



Philippine Urban Mobility Programme

Towards people-first cities empowered by efficient, dignified, and sustainable mobility

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

On behalf of



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany



CHANGING TRANSPORT

Facilitating climate actions in mobility



We change transport to limit global warming!

We promote sustainable transport worldwide to harness societal benefits, such as access to jobs, clean air and economic development, to improve quality of life and to fight climate change.

www.changing-transport.org

Project Background

Transport is the highest energy-consuming sector in 40% of all countries worldwide, and causes about a quarter of energy-related CO₂ emissions. To limit global warming to two degrees, an extensive transformation and decarbonisation of transport is necessary. The TRANSfer project's objective is to increase the efforts of developing countries and emerging economies for climate-friendly transport. The project acts as a mitigation action preparation facility and thus, specifically supports the implementation of the Nationally Determined Contributions (NDC) of the Paris Agreement. The project supports several countries (including Peru, Colombia, the Philippines, Thailand, Indonesia) in developing greenhouse gas mitigation measures in transport.

The TRANSfer project is implemented by GIZ and funded by the International Climate Initiative (IKI) of the German Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and operates on three levels.

Mobilise

Facilitating the MobiliseYourCity Partnership

The goal of the multi-stakeholder partnership MobiliseYourCity, which is currently being supported by France, Germany and the European Commission, is that 100 cities and 20 national governments commit to ambitious climate action targets for urban transport and take appropriate measures.

Prepare

Preparation of Mitigation Measures

Standardised support packages (toolkits) are developed and used for the preparation of selected mitigation measures. As a result, measures can be prepared more efficiently, until they are ready for implementation and eligible for (climate) financing. Accumulated over 10 years, the targeted measures aim for a total reduction potential of 60 MtCO₂.

Stimulate

Knowledge products, Training, and Dialogue

Based on these experiences, TRANSfer is sharing and disseminating best practises. This is achieved through the development of knowledge products, the organisation of events and trainings, and the contribution to an increasing level of ambition. Personal exchange of experience and dialogue is promoted at events, including the annual Transport and Climate Change Week in Berlin, the United Nations Climate Change Conference (COP) or the International Transport Forum.

Meet us at www.changing-transport.org

Disclaimer

The content presented in this document has been compiled with the utmost care. Nevertheless, GIZ gives no guarantee that the information provided is current, accurate, complete or error-free. GIZ accepts no liability for damage or loss arising directly or indirectly from the use of this document, provided it has not been caused intentionally or by gross negligence.

GIZ expressly reserves the right to modify or append this document in part or in whole without prior notice, or to halt publication completely or for a limited period. Cartographic presentations in no way constitute recognition under international law of boundaries and territories. The content of GIZ GmbH's documents is protected by copyright. The images used are marked with photo credits where required by law. The use of any images requires the prior consent of GIZ GmbH, if not stated otherwise.

Acknowledgements

We would especially like to express our sincere gratitude to the following government officials and experts for their input, contributions, and support in the development of the Philippine Urban Mobility Programme and this Concept Document: Ruben Reinoso (Undersecretary for Planning, Department of Transportation), Thomas Orbos (former Undersecretary for Road and Transport Infrastructure, DOTr), Mark Richmond De Leon (OIC-Undersecretary for Road and Transport Infrastructure, DOTr), Jonathan Uy (OIC-Undersecretary for Investment Programming, National Economic and Development Authority), Sheilah Napalang (Assistant Secretary for Planning, DOTr), Roderick Planta (Assistant Secretary for Investment Programming, NEDA), Martin Delgra III (Land Transportation Franchising and Regulatory Board), Sandy Gaspay (DOTr), Chie Suñe (NEDA), Glynda Bathan (Clean Air Asia), John Barry, Kathleen Demetera (CAA), Diane Fajardo, Jon Harris (Integrated Transport Planning Ltd), Alvin Mejia (CAA), Ciaran Meyers (ITP), Cresencio Montalbo, Jr. (University of the Philippines), Joemier Pontawe (CAA), Alan Silayan (CAA), Mark Tacderas (CAA), Bronwen Thornton (Walk21), Jim Walker (Walk21).

