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Non-Motorized Transport Policy Guideline For Mid-Size Cities in Indonesia

Published by:
Institute for Transportation and Development Policy (ITDP)

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Published in:
January 2020

Institute for Transportation Development Policy (ITDP) is a non-profit organization that works with cities worldwide in realizing a sustainable urban transit system as a way to cut greenhouse gas emissions and improve the quality of urban life. Founded in 1985, the ITDP has become a leading organization in the promotion of environmentally sustainable and equitable transportation policies and projects worldwide. ITDP Indonesia has been providing technical assistance to the provincial governments of DKI Jakarta, Medan, Semarang, and other cities for more than ten years on mass public transportation, parking systems, and improving pedestrian infrastructure.

GLOSSARY

APBD	Anggaran Pendapatan dan Belanja Daerah / Regional Annual Budget
ARI	Acute Respiratory Infections
BPS	Badan Pusat Statistik / Central Bureau of Statistics
CBD	Central Business District
DKI	Daerah Khusus Ibukota / Special Capital Region
FHWA	Federal Highway Administration
ITDP	Institute for Transportation and Development Policy
LLAJ	Lalu Lintas dan Angkutan Jalan / Traffic and Road Transport
NACTO	National Association of City Transportation Officials
NMT	Non-Motorized Transportation
PM	Particulate Matter
RAPBD	Rancangan Anggaran Pendapatan dan Belanja Daerah / Regional Annual Budget Plan
RPJMN	Rencana Pembangunan Jangka Menengah / National MediumTerm Development Plan
RTH	Ruang Terbuka Hijau / Green Open Space
RTRW	Rencana Tata Ruang Wilayah / Urban Land Use Plan
SMART	Specific, Measurable, Actionable, Realistic, and Time-bound
TOD	Transit-Oriented Development
UNEP	United Nations Environment Programme
URTI	Upper Respiratory Tract Infections
WHO	World Health Organization
ZoSS	Zona Selamat Sekolah / School Safety Zone

CONTENT

1 INTRODUCTION

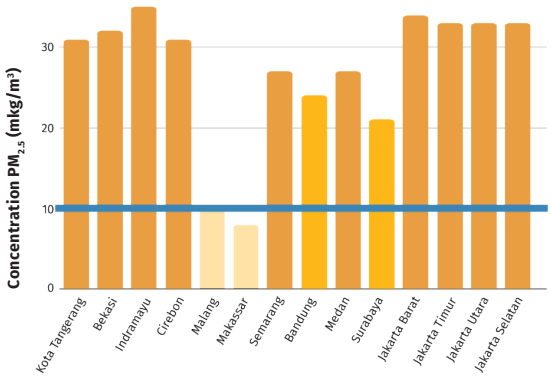
1.1 BACKGROUND

In 2019, 57% of Indonesia's population of 157 million people lived in urban areas, and it is projected that the number will increase to 220 million by 2045 (World Bank, 2019). The increasing number of urban residents influences various city issues, including those related to transportation and environment sustainability. Between 2013 and 2016, $PM_{2.5}$ pollutant concentration in Indonesia doubled (Air Life Quality Index, 2019). One of the impacts of poor air quality is that it facilitates the spread of Acute Respiratory Infections (ARI). For example, in DKI Jakarta, upper respiratory tract infections (URTI) increased steadily from 2016 to 2018. There were 5,465,727 cases, 40% of which were attributed to the city's poor air quality (Provincial Health Agency of Jakarta, 2019).

Poor air quality is not exclusive to Jakarta: More cities in Indonesia are suffering from the issue, hence the urgency for local municipalities to take effective measures. As noted in Figure 1, other cities in Indonesia have $PM_{2.5}$ pollutant concentrations that are well above the safe threshold.

Road safety is also a common issue in urban areas in Indonesia. The number of traffic casualties increased steadily at a rate of 2.7% per year (Ministry of Transportation, 2018). In 2018 there were 107,968 accidents, with a total of 171,438 casualties (Ministry of Transportation, 2018). The number of accidents involving pedestrians and cyclists is also quite high. According to WHO (World Health Organization), in 2018 there were 5,900 traffic accidents that resulted in the deaths of pedestrians and cyclists. The number accounted for 19% of the total accidents happened that year (WHO, 2018).

Figure 1. Air pollutant concentrations in various cities



A drastic increase in the level of urban air pollution and the large number of traffic accidents occur in parallel to the increasing use of private motor vehicles. Based on data from the World Bank (2019), between 1995 and 2014 the number of cars in Indonesia increased sixfold and the number of motorcycles increased tenfold. The urgent need to shift from the use of private motor vehicles to a more sustainable mode of transportation, especially in urban areas, needs to be actively promoted and followed up with concrete plans for action.

Figure 2. Lack of safe crossing
Photo: Medan, Indonesia

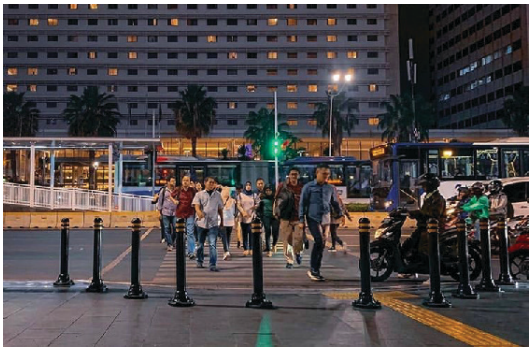


Figure 3. Provision of pelican crossing
Photo: Jakarta, Indonesia

Non-Motorized Transport (NMT) is an important aspect to achieve sustainable urban transportation system. In Indonesia, the most common types of non-motorized transportation include walking, bicycles, pedicabs ("becak"), and horse carts or "delmans." These types of non-motorized transportation don't create pollution and can have a positive impact by improving the poor air quality of a region—an issue that negatively affects many Indonesian cities, as mentioned earlier.

NMT is also an environmentally friendly mobility option that is effective and efficient in terms of cost and time, especially in urban areas, where the most frequent trips are of short and medium distance. These trips include direct trips from the original location to the destination as well as feeder trips (first mile) to the point of public transportation or the last mile from the point of public transportation to the final location of the trip. The development of mass transportation systems that is being planned to meet the directive from the National Medium Term Development Plan (RPJMN) 2020–2024 therefore not only needs to be connected to a good motorized road network system but also needs to be integrated with NMT infrastructure.

If the right infrastructure is provided, NMT can also encourage inclusiveness in urban areas because it can be used by all segments of society, regardless of ability, age, and income. Moreover, provision of appropriately designed NMT can also increase road safety, as has been shown in a recent study (Marshall and Ferenchak, 2019). This further highlights the importance of developing NMT infrastructure in cities, as improving road security and safety is one of the targets in the National Medium Term Development Plan (RPJMN) 2020–2024.

Increasing the use of non-motorized transportation needs to get full support from the government and other stakeholders so cities and residents can enjoy the various benefits associated with it.

1.2 OBJECTIVE AND SCOPE

Measures to promote NMT usage in cities need to be packaged comprehensively both in national and local NMT supporting policies and in infrastructure provisions. Development or improvement of road infrastructure quality, which is regularly included in both local and national programs, must be bundled into the development or improvement of NMT infrastructure. This document will provide guidance in formulating policies at the city level related to improvement of NMT usage and infrastructure.

