed 250 watts						in a single file on single-lane roads and during bus lane operating hours			Must not have a power start-up button/throttle. The motor power of the PAB can only cut in when the rider starts to pedal
Thailand	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Philippines <sup>69</sup>	N/A	E-bikes are classified to e-bikes with a top speed of 25kph and top speed between 26 and 50 kph	Drive license is not required	Helmet is required	Not required	N/A	E-bikes with a top speed of 25 kph are allowed to operate on barangay roads, national roads (crossing only), and bicycle lanes  E-bikes with a top speed of 26 and 50 kph are also allowed to operate on the outermost part of local roads,	N/A	N/A	N/A

<sup>69</sup> LTO Guide Electric Vehicles, [Government of The Philippines](#)



Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
							main thoroughfares (crossing only), and national highways (crossing only)			
India <sup>70</sup>	N/A	The maximum speed is 25 km/h	No age limits Not required driver license	Helmet is not required	N/A	Not required insurance	N/A	4% of the Vehicle's Cost (New age)  75% of the vehicle's cost (not more than 5 years)  25% of the vehicle's cost (> than 15 years)	N/A	N/A

<sup>70</sup> RTO Rules for Electric Vehicles in India and all Guidelines, [Government of India](#)

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
China <sup>71</sup> <sub>72 73</sub>	The weight shall not exceed 55 kg and it has included the battery  the motor power and battery voltage should not exceed 400 Watts and 48 volts respectively	Speed can't surpass 25 km/h	People under 16 is forbidden to drive e-bikes on road  Not required licensing requirements	Helmet should be worn during the ride  E-bikes must have pedals  Speed should be lowered during rainy and snowy day	N/A	N/A	Shall be operated on bike lanes  On the road without bike lane, it shall be ridden on the right side of the road	N/A	N/A	Shall not be borrowed to those who unable to ride  Should not be parked in building hallways, emergency staircases, passageways or emergency exits  Should not be charged or parked in residential building
Rwanda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Taiwan <sup>74</sup>	the weight maximum is 40 kg exclude the battery	top speed maximum is 25 km/h	N/A	brakes, bells, lights, or reflective devices must be kept intact and in good condition	must be inspected for safety approval	N/A	must be operated on slow-moving vehicle lanes  must be operated on the designated	N/A	N/A	N/A

<sup>71</sup> New national standards on electric bicycles take effect, [ChinaDaily](#)

<sup>72</sup> GB 17761-2018 on Safety technical specification for electric bicycle, [State Administration for Market Regulation of the PR China](#)

<sup>73</sup> The electric assist: Leveraging e-bikes and e-scooters for more liveable cities, [ITDP](#)

<sup>74</sup> Road Traffic Management and Penalty Act, [Taiwan Bike](#)

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Annual Road Tax	Vehicle Standards	Others
				<p>it is required to turn on the light while driving at night</p> <p>it is forbidden to be pulled by other vehicles or pulling other vehicles</p>			route			
México	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brazil	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 12 E2W Policies Benchmark

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Vehicle Standards	Annual Road Tax	Others
Indonesia <sup>75 76</sup>	N/A	70 km/h	Driver license is required  Minimum age to drive is 16 years old	Helmet is required	registration is required	N/A	N/A	SNI ISO/TR 13062:2015 (global standard)	N/A	N/A
Vietnam <sup>77</sup>	maximum engine capacity of no greater than 4 kW  vehicle weight of up to 118kg	Required to have maximum speed of no greater than 50 km/h	No age limits  Not required driver license	Helmet is required	required to register e-motorbikes  unregistered two-wheelers will be fined between VND 300,000 to VND400,000 (US\$13 to \$17)		N/A	Vietnam's national standard system (TCVN) ISO/TR 13062:2015 (global standard)	N/A	N/A

<sup>75</sup> National Police Regulations No. 7 of 2021 Ch. 45 v. 2

<sup>76</sup> National Law No. 22 of 2009 on traffic and road transport

<sup>77</sup> Service Issues: overview of electric vehicles use in Vietnam, [Xuan Truong Nguyen, Quang Hung Nguyen](#)

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Vehicle Standards	Annual Road Tax	Others
Singapore <sup>78</sup>	Electric motorcycles with power ratings below or equal to 10 kW	Maximum speed is no greater than 50 km/h	<p>Driver license is required</p> <p>Minimum age to drive is 16 years old</p> <p>Existing licensing requirements for Class 2B, 2A and 2 licences will apply to riders of electric motorcycles.</p>	Helmet is required	<p>Registration is required costs S\$20</p> <p>Unregistered will be fine for \$2,000 and/or jailed up to 3 months. Repeat offenders can be fined up to \$5,000 and/or jailed up to 6 months</p>	N/A	<p>electric motorcycles with power ratings below or equal to 10 kW are allowed on public roads</p> <p>registered higher-powered electric motorcycles with power ratings exceeding 10 kilowatts (kW) can use public roads</p> <p>electric motorcycles with a top speed of 50 km/h and above allowed on expressways (started from 1 April 2020)</p>	ISO/TR 13062:2015 (Global standard)	<p>Additional tax of \$200/year will be applicable for electric motorcycles, to partially recover for the fuel excise duties paid by equivalent ICE motorcycles. This additional tax will phase over three years from 1 January 2021.</p>	For non-commercial riders' insurance is encouraged, while commercial riders or company employing riders are obligatory.
Thailand	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Philippines	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