Content

Executive Summary	viii
The Philippine Urban Mobility Programme	viii
PUMP Thematic Areas.....	ix
PUMP Timelines, Phasing	xi
Financing of the PUMP and Activities	xii
Implementation of the PUMP	xiv
Environmental Impacts	xiv
1. Introduction	1
2. Sector Overview: Philippine Urban Mobility	4
2.1 Relevance of the Sub-Sector	4
2.2 Transport and Climate Policy Context.....	7
2.3 Governance, Market Organisation, and Stakeholders.....	10
2.4 Finance and Current Business Model(s).....	15
2.5 Related Initiatives.....	18
3. Barriers to Sustainable Urban Mobility in the Philippines	20
3.1 Barriers to Sustainable Urban Mobility in the Philippines.....	20
3.2 Barriers Specific to PUMP Themes.....	24
4. The Philippine Urban Mobility Programme	27
4.1 Vision and Objectives.....	27
4.2 Themes and Components	28
4.3 Scope	30
4.4 Non-Motorised Transport Activities and Actions	31
4.5 Public Transport Activities and Actions	40
4.6 Urban Freight Activities and Actions.....	42
4.7 Travel Demand Management	47
4.8 Transit Oriented Development	47
4.9 Implementation Arrangement (organisational measures)	48
5. Financing Concept	50
5.1 Implementation Costs and Revenues.....	51
5.2 Non-Motorised Transport (NMT)	51
5.3 Public Transport	53
5.4 Urban Freight Costs and Revenues	57
6. Expected Benefits and MRV Approach.....	59
6.1 Cause-Impact Chain	59
6.2 Assessment Boundaries	62
6.3 Ex Ante Impact Assessment.....	65
6.3.1. Baseline and Mitigation Scenarios	65

6.3.2. Methodology for Calculation.....	67
6.3.3. Data.....	67
6.3.4. Expected Benefits	70
6.3.4.1. GHG Mitigation Impact.....	70
6.3.4.2. Sustainable Development Benefits.....	71
6.4 Monitoring and Reporting Plan	73
Bibliography	78
Annex 1: Transport Plans, Programmes, Policies	82
Annex 2: Barriers to Non-Motorised Transport	89
Annex 3: Detailed Assumptions.....	92

List of Tables

Table 1. GHG mitigation potential of PUMP.	xv
Table 2. Transport Energy Consumption and CO ₂ Emissions.....	6
Table 3. National Policies and Programmes relevant to Urban Mobility and Climate Change.	8
Table 4. Actors in Sustainable Urban Mobility in the Philippines.	11
Table 5. Public-Private Partnership Projects Related to Urban Mobility.	17
Table 6. Some Foreign-Assisted Initiatives in Philippine Urban Mobility.	19
Table 7. NMT Data Collection Requirements.	32
Table 8. Estimated NMT staff requirements for LGUs.....	33
Table 9. NMT initiatives currently underway.....	34
Table 10. Summary of NMT challenges and proposed actions.	38
Table 11. Costs of Non-Motorised Transport Activities.	52
Table 12: Annual maintenance cost of baseline jeepneys by route.....	54
Table 13. Modern jeepney operating costs per month	56
Table 14. Commercial Performance of Operations over 15-year Period (PHP/EUR)	56
Table 15. Costs of Urban Freight Activities.....	58
Table 16. Assessment boundaries for Non-Motorised Transport.....	62
Table 17. Assessment boundaries for Public Transport.....	63
Table 18. Assessment boundaries for Urban Freight.....	64
Table 19. Assessment boundaries for Travel Demand Management.....	64
Table 20. Assessment boundaries for Transit Oriented Development.....	65
Table 21. BAU and Mitigation Scenarios.....	65
Table 22. Data utilised to calculate for GHG and non-GHG benefits of PUMP.....	69
Table 23. Ex-ante GHG Impact Assessment 2020-2030.....	70
Table 24. Total Pollutant Emissions Avoided from 2020 to 2030 (accumulated tonnes over 10 years).....	71
Table 25: Qualitative assessment of co-benefits (sustainable development benefits)	72

Table 26. Target groups for GHG impact monitoring and reporting.	73
Table 27. Parameters for GHG impact monitoring.	74
Table 28. Monitoring parameters for sustainable development impacts.	76

