



Guidelines on The Integration of Electric Two- and Three- Wheelers in Urban Traffic





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Guidelines on The Integration of Electric Two- and Three-Wheelers in Urban Traffic

Supporting E-mobility focusing on Electric Two- and Three-wheelers and Policies on Urban Traffic Integration in Indonesia

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TERMS AND DEFINITIONS

ICE Motorcycles	2-wheeler/2W (also 3-wheeler/3W) 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-2W (E2W)	Electric-powered vehicle that runs on two wheels. For instance, E-bike and E-motor.
Electric 3W (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
STNK	Vehicle registration certificate
SIM	Driver's license
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

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Executive Summary

The transport sector significantly contributes to greenhouse gas emissions in Indonesia, prompting the government to prioritize emission reduction and energy efficiency. This includes promoting non-polluting transport modes such as walking and cycling, promoting public transport, and accelerating the adoption of cleaner vehicles, such as electric two- and three-wheelers (E2&3W). In the project titled “Supporting E-Mobility Focusing On Electric Two- And Three-Wheelers And Policies On Urban Traffic Integration In Indonesia” “ the Institute for Transportation and Development Policy (ITDP) Indonesia supported by the United Nations Environment Programme (UNEP) developed three main outputs as follows:

- 1. Baseline Assessment of Two- and Three-Wheelers in Indonesia**
- 2. Development of National Policies And Standards on Two- and Three-Wheelers Electric Mobility Transition in Indonesia**
- 3. Guidelines On The Integration Of Electric Two- and Three-Wheelers In Urban Traffic**

The “Guidelines On The Integration Of Electric Two- and Three-Wheelers In Urban Traffic” report guides national governments and cities to govern the future mass E2&3W on the road. Proper management of the emerging E2&3W in city traffic can improve the safety and convenience of using electric mode and serve as a driving force to improve general traffic conditions.

The guideline builds on a previous study by ITDP Indonesia, titled “Road Map and Timetable of 2W Electrification in Greater Jakarta”, conducted under the UK Partnership for Accelerating Climate Transition (UK PACT) programme. In this guideline, further elaborations were made to contextualize the recommendations to other Asian countries. In addition, an expert group meeting was organized with policymakers from public agencies and representatives of road users, including vulnerable groups such as women, people with disabilities and the elderly, to validate the guideline’s applicability and relevance to solving urban traffic problems.

The guideline aims to address traffic violence, climate change, and quality of life issues by promoting electric 2&3W vehicles over ICE motorcycles. Objectives include reducing traffic violence and air/noise pollution through regulation and shifting to electric vehicles, measured by metrics such as injury severity and emissions levels. Improving conditions for electric 2&3Ws involves developing specific regulations and infrastructure, measured by metrics like infrastructure built and policy issuance. In Indonesian cities, widespread traffic violations by motorized 2Ws lead to safety and accessibility issues for pedestrians and other road users. These include breaches of sidewalks, bike lanes, bus lanes, illegal parking, unlicensed users, traffic light violations, and speeding, often near transit stations. These infractions occur due to insufficient enforcement and awareness of regulations, compromising pedestrian safety and creating high traffic volume in residential areas, poorly maintained sidewalks, inadequate crossings, and unclear lane allocation for E2&3W vehicles. The lack of bicycle parking facilities and customized 2Ws or 3Ws also exacerbates accessibility challenges.

The guideline also aims to increase the quality of life on city streets and equity in the transport sector, measured by metrics like travel efficiency gains and perception of safety for vulnerable groups. Guiding principles include prioritizing safety, inclusivity, sustainability, and livability. The methodology involved desk research, field observations, and focus group discussions with stakeholders, particularly vulnerable groups, to identify issues and develop recommendations, with feedback gathered and prioritized through subsequent discussions.

Regarding policies related to various types of 2&3W vehicles in Asian and African countries, some Asian nations have more detailed regulations, particularly for E2&3Ws, while policies for 3Ws are generally limited despite their widespread use. Regulations typically cover dimensions, speed limits, helmet requirements, operating areas, and minimum age or licensing requirements for 2Ws, while regulations for 3Ws are less comprehensive, with only a few countries setting criteria for dimensions, speed, and power. Best practices include clear regulations on dimensions, weight, and speed to prevent traffic conflicts and ensure safety. Singapore and China stand out for their comprehensive regulation of e-bikes and e-scooters. However, policy gaps exist, particularly regarding regulations for vehicle dimensions and operating areas, which must be addressed to ensure the safe and efficient use of 2&3W vehicles, including e-bikes and motorcycles.

The interventions proposed to scale up E2&3W adoption and enhance traffic safety encompass various aspects of vehicle classification, street design and operations, street management, and street users. Firstly, establishing appropriate urban traffic policies is essential to clearly classify E2&3W vehicles based on speed, pedal presence, and motor type. Street design modifications, such as lane assignments and lower speed limits, offer opportunities to enhance safety and accessibility for all road users. Challenges include public awareness, enforcement, and the need for infrastructure adjustments. Street management strategies, including limiting through-traffic and managing curb use, aim to create safer and more pedestrian-friendly environments. Encouraging last-mile connectivity with transit and clarifying regulations regarding minimum age, permits, and safety accessories are vital for fostering safe and sustainable transportation practices. Additionally, requiring speed limiters, noise limiters, and AVAS for E2&3W vehicles can further improve road safety by mitigating speed-related risks and ensuring adequate vehicle alerts for all road users, especially those with disabilities. Enforcement mechanisms, such as electronic license plate readers and automatic ticketing systems, are crucial for implementing and maintaining compliance with these interventions.

1 Guideline Vision, Objectives, And Principles

1.1 VISION

To equitably address traffic violence, climate change, and quality of life by improving conditions for E2&3W and shifting away from ICE motorcycles.

1.2 OBJECTIVES

1. To reduce traffic violence and air/noise pollution caused by ICE motorcycles
 - a. The reduction of traffic violence will be attained by regulating street design, street management, street operations, street users, and vehicles.
Metric: Injury severity caused by traffic violence.
 - b. A shift from ICE to electric-based vehicles will diminish air/noise pollution, as EVs produce lower emissions and noise pollution.
Metrics: GHG emission and noise level.
2. To improve conditions for electric-powered 2&3Ws
Currently, there are few specific regulations for 2&3W in Indonesian as well as other Asian cities. This report contains recommendations to address this shortcoming.
Metrics: a) Dedicated infrastructure built, and b) Issuance of national- and regional-level policy.
3. To increase the quality of life on city streets
Quality of life includes physical, social, economic and psychological aspects. Under the impact of massive urbanization and ICE motorcycles, many Asian cities are less inclusive of all street users, especially the vulnerable groups, and the behavior of ICE motorcycle users is also poor.
Metrics: a) Shift from ICE to E2&3W, 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 means that all street users have the right to use the space without discrimination according to their purpose. However, in practice, non-motorized transport and the emerging electric vehicle users are often excluded.
Metric: Perception of safety and comfort of vulnerable and disadvantaged people.

1.3 PRINCIPLES

SAFE AND SECURE	<ul style="list-style-type: none"> • Enables people to protect themselves from hazards • Control identifiable hazards to an acceptable level of risk • Provide protection or resistance against possible damage caused by other
INCLUSIVE AND INTUITIVE	<ul style="list-style-type: none"> • Meet the needs of all users and all abilities • Provide clear and simple rules and guidance
SHIFTS	<ul style="list-style-type: none"> • Supports sustainable transportation system (prioritising NMT, supporting public transport) • Encourage the shift to low- and zero-emission transport
LIVEABLE	<ul style="list-style-type: none"> • Provide people with a healthy and happy urban life and good community well-being

2 Guideline Development Methodology

In developing this guideline, urban mobility issues for 2&3W were identified through desk research, field observations and focus group discussions with various stakeholder groups, including public sector stakeholders and road users, in particular the vulnerable groups. The process is illustrated in the following diagram:

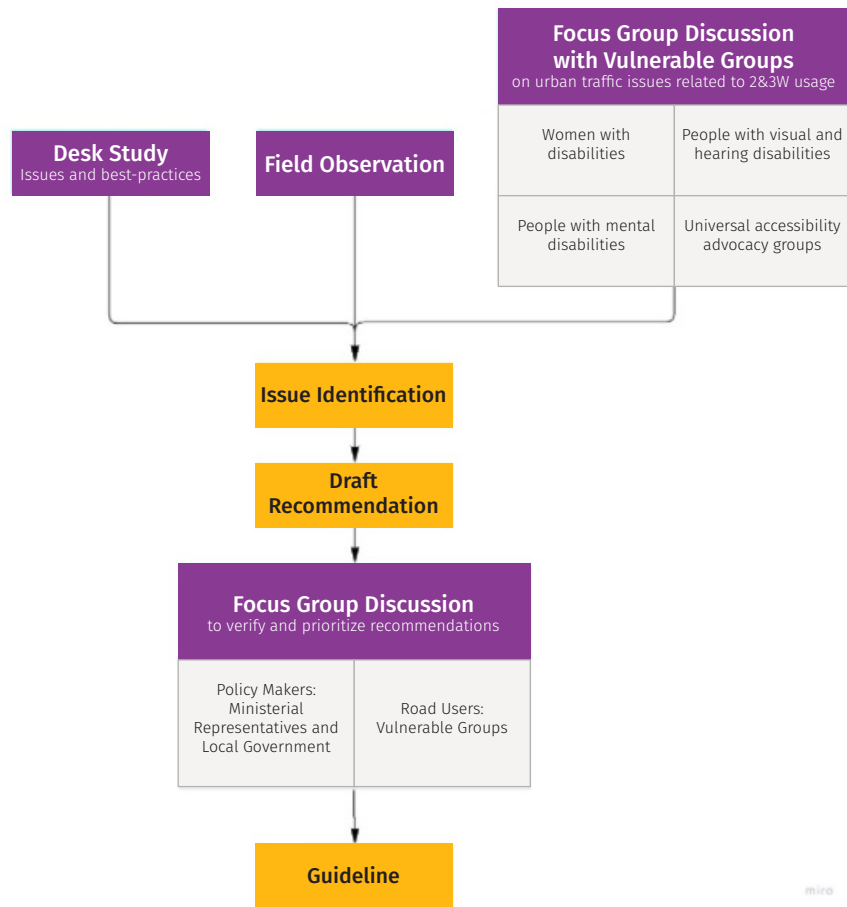


Figure 1. Issue Identification and Guideline Development Process

The first focus group discussion took place in 2021 (see Appendix B). Six different communities of people with disabilities participated to gather urban transport issues from the perspective of vulnerable groups, particularly those related to safety and comfort. Potential traffic issues resulting from future mass adoption of E2&3W were also discussed.

Participants' concerns and ideas were collected and combined with best practices from other countries to develop draft recommendations. After compiling the issues and developing draft recommendations, another group discussion was held, including representatives of vulnerable road user groups and officials from national ministries and local government agencies, to gather feedback and prioritize the recommendations.

3 Overview of E2&3W Policies in Asia and Africa

In this report, the policies documented cover a wide range of 2&3Ws, including non-motorized (pedal-powered), pedal assisted, ICE, and E2&3Ws. In general, Asian and African countries have similar policies although some Asian countries have more elaborate policies, including more advanced E2&3W regulations. While 2W, particularly motorized 2W, has a more comprehensive set of regulations, 3W has more limited regulation despite being commonly used in Asia and Africa. Asian countries in this study are represented by Indonesia, Singapore, Philippines, India, and China, while African countries cover South Africa, Nigeria, and Kenya.