To achieve this goal, this document is covers a number of discussions as follows:

1. Identification of issues related to NMT in urban areas of Indonesia
2. Study of existing policies and programs related to NMT in Indonesian urban areas and abroad
3. Discussion of policy gaps related to NMT
4. Discussion of building political commitment to increasing the use of NMT in Indonesian cities
5. Proposed directions for policies related to NMT

This document was prepared primarily for midsize cities in Indonesia, namely those with a population of 500,000 to 1 million people

1.3 METHODS

This document was prepared based on a literature study of the laws, regulations, and other policy documents that are currently implemented in Indonesia; research data; and benchmarking of NMT policies in other countries. It also reflects direct data collection through field observation and discussions with relevant government agencies and practitioners.

2 NON-MOTORIZED TRANSPORT IN INDONESIAN CITIES

2.1 OVERVIEW OF THE USE OF NMT

NMT includes all modes of movement driven by human labor (bicycles, pedicabs/"becak," etc.) or animals (horse cart, etc.). Walking is also a form of NMT.

Before the rise of motorized vehicles usage, non-motorized modes such as walking, cycling, rickshaws, and others were popular and used by Indonesians for intra-city trips, such as work, school, office, shopping, and recreational outings. However, the increasingly popular use of private motor vehicles and a trend in development that prioritizes motorized vehicles mean fewer NMT trips are taken nowadays. Restrictions on the operational areas of a number of NMT modes—for example, the prohibition of pedicab operations on a number of roads in the cities of Bekasi, Depok, and Surabaya—has made those sustainable modes of transportation steadily disappear. These bans are generally argued to be based on congestion, safety, and humanitarian reasons, since many of the drivers are the elderly (Clean Air Asia, 2013; Firmansyah, 2018). Even in cities without a ban, the number of pedicabs is decreasing due to the switch to online motorcycle taxis.

Data on the use of NMT in mid-size Indonesian cities, or even any city in general, is still very limited. Documentation of modal split has not become a standard practice of local transport or statistic agencies, as will be discussed further in section 2.1.2. The majority of modal split data comes from studies conducted by academics and nonprofit organizations. Since the data collection has been done by different parties, variations in the types of modes recorded were inevitable.

Table 1. Modal split in mid-size cities (various sources)

City (source of data)	Modal split			
	Motorcycle	Car	Public transport	Others (taxis, motorized rickshaws)
Medan (ITDP, 2017)	49,7%	22,8%	17,9%	9,6%
Bandung (SUTI, 2017)	40,7%	36,2%	23,0%	0,1%
Surabaya (Surabaya City Transport Agency, 2012)	51%	2%	6,5%	Pedicabs and Bicycle: 12% Others (walking, taxi, car sharing): 28,5%

For transportation modes, local and national statistics agencies only gathered data on vehicle ownership:

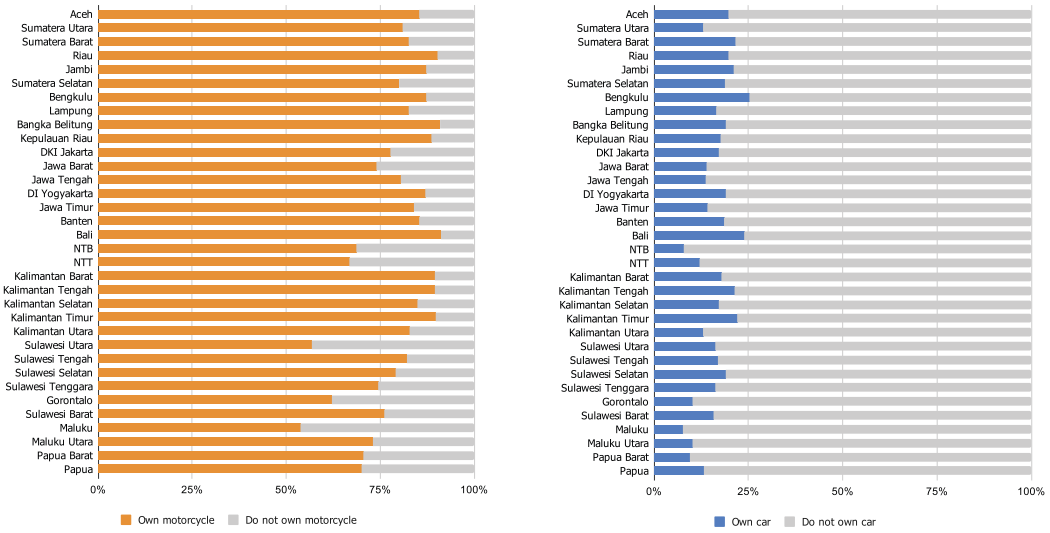
Table 2. Vehicle ownerships (BPS, 2018)

Year	2014	2015	2016	2017	2018
Motorcycle					
Number of vehicles owned	94,243,031	100,457,355	106,538,948	108,594,712	114,785,638
% increase	**6.59%**	**6.05%**	**1.93%**	**5.70%**	N/A
Car					
Number of vehicles owned	11,561,123	12,424,358	13,278,197	13,589,328	17,072,358
% increase	**7.47%**	**6.87%**	**2.34%**	**25.63%**	N/A

There was an increase in motorcycle and car ownership every year. The surge in car ownership occurred in 2018, when the total was 25.63% more than the previous year. Also related to motorized vehicle ownership data, in 2018 as many as 80% of households in urban areas in Indonesia already had a motorcycle and 15.5% had a car. This illustrates the increasing dependency of Indonesian urban communities on motorized vehicles.

Figure 4 (left). Percentage of urban households with motorcycle (BPS, 2018)

Figure 5 (right). Percentage of urban households with car (BPS, 2018)



2.2 NMT ISSUES IN CITIES

In addition to conducting field observations and discussions with government agencies and practitioners, a survey on non-motorized transportation was distributed online to residents in a number of urban areas in Indonesia to gather insights on the main issues related to non-motorized transportation. In total 713 respondents participated in the survey. The collected data is grouped based on participants' domicile, namely cities in DKI Jakarta Province ("DKI Jakarta"), mid-size cities ("Metro"), and other cities ("Non-metro"). The distribution of respondents is fairly even: Out of the 713 respondents, 221 came from the DKI Jakarta group, 259 came from Metro, and 233 from Non-metro.

2.2.1 INFRASTRUCTURE QUALITY

Safety is the key principle that must be met to increase the number of pedestrians and cyclists in an area (Nokes, 2019). However, there are still many pedestrians and cyclists who do not feel safe moving on urban roads. In fact, 22% of respondents living in the mid-size cities felt very unsafe walking and 40.9% felt somewhat unsafe. Cycling was considered even more unsafe: Only 20% of respondents in mid-size cities felt safe cycling in their areas, which is the lowest among the groups.