List of Figures

Figure 1. Non-Motorised Transport Challenges and Proposed Solutions.	ix
Figure 2. Public Transport Components (through the PUV Modernisation Programme). (DOTr, 2017)...	x
Figure 3. Urban Freight Challenges and Proposed Solutions.	x
Figure 4. Time Horizon for PUMP Implementation.	xi
Figure 5. PUMP Implementation Phasing.	xi
Figure 6. <i>Green, Green, Green Programme</i> Fund Release Process. (DBM, 2018).	xii
Figure 7. Public Transport (PUV Modernisation Programme) Financing Mechanism. (GIZ, 2018).	xiii
Figure 8. PUMP Implementation Process.	xiv
Figure 9. Causal chain for GHG emission reduction due to the PUMP.	xiv
Figure 10. Car Ownership vis-à-vis Economic Growth. (GIZ, 2018)	1
Figure 11. National Urban Mobility Programme Development Process. (MobiliseYourCity, unpublished)3	
Figure 12. Population Age Pyramid (2015). (PSA, 2017)	4
Figure 13. Population and Growth Rate (1960-2015). (PSA, 2017)	4
Figure 14. Urbanization per Region (2015). (PSA, 2019)	4
Figure 15. Philippine GDP from 2009-2018 (highlighting biggest regions). (PSA, 2019)	5
Figure 16. Registered Vehicles by Region (2016) and Growth Rate from 2015. (PSA, 2017)	5
Figure 17. Modal Split of Daily Trips around Metro Manila. (JICA, 2015)	6
Figure 18. Philippines' GHG Emissions by Sector (2000-2014) and Growth of Transport Emissions. (WRI, 2019)	7
Figure 19. Stakeholders for the Philippine Urban Mobility Programme.	10
Figure 20. Share of DOTr, DPWH in 2017 and 2018 GAA. (DBM, 2017; DBM, 2018)	15
Figure 21. Infrastructure Budget for 2017 and 2018. (DBM, 2018)	16
Figure 22. Highlights of the 2018 DOTr Budget for Road and Rail Transport. (DBM, 2018)	16
Figure 23. Highlights of the 2018 DPWH Budget. (DBM, 2018)	16
Figure 24. DOTr, DPWH Loan Count and Totals (2017). (NEDA, 2018)	18
Figure 25. Summary of Barriers to Sustainable Urban Mobility.	23
Figure 26. Objectives and Targets of PUMP Activities.	28
Figure 27. The Philippine Urban Mobility Programme (PUMP) Vision and Strategy.	29
Figure 28. Scope of geographical coverage of PUMP components.	30
Figure 29. Time Horizon for PUMP Implementation.	30
Figure 30. PUMP Implementation Phasing.	30
Figure 31. Actions and Activities Identified under the NMT Theme.	31

Figure 32. <i>Green, Green, Green Programme</i> application process.....	34
Figure 33. Example of pedestrian sidewalk provision in Salcedo Village, Makati City.....	35
Figure 34. Example of a well-designed junction which reduces the potential for poor driving behaviour.....	37
Figure 35. Public park in Legazpi Village, Makati City.....	39
Figure 36. Cause-Impact Chain for Non-Motorised Transport.....	39
Figure 37. Short-Term Action Plan for NMT Supporting Measures.....	40
Figure 38. Low-carbon pathway for road-based public transport. (GIZ, 2018).....	40
Figure 39. Public Transport Components (through the PUV Modernisation Programme). (DOTr, 2017)	41
Figure 40. Cause-Impact Chain for Public Transport.....	41
Figure 41. Actions and Activities for Sustainable Urban Freight.....	42
Figure 42. Freight vehicles on the streets of Metro Manila.....	43
Figure 43. Institutional Structure for Urban Freight Programme Delivery.....	44
Figure 44. Cause-Impact Chain for Urban Freight.....	46
Figure 45. Cause-Impact Chain for Travel Demand Management.....	47
Figure 46. Cause-Impact Chain for TOD.....	47
Figure 47. PUMP Implementation Process.....	48
Figure 48. PUMP Implementation Committee Structure.....	49
Figure 49. <i>Green, Green, Green Programme</i> Fund Release Process. (DBM, 2018).....	53
Figure 50. Public Transport (PUV Modernisation Programme) Financing Mechanism. (GIZ, 2018).....	55
Figure 51. Cause-Impact Chain for Non-Motorised Transport.....	60
Figure 52. Cause-Impact Chain for Public Transport.....	60
Figure 53. Cause-Impact Chain for Urban Freight.....	61
Figure 54. Cause-Impact Chain for Travel Demand Management.....	61
Figure 55. Cause-Impact Chain for Transit Oriented Development.....	62
Figure 56. Philippine Road Transport GHG Emissions per Scenario (2020-2030).....	71
Figure 57. DOTr GHG inventory team structure.....	77

List of Acronyms

ADB	Asian Development Bank
AFCS	Automatic Fare Collection System
AFD	French Development Agency
ASEAN	Association of Southeast Asian Nations
ASIF	Activity, Structure, Intensity, and Factor
BAU	Business-as-Usual
BCDA	Bases Conversion and Development Authority
BMU	German Ministry for the Environment, Nature Conservation, and Nuclear Safety
BRT	Bus Rapid Transit
CAA	Clean Air Asia