The diagram below illustrates the general typology of 2&3W used in this chapter.

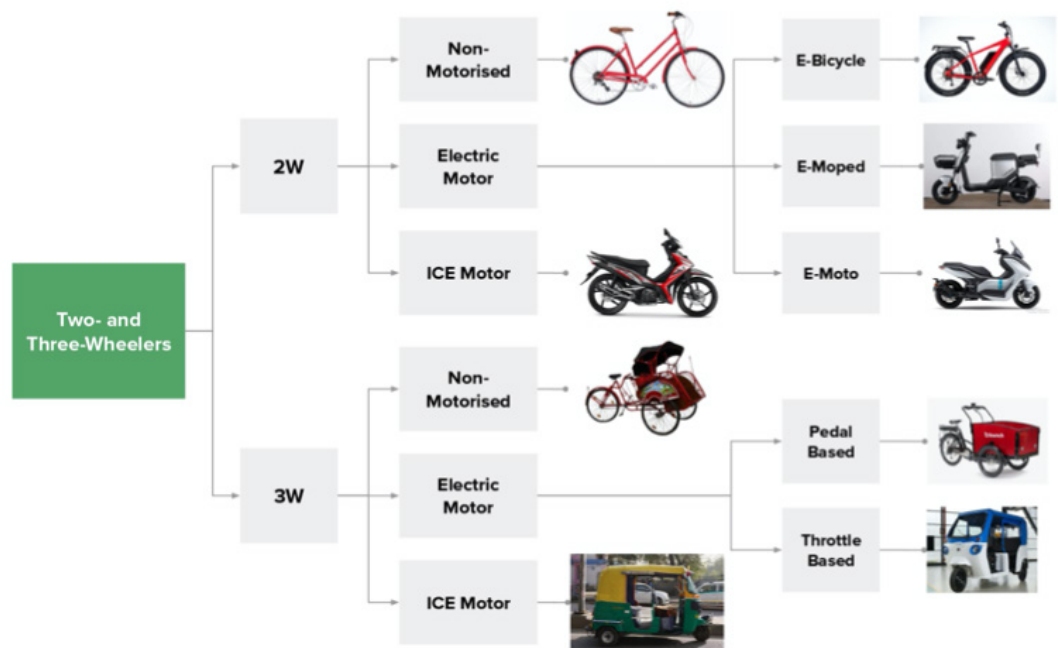


Figure 2. General Typology of Two- and Three-Wheeler

3.1 2W POLICIES

The 2Ws discussed in this subsection includes the pedal-powered or pedal-assisted and throttle-powered or commonly known as motorbike or motorcycle, and in context for urban transportation purpose.

3.1.1 PEDAL-POWERED

This includes pedal-powered bicycles and pedal-assisted electric bicycles (e-bikes) which have a pedal on them.

A. MAXIMUM VEHICLE DIMENSION AND WEIGHT

Almost all of the documented countries do not regulate the dimensions of bicycles or electric bicycles, except Indonesia, Singapore, and China. Singapore requires the bicycle and e-bike to be less than 700 mm in width¹ while Indonesia, sets the bicycle (and presumably the electric one) not to be more than 550 mm wide and 2100 mm long². The width requirements of 550 mm might be too narrow for modern bikes which mostly have handlebars with a length of 550-700 mm. China also regulates the width of e-bikes (not including the handlebar and pedal) to be less than 450 mm³.

Besides the dimensions, weight is also regulated for electric bicycles in some countries. Singapore regulated e-bikes to be less than 20 kg to reduce the risk of injuries while in South Africa, it is up to 40 kg⁴. Meanwhile, China limits e-bikes to be slightly heavier at 55 kg⁵.

B. MAXIMUM VEHICLE SPEED OR POWER

In most countries with e-bike regulations, e-bikes are in general regulated not to exceed 25 km/h. However, the Philippines is one of the countries that regulate e-bike classes into two categories. Category 1 e-bikes can go up to 25 km/h while Category 2 e-bikes can go up to 50 km/h⁶. In addition, e-bike motor power is often also regulated. Most countries limit e-bike motor power to 250 W while China allows it to 400 W⁷.

C. HELMET REQUIREMENTS

Most countries do not require bicycle riders to use helmets although some advise it. Countries such as Singapore⁸, the Philippines⁹, and South Africa¹⁰ oblige cyclists to use helmets. While regulations for e-bikes are still limited in African countries, most Asian countries require e-bike users to use helmets.

¹ Land Transport Authority of Singapore. 2018. Rules & Code of Conduct, Active Mobility Act. Land Transport Authority. [Online]. [Accessed 2022]. Available from www.lta.gov.sg

² Government of Indonesia. 2012. Government Regulation of The Republic of Indonesia Number 55 of 2012 Concerning Vehicles. State Gazette of the Republic of Indonesia. [Online]. [Accessed 2022]. Available from <https://peraturan.bpk.go.id>

³ China. 2003. Law of the People's Republic of China on Road Traffic Safety. The National People's Congress of the People's Republic of China. [Online]. [Accessed 2022]. Available from <http://www.npc.gov.cn>

⁴ Bicycle South. 2017. South African Rules of the Road and Cycling Legislation. Bicycle South. [Online]. [Accessed 2022]. Available from <https://bicyclesouth.co.za>

⁵ Yang, Y. 2019. New National Standards on Electric Bicycles Take Effect. China Daily. [Online]. [Accessed 2022] Available from <https://www.chinadaily.com.cn>

⁶ Philippines. 2021. Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. [Online]. [Accessed 2022] Available from <https://lto.gov.ph>

⁷ Sui, B. 2021. Powered Two-Wheelers (>25 km/h) in China. International Transport Forum. [Online]. [Accessed 2022] Available from <https://www.itf-oecd.org>

⁸ Land Transport Authority of Singapore. 2018. Rules & Code of Conduct, Active Mobility Act. Land Transport Authority. [Online]. [Accessed 2022] Available from <https://www.lta.gov.sg>

⁹ Philippines. 2021. Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. [Online]. [Accessed 2022] Available from <https://lto.gov.ph>

¹⁰ Bicycle South. 2017. South African Rules of the Road and Cycling Legislation. Bicycle South. [Online]. [Accessed 2022] Available from <https://bicyclesouth.co.za/wp-content/uploads/2017/05/SOUTH-AFRICAN-RULES-OF-THE-ROAD.pdf>

D. OPERATING AREA AND SPEED LIMIT

It is unanimously agreed among the countries that bicycles have to use a bike lane or path when available or otherwise are required to use the outermost lane or slow lanes. The maximum speed limit on a bike lane or path is generally 25 km/h, except in China which regulates it to be 15 km/h¹¹. Nevertheless, in practice, an e-bike's maximum design speed in China is typically 25 km/h and therefore often still uses the bike lane with its maximum speed capability.

In Singapore, bicycle usage on the sidewalk which is designated as a shared path with pedestrians is limited to 10 km/h¹².

Similar to regular bicycles, e-bikes are typically also required to be operated on the bike lane or path. However, Singapore forbids the usage of e-bikes on sidewalks¹³ while India does not regulate it. There is no clear regulation yet for e-bikes in African countries.

E. MINIMUM AGE OR DRIVING LICENSE AND VEHICLE REGISTRATION

Driving license and vehicle registration are not required for bicycle users. No minimum age is also required. However, some countries regulate the minimum age for e-bikes. For instance, Indonesia requires e-bike users to be at least 12 years old and have to be accompanied by an adult until 15 years old¹⁴. China and Singapore regulate the user to be at least 16 years old and require all e-bikes to be registered and display license plates¹⁵.

3.1.2 THROTTLE-POWERED

This includes conventional motorcycles and electric motorcycles which use a throttle to operate them.

A. MAXIMUM VEHICLE DIMENSION

No maximum vehicle dimension regulation for motorcycles is found, and neither for e-motorcycle.

B. MAXIMUM VEHICLE SPEED OR POWER

Although there are classes of engine capacity, no such maximum vehicle speed or power exists for ICE motorcycles. E-motorcycle, on the other hand, is regulated for the minimum and maximum speed. For instance, China regulates its moped to be at least 20 km/h but not exceed 50 km/h with motor power under 4 kW while for its e-motorcycle, it should be at least 50 km/h with motor power more than 4 kW¹⁶. This also applies to the Philippines which requires its L3 e-motorcycle to be more than 50 km/h¹⁷. Singapore limits its e-motorcycle to 10 kW¹⁸, while no such regulations are found yet in African countries.

¹¹Sui, B. 2021. Powered Two-Wheelers (>25 km/h) in China. International Transport Forum.[Online]. [Accessed 2022] Available from <https://www.itf-oecd.org>

¹²Singapore. 2018. Active Mobility Regulations. Land Transport Authority of Singapore. [Online]. [Accessed 2022] Available from <https://sso.agc.gov.sg>

¹³Land Transport Authority of Singapore. 2018. Rules & Code of Conduct, Active Mobility Act. Land Transport Authority. [Online]. [Accessed 2022] Available from <https://www.lta.gov.sg>

¹⁴Indonesia. 2020. Ministry of Transportation Regulation Number 45 of 2020 Concerning Specific Vehicle with Electric Motor. Ministry of Transportation of Indonesia. [Online]. [Accessed 2022] Available from <https://jdih.dephub.go.id>

¹⁵Land Transport Authority of Singapore. 2018. Rules & Code of Conduct, Active Mobility Act. Land Transport Authority. [Online]. [Accessed 2022] Available from <https://www.lta.gov.sg>

¹⁶Sui, B. 2021. Powered Two-Wheelers (>25 km/h) in China. International Transport Forum.[Online]. [Accessed 2022] Available from <https://www.itf-oecd.org>

¹⁷Philippines. 2021. Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. [Online]. [Accessed 2022] Available from <https://lto.gov.ph>

¹⁸Land Transport Authority. 2020. Introduction of Higher-Powered Electric Motorcycle Regime to Encourage Adoption of Cleaner Vehicles. Land Transport Authority. [Online]. [Accessed 2022] Available from <https://www.lta.gov.sg>

C. HELMET REQUIREMENTS

Helmet is unanimously required for motorcycle users, including for e-motorcycle riders.

D. OPERATING AREA AND SPEED LIMIT

Typically, throttle-powered 2W use the same lane as other motorised vehicles but on the outermost lane. Speed limits vary between countries, and commonly follow the traffic speed limit applicable to the road segment. Indonesia, for example, has a speed limit of 50 km/h on urban roads¹⁹, although it is hardly obeyed by the riders. Singapore, India, and Nigeria, also have 50 km/h speed limits. The Philippines is slightly lower at 40 km/h and South Africa slightly higher at 60 km/h in urban areas²⁰. Kenya has a significant speed limit of 100 km/h for single carriage highways and even 110 km/h for dual carriage highways²¹.

E. MINIMUM AGE OR DRIVING LICENSE AND VEHICLE REGISTRATION

Motorcycles and also e-motorcycles are required to be registered and ridden by qualified riders with a driving license. The minimum age varied from 16-18 years old between countries. Some countries such as India and the Philippines have two types of driver licenses; 16 years old for a learner license and 18 years old for the actual license²².

3.2 3W POLICIES

There are two main types of 3Ws being discussed in this report. First, pedal-powered or pedal-assisted electric 3Ws such as tricycles, rickshaws, or other terms depending on the area. Second is motorized 3Ws such as auto-rickshaws or 3W motorcycles, both ICE and electric.

Even though 3Ws are popular in Asian and African countries, there are limited policies regarding the 3Ws, especially the motorized 3Ws.