<sup>78</sup> Introduction of Higher-Powered Electric Motorcycle Regime to Encourage Adoption of Cleaner Vehicles, [Land Transport Authority](#)

Country	Vehicle Dimension and Power	Speed Limitation	Driver Age and Licensing Requirement	Safety Equipment	Vehicle Registration (License Plate)	Vehicle Insurance	Road Usage	Vehicle Standards	Annual Road Tax	Others
India	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
China	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rwanda	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Taiwan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mexico <sup>79</sup>	N/A	Max. 25 km/h, ensure that electric service units have a system that restricts such assistance reaching 25 km/h	N/A	Helmet is required	N/A	N/A	A single area of operation is created for all companies, equal in three original polygons: City Halls Benito Juárez, Cuauhtémoc and Miguel Hidalgo. Operation is prohibited in areas of cultural value, federal zones, and green areas	ISO 4210; The operator must have a solid waste disposal plan for the service units and their components, which should be based on NOM-052-SEMARNAT-2005 and NADF-024-AMBT-2013	Per vehicle: MXN\$ 14,000 (USD\$ 686) annually Operating Permit: MXN\$ 24,500,000 (USD\$ 1,201,043) annually In total, the five companies must pay to operate in Mexico City for a year 46 million 710 thousand pesos	Maximum fleet permitted within jurisdiction: 3,500  Maximum fleet permitted per provider: 1,750  Parking is allowed only in dedicated drawers, bike share station, sidewalk, street/curb.
Brazil	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

<sup>79</sup> Departmental guidelines on powered standing scooter/kick scooter, [Government of Mexico City](#)



Table 13 Advanced Vehicle Classification for 2- and 3-wheelers

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
2&3 wheelers	Motorised (ICE)	2W	Motorcycle <sup>80</sup>	Weight: 106 - 147 kg Length: 1.9 Width: 0.8 - 1 m Height: 1.1 m	90 km/h	vehicular lane
			Scooter <sup>81</sup>	Weight: 106 - 147 kg Length: 1.8 m Width: 0.8 - 1 m Height: 1.1 m	70 km/h	vehicular lane/bicycle lane
		3W	Bajaj / auto rickshaw <sup>82</sup>	Weight: 340 kg Length: 3.35 m Width: 1.34 m Height: 1.30 m	70 km/h	vehicular lane
			Cargo <sup>83</sup>	Weight: 360 kg Length: 3.35 m Width: 1.34 m Height: 1.30 m	85 km/h	vehicular lane

<sup>80</sup> Honda “bebek” motorcycle, [PT. Astra Honda Motor Indonesia](#)

<sup>81</sup> Scooter Vespa Sprint, [PIAGIO Indonesia](#)

<sup>82</sup> Auto rickshaw, [TVS Motor Indonesia](#)

<sup>83</sup> Viar Karya, [Viar Motor Indonesia](#)

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
	Non-motorised (NM)	2W	Bicycle (commuter & recreational) <sup>84</sup>	Weight: 12-20 kg Length: 1.8 m Width: 1 m Height: 2.2 m	20 - 30 km/h	bicycle lane
			Cargo bicycle <sup>85</sup>	Weight: 20 - 30 kg Length: 1.5 m Width: 0.6 m Height: 1.7 m	20 - 30 km/h	bicycle lane
		3W	Gerobak <sup>86</sup>	Weight: 12-20 kg Length: 1.5 m Width: 0.6 m Height: 1.7 m	5 km/h	bicycle lane
			Pedicab (becak, dll) <sup>87</sup>	Weight: 80-120 kg Length: 1.35 - 2.25 m Width: 0.65 - 1 m Height: 0.65 - 1 m	10 km/h	bicycle lane

<sup>84</sup> Gazelle Marco Polo, [Gazelle Dutch Bike](#)

<sup>85</sup> The Cargo City Bike, [Cycle Logistic EU](#)

<sup>86</sup> A Gerobak sale in marketplace, [Tokopedia Indonesia](#)

<sup>87</sup> Becak sizes, [Becak Miniku Indonesia](#)

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
			Storage Tricycle <sup>88</sup>	Weight: kg Length: m Width: m Height: m	30 km/h	bicycle lane
	Electric-powered (E)	2W	E-bicycle Class 1 (pedal assisted) <sup>89</sup>	Weight: 21-30 kg Length: 1.82 m Width: 0.8 m Height: 0.98 m	32 km/h	bicycle lane
			E-bicycle Class 2 (semi) <sup>90</sup>	Weight: 21-30 kg Length: 1.82 m Width: 0.8 m Height: 0.98 m	32 km/h	bicycle lane
			E-bicycle Class 3 (throttle) <sup>91</sup>	Weight: 21-30 kg Length: 1.82 m Width: 0.8 m Height: 0.98 m	45 km/h	bicycle lane
			E-Moped <sup>92</sup>	Weight: 44 kg Length: 1.6 m Width: 0.8 m Height: 1.08 m	25 km/h	bicycle lane