CAAP	Civil Aviation Authority of the Philippines
CAIT	Climate Access Indicators Tool
CAPEX	Capital Expenditures
CCAP	Center for Clean Air Policy
CCC	Climate Change Commission
CDA	Cooperative Development Authority
CLUP	Comprehensive Land Use Plan
CPA	Cebu Ports Authority
CSO	Civil Society Organisation
DBM	Department of Budget and Management
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DOE	Department of Energy
DOF	Department of Finance
DOTC	Department of Transportation and Communications (<i>note: former name of DOTr</i>)
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
EDSA	Epifanio de los Santos Avenue
EMB	Environmental Management Bureau
ESITU	Environmentally Sustainable Initiative Transportation Unit
EUR	Euro
FIRR	Financial Internal Rate of Return
GAA	General Appropriations Act
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GPS	Global Positioning System
HLURB	Housing and Land-Use Regulatory Board
HPG	Highway Patrol Group
HUC	Highly Urbanised City
IATCTP	Inter-Agency Technical Committee on Transport Planning
ICC	Investment Coordination Committee
ICE	Internal Combustion Engine
IEC	Information, Education, and Communications
IKI	International Climate Initiative
INDC	Intended Nationally Determined Contribution
IRA	Internal Revenue Allotment
IRR	Implementing Rules and Regulations

JICA	Japan International Cooperation Agency
KEXIM	Export-Import Bank of Korea
KOICA	Korea International Cooperation Agency
LGU	Local Government Unit
LPTRP	Local Public Transport Route Planning
LRT	Light Rail Transit
LRTA	Light Rail Transit Authority
LTFRB	Land Transportation Franchising and Regulatory Board
LTO	Land Transportation Office
LVC	Land Value Capture
MARINA	Maritime Industry Authority
MMDA	Metropolitan Manila Development Authority
MRT	Metro Rail Transit
MRV	Measurement, Reporting, and Verification
MUCEP	MMUTIS [Metro Manila Urban Transportation Integration Study] Update and Enhancement Project
MVIS	Motor Vehicle Inspection System
MYC	MobiliseYourCity
NAIA	Ninoy Aquino International Airport
NAMA	Nationally Appropriate Mitigation Action
NCCAP	National Climate Change Action Plan
NCR	National Capital Region (<i>also called Metro Manila</i>)
NCTS	National Center for Transportation Studies
NDC	Nationally Determined Contribution
NEDA	National Economic and Development Authority
NGO	Non-Government Organisation
NIP	National Implementation Plan for Environmental Improvement in the Transport Sector
NLEX	North Luzon Expressway
NLMP	National Logistics Masterplan Program
NMHC	Non-Methane Hydrogen Compounds
NMT	Non-Motorised Transport (<i>also called Active Transport</i>)
NTP	National Transport Policy
NUDHF	National Urban Development and Housing Framework
NUMP	National Urban Mobility Programme
ODA	Official Development Assistance
OIC	Officer-in-Charge
OPEX	Operating Expenses
OTC	Office of Transportation Cooperatives
PDP	Philippine Development Plan
PETC	Private Emission Testing Center
PHP	Philippine Peso

PIA	Philippine Information Agency
PNP	Philippine National Police
PNR	Philippine National Railways
PPA	Philippine Ports Authority
PPP	Public-Private Partnership
PSA	Philippine Statistics Authority
PUMP	Philippine Urban Mobility Programme
PUV	Public Utility Vehicle
PUVMP	Public Utility Vehicle Modernisation Programme
RDC	Regional Development Council
RFID	Radio-Frequency Identification
SIRPAFF	Survey on Inter-Regional Passenger and Freight Flow
SLEX	South Luzon Expressway
SME	Small- and Medium-sized Enterprise
TBD	To be Determined
TDM	Travel Demand Management
TEEMP	Transport Emissions Evaluation Models for Projects
TESDA	Technical Education and Skills Development Authority
TKT	Tonnes kilometre travelled
TOD	Transit-oriented development
TRAIN	Tax Reform for Acceleration and Inclusion Act
TRB	Toll Regulatory Board
TTW	Tank-to-Wheel
TWG	Technical Working Group
UITP	International Association of Public Transport
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
VKM	Vehicle Kilometre Miles
VKT	Vehicle Kilometres Travelled
VOC	Volatile Organic Compounds
WIG	Wider Interest Group
WRI	World Resources Institute

Exchange rates

Local Currency	EUR	USD	Date
1 PHP	0.017417 EUR	0.019553 USD	07.2019

(Bangko Sentral ng Pilipinas, 2019.)

Executive Summary

The Philippine Urban Mobility Programme

Cities in the Philippines are growing at an unprecedented pace. The United Nations estimates that by 2050, 68% of the population will live in cities, up from 55% today (United Nations, 2018). Philippine cities also play a vital role supporting the economy, generating more than 70% of our national income.

An efficient transport system plays a key role in delivering prosperity, with urban mobility essential to meet the social and economic needs of residents and of the economy. However, transport is also an area which generates a number of undesirable impacts. These include congestion (which is estimated to cost the economy more than EUR 61.0 million, or PHP 3.5 billion, daily), emissions of both local air pollution and greenhouse gases, accidents leading to injury and loss of life, and detracting from the public realm resulting from the public space given to highways.