3.2.1 PEDAL-POWERED

A. MAXIMUM VEHICLE DIMENSION

Indonesia, regulates the dimensions of rickshaws (commonly known as “becak”) to be not more than 1500x2800x1800 mm for width, length, and height respectively²³. There is no current national regulation for electric rickshaws yet, but Jakarta has started to develop the regulations. China also regulates the dimensions of conventional rickshaws, which should not be more than 850 mm wide²⁴.

B. MAXIMUM VEHICLE SPEED OR POWER

The Philippines sets the maximum speed for electric rickshaws not to be more than 50 km/h²⁵. No other countries are found to state the maximum speed of electric rickshaws.

¹⁹Indonesia. 2013. Government Regulation of the Republic of Indonesia Number 79 of 2013 Concerning Transportation Network and Road Transport. State Gazette of The Republic of Indonesia. [Online]. [Accessed 2022] Available from <https://jdih.dephub.go.id>

²⁰South Africa. 2012. National Road Traffic Act, 1996 (Act No. 93 of 1996). Department of Transport. [Online]. [Accessed 2022] Available from <https://www.gov.za>

²¹Kenya. 2012. Laws of Kenya The Traffic Act Chapter 403 (Revised Edition ed.). National Council for Law Reporting. [Online]. [Accessed 2022] Available from <http://kenyalaw.org>

²²Policy Bazaar. 2019. Traffic Rules in India That Every Two Wheeler Rider Should Know. Policy Bazaar. [Online]. [Accessed 2022] Available from <https://www.policybazaar.com>

²³Indonesia. 2012. Government Regulation of The Republic of Indonesia Number 55 of 2012 Concerning Vehicles. State Gazette of the Republic of Indonesia. [Online]. [Accessed 2022] Available from <https://peraturan.bpk.go.id>

²⁴China. 2019. National Standard of the People's Republic of China. General Administration of Quality Supervision, Inspection and Quarantine of PRC. [Online]. [Accessed 2022] Available from <https://www.chinesestandard.net>

²⁵Philippines. (2021). Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. <https://lto.gov.ph/>

C. HELMET REQUIREMENTS

Helmet is not required for rickshaws or pedal-assisted rickshaw riders.

D. OPERATING AREA AND SPEED LIMIT

In several countries such as Indonesia and the Philippines, rickshaw operations often have limited operational areas^{26,27}. They are allowed to be operated on the bike lane or path in most Asian countries, with a maximum speed of 25 km/h.

E. MINIMUM AGE OR DRIVING LICENSE AND VEHICLE REGISTRATION

Rickshaws are generally used for public transportation, therefore some countries require them to be registered and the drivers to have a permit or vocational license, just like in Indonesia, the Philippines (Philippines, 2020, 5)²⁸, and India.

3.2.2 THROTTLE-POWERED

Throttle-powered 3Ws such as auto-rickshaws have a very limited regulatory framework, despite being popular in many Asian and African countries. Besides vehicle dimension, maximum vehicle speed, and maximum power, there is a lack of regulation concerning their operations.

A. MAXIMUM VEHICLE DIMENSION

India regulated the maximum dimension of electric auto-rickshaw to be less than 1800x2800x1000 mm²⁹ while the Philippines oblige the weight to be less than 600 kg³⁰.

B. MAXIMUM VEHICLE SPEED OR POWER

While the Philippines requires an electric autorickshaw to have more than 1000 kW power, India limits it to be less than 2000 kW with a speed limit of 25 km/h.

²⁶Carina, J. 2018. Melihat Perbedaan Aturan Pelarangan Becak di Jakarta dan Kota Mitra... KOMPAS. [Online]. [Accessed 2022] Available from <https://megapolitan.kompas.com>

²⁷Philippines. 2021. Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. [Online]. [Accessed 2022] Available from <https://lto.gov.ph/>

²⁸Philippines. 2020. Guidelines in the Review or Revisiting the City or Municipal Tricycle and Pedicab Franchise and Regulatory Ordinance or Code and Barangay Ordinance on the Use of Public Roads, Pathways and Alleys. Department of the Interior and Local Government. [Online]. [Accessed 2022] Available from <https://www.dilg.gov.ph>

²⁹Delhi. 2014. E-Rickshaw Sewa Scheme. Government of National Capital Territory of Delhi. [Online]. [Accessed 2022] Available from <https://transport.delhi.gov.in>

³⁰Philippines. 2021. Consolidated Guidelines in the Classification, Registration and Operation of All Types of Electric Motor Vehicles. Department of Transportation Republic of The Philippines. [Online]. [Accessed 2022] Available from <https://lto.gov.ph>

3.3 SUMMARY OF EXISTING POLICIES

The overview of the current landscape of E2&3W policies in Asian and African countries shows that some policy components have been well governed, while there are still some gaps to fulfill in other components. The policy status overview can be illustrated as follows.

Category	2W		3W	
	Pedal-Based	Throttle-Based	Pedal-Based	Throttle-Based
Maximum Vehicle Dimension and Weight	Limited weight regulation that could impose danger to other street users.	Motorized 2W is getting bigger, hence the weight. Should be regulated to reduce traffic safety hazard.	Limited weight regulation that could impose danger to other street users. Dimension should be regulated to be compatible to bike lane.	Limited regulation for the dimension and weight. Should be more well regulated in most countries.
Maximum Vehicle Speed or Power		Should be regulated to prevent speeding.		Limited available regulation. Should be more well regulated to reduce speeding.
Helmet Requirements				
Operating Area and Speed Limit	Especially for Indonesia that does not allow electric bicycle to be operated in regular street.		Bike lane width should be standardized to allow 3W.	Limited regulation. Should be clarified the operational area for 3W.
Minimum Age or Driving License and Vehicle Registration				

Table 1. E2&3W Policy Status in Asian and African countries

Legend

	Governed
	Governed but needs to be improved
	Not Governed

3.3.1 BEST PRACTICES

A. DIMENSIONS, WEIGHT, AND SPEED REGULATION

Most countries with e-bike regulations classify them based on size, weight, and speed. Singapore and China are among the countries that regulate them well and comprehensively. Clear regulations are necessary to prevent or minimize the impact of potential traffic conflicts on other road users. In addition to e-bikes, Singapore and China also regulate e-scooters, although not as comprehensively as e-bikes. The size, weight, and speed of motorcycles and electric motorcycles should also be regulated to prevent violations such as speeding.

Not just two-wheelers, some countries also regulate the width and weight of three-wheelers, both non-motorized or motor-based. This is important, especially for non-motorized or pedal-assisted E3W that can use bike lanes. The width must be limited so as not to occupy the entire bike lane.

B. DRIVING LICENSE, VEHICLE REGISTRATION, AND MINIMUM AGE

Although bicycles and other non-motorized 2&3W generally do not require a driving license, some countries require e-bikes and several other non-motorized 2&3W to be registered and use a license plate. Having a license plate is especially important for vehicles used as public transport, such as rickshaws.

C. OPERATING AREA

Bicycles and e-bikes in general should use bike lanes when available. Otherwise, most countries allow them to operate on the curbside vehicular lane. Meanwhile, Singapore has banned the use of e-bikes on sidewalks, which could pose a safety hazard to pedestrians.

3.3.2 POLICY GAPS

A. DIMENSIONS, WEIGHT, AND SPEED REGULATION

Current bicycle width regulation (550 mm wide at maximum) in Indonesia is far too narrow for modern bikes. Singapore, for instance, regulate it to be not more than 700 mm which is enough for bicycle nowadays. Even if regulations concerning vehicle dimension are seldom enforced by the Traffic Corps Police, appropriate regulations must be in place. The weight of bicycles and e-bikes should also be regulated so that they do not pose harm to pedestrians.

As with e-bikes, conventional and electric motorcycles also need to be regulated for their size, weight and top design speed. Although the operational speed is usually have been regulated according to the type of street or area, but having a maximum vehicle design speed helps to ensure the compliance to the specified operating speed. Similar to cars, motorcycles are becoming larger and have thus have bigger engine displacements. It should also be regulated to limit motorcycle emissions.

B. DRIVING LICENSE, VEHICLE REGISTRATION, AND MINIMUM AGE

In Indonesia, e-bikes are currently only allowed on bike lanes and special areas, including sidewalks. Although the availability of bike lanes in Indonesia is very limited, e-bikes should be allowed on the streets, but should use the curbside lane similar to bicycles. Due to the relatively high speed and weight of e-bikes compared to pedestrians, the use of them on sidewalks should also be prohibited.

In addition to ordinary bicycles and electric bicycles, pedal-based three-wheelers should be allowed to use cycle paths or bike lanes. Therefore, the width of the cycling infrastructure should be wide enough to accommodate the 3W.

4

Urban Traffic Issues of 2&3W

Traffic violations, especially by motorized 2Ws, are still common in Indonesian cities and are a major problem, often creating safety and accessibility issues for other road users. Motorcyclists often also do not give priority to pedestrians and endanger them by violating traffic lights and entering sidewalks.

The main urban traffic issues related to motorized 2&3W in Indonesian cities can be summarized as follows:

1. TRAFFIC RULE VIOLATIONS, IN PARTICULAR BY MOTORIZED 2W

- a. Breach of sidewalks, bike lanes, or bus lanes to bypass traffic jams or to drive in the wrong direction;
 - b. Illegal parking on the sidewalk or in illegal parking facilities on and off the street;
 - c. Unlicensed users, including underage drivers;
 - d. Traffic light violation;
 - e. Speeding, including in safe school zones and residential areas with lower speed limits; and
 - f. A large number of motorized 2Ws occupy the vehicular lanes adjacent to transit stations, which mainly consist of ride-hailing fleets waiting to pick-up or dropping off passengers.
- These violations occur primarily due to a lack of enforcement and awareness of regulations.

2. SAFETY ISSUES FOR PEDESTRIANS, ESPECIALLY VULNERABLE GROUPS, FOR THE FOLLOWING REASONS

- a. Conflicts with motorized 2Ws and cyclists on sidewalks and at intersections due to the above traffic
- b. violations;
- c. High volume of through traffic in residential alleys or shared streets;
- d. Poorly maintained, poorly lit discontinuous sidewalks;
- e. Lack of safe crossings with sufficient crossing time;
- f. Curb bollards at sidewalks designed to prevent motorized 2W encroachment often restrict wheelchair users as well; and
- g. Lack of noise of approaching E2&3W in particular may endanger visually impaired pedestrians.

3. CLASSIFICATION, IDENTIFICATION AND LANE ALLOCATION OF E2&3W ARE UNCLEAR

E2W classification, including lane allocation for e-bikes and e-mopeds, is currently unclear. Also, there is no clear identification system, for example. License plates, stickers or other means distinguish the different types of E2&3W, which will make law enforcement more difficult.

4. LACK OF PARKING FACILITIES FOR BICYCLE AND CUSTOMIZED 2W OR 3W FOR PEOPLE WITH REDUCED MOBILITY

Compared with ordinary motorcycles, customized 2W or 3W for people with disabilities is generally larger (wider) and hence usually are not allowed to park in the motorcycle parking area nor in car parking areas as they are not classed as cars. Even if they are allowed in the motorcycle parking area, the maneuver room is not wide enough for them.

5 Integrating E2&3W in Urban Traffic

5.1 ACTION ITEMS PRIORITY

The overview of the current landscape of E2&3W policies in Asian and African countries shows that some policy components have been well governed, while there are still some gaps to fulfill in other components. The policy status overview can be illustrated as follows.