Inadequate provision of pedestrian and cyclist infrastructure in many cities in Indonesia is one of the main factors that causes people to feel unsafe to walk and cycle. In tandem with the low level of perceived safety, the majority of respondents were not satisfied with the condition of the pedestrian and cycling infrastructure in their hometown. The lowest level of satisfaction with the quality of NMT infrastructure was evident in the mid-size cities resident group, where 68% of respondents were not satisfied with the condition of pedestrian infrastructure in their city. The percentage of mid-size city respondents who were dissatisfied with cyclist infrastructure in their cities was the largest compared to the other groups.

Figure 6 (left). Safety perception of walking

Figure 7 (right). Safety perception of cycling

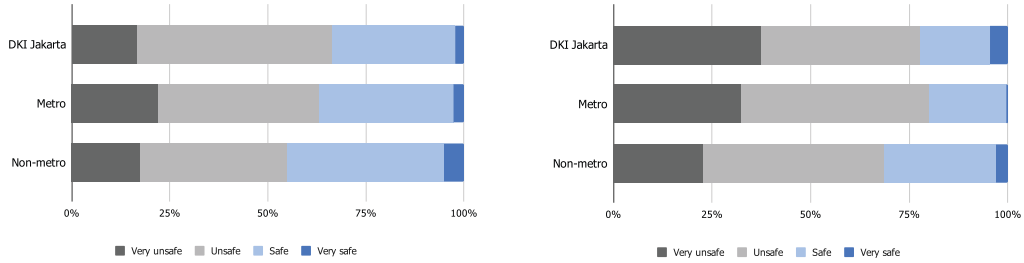
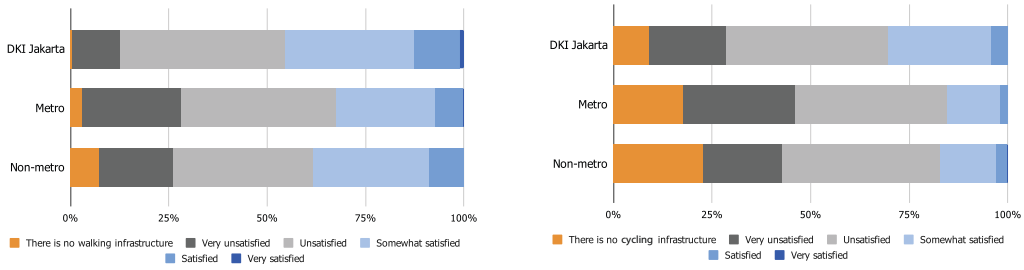


Figure 8 (left). Level of satisfaction with existing pedestrian infrastructure

Figure 9 (right). Level of satisfaction with existing cycling infrastructure



In mid-size cities, the main issues that deter people from walking are:

1. **Lack of sidewalks**. Many urban roads still do not have sidewalks at all, so walking must be done on the edge of the lane for motorized vehicles.
2. **Illegal use of existing sidewalks for parking areas**.
3. **Poor quality of the available sidewalks**. For example, many sidewalks are too narrow or poorly maintained (e.g., they have holes or an uneven surface due to tree roots).
4. **Lack of crossings**.
5. **High number of obstacles** when walking on the sidewalk caused by the placement of road furniture in the pedestrian space.

There is also a relatively high level of concern about danger caused by reckless motorists, as well as less frequent concerns about sexual harassment and pickpocketing when walking. These concerns are also indirectly related to the prevailing condition of sidewalks: Pedestrians may not feel they have enough protection from motorized vehicles, and the sidewalks may not have sufficient lighting, which could increase the risk of criminal activity.

The lack of adequate cycling infrastructure is also cited as the main reason why people don't cycle. The top infrastructure issues deterring people from cycling are:

1. **The absence of cycling infrastructure.** The need for a dedicated cycle lane is relevant to the second identified main obstacle: concerns about conflicts with motorized vehicles. Cycle lanes have not been developed much in cities in Indonesia, either partially or as a network. Cyclists in cities generally still have to ride alongside motorized vehicles, which are increasing in number every year.
2. **Absence of bicycle racks or other parking facilities.** Cycling infrastructure must be equipped with supporting facilities such as bicycle racks or parking areas, which are not available yet in most buildings or public facilities.

Figure 10. Obstacles to walking in mid-size cities

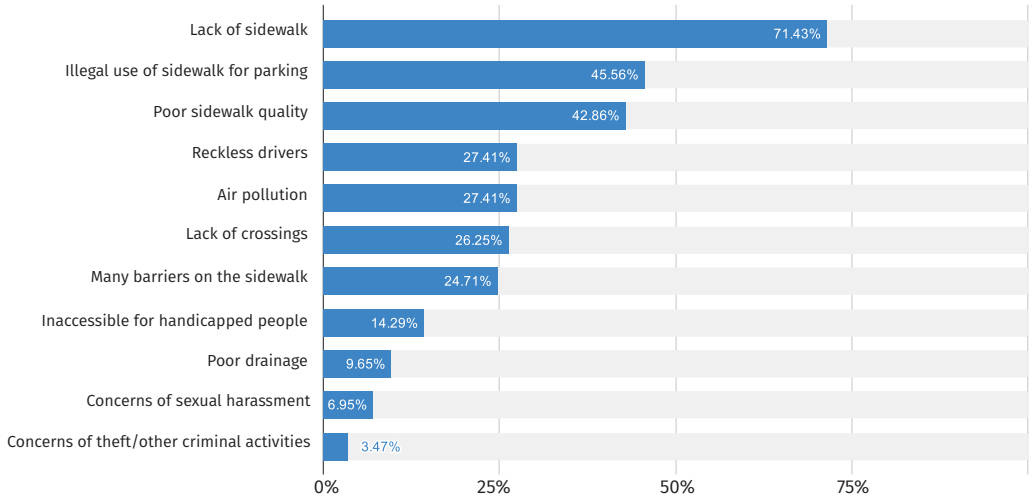
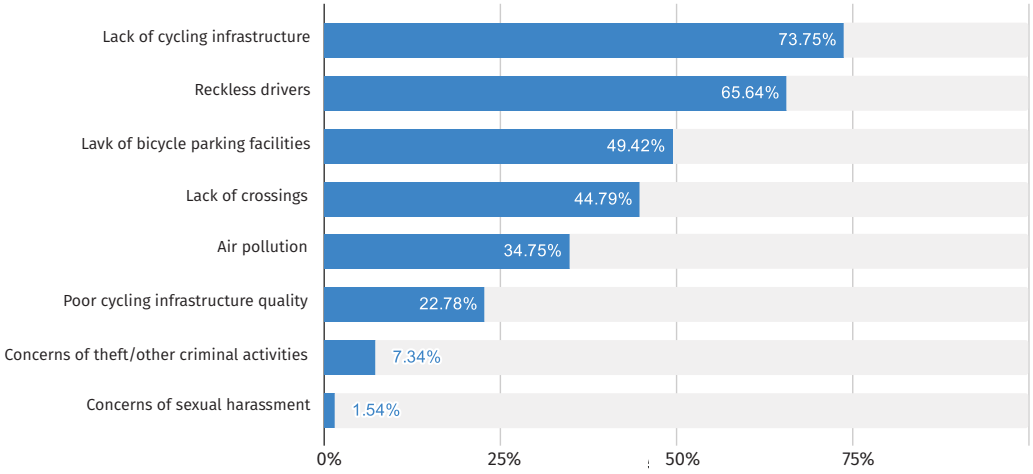


Figure 11. Obstacles to cycling in mid-size cities



2.2.2 DATA QUALITY

Data regarding the use and availability of NMT facilities is still very limited. As mentioned earlier, official data from regional and national statistical bodies can only give an indication of the use of transport modes through motorized vehicle ownership data. There is no periodical documentation regarding modal split or residents' travel behavior (for example, in the form of annual transportation surveys) by government agencies, let alone a collection of NMT usage data. To date, there has been no standardization of methods on a city or regional scale related to the collection travel data, such as modal split, choice of ingress or egress mode at public transportation modes, ownership of non-motorized transportation modes, or the number of and the location of accidents involving NMT users.