Without action, transport challenges in Philippine cities will persist and likely worsen in the future. The pressures of a growing urban population and rising incomes will increase motorisation rates, resulting in worsening congestion, increased emissions, and a failing mobility system. By nature, space within cities is limited, so the ability to increase road-space for more vehicles is restricted, and further roadbuilding as a has proved to be an ineffective solution around the world, as this just encourages even more traffic.

Whilst urban transport is first and foremost a local issue, requiring locally implemented solutions, there is also a key role for national government in developing overarching strategy, and in providing support and funding to local government to enable the effective delivery of urban transport policy. A National Urban Mobility Programme provides the framework within which the national government can deliver this supporting role. According to the MobiliseYourCity (2018):

A National Urban Mobility Programme is a strategic, action-oriented framework for urban mobility, developed by national governments, enacted to enhance the capability of cities to plan, finance, and implement projects and measures designed to fulfil the mobility needs of people and businesses in cities and their surroundings in a sustainable manner.

The National Urban Mobility Programme for the Philippines, or the Philippine Urban Mobility Programme (PUMP) sets out the framework for the Government of the Philippines to support Highly Urbanised Cities (HUCs) and urban Local Government Units (LGUs) to improve urban mobility within their areas.

Vision

With the active participation of wide-ranging stakeholders, the collective developed an overarching vision for the desired outcomes of the Philippine Urban Mobility Programme. This vision is to achieve:

People-oriented cities empowered by efficient, dignified, and sustainable mobility.

The vision for urban mobility touches on three distinct social, environmental, and economic objectives that are important to delivering the desired outcomes. These are discussed below.

Social Objectives

People should be at the heart of the urban mobility strategy. Planners have for many years focused on the movement of vehicles, whilst overlooking the fact that it is actually people who should be at the centre of planning decisions. A better understanding of the negative impacts of the outdated vehicle-centric focus on people's health and wellbeing has led to a paradigm shift in the approach to transport planning in the most forward-thinking cities worldwide.

Considering the travel experience at a personal level is therefore essential to achieving the aspirations defined in the vision for urban mobility and is embodied in the following objective statement:

A people-first approach, which ensures inclusive, comfortable, safe and dignified access to public services.

Environmental Objectives

Managing and mitigating the impacts of people and goods movement on the environment, both local and global, is critical to protect the health and well-being of the population and to sustainability. Therefore, we must seek to develop:

An urban transport system which reduces its negative impacts imposed on the environment and on public health towards “healthy cities.”

Economic Objectives

Transport plays an important role in supporting the national economy which in turn leads to opportunity and prosperity for the people. To support these objectives, we need:

Efficient, affordable and economically sustainable transport, which supports economic vitality for the individual and for the city.

PUMP Thematic Areas

The vision for urban mobility will not be achieved without strong and concerted actions aligned to delivering on the above objectives. We can identify a number of thematic areas in which transport relevant policy can have material impacts on supporting sustainable urban mobility:

Non-Motorised Transport (NMT)

Walking is still the most important mode of travel in the Philippines. In Metro Manila, walking trips still comprise 30% of the total trips made despite the high car dependency (JICA, 2015). Even for motorised trips, the journey typically begins and ends on foot, highlighting the importance of good infrastructure for active and public transport.

It is therefore vital that cities offer a safe, accommodative, and appropriate environment for pedestrians. Travel by foot not only avoids the emissions associated with motorised trips; it can also play a positive role in contributing to public health. Travel by foot offers one of the most space-efficient means of travel, and therefore merits strong support as a means of tackling the congestion challenges growing within cities.

Similarly, cycling of people and goods offers a zero-emission form of transport which also is very space-efficient by comparison with cars and trucks. Walking and cycling are some of the most important pieces of the sustainable urban mobility puzzle, and they can be very cost-efficient to governments units.

The PUMP includes a set of ten actions developed to address the barriers identified in delivery of improved non-motorised transport facilities in Philippine cities.