Topic	Recommendations	Regulator and/or Implementer				Prioritisation
		Indonesian Ministry of Transportation	Indonesian Ministry of Public Works and Public Housing	Jakarta Transport Agency	Jakarta Public Works Agency	
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
Vehicle	8. Require Speed Limiters					High
	9. Require Noise Limiters and AVAS					Low

Table 2. Action Items & Prioritisation

5.2 ACTION ITEMS

Below is a list of nine interventions (action items) to scale up E2&3W adoption and improve overall traffic safety. They are organized as follows: Vehicle Classification, Street Design and Operation, Street Management, Street Users and Vehicles. The context, opportunities, challenges, implementation and regulation of each intervention are discussed.

Vehicle Classification (#0)

The introduction of E2W, which has characteristics somewhere between traditional bicycles and motorized 2W, creates a gray area in vehicle classification and subsequent urban traffic policies. Before discussing these recommendations, it is important to first determine the E2&3W classification in urban transport. Table 3 classifies 2&3W into non-motorized, electric, and ICE motor-powered. E2&3W are further classified by speed and the presence of pedals. E2&3Ws that have > 25 km/h top speed from their electric motors are classified as e-motorcycles or e-auto rickshaw and must comply to urban traffic rules applicable for motorized ICE 2&3Ws.

However, some e-scooters or e-scooters physically resemble a hybrid of an e-scooter and an e-bike (see Figure 3). This could pose problems for law enforcement in determining traffic violations, such as the fitness of vehicles to enter bike lanes. To contribute to this, it is suggested that the presence of pedals is a point of differentiation: the E2&3W with pedals should have a top speed of less than 25 km/h when running with the electric motor. On the other hand, electric motorcycles (or scooters) whose speed exceeds 25 km/h must not have pedals.

Vehicle Type		Top Design Speed	Pedal	
2W	Non-Motorized	Conventional Bicycle	< 25	Yes
	Electric Motor	E-Bicycle (Pedal Assist or Throttle)	< 25	Yes
		E-Moped/E-Scooter	< 25	Yes
		E-Motorcycle (L1, L3)	-	No
	ICE Motor	Motorcycle (L1, L3)	-	No
3W	Non-Motorized	Pedicab	< 25	Yes
		Cargo Bike	< 25	Yes
	Electric Motor	Electric Pedicab	< 25	Yes
		Electric Cargo Bike	< 25	Yes
		Electric Auto Rickshaw (L2, L4, L5)	-	No
	Motorized	Electric Cargo Motor (L2, L4, L5)	-	No
		Auto Rickshaw/Bajaj (L2, L4, L5)	-	No
		Cargo Motor (L2, L4, L5)	-	No

Table 3. 2&3Ws Classification Recommendation



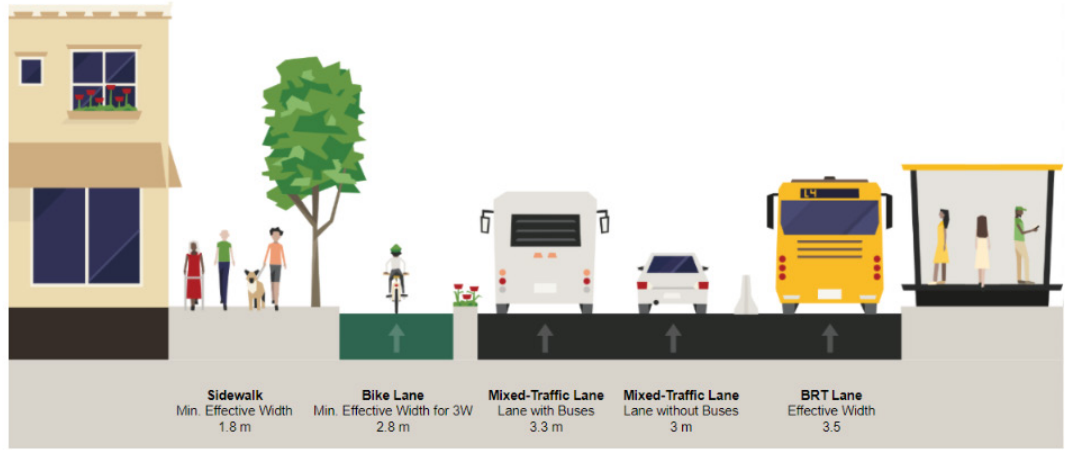
Figure 3. E-Moped or E-Scooter Example (Source: viarindonesia.com)

2.1.1 STREET DESIGN AND OPERATIONS

Modify Lane Assignments (#1)

CONTEXT	Slower vehicles, such as 2&3W, are currently considered a safety hazard when traveling in faster traffic. They are prohibited on restricted-access highways and must use the access lanes on multi-lane boulevards. While speed differences are a factor, higher speeds are associated with higher crash rates. These restrictions are therefore aimed more at facilitating faster traffic for 4Ws than at improving the road safety of all users.
OPPORTUNITIES	Researchers, practitioners, and the general public are beginning to recognize that complete street designs with lower speeds are safer and accessible to all users - including E2&3Ws. Priority should be given to areas where there are more vulnerable street users, such as school districts or areas for the elderly.
CHALLENGES	Public awareness of lane assignment is critical, especially amongst drivers. On larger streets, assigning lanes is possible. Nevertheless, users need to share the space on narrower streets or lower street classes, so traffic speed management is critical. Enforcement and education should also be improved to ensure no encroachment, especially on the sidewalks.
IMPLEMENTATION	<p>Ministry of Transportation to initiate the revision of Law No. 22 of 2009 with these lane assignments, see Figure 4.</p> <ul style="list-style-type: none"> • Sidewalk: Exclusive to people walking, waiting, standing, talking, etc. Bicycles (conventional only) may be used at “walking” speed or used on a designated space (i.e. cycle track). Motorized vehicles, both ICE and electric, are prohibited. • Bike lane, cycle tracks: Available for non-motorized (pedal-powered) and pedal-assisted 2&3Ws, including electric kick-scooter. Motorized vehicles, both ICE and electric, are prohibited. • Vehicular lanes: Any vehicle may use either access or through lanes, as long as the driver complies with the speed limit (see below). • BRT lanes: No other vehicles are allowed than buses.
ENFORCEMENT	Electronic license plate readers and automatic ticketing of violators on sidewalks, bike lanes, access lanes, and BRT lanes.

Figure 4. Lane alignment and width for Vehicles



Lower Vehicle Speed (#2)

CONTEXT	Speed is the primary consideration for road safety. Lower speeds help reduce accident rates, reduce injury severity, and provide more accessible streets for all users. Given the nature of mixed traffic in Indonesia and many Asian cities, the current speed limit in urban areas is not considered safe enough. The speed limit should be set low enough to keep vulnerable users safe.
OPPORTUNITIES	The introduction of electric 2&3Ws, which are often slower than conventional ICE vehicles, is an opportunity to reduce speed in general. Traffic calming is a proven way to slow down vehicles. Narrower vehicular lanes provide space for other users. Areas where there are more vulnerable street users, such as a school districts or residential areas, should have a lower speed limit.
CHALLENGES	Public awareness of the dangers of speeding is low. Additionally, there is little government intervention to enforce lower speed limits, and there are not even speed limit signs on many major and secondary roads. Enforcement must be done through law enforcement officers or e-tickets.

IMPLEMENTATION

1. Ministry of Transportation to adjust speed limits to below:
 - 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
2. Transport Agency and Public Works Agency to implement standardized traffic calming measures below:
 - Speed hump/table: Install where traffic speeds often 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 5. Speed Bump (Left) and Raised Crosswalk (Right)

- Chicane, mini-roundabout, refuge island, and other devices.
- Textured street: Due to its uneven road surface, a 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 6. Chicane (Left) and Textured Street (Right)

ENFORCEMENT	<p>3. Transport Agency to adjust lane widths as follows:</p> <ul style="list-style-type: none"> • Typical: 3.0 m. Maximum width of the outside lane for trucks or buses should be 3.3 m³¹ • Typical minimum bike lane: 2.8 m to accommodate 3Ws with absolute minimum width of 2.2 m and ideal width of 3.5 m³² <p>Speed cameras and electronic ticketing.</p>
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Reduce Conflicts (#3)

BACKGROUND	Traffic accidents disproportionately occur at places of conflict, such as intersections, ramps, bus stops, loading areas, and other places where different directions, patterns, and speeds meet protecting vulnerable users in these conflict zones is essential.
OPPORTUNITIES	Many locations with high conflicts are actually designed for high-speed traffic and large vehicles, due to the outdated idea that a greater margin of error produces safer streets. The introduction of E2&3Ws offers the opportunity to rethink conflict zones.
CHALLENGES	The shift from highway design to street design challenged popular road design paradigms. Policies need to be updated and practitioners need to be retrained. Involving vulnerable street users in planning is essential.
IMPLEMENTATION	<p>1. Public Works Agency to redesign streets:</p> <ol style="list-style-type: none"> a. See traffic calming above (in recommendation #2) b. Intersections (See Figure 9-13) <ol style="list-style-type: none"> i. Crossing opportunities in all directions ii. Wheelchair friendly refuge island and median tips iii. Minimised turning radius and lower turning speeds iv. Priority to people walking and cycling at traffic signals v. Cyclist should also prioritised pedestrian vi. Make crossing time long enough for vulnerable groups and accessible beg button vii. No driveways and minor streets within 15 m of a traffic signal viii. Provide waiting area for 2&3W ix. Raised intersections to slow traffic down especially in unsignalised intersections

³¹NACTO & GDCI. 2016. Global Street Design Guide. Island Press.

³²Luke, N., Adriaola-Steil, C., Pérez-Barbosa, D., Batista, B., Li, W., Sharpin, A. B., ... & Nout, L. 2021. Safe Bicycle Lane Design Principles: Responding to Cycling Needs in Cities during COVID and Beyond.



Figure 7. Signalised Intersection with Protected Bike Lane



Figure 8. Signalised Intersection without Protected Bike Lane

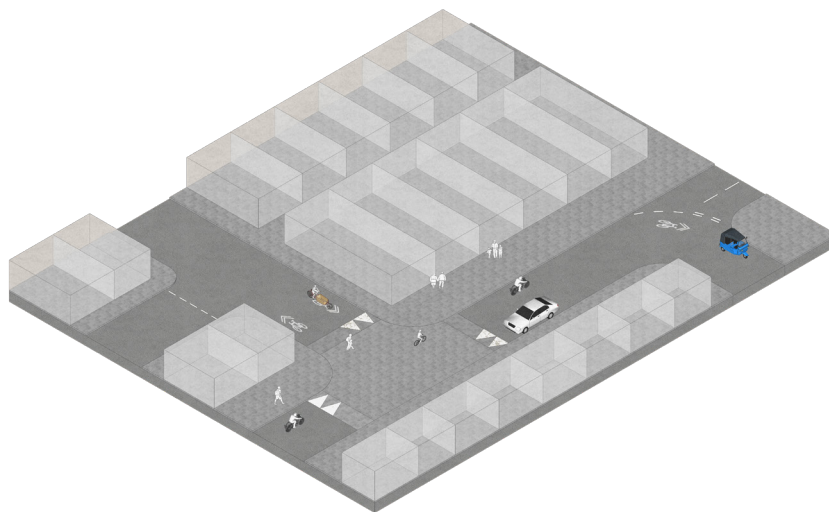


Figure 9. Raised Intersection

- c. Bus stops
 - i. Bus bulbs so that the bus does not have to pull out of traffic. Bus bays and lay bays only at terminals.
 - ii. Far side bus stops at traffic signals.
 - iii. Route bike lanes behind the bus stop, except where bus frequency is low, see Figure 10 and Figure 11.
 - iv. Ensure that the bus stop design does not disrupt pedestrian traffic.