The available data is mostly collected by academics and local or international nonprofits in the context of academic work and other studies, such as feasibility studies for a new public transportation system. This causes differences in methods and types of modes investigated.

3 NMT POLICY IN INDONESIAN MID-SIZE CITIES

3.1 OVERVIEW OF EXISTING NATIONAL AND CITY-LEVEL POLICIES

Policies related to pedestrian and cyclist infrastructure should be made to meet the needs of the users and to provide the best conditions possible for them to use it. Pedestrians and cyclists are the most vulnerable road users and must be protected, and that requires that clear and straightforward road traffic rules must be devised and implemented.

In relation to the interests of pedestrians and cyclists, the specific regulation that forms the legal basis is Law No. 22 of 2009 on Traffic and Road Transportation. Article 25 paragraph 1 states that:

> *"Every road used for public traffic must be equipped with road elements"*

and in item G explains that:

> *"the intended road elements are facilities for bicycles, pedestrians and people with disabilities".*

Furthermore, Law No. 22 of 2009 concerning Traffic and Road Transportation mentions that traffic management and engineering gives priority to pedestrian and cyclist safety and comfort, as stated in Article 106 paragraph 2:

> *"Every person who drives a motorized vehicle on the road must prioritize the safety of pedestrians and cyclists."*

Article 131 in the same Law has mentioned the right of pedestrians, such as:
1. Pedestrians are entitled to the availability of supporting facilities in the form of sidewalks, crossings, and other facilities.
2. Pedestrians are entitled to get priority when crossing the road at crossings.
3. If pedestrian crossing facilities are not yet available, pedestrians have the right to cross in the chosen place with due regard to their safety.

Article 132 states the obligations of pedestrians, namely:
1. Pedestrians must use the part of a road that is intended for pedestrians, or the left-most edge of a road, or cross the road at a predetermined place.
2. If such facilities are not yet available, pedestrians must pay attention to the safety and flow of traffic.
3. Persons with disabilities must wear special signs that are clear and can be easily recognized by other road users.

The government also implements several transportation sector regulations that address global climate change and air quality issues. Those issues were then translated into several actions at the national and provincial level, one of which is to reduce emissions. In the transportation sector, relevant actionable regulations include the Presidential Regulation No. 2 of 2015 on Indonesia's National Medium Term Development Plan 2015–2019 (RPJMN 2015–2019) in book Matrix II and Indonesia's National Medium Term Development Plan 2015–2019 (RPJMN 2015–2019) in the annexes. However, provision of pedestrian or cycling infrastructure or other measures promoting the use of NMT is not stated explicitly.

To date, Indonesia has had several regulations and guidelines related to pedestrian infrastructure, such as:
- Minister of Public Works Regulation No. 3 of 2014
- Ministry of Public Works and Housing Guidelines on Pedestrian Facility Planning of 2018
- Ministry of Transportation Regulation No. 3582 of 2018 on Technical Guidelines for Prioritizing Pedestrian Safety and Comfort in the School Area Through the Provision of School Safe Zones ("Zona Selamat Sekolah"/ZoSS)
- Minister of Transportation Regulation No. 67 of 2018 on Road Markings

At the city level, those laws should have been further translated into regional policies governing pedestrian and cyclist infrastructure by including additional elements to allow practical implementation. However, most cities in Indonesia only mention it briefly or/and in a general manner in their respective Urban Land Use Plans ("Rencana Tata Ruang Wilayah"/RTRW) and Green Open Space ("Ruang Terbuka Hijau"/RTH) Provision guidelines. To date, there are no policies at the city level that regulate the provision and maintenance of pedestrian and cyclist infrastructure in a sufficient level of detail, such as with detailed strategies, action plans, and timelines for completing the actions.

Some examples of city-level policies available in several cities in Indonesia related to non-motorized vehicle infrastructure are as follows:

Table 3.
Existing city-level policies

City	Policies related to/concerning NMT	Contents and outcomes
Bandung	Bandung City Regulation No. 18 of 2011 on Bandung City Urban Land Use Plan 2011-2031	This regulation states that one of the infrastructure plans for the city of Bandung is the provision and use of pedestrian infrastructure and facilities (Article 36, Point e), by: 1. Improving the quality of existing facilities and infrastructure along arterial and collector roads, especially in the central area of activity. 2. Providing pedestrian facilities on arterial and collector roads that already have sidewalks but do not yet have complete facilities, such as street lights, benches, garbage boxes, zebra crossings, crossing bridges, and other facilities. 3. Adding pedestrian infrastructure to arterial and collector roads that only have sidewalks on one side of the road. 4. Providing pedestrian infrastructure on arterial and collector road sections that do not yet have sidewalks and other equipment. Nevertheless, this document does not include detailed design guidelines for the provision of pedestrian facilities and infrastructure.
Medan	Medan City Regulation No. 13 of 2011 on Medan City Urban Land Use Plan 2011-2031	This regulation states that pedestrian facilities and infrastructure is one part of Medan City facilities and infrastructure network. In this regulation it is emphasized that: 1. Pedestrian facilities and infrastructure provision aims to accommodate pedestrians, so that security and safety occur. (Article 33) 2. Pedestrian facilities and infrastructure shall be provided in Transit Oriented Development (TOD) points, namely Belawan TOD, Labuhan TOD, Mabar TOD, Brayan TOD, Sunggal TOD, Literacy Area, TOD Medan City Region, Maimun and Sisingamangaraja Region, Garden City Polonia Area, Polonia CBD, TOD Sunggal, Literature Area, TOD Medan City Region, Maimun and Sisingamangaraja Region, Garden City Polonia Area, Polonia CBD, TOD Sunggal Sandpaper, TOD Tuntung. (Article 33) 3. Pedestrian facilities and infrastructure shall be provided in the Green Open Space (RTH) area of the Pedestrian Path, which is on either side of the road or in the parks. (Article 38) The planned network of pedestrian facilities in the city of Medan is detailed in Annex I.8, which is an inseparable part of this regulation.