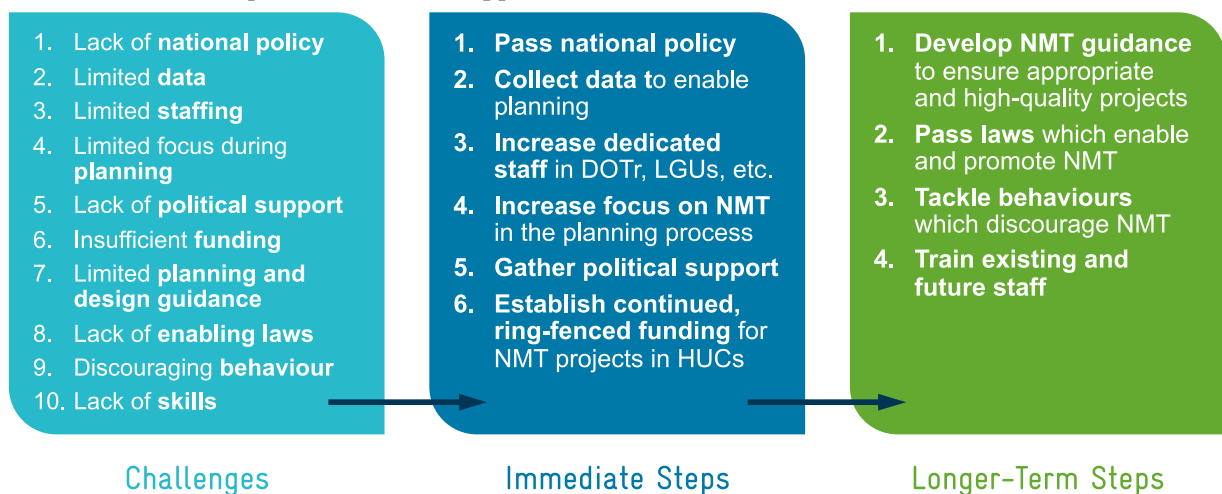


Figure 1. Non-Motorised Transport Challenges and Proposed Solutions.

Public Transport – Public Utility Vehicles (PUV)

Public utility vehicles (PUV) — particularly buses and jeepneys — currently play a vital role in delivering urban mobility, carrying over 35% of motorised trips around Metro Manila (JICA, 2015). The many jeepneys and buses plying a wide number of routes in the cities offer an affordable and space-efficient means of transport. However, ageing vehicles and an insufficient industry structure present challenges to economic efficiency and sustainability, road safety, GHG emissions, and air quality, as well as traveller comfort.

Ensuring that communal transport remains attractive to travellers will be key to suppressing the growth in private car ownership and use, and it is one of the top priorities of the Government that the PUV sector transforms towards state-of-the-art vehicles and operations.

Launched in 2017, the nationwide PUV Modernisation Programme forms a central activity of the PUMP, addressing vehicle quality, network efficiency, regulation, and franchising.



Figure 2. Public Transport Components (through the PUV Modernisation Programme). (DOTr, 2017)

Urban Freight

Efficient freight and logistics are vital to the sustainability and economic growth of our cities. By their nature, freight vehicles tend to be large and intensively used, accounting for a high relative proportion of pollution, and having adverse impact on traffic congestion. According to Clean Air Asia and the Philippine Land Transportation Office, freight vehicles have been seen to emit 59% of total transport CO₂ emissions, despite being just 21% of the total fleet (GIZ, 2018). Freight vehicles are also estimated to be 36% of the average daily traffic, especially in Metro Manila (GIZ, 2018).

Government aims to support the freight sector to overcome its current challenges, such as fragmentation, an outdated vehicle fleet, inefficient operations, and a lack of coordination. Again, PUMP activities have been defined after identifying the barriers faced to increased efficiency in freight operations and regulation.

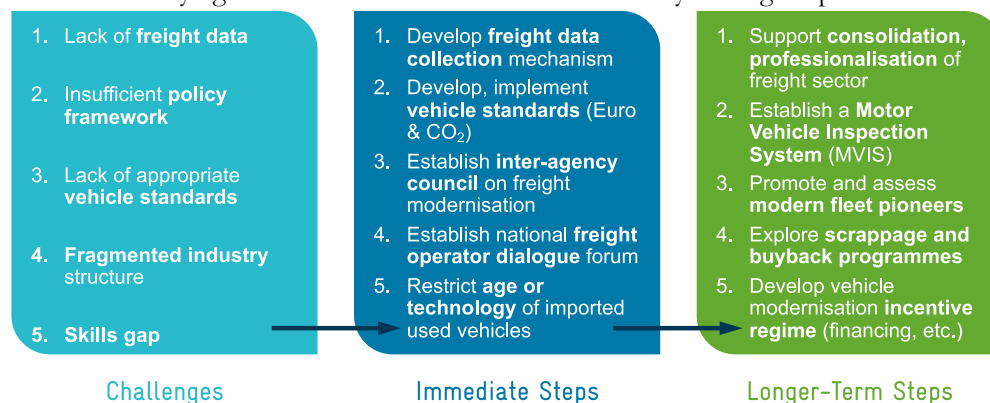


Figure 3. Urban Freight Challenges and Proposed Solutions.