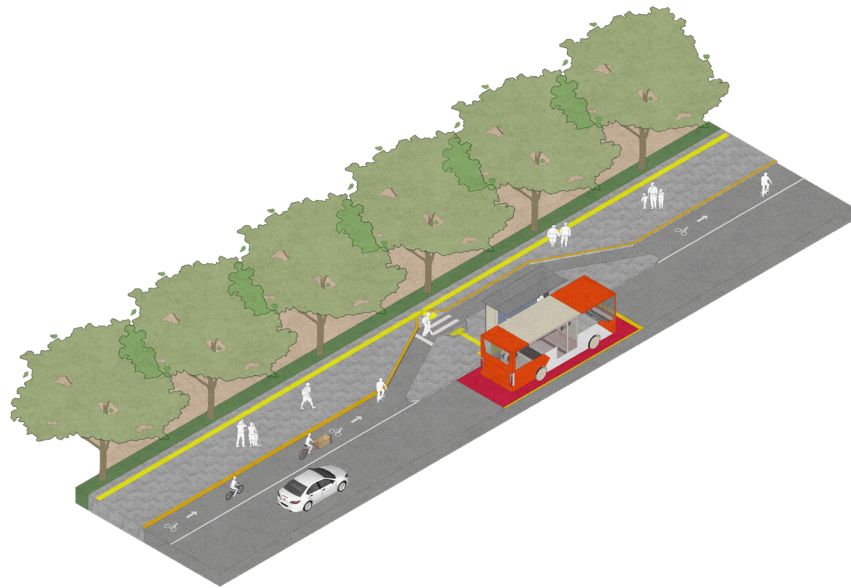


Figure 10. Bus Stop with Boarding Island

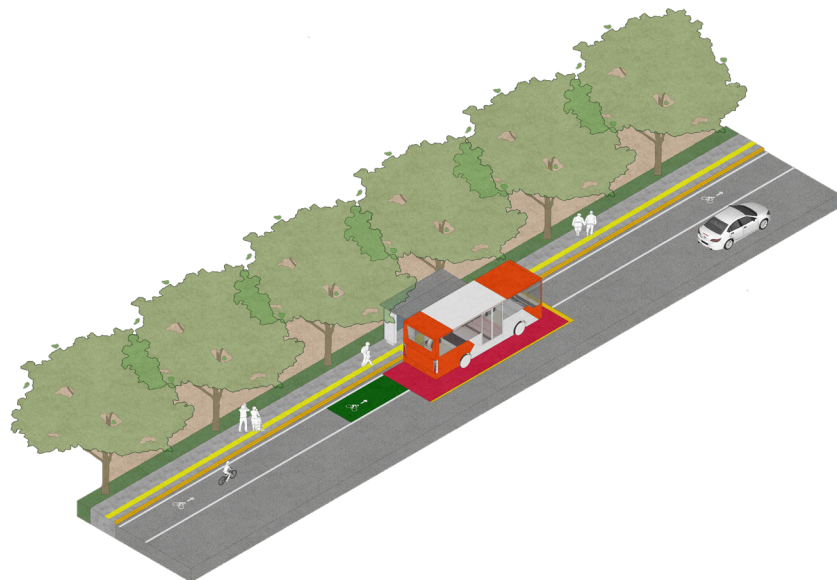


Figure 11. Regular Bus Stop

ENFORCEMENT

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

2.1.2 STREET MANAGEMENT

Limit Through Traffic (#4)

BACKGROUND	An unfortunate byproduct of ridesharing services is the increased traffic in residential areas due to the app's routing algorithm. Increased traffic reduces safety, especially on shared residential streets, and increases negative externalities such as noise and air pollution.
OPPORTUNITIES	Restricting through traffic will provide residents with safer streets, including spaces to walk, cycle, exercise, or play with children. During the pandemic, many streets were closed to traffic, which had a positive impact on the community.
CHALLENGES	The restriction of through traffic involves changes to the road network and possible restrictions on residents' access. Law enforcement officers may be required to enforce the restrictions, as well as physical access limiters, such as bollards.
IMPLEMENTATION	<ol style="list-style-type: none">1. Neighbourhood organizations or real estate developers establish neighborhood-specific traffic networks that allow access to all properties, but make main roads more direct than residential roads to discourage through traffic.2. Neighbourhood organizations or real estate developers to install bollards, barriers, or planters to restrict large vehicles, both conventional and electric.3. Maintains permeability for low-speed walking and cycling (bicycles, E2W, E3W), including wheelchair users.4. Transport Agency to coordinate with online map app providers to not direct users to residential streets.

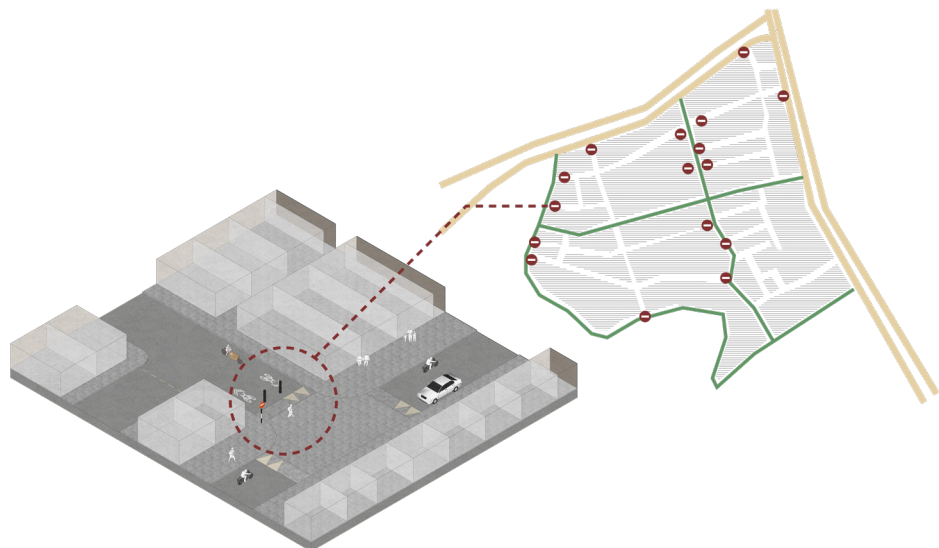


Figure 12. Limiting Motorised Access to Reduce Through Traffic

ENFORCEMENT	Local residents or neighborhood security workers enforce the implementation.
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Manage Curb Use (#5)

BACKGROUND	<p>In general, private vehicles should not be allowed to be parked on streets' right-of-way (on-street parking) for long periods of time (full day or overnight). Ideally, most on-street parking would be eliminated and sidewalks widened. That said, allocating curbside space (waiting areas) to 2&3W is one way to encourage their use. This space is reserved for short-term use, such as waiting, loading, and unloading passengers and cargo. Curbside space should not be used for electric vehicle charging facilities as this would encourage legal or illegal parking on the street.</p>
OPPORTUNITIES	<p>Reserving waiting zones for electric vehicles could push forward EV adoption.</p>
CHALLENGES	<p>Providing public goods for one use (EV) but not for the other (ICE) creates conflicts between users. A public campaign will help explain the extent to which electric vehicles are favored to save the environment. Given the ad-hoc nature of the streets in many Indonesian or even Asian cities, compliance will be an issue except in well-regulated places such as shopping malls and transport hubs. In addition, land availability, especially public spaces for pickups, is often limited.</p>
IMPLEMENTATION	<ol style="list-style-type: none"> 1. Public Works Agency to clearly define waiting zones for E2&3Ws. <ol style="list-style-type: none"> a. Only if there is sufficient walking and cycling space (see above) b. Adjacent to the vehicular lane (carriageway). c. Near destinations, but not disruptive to people walking or cycling.

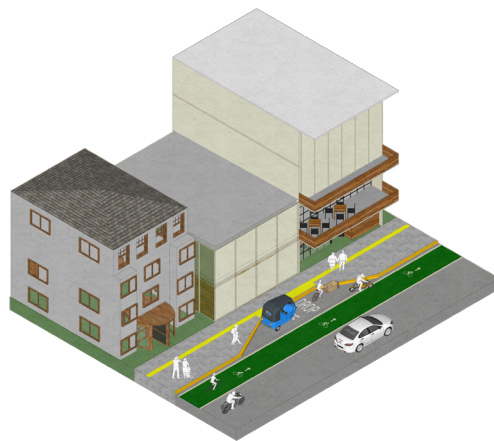


Figure 13. Pick-up, Drop-off, and Waiting Bay for 2&3W (left)

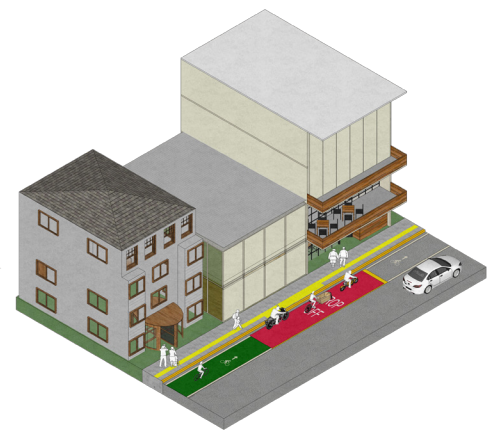
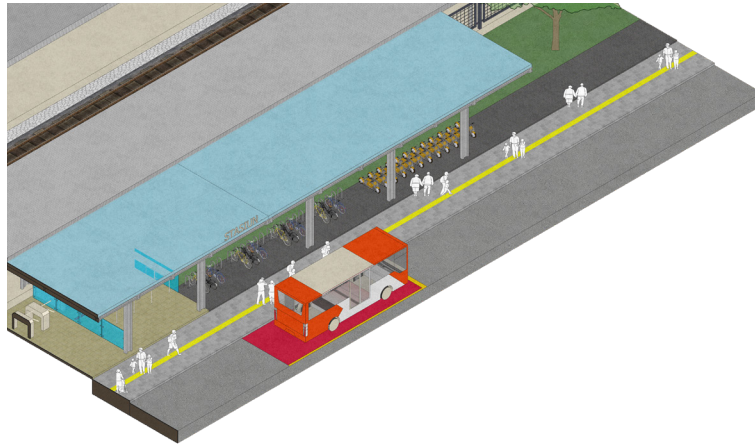


Figure 14. Pick-up and Drop-Off Zone for 2&3Ws (right)

IMPLEMENTATION	<ol style="list-style-type: none"> 2. Non-motorised 2&3Ws parking should be made as close as possible to the main entrance, followed by the E2&3Ws and conventional, and the last 4Ws.
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Figure 15. Prioritisation for Non-Motorised Transport Near Main Entrance



REGULATION Enforcement by local attendants or security workers.