Table 3 (cont.).
Existing city-level policies

City	Policies related to/concerning NMT	Contents and outcomes
Makassar	Makassar Mayor Regulation No. 145 of 2009	In this mayor regulation, there are 7 roads that serve as Traffic Orderly Zones, namely: Sudirman Road, H. Bau Road, Penghibur Road, Fish Market Road, Ujung Pandang Road, Rairahe Road, and Ahmad Yani Road. The return of those sidewalks' function as pedestrian realms has become one of the actions to follow up the mayor regulation.
	Makassar City Regulation No. 4 of 2015 on Makassar City Urban Land Use Plan 2015-2034	This local regulation regulates the strategies to develop facilities and infrastructure network in Makassar City, which includes the development of an integrated pedestrian network system for pedestrians with disabilities, and bicycles on the arterial and collector road network. This regulation also mentions several important aspects in the construction of pedestrian facilities, from the continuous sidewalk component to sanctions against closing access to pedestrian facilities. Annex IV states that, every year in all districts, development, improvement, stabilization and rehabilitation of traffic and road transportation facilities shall be carried out in the form of: 1. Sidewalks, 2. Bicycle lanes, 3. Pedestrian crossings, and 4. Bus stops, through fundings from the State Budget, Provincial Budget, City Budget, and / or other legal sources.
Semarang	Semarang City Regulation No. 7 of 2010 on Green Open Space (RTH) Arrangement	This regulation states that green space provisions on pedestrian paths shall act as clear buffer between the pedestrian sidewalk and the motorized vehicle lane. Provision of green space on pedestrian paths is also expected to create a space which can be humanely, safely, and comfortably used by pedestrians, provides shelter or protective shades, and creates attractive views. In this regulation, it is also stated that in order to support the activity of walking mode to the fullest, the provision of green space on pedestrian paths can be equipped by providing various street furniture.
Yogyakarta	Yogyakarta City Regulation Number 2 of 2010 on Yogyakarta Urban Land Use Plan (RTRW) for 2010-2029	This local regulation regulates the city's pedestrian network in Article 80. Points related to pedestrian facility provisions are: 1. Pedestrian path provisions shall accommodate the interests and needs of people with disabilities 2. Directives to develop pedestrian areas (pedestrianization) on Mangkubumi Road, Malioboro Road, and Ahmad Yani Road, while continuing to permit access for logistic vehicles, which will be regulated in another mayor regulation.
	Yogyakarta City Mayor Regulation No. 25 of 2010 on Non-Motorized Vehicles ("Kendaraan Tidak Bermotor"/KTB)	In this regulation it is stated that non-motorized vehicles (KTB) include bicycles, horse-drawn carriages, carts, and pedicabs. This regulation also regulates: 1. Obligation for the NMVs to comply with safety standards 2. KTB traffic regulations 3. Obligation to have a Non-Motorized Vehicle Operating License ("Surat Izin Operasi Kendaraan Tidak Bermotor"/SIOKTB) and Non-Motorized Vehicle Number ("Tanda Nomor Kendaraan Tidak Bermotor"/ TNKTB) for horse-drawn carriages, carts, and pedicabs 4. Dimension specifications for each type of KTB.

Table 3 (cont.).
Existing city-level policies

City	Policies related to/concerning NMT	Contents and verdicts
Yogyakarta (cont.)	Yogyakarta City Mayor Regulation No. 25 of 2010 on Non-Motorized Vehicles ("Kendaraan Tidak Bermotor"/KTB) (cont.)	The regulation explicitly mentions the need to provide infrastructure for KTB, including a special lane for KTB, a bicycle parking lot, and posts to park horses (Article 24). If on a certain road a special KTB lane is not yet available, referring to this regulation, the KTB must use the leftmost lane of the road (Article 26).
Surabaya	Surabaya City Regulation No. 12 of 2014 on Surabaya City Urban Land Use Plan (RTRW) 2014 - 2034	This regulation regulates the improvement of pedestrian facilities for people with special needs on the city's road network and functional areas (Article 11, Section 5). The infrastructure development plan in the city of Surabaya is said to be carried out by developing infrastructure and facilities for pedestrians and non-motorized vehicles (Article 32, Point e). Development of mass transportation system within the city, referring to this regulation, must also be complemented by the provision of pedestrian facilities and lanes for non-motorized vehicles (Articles 25 and 26).

3.2 POLICIES IN OTHER COUNTRIES

Many countries in the world started their campaigns for non-motorized transportation policies by committing to implement Vision Zero. Adoption of—or at least references to—Vision Zero is highly relevant and is recommended as a starting point to promote NMT in Indonesian mid-size cities, since improvement of road safety is explicitly stated in the National Medium-Term Development Plan (RPJMN) 2020–2024.

Vision Zero is a road safety philosophy developed in Sweden in the late 1990s to reduce accidents caused by vehicle traffic. Through this Vision Zero effort, Sweden has been able to reduce its number of traffic fatalities by half and become one of the safest countries for travel in the world. The main principle of Vision Zero is that people, especially pedestrians, must not be injured and die as a result of transportation. Vision Zero does not deny that humans can make mistakes—however, the transportation system should be designed to minimize the consequences of these errors.

In the past seven years (2012–2019), more than 20 cities in the United States have adopted Vision Zero and developed a plan to reduce the number of traffic deaths. The Netherlands and several countries in the United Kingdom also have implemented Vision Zero. Japan and South Korea started Vision Zero several years ago, and the city of Haryana in India adopted Vision Zero in 2017. Cities have adapted the principles of Vision Zero from Sweden's model and adapted them to the conditions of their respective regions.

A. Principles of Vision Zero

The principles of Vision Zero, as stated by Vision Zero Network, are as follows:

1. Traffic deaths and severe injuries are acknowledged to be preventable.
2. Human life and health are prioritized within all aspects of the transportation system.
3. Acknowledgment that human error is inevitable and transportation systems should be forgiving.
4. Safety work should focus on system-level changes above influencing individual behavior.
5. Mitigation of speed is recognized and prioritized as the fundamental factor in crash safety.

B. IMPLEMENTATION STEPS OF VISION ZERO

The steps to implement Vision Zero in a city are:

1. Ensuring understanding of Vision Zero by all related agencies, especially in the government ranks.
2. Making city-level strategy based on the main strategy of Vision Zero, "Create Safe Speeds."
3. Formulating action plans from each related government agency.
4. Formulating action or program collaboration and process.
5. Implementing the action plan/programs.
6. Improving the collection process and quality of data related to action, progress, and results. Transparency of those data are crucial for public monitoring and to ensure accountability.
7. Evaluating actions/programs regularly.

Figure 12 (left). Denver city action plan to achieve the goal of Vision Zero

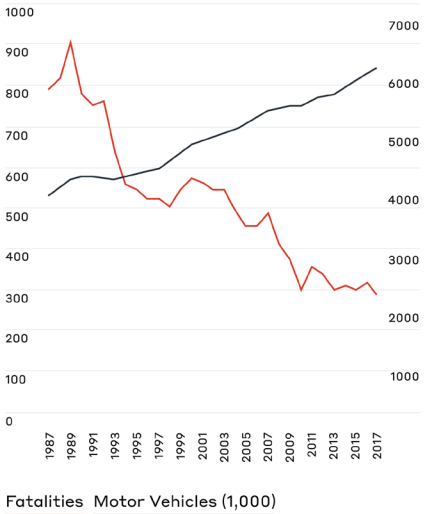
Figure 13 (middle). Denver city annual report of Vision Zero

Figure 14 (right). Publicly accessible website with news, data, action plan, and annual report of Vision Zero

C. IMPACTS OF VISION ZERO ON ROAD SAFETY

The significant impact of Vision Zero is that the number of road accident fatalities has been halved. For example, in Sweden, in the early years after Vision Zero was adopted by the Swedish Parliament, the number of fatalities caused by road accidents was 7 per 100,000 inhabitants. At that time that was a low figure globally, and many people were skeptical about the possibility of reducing this number even further. But now, the number of traffic fatalities in Sweden has been more than halved, though the volume of traffic has increased with the times.