Travel Demand Management (TDM)

Managing people’s desire to travel through better information dissemination, encouragement to make alternative travel choices, and incentives to travel in a way which minimises adverse impacts. Currently, 42% of passenger-kilometres are made by private modes (cars and motorcycles) while bus and rail are around 20% of passenger kilometres (GIZ, 2018). TDM would aim to, first, reduce and disincentivise private vehicle travel; and, second, shift demand to mass transit modes through incentives. An example of an existing TDM practice in the Philippines are the number coding schemes that ban use of vehicles on certain roads, at certain times, based on their plate number. However, experience in many cities show that this scheme only encourages the purchase of additional vehicles to circumvent the policy.

TDM policies within the PUMP will include policies relating to telecommuting, parking fees, vehicle taxation, and congestion charging.

Transit Oriented Development (TOD)

Land use planning that allows public transport to be the main means of travel, complemented by non-motorised transport. TOD also tackles spatial planning such that long trips by private modes are reduced. This aims to alleviate issues currently faced by Philippine cities, where development of expensive residential areas in city centres forced sprawling suburban development.

The development of TOD policies and the leveraging of opportunities relating to the expansion of the mass transit networks within the major cities will ensure that the linkage between transport and land use is effectively recognised within the PUMP.

PUMP Timelines, Phasing

The PUMP is intended to serve as an ongoing programme which develops over time to address the evolving challenges in delivery of effective urban mobility polices. The initial PUMP activities have been developed within a timeline extending to 2030, with internal phasing within the five thematic areas.



Figure 4. Time Horizon for PUMP Implementation.

Initial emphasis has been placed on three of the PUMP thematic areas. The roll-out of activities under the thematic area of public transport is already underway. NMT and Urban Freight are the next thematic areas which are prepared for implementation with TDM and TOD to be implemented in the longer-term as resources permit.

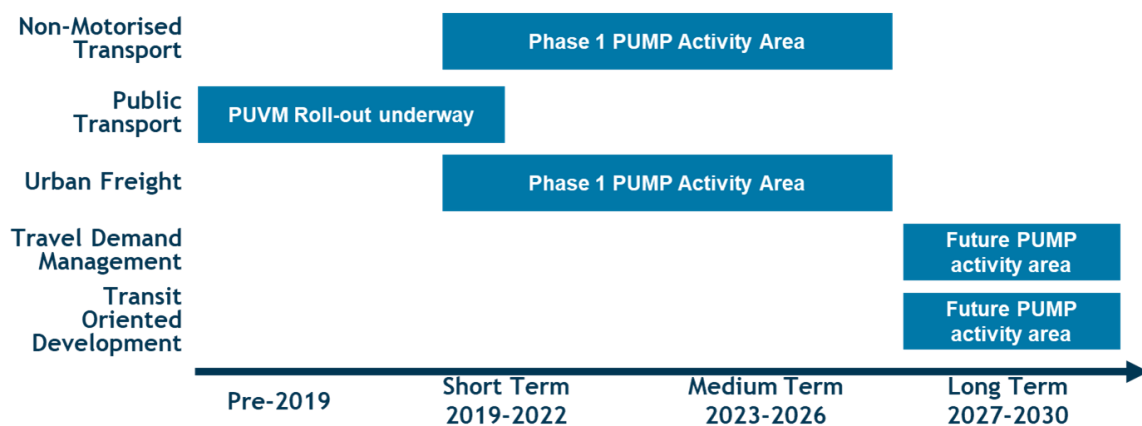


Figure 5. PUMP Implementation Phasing.

Financing of the PUMP and Activities

Implementation of the policies and activities identified within the PUMP can only be achieved with the necessary allocation of funding and resources.

- The implementation of measures to improve the environment for walking and cycling in cities requires planning, action and expenditure at the local level. However, national government also has a role to play in incentivising and enabling local investment to occur.
- Delivering transformative change to public transport in the Philippines, as outlined under the PUV Modernisation programme, requires investment in the modernising of the vehicle stock at levels not seen in the sector to date.
- Modernisation of the freight sector and implementation of activities to improve the efficiency of freight operations and to support capacity development within the freight sector will require a tripart engagement and investment by the freight sector operators, the government and the main clients of freight sector activities.

NMT Financing Requirements and Financing Mechanism

Implementation of the ten identified NMT activities will require a capital expenditure of EUR 50 million per annum, totalling EUR 500 million until 2030. In addition, an operating expenditure of EUR 62 million is estimated over the same time period. The increased staffing resources must be financed through national and local budget allocations.