2.1.2 STREET USERS

Encourage Last Mile Connectivity With Transit (#6)

BACKGROUND	<p>Ride-hailing services often compete with public transport by operating on the same corridor. Instead of offering door-to-door service, they should be encouraged to integrate with public transit to provide first-mile to last-mile connections.</p>
OPPORTUNITIES	<p>Organising ride-hailing services as first-last mile connections instead of door-to-door service would be more energy-efficient, reduce traffic, and ultimately lead toward an integrated system. Providing parking at transit stops can help expedite the use of 2&3Ws for first and last-mile trips. Additionally, the government can require ride-hailing services to use E2&3Ws to accelerate the adoption of the electric modes.</p>
CHALLENGES	<p>Private trips (non-ride-hailing trips) will be more difficult to regulate as there are no monitoring or enforcement options other than restricting private vehicles on main streets with public transport. 2&3W parking spaces should be provided, including 3W motorcycles modified for wheelchair users. Most importantly, accessible public transport must first be provided, including for people with disabilities.</p>
IMPLEMENTATION	<ol style="list-style-type: none"> 1. Ministry of Transportation to limit ride-hailing 2W travel distances and destinations in transit corridors. The distance should be less than a 15-minutes trip by public transport. Destinations outside public transit corridors should not be affected. 2. Ministry of Transportation to require ride-hailing companies to use E2&3W fleets. 3. Transport Agency to offer bike-sharing services for journeys within 3 kilometers of transit stations. 4. Transport Agency to provide taxi and ride-hailing shelters near transit stations to avoid encroachment of sidewalk and vehicular lanes by parked fleets.
ENFORCEMENT	<p>Ride-hailing companies should enforce the policies to their drivers. However, clear regulation and penalties should be formulated first by the government.</p>

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

BACKGROUND	E2&3Ws are relatively new vehicles on the market and have so far not been regulated sufficiently by the government. They exist between bicycles, which do not require registration or a driving license, and conventional motorized 2&3W, which require registration and a driving license. There are a wide range of electric 2&3W models, with varying safety accessories.
OPPORTUNITIES	Clear definitions and regulations for 2&3W electricity will enable the implementation of action plans described in this document.
CHALLENGES	The E2&3W market is still rapidly growing and evolving. Any regulations adopted today might need to be updated in the near future.
IMPLEMENTATION	<ol style="list-style-type: none"> The Ministry of Transport to require registrations, driver's licenses and helmets for electric scooters and motorcycles. E-bikes and e-mopeds with pedal assistance and electric mopeds should not require registration as long as their designed top speed do not exceed 25 km/h. Helmets are recommended for cyclists or scooters as speed limits on bike lanes are quite high (25 km/h) especially for children.

Vehicle Type		Vehicle Registration and Drivers' License	Helmet	Minimum Age	
2W	Non-Motorized	Conventional Bicycle	-	-	
		E-Bicycle (Pedal Assist or Throttle)	-	Recommended	
	Electric Motor	E-Moped/E-Scooter	-	Recommended	12*
		E-Motorcycle (L1, L3)	Mandatory	Mandatory	12*
		ICE Motor	Motorcycle (L1, L3)	Mandatory	Mandatory
3W	Non-Motorized	Pedicab	-	-	17
		Cargo Bike	-	-	-
	Electric Motor	Electric Pedicab	-	-	-
		Electric Cargo Bike	-	-	-
		Electric Auto Rickshaw (L2, L4, L5)	Mandatory	-	17
		Electric Cargo Motor (L2, L4, L5)	Mandatory	-	17
	Motorized	Auto Rickshaw/Bajaj (L2, L4, L5)	Mandatory	-	17
Cargo Motor (L2, L4, L5)		Mandatory	-	17	

Table 4. E2&3W Types and Requirements

ENFORCEMENT	<ol style="list-style-type: none"> The Ministry of Industry and the Ministry of Transport must ensure that e-bikes, e-mopeds or e-scooters have a maximum speed of 25 km/h, otherwise the vehicle must be registered and the pedals must not be used for facilitate the differentiation of registration needs. The minimum user ages are 17 for motorized 2&3W and 12 with adult supervision for e-bikes and other E2&3W with maximum design speed of 25 km/h, as regulated in the Ministry of Transportation Regulation No. 45 of 2020. <p>Enforcement by the Traffic Police Corps.</p>
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2.1.4 VEHICLE

Require Speed Limiters (#8)

BACKGROUND	<p>Speed is the primary consideration for street safety. Lower speeds help reduce accident rates, reduce injury severity, and provide easier streets for all users. Automatic vehicle speed limiter is a guaranteed method of speed management, because most of the time drivers are not aware of their current speed or the speed limitation at the road segment.</p>
OPPORTUNITIES	<p>Mandatory installation of speed limiter for E2&3Ws will show the government's emphasis on road safety. Slower vehicles also support compact urban development and public transport ridership. Reserving certain parts of the street for slower vehicles (see lane assignments above) will encourage conversion to electric vehicles. Similar actions are being considered by the EU and the UK.</p>
CHALLENGES	<p>The limited infrastructure will be a huge obstacle. For example, speed limit signs are rarely seen on city streets. Vehicles fitted with speed limiters will mainly be used for inner city journeys, which is a less recognized market.</p>
IMPLEMENTATION	<ol style="list-style-type: none">1. The Ministry of Transportation, coordinating with Ministry of Trade, to obligate speed limiter and in the near future, Intelligent Speed Assistance system, installation at E2&3W to automatically limit vehicle speed according to set speed limit in the area.2. The Ministry of Transport to require speed limiter for E2&3W registration requirements.3. Transport Agency to install speed limit signs and other supporting infrastructure, starting at areas with many vulnerable road users.
ENFORCEMENT	<ol style="list-style-type: none">1. The Ministry of Trade to ensure all E2&3W in the market to have speed limiter.2. Traffic Police Corps to implement electronic license plate readers and automatic ticketing of speed limit violators.

Require Noise Limiters and AVAS (#9)

BACKGROUND	<p>Silent vehicles are problematic because road users rely on hearing to detect upcoming vehicles. This is especially true for people with limited vision. Electric vehicles are usually equipped with some kind of acoustic vehicle alert system (AVAS).</p> <p>The shift to electric fleets brings the promise of quieter streets, which have been shown to improve quality of life. Nevertheless, ensuring the vehicle is not completely silent will help people with limited vision. Similar actions are being considered by the EU and the UK.</p>
OPPORTUNITIES	<p>According to the former regulations of the Minister of Transport on type testing of motor vehicles, the minimum noise for electric vehicles is specified as a minimum noise of 31 decibels and should not exceed the limit for motorized vehicles. The minimum noise level is subject to the speed:</p> <ul style="list-style-type: none">• Minimum 50 dB for speed 10 km/h• Minimum 65 dB for speed 20 km/h• Minimum 47 dB for reverse driving <p>Unfortunately, this regulation has been amended and the noise level policy is not mentioned in the new regulation.</p> <p>Besides sound cues, visual cues should also be implemented.</p>
CHALLENGES	<p>Motorcyclists are generally averse to noise limiters, hence education and enforcement are urgently needed. On the other hand, currently AVAS is not widely used in E2&3W. The government should obligate AVAS installation as soon as possible to ensure the presence of sound cues for road users with limited vision and inform the policy to the public.</p>
IMPLEMENTATION	<ol style="list-style-type: none">1. Ministry of Transportation to require all motorized 2&3W on city streets to use noise limiters up to 80 decibels (currently is only mandatory for motorcycles 150 cc or less).2. Ministry of Transportation to require AVAS for E2&3W<ul style="list-style-type: none">• AVAS noise should increase with increasing vehicle speed.• Should be loud enough to alert street users, but not causing noise nuisance.
ENFORCEMENT	<ol style="list-style-type: none">1. The Ministry of Trade to ensure all E2&3W in the market to have AVAS.2. Traffic Police Corps to implement electronic license plate readers, electric noise readers, and automatic ticketing of noise limit violators.

2.2 ACTION ITEM BASED ON STREET TYPOLOGIES

This section applies the physical interventions above to streets typically found in Indonesian and other Asian cities. 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.

2.2.1 SHARED STREET

Speeds on shared streets should be less than 15 km/h as there are no dedicated facilities for pedestrians or cyclists. Traffic calming measures such as speed bumps, textured streets or curves should be put in place to slow traffic. A bollard or gate can be used to restrict the passage of vehicles.

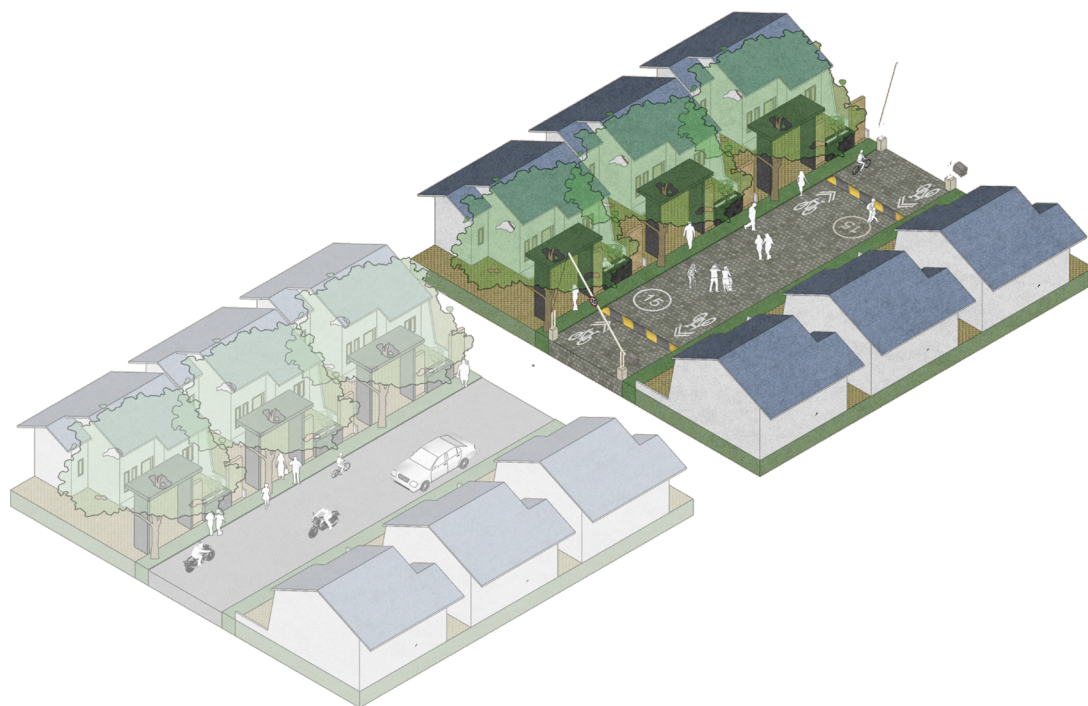


Figure 16. Interventions on Shared Street

2.2.2 TWO-LANE, TWO-WAY STREET

Two-lane, two-way streets without bike lanes should be safe enough for cyclists to share the street. To limit the speeds below 30 km/h, it is advisable to put in place traffic restrictions such as speed limiters or raised crossings. If there are no buses crossing the street, the width of the lane should not exceed 3 m.

Streets with the same configuration but with heavier traffic or buses should have a conventional cycle lane to allow motorized vehicles to safely pass cycle lane users.