Fatalities in road traffic and motor vehicles in use in Sweden 1987-2017
(Swedish Transport Administration. 2017)



Fatalities in road traffic in countries that adopted Vision Zero
(Federal Highway Research Institute, 2019)

Country	1980 Killed by Road Accident	2013 Killed by Road Accident
Australia	3,272	1,185
Austria	2,003	455
Belgium	2,396	723
Canada	5,462	2,255
Czech Republic	1,261	655
Denmark	690	191
Finland	551	258
France	13,636	3,268
Germany	15,050	3,339
Greece	1,446	874
Hungary	1,630	591
Ireland	564	190
Italy	9,220	3,385
Japan	11,388	5,152
Luxembourg	98	45
Netherlands	1,996	476
Norway	362	187
Poland	6,002	3,357
Portugal	2,850	637
Slovenia	558	125
South Korea	6,449	5,092
Spain	6,522	1,680
Sweden	848	260
Switzerland	1,209	269
United Kingdom	6,182	1,770
United States	51,091	32,719

3.3 GAPS IN CITY-LEVEL POLICIES

3.3.1 THE NEED FOR A MAIN PERSON IN CHARGE OF NMT

Based on the regulations and guidelines mentioned above, it is clear that authority for NMT policy is currently under more than one technical ministry (i.e., Ministry of Public Works, Ministry of Transportation, Ministry of Spatial Planning). There must be collaboration among various stakeholders (intergovernment agencies, both at national and local level) related to NMT policy.

It is recommended that one ministry is chosen to be the main authority in charge of NMT development policy and includes NMT-related goals in its key performance indicators. The ministry (and thus related local agencies) in charge should lead the collaboration with other ministries (and related local agencies) based on their assigned roles and responsibilities.

This recommendation to have a leading ministry is made to ensure a sense of ownership in NMT infrastructure development and to give a clear focus and direction to the cross-functional team.

3.3.2 POLICY GAPS

Based on the analysis of national and regional policies and regulations, there is no quantitative target regarding the improvement of pedestrian and cyclist facilities that has a strong justification. The highest legal product, namely Law No. 26 of 2007 on Spatial Planning, Article 28 Point c only states:

> *"...planned provision and utilization of pedestrian network infrastructure and facilities, public transport, informal sector activities, and disaster evacuation rooms, which are needed to carry out the functions of the city area as a center for socio-economic services and a center for regional growth."*

Lack of a main objective regarding NMT makes it difficult for cities to translate the higher laws to Specific, Measurable, Actionable, Realistic, and Time-Bound (SMART) targets. This also applies to formulating integrated and clear strategies and action plan.

In addition, the safety of pedestrians and cyclists has not yet been considered a priority. Looking at the policies in Indonesian mid-size cities, pedestrian infrastructure seems to be regarded only as an additional point instead of a crucial element of a city's transportation system. Some cities in Indonesia have not yet fully adopted Law No. 22/2009, which concerns the safety of pedestrians and cyclists. Failure to translate the law to more tactical local regulations is still a problem, as evident in the scarcity of local regulations that explicitly regulate or mention the matter of safety of pedestrians and cyclists, who are supposed to have the highest priority as road users.

Besides safety, another important issue that should be addressed in city-level policies is how to build a transit point that is integrated with a network of pedestrian facilities. Law No. 22 of 2009 mentions that some of the supporting facilities for road transport are sidewalks, bicycle lanes, pedestrian crossings, shelters, and special facilities for persons with disabilities and the elderly (Article 45 Paragraph 1). However, this higher law is not translated into most city-level regulations. One city that has explicitly stated integration in its policies is Surabaya City, in Surabaya City Regulation No. 12 of 2014 on Surabaya City Urban Land Use Plan 2014–2034, which states that the development of mass transit in the city must include provision of pedestrian infrastructure and lanes for non-motorized vehicles (articles 25 and 26).

Regulations that reflect the laws or ministerial regulations are not the only guidelines needed in city-level policies in Indonesian mid-size cities. Specific transport plan documents related to the strategies, action plans, and timelines that will be carried out by all relevant institutions/agencies are also required, as well as the evaluation documents or achievement targets of the strategies and actions. Transparency is also needed in documentation so that the community can access and be well informed about government programs and performance.

4 POLITICAL COMMITMENT

A strong political commitment by local government agencies to support the use of non-motorized transportation is very important in formulating a comprehensive policy package at the city scale. Although the change is often initiated by activists or advocates, a political commitment eventually needs to be owned by the heads of municipalities, who have the authority to provide interagency directives or mandates. Coordination of work activities between relevant government agencies is crucial, because supporting the use of non-motorized transportation involves not one but several agencies at once, as will be elaborated further in this chapter.