<sup>88</sup> The Cargo City Bike, [Cycle Logistic EU](#)

<sup>89</sup> What Are Ebike 'Classes' and What Do They Mean, [Wired International](#)

<sup>90</sup> What Are Ebike 'Classes' and What Do They Mean, [Wired International](#)

<sup>91</sup> What Are Ebike 'Classes' and What Do They Mean, [Wired International](#)

<sup>92</sup> The future of riding, [Selis Electric Moped](#)

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
			E-motorcycle scooter <sup>93 94</sup>	Weight: 130 kg Length: 1.870 m Width: 0.73 m Height: 1.15 m	40 - 70 km/h	bicycle lane
			E-kick scooter <sup>95</sup>	Weight: 17 kg Length: 1.109 m Width: 0.47 m Height: 1.14 m/0.53 (fold)	20 - 25 km/h	bicycle lane
			E-Pedicab <sup>96</sup>	Weight: 80-120 kg Length: 1.35 - 2.25 m Width: 0.65 - 1 m Height: 0.65 - 1 m	40 km/h	bicycle lane/vehicular lane
		3W	E-cargo bike <sup>97 98</sup>	Weight: 25 kg Length: 2.430 m Width: 0.446 m Height: 0.95 m	20 - 30 km/h	bicycle lane

<sup>93</sup> Vespa Elettrica 45 km/h, [Piaggio](#)

<sup>94</sup> Vespa Elettrica 70 km/h, [Piaggio](#)

<sup>95</sup> Ninebot max electric kick scooter, [Scootersvibes](#)

<sup>96</sup> Belia "The Sustainable Pedicab made in Yogyakarta", [Transport Agency Yogyakarta](#)

<sup>97</sup> The Cargo City Bikes, [Cycle Logistics EU](#)

<sup>98</sup> Bullitt technical details, [Splendid Cycle](#)

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
			E-scooter (handicapped) <sup>99</sup>	Weight: 43 kg Length: 0.95 m Width: 0.48 m Height: 0.98 m	12 km/h	bicycle lane
			E-bajaj <sup>100</sup>	Weight: 713 kg Length: 2.7 m Width: 1.37 m Height: 1.72 m	45 km/h	vehicular lane

<sup>99</sup> Three-wheel scooter Antares, [Chollortopedia Online Marketplace](#)

<sup>100</sup> Piaggio Ape, [Piaggio India](#)

## 4.4. Speed and noise limiter efforts in other countries

### Speed limiters

The European Commission will require new cars sold after 6 July 2022 to be fitted with speed limiters. It is understood that the UK will adopt this rule as well.<sup>101</sup> The regulation only applies to 4-wheelers, as current ISA technology has not been adapted to the motorcycle.<sup>102</sup>

Speed limiters use Intelligent Speed Assistance (ISA) technology which uses GPS data or video to determine the posted speed limit. When drivers exceed it, the limiter sends feedback with options such as a visual sign, audio, engine speed reduction, pedal pushback, and/or pedal vibration. The device keeps giving alerts until the driver slows down.<sup>103</sup>

### Noise Limiters and Alert Systems

The United Nations' World Forum for Harmonisation of Vehicle Regulations recommends that vehicles with low and medium power engines emit 74 dB of noise or less. This recommendation is expected to be revised lower by 2024. India sets the maximum noise limit for motorcycles and scooters at 80 decibels, with a penalty of Rs 1,000 - 2,000 (10 - 20 GBP).<sup>104</sup>

The United Nations' World Forum for Harmonisation of Vehicle Regulations recommends an Acoustic Vehicle Alerting System (AVAS) for all hybrid and electrical vehicles. The AVAS creates artificial noise, which increases with speed and reaches 56 decibels at 20 km/h. This is based on the tendency of people walking to relate the noise level of the vehicle to its speed. Research has shown that EVs with AVAS sound the same as conventional vehicles at 30 km/h. The noise level is capped to protect against noise pollution while being loud enough to warn road users.<sup>105</sup>

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<sup>101</sup> Speed limiters to be fitted on all new cars by 2022, [Confused.com](https://www.confused.com/news/speed-limiters-to-be-fitted-on-all-new-cars-by-2022)

<sup>102</sup> Mandated Intelligent Speed Assistance (ISA) for Motos?, [Adventure Rider](https://www.adventure-riders.com/news/mandated-intelligent-speed-assistance-isa-for-motos/)

<sup>103</sup> Briefing: Intelligent Speed Assistance, [ETSC](https://www.etsc.eu/Briefing-Intelligent-Speed-Assistance)

<sup>104</sup> Bhubaneshwar. (2018, January 29). Eye on bikes with modified silencers. The Telegraph India.

<sup>105</sup> Miloradovic, D. M., Glisovic, J., Lukic, J. (2017). *Regulations on Road Vehicle Noise*. Trends and Future Activities.

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