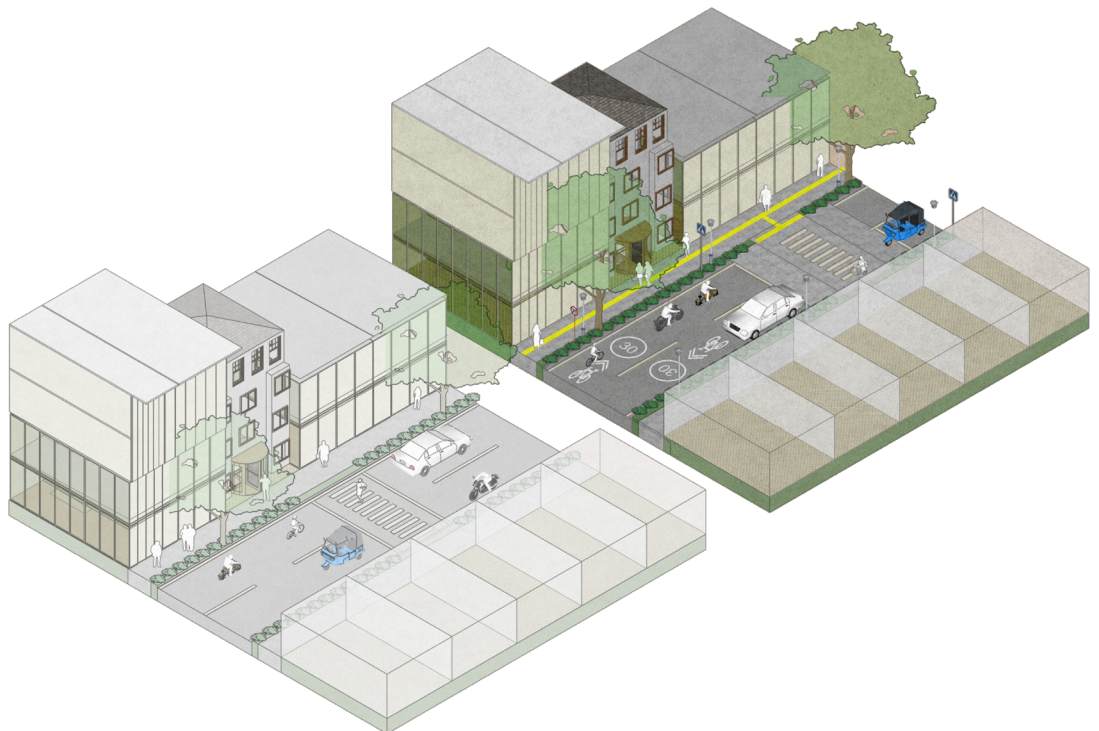


Figure 17. Interventions on Low Volume Two-lane, Two-way Street



Figure 18. Interventions on Higher Volume Two-Lane, Two-way Street

2.2.3 FOUR-LANE, TWO-WAY STREETS

With separated bike lane

Four-lane, two-way streets with dedicated bike lanes must remain safe enough for motorized and electric 2&3W with a 40km/h speed limit. Traffic calmings such as raised intersections need to be installed, and lane widths need to be reduced.



Figure 19. Interventions on Four-Lane, Two-way Street with Bike Land

Without separated bike lane

Priority should be given to reallocating a lane for use as a separate bike lane. The median can also be removed if desired.



Figure 20. Reallocation of Four-Lane, Two-way Street to Two-Lane, Two-way Street with Bike Lane

If lane reallocation is not possible, the speed limit must be kept below 30 km/h to keep the non-motorized or pedal-assisted 2&3W users safe.



Figure 21. Interventions on Four-Lane, Two-Way Street Without Bike Lane

2.2.4 SIX-LANE OR MORE, TWO-WAY STREETS

With separated bike lane

Two-way streets with more than six lanes are prone to speeding. Bike lanes are necessary and intersections should be equipped with traffic lights. The width of the lane should not exceed 3m and the width of the bus lane should not exceed 3.3 m to avoid speeding.

If there is currently no separate bike lane, one lane must be converted to a separate bike lane. Four two-way lanes will also be safer and easier for pedestrians to cross.



Figure 22. Interventions on Four-Lane, Two-way Street with Bike Lane

Without separated bike lane



Figure 23. Reallocation of Six-lane, Two-way Street to Four-lane, Two-way Street

2.2.5 MULTI-LANE BOULEVARD (WITH ACCESS AND THROUGH LANES)

On multi-lane boulevards, slower 2&3W should use the access lane with speed limit of 30 km/h. The speed limit on the through lanes should be kept 40 km/h or less. Separated bike lanes should be provided on high traffic streets such as these. Alternatively, the access lanes can be designed as shared streets through further lowering speed limit and install traffic calming measures.



Figure 24. Reallocation of Access Lane on Multiway Boulevard for Bike Lane



Figure 25. Reallocation of Access Lane on Multiway Boulevard for Shared Street

APPENDIX A. 2&3W POLICIES IN ASIA AND AFRICA

The tables below summarises the policies related to E2&3W in Asian and African cities. The policies cover 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. The vehicles include bicycles, motorised 2W, non-motorized 3W (rickshaws), motorised 3Ws, e-bikes, e-2Ws, and e-3Ws. 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).

1. PEDAL-POWERED 2W (BICYCLE AND ELECTRIC BICYCLE)

Countries		Maximum Vehicle Dimension		Maximum Vehicle Speed and Power		Helmet Requirement		Administrative Requirements		Operating Area and Speed Limit	
		Bicycle	Electric Bicycle	Bicycle	Electric Bicycle	Bicycle	Electric Bicycle	Bicycle	Electric Bicycle	Bicycle	Electric Bicycle
Asia	China		W 450 mm (excl.handle-barand pedal) Weight 55 kg		Speed 25 km/h Power < 400 w	Not Required	Required	Not Required	16 y.o. Registration plate is required	Bike lane when available or on the outermost lane (right) 15 km/h	Operated on the bike lane
	India				Speed 25 km/h Power < 250 w	Not Required	Not Required	Not Required			Allowed on the bike lane and footpath
	Indonesia	WxL 550x2100 mm	WxL 550x2100 mm		Speed 25 km/h	Not Required	Required	Not Required	> 12 y.o., 12-15 y.o. should be supervised by adult	Bike lane when available or on the outermost lane (left) 25 km/h	Operated on the bike lane or special area 25 km/h
	Philippines				Type 1: < 25 km/h Type 2: 26-50 km/h	Required	Required	Not Required		Bike lane when available or on the outermost lane (right) 25 km/h	Type 1: allowed in the bike lane Type 2: general road
	Singapore	W 700 mm	W 700 mm Weight 20 kg		Speed 25 km/h Power < 250 w	Required	Required	Not Required	> 16 y.o., need theory test Registration plate is required	Bike lane when available or on the outermost lane (right) 25 km/h or 10 km/h on footpaths	Allowed on the bike lane Prohibited on the footpath
Afrika	Kenya					Not Required		Not Required		Bike lane when available	
	Nigeria					Not Required		Not Required		Bike lane when available	
	South Africa		Weight 40 kg		Speed 25 km/h Power < 250 w	Required		Not Required		Bike lane when available or on the outermost lane (left) 25 km/h	

Table 5. Bicycle Policies Benchmark

2. MOTORISED 2W (ICE AND ELECTRIC MOTORCYCLE)

Countries		Maximum Vehicle Speed and Power		Helmet Requirement		Administrative Requirements		Operating Area and Speed Limit	
		Motorcycle	E-Motorcycle	Motorcycle	E-Motorcycle	Motorcycle	E-Motorcycle	Motorcycle	E-Motorcycle
Asia	China	Some cities prohibited 250+ cc motorcycle	Moped: 25-50 km/h; 0.4-4 kW Motorcycle: > 50 km/h; > 4 kW	Required	Required	Driver's license Must be registered	Driver's license Must be registered	Outer most lane According to street speed limit	
	India			Required	Required	Driver's license; > 16 y.o learner license, 18 y.o. actual driver's license Must be registered	Driver's license Must be registered	Outer most lane Varied between state, generally 50 km/h	
	Indonesia			Required	Required	Driver's license; > 17 y.o. Must be registered	Driver's license Must be registered	Outer most lane 50 km/h on urban road, 30 km/h on residential road	
	Philippines		L3: >50 km/h	Required	Required	Driver's license; > 16 y.o student permit, 18 y.o. actual driver's license Must be registered		Outer most lane 40 km/h on through street; 30 km/h on not through street; 20 km/h everywhere else	
	Singapore		Power ≤ 10 kW	Required	Required	Driver's license; > 18 y.o. Must be registered	Driver's license Must be registered	Outer most lane 50 km/h on road, 70-90 km/h on expressway	
Afrika	Kenya			Required		Driver's license; > 16 y.o.		100km/h on single carriageway highways; 110km/h on dual carriageway highways	
	Nigeria			Required		Driver's license; > 18 y.o.		50 km/h on built-up area; 50 km/h on highway	
	South Africa		Speed 25 km/h Power < 250 w	Required		Driver's license; >16 y.o. for 125 cc		60 km/h on a public road within an urban area; 100 km/h on public road outside an urban area which not a freeway; 120 km/h on every freeway	

Table 6. Motorised 2W Policies Benchmark

3. PEDAL-POWERED AND MOTORISED 3W (RICKSHAWS, ETC)

Countries		Maximum Vehicle Dimension			Maximum Vehicle Speed and Power			Helmet Requirement		Administrative Requirements		Operating Area and Speed Limit	
		Rickshaw	E-Rickshaw	E-Auto Rickshaw	Rickshaw	E-Rickshaw	E-Auto Rickshaw	Rickshaw	E-Rickshaw	Rickshaw	E-Rickshaw	Rickshaw	E-Rickshaw
Asia	China										18 y.o. Required to be registered	20 km/h	
	India			WxLxH 1800 x 2800 x 1000 mm			Speed 25 km/h Power < 2000 W		Not Required	Rickshaw driver's license Must be registered	Requires permit; 18 y.o.	Bike lane when available	
	Indonesia	WxLxH 1500 x 2800 x 1800 mm								Some regions require driver's permit Must be registered	NA	Limited to certain areas; 25 km/h on bike lane	
	Philippines			Weight 600 kg		50 km/h	Power > 1000 W		Not Required	Driver's ID Must be registered annually	Driver's license	Limited to certain areas; 25 km/h on bike lane	
	Singapore									Vocational license Must be registered	NA	Bike lane when available; 25 km/h and 10 km/h on footpath	

Table 7. 3W Policies Benchmark

3.1. Vehicle Classification

Mobility means	Propulsion system	Wheel drive	Type	Dimension	Top Speed	Road usage (preferred)
2&3W	Motorised (ICE)	2W	Motorcycle ³³	Weight: 106 - 147 kg Length: 1.9 m Width: 0.8 - 1 m Height: 1.1 m	90 km/h	vehicular lane
			Scooter ³⁴	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 ³⁵	Weight: 340 kg Length: 3.35 m Width: 1.34 m Height: 1.30 m	70 km/h	vehicular lane
			Cargo ³⁶	Weight: 360 kg Length: 3.35 m Width: 1.34 m Height: 1.30 m	85 km/h	vehicular lane
	Non-motorised (NM)	2W	Bicycle (commuter & recreational) ³⁷	Weight: 12-20 kg Length: 1.8 m Width: 1 m Height: 2.2 m	20 - 30 km/h	bicycle lane
			Cargo bicycle ³⁸	Weight: 20 - 30 kg Length: 1.5 m Width: 0.6 m Height: 1.7 m	20 - 30 km/h	bicycle lane
		3W	Gerobak ³⁹	Weight: 12-20 kg Length: 1.5 m Width: 0.6 m Height: 1.7 m	5 km/h	bicycle lane
			Pedicab (becak, dll) ⁴⁰	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
			Storage Tricycle ⁴¹	Weight: kg Length: m Width: m Height: m	30 km/h	bicycle lane
	Electric-powered (E)	2W	E-bicycle Class 1 (pedal assisted) ⁴²	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) ⁴³	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) ⁴⁴	Weight: 21-30 kg Length: 1.82 m Width: 0.8 m Height: 0.98 m	45 km/h	bicycle lane
E-Moped ⁴⁵			Weight: 44 kg Length: 1.6 m Width: 0.8 m Height: 1.08 m	25 km/h	bicycle lane	