4.1 INSTITUTIONAL ARRANGEMENTS

4.1.1 OVERVIEW OF STAKEHOLDERS

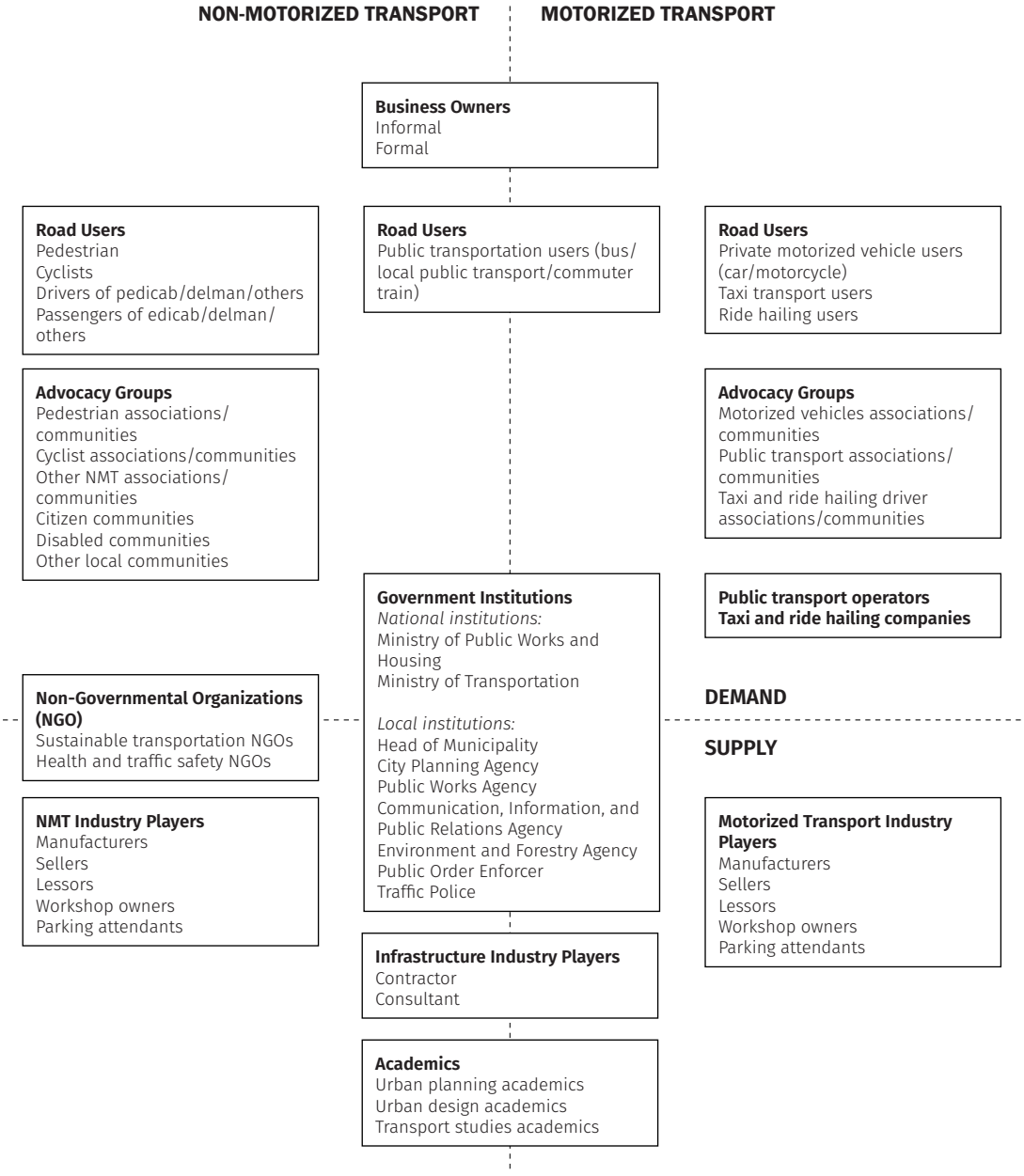
Key stakeholders that must be involved and/or have their needs considered as non-motorized transport policies are formulated at the city scale include (adapted from I-CE, 2000):

1. All road users: pedestrians, cyclists, and other non-motorized transportation (e.g., rickshaws), as well as drivers and passengers of motorized vehicles (e.g., cars, motorbikes, buses, and trucks).
2. Advocacy groups related to each mode of transportation.
3. Public transportation operators.
4. Local communities and residents, especially if the policy or programs affect residential areas.
5. Local government agencies (head of municipality, local development planning agency, transportation agency, public works agency, communication, information and public relations agency, environmental and forestry agency, public order enforcers or "Satpol PP," police) and national government agencies (e.g., the Ministry of Public Works and Housing, and the Ministry of Transportation).
6. Academics, especially from the fields of urban planning, urban design, and transportation.
7. Transportation and infrastructure industry players.
8. Non-governmental organizations, although they commonly work through other institutions.

In addition, there are other actors who also have interest in the development of non-motorized transportation, although indirectly, such as formal or informal business owners whose premises are located in the areas where the policy applies.

The diagram on the following page is a mapping of these stakeholders based on the stance that tends to be taken between non-motorized and motorized transportation, and based on their role in the use (demand) or provision of transportation facilities and infrastructure (supply) (adapted from I-CE, 2000).

Figure 15. Stakeholder mapping



4.1.2 ROLES AND RESPONSIBILITIES OF THE GOVERNMENT INSTITUTIONS

The development of non-motorized transportation policies, especially related to infrastructure development in an urban area, requires cooperation and coordination from city-level decision- makers and government agencies in addition to support from other stakeholders. The roles and responsibilities of each actor need to be known and clearly stated from the beginning to promote accountability and eliminate any confusion about responsibilities at the time of implementation.

Table 4. Roles and responsibilities arrangement

Phase	Roles and responsibilities
Analysis of existing conditions	**Transportation Agency** 1. Leading the collection of data and metrics related to NMT infrastructure and usage 2. Conducting baseline analysis 3. Describing the analysis of existing conditions to the Head of Municipality and other city agencies **Public Works Agency** Providing relevant data **Communication, Information and Public Relations Public Works Agency** Providing relevant statistical data
Formulation of vision and target areas related to non-motorized transportation	**Head of Municipality** 1. Leading the formulation of regional visions and targets related to NMT 2. Giving direction to relevant agencies to achieve the visions and targets through a Decree or Mayor Regulation
Formulation of NMT infrastructure plan and supporting policies	**Head of Municipality** Coordinating with the national and provincial governments regarding plans and funding **City Planning Agency** 1. Coordinating related city agencies to formulate NMT network plans and infrastructure designs 2. Cooperating with external parties (e.g. NGOs, the national government) regarding conceptual, technical, and financial assistance **Transportation Agency** 1. Planning the NMT network 2. Formulating traffic engineering strategies, and marking and sign requirements **Public Works Agency** 1. Assessing the standard dimensions and space requirements for NMT infrastructure and supporting facilities 2. Preparing infrastructure designs and supporting facilities for NMT 3. Together with the Transportation Agency, establishing a continuous pedestrian and cycling network plan in accordance with the spatial plan **Environment and Forestry Agency** 1. Collecting data on the existing trees which will be affected by NMT infrastructure development 2. Developing street trees plan in accordance to NMT network plans to provide shades
Implementation	**Head of Municipality** Ensuring the implementation goes according to the plan **City Planning Agency** Preparing Regional Annual Budget Plan ("RAPBD") which contains the NMT development budget in accordance to the plan **Transportation Agency** 1. Formulating Annual TransportationBudget Plan ("LLAJ RAPBD") which contains the NMT development budget in accordance to the plan 2. Implementing traffic calming measures at designated locations to prioritize NMT users 3. Installing signages and markings for NMT infrastructure 4. If needed, re-evaluating on-street parking locations to accommodate NMT infrastructure **Public Works Agency** 1. Formulating Infrastructure Annual Budget Plan which contains the NMT development budget in accordance to the plan 2. Constructing NMT infrastructure **Environment and Forestry Agency** 1. Formulating and proposing Annual Budget Plan related to street trees and vegetations along NMT infrastructure 2. Procuring, planting, and maintaining the street trees and vegetations

Table 4 (cont.). Roles and responsibilities arrangement

Phase	Roles and responsibilities
Implementation (cont.)	**Communication, Information and Public Relations Public Works Agency** 1. Developing and disseminating campaign materials to promote NMT usage 2. Developing and disseminating publications on the new NMT infrastructure 3. Coordinating the media in publications related to NMT **Public Order Enforcer ("Satpol PP") and Traffic Police** Developing and implementing standard operation procedures to ensure safety of all road users
Monitoring and Evaluation	**Transportation Agency** 1. Cooperating with Satpol PP and Traffic Police to ensure no NMT infrastructure misuse 2. Regularly collecting and analyzing NMT performance metrics data 3. Regiularly evaluating the NMT infrastructure **Public Works Agency** Analyzing data and evaluating the design of existing NMT facilities **Public Order Enforcer (Satpol PP) and Traffic Police** Ensure appropriate usage of NMT infrastructure