Table 8. Advanced Vehicle Classification for 2&3Ws

³³Honda "bebek" motorcycle, PT. Astra Honda Motor Indonesia

³⁴Scooter Vespa Sprint, PIAGIO Indonesia

³⁵Auto rickshaw, TVS Motor Indonesia

³⁶Viar Karya, Viar Motor Indonesia

³⁷Gazelle Marco Polo, Gazelle Dutch Bike

³⁸The Cargo City Bike, Cycle Logistic EU

³⁹A Gerobak sale in marketplace, Tokopedia Indonesia

⁴⁰Becak sizes, Becak Miniku Indonesia

⁴¹The Cargo City Bike, Cycle Logistic EU

⁴²What Are Ebike 'Classes' and What Do They Mean, Wired International

⁴³What Are Ebike 'Classes' and What Do They Mean, Wired International

⁴⁴What Are Ebike 'Classes' and What Do They Mean, Wired International

⁴⁵The future of riding, Selis Electric Moped

			E-motorcycle scooter ^{46,47}	Weight: 130 kg Length: 1.870 m Width: 0.73 m Height: 1.15 m	40 - 70 km/h	bicycle lane
			E-kick scooter ⁴⁸	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 ⁴⁹	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 ^{50,51}	Weight: 25 kg Length: 2.430 m Width: 0.446 m Height: 0.95 m	20 - 30 km/h	bicycle lane
			E-scooter (handicapped) ⁵²	Weight: 43 kg Length: 0.95 m Width: 0.48 m Height: 0.98 m	12 km/h	bicycle lane
			E-bajaj ⁵³	Weight: 713 kg Length: 2.7 m Width: 1.37 m Height: 1.72 m	45 km/h	vehicular lane

3.2. 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 well⁵⁴. The regulation only applies to 4Ws, as current ISA technology has not been adapted to the motorcycle⁵⁵.

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 down⁵⁶.

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 - 2,000⁵⁷.

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 users⁵⁸.

⁴⁶Vespa Elettrica 45 km/h, Piaggio

⁴⁷Vespa Elettrica 70 km/h, Piaggio

⁴⁸Ninebot max electric kick scooter, Scootersvibes

⁴⁹Belia "The Sustainable Pedicab made in Yogyakarta", Transport Agency Yogyakarta

⁵⁰The Cargo City Bikes, Cycle Logistics EU

⁵¹Bullitt technical details, Splendid Cycle

⁵²Three-wheel scooter Antares, Chollortopedia Online Marketplace

⁵³Piaggio Ape, Piaggio India

⁵⁴Campion, A. 2022, February 16. Speed limiters on new cars by 2022. Confused.com. [Online]. [Accessed 2022] Available from <https://www.confused.com>

⁵⁵Botan, M., & Roberson, B. 2021. Mandated Intelligent Speed Assistance (ISA) For Motos? Adventure Rider. [Online]. [Accessed 2022] Available from <https://www.advrider.com>

⁵⁶Avenoso, A. 2017. Briefing: Intelligent Speed Assistance (ISA) | ETSC. ETSC | European Transport Safety Council. [Online]. [Accessed 2022] Available from <https://etsc.eu/>

⁵⁷Pati, A. 2018. Eye on bikes with modified silencers. Telegraph India. [Online]. [Accessed 2022] Available from <https://www.telegraphindia.com>

⁵⁸Miloradović, D., Glišović, J., & Lukić, J. 2017. Regulations on Road Vehicle Noise—Trends and Future Activities. *Mobility & Vehicle Mechanics*, 43(1), 59-72.

APPENDIX B. EXPERT GROUP MEETINGS

1. ISSUE IDENTIFICATION

Following the preliminary survey of street safety, an expert group meeting was held in November 2021⁵⁹. The meeting, which was titled Focus Group Discussion on Issues of Street Safety Regarding Conventional Motorcycle and Electric Motorcycle in Greater Jakarta was done to identify street safety issues regarding motorcycles in Greater Jakarta, not only from the perspective of motorcycle drivers, but also from vulnerable street users including people with disabilities. The issues and inputs gathered from the event, combined with the best practices from other countries, were used to develop the recommendation draft.

1.1. Participants

The meeting was attended by six communities of people with (different) disabilities with a total of seventeen people. It was done to gather information of street safety regarding the operation and impact of motorcycles and the potential danger of electric motorcycle eruption from the perspective of vulnerable groups. The groups range from pedestrians to motorcycle users itself.

1.2. Inputs

There are mainly five main concerns and inputs from the audience:

1. The availability and quality of sidewalks which are still poor in many part of the city, mainly in the outskirts part of the city.
2. Motorcycle riders do not prioritise and endanger pedestrians. This also includes the encroachment of motorcycles in the sidewalk whether for parking or for riding.
3. E2W (and other vehicle) which do not emit sound is feared to impose danger for pedestrian, especially the blind or visually impaired.
4. E2W classification is not clear yet, especially regarding the lane assignment for electric bicycle and electric moped.
5. License and registration requirements for E2W as it is easily accessible for public.

2. DRAFT RECOMMENDATION CONSULTATION

Street design recommendations draft were developed based on the identified issue and best practices around the world. This draft then was consulted to the stakeholders to ensure the recommendations have already cover the needs of wide range of street users and to gain feedback including the implementation. The consultation event was held twice, first with the national and local-level public officials and second with street users.

2.1. Participants

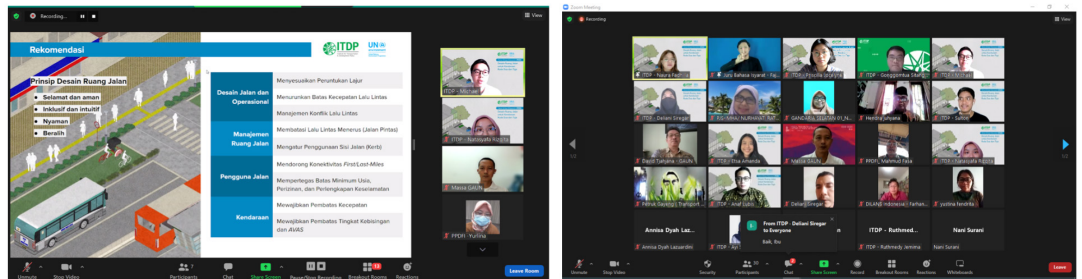
2.1.1 National and Local Government

The consultation event was attended by the related stakeholders in Jakarta and Indonesia which are Ministry of Transportation of Republic Indonesia, Ministry of Public Works and Public Housing of Republic Indonesia, Jakarta Transportation Agency, and Jakarta Public Works Agency.

⁵⁹Conducted by ITDP Indonesia under Roadmap and Timetable for Ride-Hailing Electrification in Greater Jakarta project, supported by UK PACT

2.1.2 Road users (General public)

Figure 26. Public Draft Consultation
Figure 27. Audiences of Public Draft Consultation



This consultation event was attended by street users of vulnerable groups to ensure that the recommendation is universal enough to accommodate a wide range of street users. It consisted of:

- Pedestrian and or 2&3W passenger
- 2W (pedal and motorised) riders
- 3W (pedal and motorised) riders

2.2. Input

2.2.1 National and Local Government

Input from the government were mainly regarding the suitability of the recommendations and the administration and roles of each stakeholders.

1. Greater area of Jakarta has key performance indicators regarding traffic speed at least 30 km/h which is contrast with the recommendation to limit the traffic speed.
2. Most important conflict to reduce is regarding the crosswalk conflict. Current effort mainly covers marking and signage, pelican crossing, guarded crossings, and pedestrian bridge.
3. Highlighting the needs of shelter or drop off/pick up zones within 500 m to reduce traffic congestion or violation.
4. The usage of two- and 3Ws should be clarified whether for first and last miles or direct transportation. Current 2W ride-hailing also being used for first and last miles trip with public transport.
5. Currently there is no regulation yet regarding regular or periodic testing for E2&3Ws.
6. Currently Transjakarta fleets has mechanism to report speeding done by the drivers.
7. Noise limiters could be considered in the near future but need more thorough research.

2.2.2. Road users (General public)

Participants from vulnerable group representatives gave feedback on the recommendations based on their using experience.

1. Lane assignment, not only should be clear but also should be enforced and educated to make sure no violation from any street users. For instance, motorcycle are often using sidewalks for travelling and parking. Besides, the availability, continuity, and the service of sidewalks should be well maintained.
2. Speed limit is a good measure to support street safety. Marking, signage, and physical intervention should be needed as well as continuous enforcement and education for all street users. Special zones such as school zone or elderly zone could have lower speed limit.
3. Pedestrian safety should be prioritized and ensured by all other street user including cyclists. Physical intervention should also accommodate the needs of safe crossing such as sufficient crossing time, reachable beg button for wheelchair users, and ramp elevation.
4. Through traffic should be limited but the implementation should be thoroughly thought. The access barriers for vehicle should be still accessible by wheelchair users.
5. Safety and clear of encroachment, lighting, and cleanliness should be well maintained on the sidewalks.
6. 2&3Ws could be used for first last miles of public transportation, if only the public transportation is already accessible by people with disabilities. Besides, the parking availability for bicycle and custom vehicle, such as three-wheeled motorcycle for wheel chair users, should be ensured.
7. Helmet usage could be mandated for bike lane users especially for children since the speed limit of bike lane is 25 km/h.
8. Speed limiter is good idea but should exclude emergency vehicle or condition.
9. Noise limit level should be tested and socialised to the public, and enforcing the usage of loud muffler. AVAS should be implemented soon and could also be enhanced by visual signing or lighting.

SUMMARY OF INPUT

From the two Focus Group Discussions, there were many inputs on safety issues regarding the road design based on their experiences such as increased physical interventions to accommodate crossers, enforcement of lane designations to prevent motorcyclists from using sidewalks as access to the road, use of AVAS to enforce the use of loud exhausts, speed limits especially in designated zones, and stricter regulations for bicycle lane users to wear helmets (speed limit at 25 km/h). The government also gave inputs regarding the suitability of the recommendations, marking and signage facilities, guarded crossings, and pedestrian bridges that need to be improved to reduce congestion and crossing conflicts, drop off/pick up points that should be required within 500m, the use of 2&3Ws that should be clarified in their use (first and last trip or direct transportation), and traffic speeds in the Greater Jakarta area that need to be adjusted to the traffic speed recommendations.

Regulations on driving speed and licensing and registration requirements for driving still need to be improved. As an example, many motorists drive above the prescribed speed, as well as the contrast in traffic speed between the key performance indicators for the Greater Jakarta area and the prescribed recommendations. Regarding the driver's license, it can be quite easily obtained without following the regulated procedures and many people who do not have a driver's license but dare to drive and drive through traffic, this happens because licensing and registration of vehicles is not done quickly and easily. In addition, education is needed for minors who do not have a driver's license not to drive 2W motorized vehicles without the guidance of older people or those who have a driver's license, this often happens in secondary cities in Indonesia.

There are many traffic violations and road safety issues by motorcycles due to unclear or unenforced regulations, introducing new regulations and policies to accommodate the uptake of E2&3Ws in urban traffic can improve road safety. For example, license and registration requirements for E2W should be easily accessible to the public and classification of motorcycles as public/shared passenger transport. There is also a need for education and campaigns on safe driving and operation of EVs in general and E2&3W in particular. The information needs to be at least on the risks and damages to have a deterrent effect on road safety violators.