4.2 BUILDING POLITICAL COMMITMENT

Below are the steps that could be taken by the non-motorized transportation policy initiator to build political commitment among the key players, especially from the public sector:

1. Providing knowledge to political leaders (most importantly, the head of municipality) about the benefits of walking and cycling. This message can be conveyed by initiating formal or informal discussions, giving a pitch presentation, and also by visiting local or international regions that have successfully provided appropriate, organized, and efficient pedestrian and cyclist infrastructure.
2. Creating the desire to achieve the best practices of an NMT-friendly environment and commitment of political leaders by incorporating NMT-related goals in national- and local-level government agencies' KPIs.
3. Ensuring synchronization of understanding between the leader and the city-level implementation team (e.g., relevant government agencies) to align the vision and mission. This is crucial to prevent any misconception in the implementation phase.
4. Ensuring that the decision-makers and implementation team will become the champions or bearers of the success of the developed policies in their respective cities.

5 RECOMMENDATIONS FOR POLICY MAKERS

5.1 UNDERSTANDING NMT CONCEPTS FOR POLICYMAKERS

Political commitment is not enough to develop cities that can promote NMT—actual improvement and development of regional policies are also crucial. A thorough understanding of the concept of a pedestrian- and cyclist-friendly city is needed to support the determination of the leaders, the decision-makers, and the implementation team. This understanding can be achieved by:

1. Studying documents related to vision, standardization, and action plans for the development of pedestrian and cyclist infrastructure. The documents studied should not be restricted to Indonesian policies, but also include publications from other countries and literature from international institutions, such as "Street for Walking and Cycling" literature by ITDP, "Urban Street Design Guide" by NACTO, "Pedestrian Safety Guide and Countermeasure Selection System" by FHWA, and others.
2. Participating in training, workshops, seminars, and discussion forums related to pedestrians and cyclists, which aims to:
    a. Add insight and understanding about NMT
    b. Get the opportunity to discuss with other regional implementers or the community and to gain insights and their practical know-how
    c. Increase motivation and optimism in increasing the activity of pedestrians and cyclists in their own area
    d. Give encouragement, share enthusiasm, and build the capacity of their staff when they return to their area.
3. Taking a comparative study or field trip if needed. This will give inspiration from the firsthand experience of seeing and feeling the benefits of having good NMT infrastructure, facilities, and usage, and to learn about its implementation.

5.2 POLICY RECOMMENDATIONS

After the leaders, decision-makers, and implementation team understand NMT concepts and are willing to commit to the development of pedestrian and cyclist infrastructure in their city, NMT policy improvement is ready to be developed and implemented. Recommendations for formulating and implementing policies related to NMT in Indonesian mid-size cities are as follows:

1. ***Develop a city-level vision related to pedestrian and cyclist infrastructure development and improvement***

    with reference to:

    a. Law No. 22 of 2009 on Traffic and Road Transportation, which states that everyone must prioritize the safety of pedestrians and cyclists.
    b. Law No. 26 of 2007 on Spatial Planning, which states that the pedestrian infrastructure network supports the city's function as a center for socioeconomic services and regional growth.

2. ***Develop city documents containing strategies, action plans, and targets which specifically address pedestrian and cyclist infrastructure, based on the agreed visions.*** The targets made should be SMART (Specific, Measurable, Achievable, Realistic, and Time-Bound). The action plans need to include a number of components as proposed in Table 5.

3. ***Provide activity report documents, evaluations and achievement targets of strategies and action plans that are publicly accessible.*** This document should be updated regularly (every six months or annually). Commitment and coordination from all levels of the city government are needed to do this.

4. ***Regularly collect data related to non-motorized transportation and routine use of transportation.*** The data collected will be the basis for future targets as well as the parameters for the success of the policy that is enforced. Some recommended data to document are:

   a. The city's modal split, especially for commuter and school trips. This will include the share of non-motorized transportation modes.

   b. Modal split for access and egress at public transportation points.

   c. Number and location of accidents involving pedestrians and/or cyclists.

   d. Percentage of roads that have been equipped with pedestrian and cyclist infrastructure that complies with applicable standards, is safe, and is easily accessed universally.

   e. Percentage of intersections with safe and easily accessible crossings in all directions of the intersection.

   f. Percentage of pedestrian paths that provide adequate shade or protective elements, whether trees, canopies, arcades, or building shadows.

   g. Percentage of pedestrian pathways with visual connection to building activities (active frontage).

   h. Number of buildings and public transportation points (terminals, stations, bus stops) equipped with bicycle parking.

Table 5. Recommended policy components

Component	Action plan	Guideline
Traffic and road transport	1. Prioritize the safety of pedestrians and cyclists by providing appropriate infrastructure and making efforts to reduce the speed of motorized vehicles 2. Integrate NMT and public transport networks	Pedestrian and cyclist safety prioritization is done by: 1. Providing crossings with pedestrian platform/raised crossing on local roads 2. Imposing a speed restriction at 30 km/h in areas with high pedestrian volumes and installing traffic calming measures 3. Expanding the space for pedestrians and cyclists at intersections by reducing the curb radius of the intersections to 1.5 - 3 meters (FHWA, 2013) Integration of NMT network to public transport network is done by: 1. Building transit facilities that aree universally accessible 2. Ensuring the availability of sidewalks with adequate width (1.8 meters of pedestrian zone) behind/in front of bus stops 3. Providing bicycle parking facilities at transit facilities
Pedestrian and cycling infrastructure	1. Ensure the infrastructure is accessible to vulnerable groups (elderly, children, women and people with disabilities)/ provide universal access 2. Develop high quality NMT infrastructure which complies to applicable design and construction standards	Provision of universal access is done by: 1. Providing at least 1.8 meters wide pedestrian zone on sidewalks 2. Providing ramps with a maximum slope of 8% 3. Providing tactile pavings which complies to applicable design and construction standards

Table 5 (cont.). Recommended policy components

Component	Action plan	Guideline
Pedestrian and cycling infrastructure (cont.)	3. Package sidewalks and cycling lanes development/improvement in every road development/improvement projects 4. Prioritize installing at-grade crossings over constructing pedestrian bridges 5. Place street furniture appropriately to not obstruct pedestrian movement on sidewalks	Provision of crossing facilities is done by: 1. Installing crossings with a minimum width of 2.5 meters at each intersection and/or every 80-100 meters at mid-blocks 2. Providing pedestrian refuge islands with a minimum width of 1.2 meter at each crossing facility on roads with more than 2 lanes Provision of high quality NMT infrastructure, in addition to complying with applicable standards, is done by providing shades and shelters along pedestrian and cycling facilities
Small-medium businesses	Regulate, not ban, street vendors in the city; keeping in mind that street vendors have a positive impact on street activation and security	Provision of street vendor facilities at sidewalks is done by: 1. Ensuring the availability of pedestrian zone with adequate width (1.8 meters) when placing street vendor facilities 2. Providing appropriate street furniture, such as bins, sanitation appliances, and lightings

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