Capital expenditure will be channelled to cities through the mechanisms such as the *Green, Green, Green Programme* led by the Department of Budget and Management (DBM), which enables local government units to bid for funding to deliver local schemes. The fund release process is shown below:

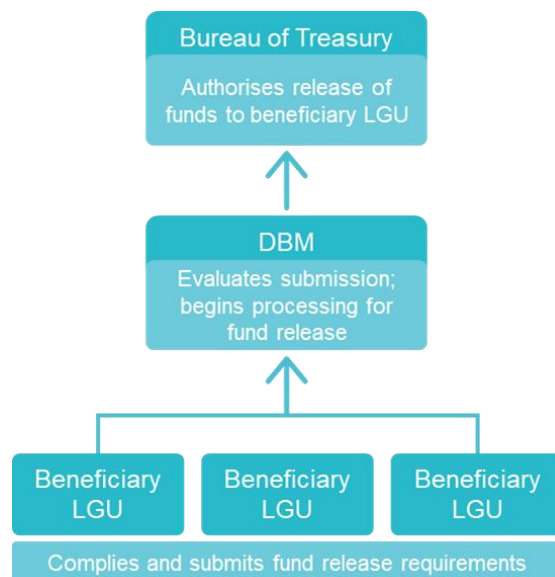


Figure 6. *Green, Green, Green Programme* Fund Release Process. (DBM, 2018)

Public Transport Financing Requirements

The financing requirements for fleet modernisation under the PUV Modernisation Programme are estimated to be over EUR 4 billion. A financial assistance programme has been established to support operators to make the required investment. The scheme, known locally as ‘5,6,7,’ provides preferential financing terms for loans through the national development banks, with additional government subsidy support.

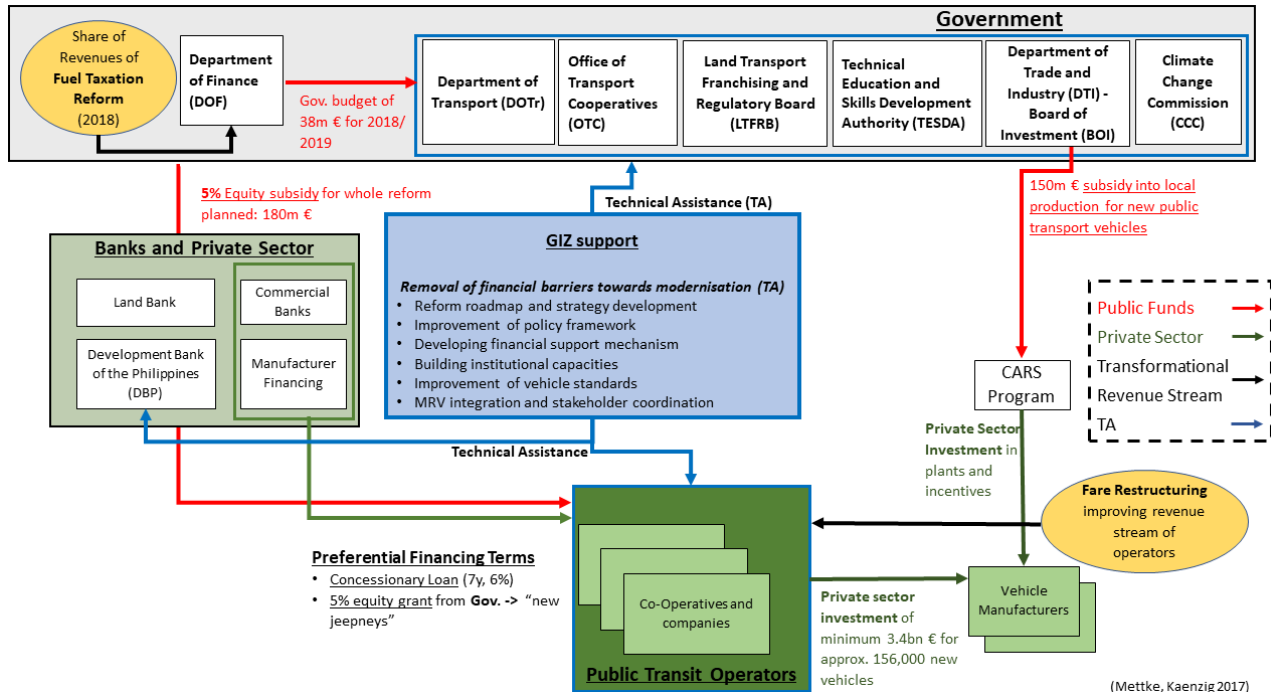


Figure 7. Public Transport (PUV Modernisation Programme) Financing Mechanism. (GIZ, 2018)

Urban Freight Financing Requirements

The estimated financing requirements for urban freight activities stands at EUR 340 million for all components except support for the fleet modernisation. The renewal of the freight fleet could require as much as EUR 9 billion investment, although precise estimates are hampered by the lack of robust data on the current freight sector fleet composition and activity.

The preliminary activities set out for the urban freight thematic area are targeted at addressing the data shortfalls and will allow the development of an appropriate financing mechanism which reflects the ability of the sector to support investment and the scale of the viability gap in modernising the fleet.

TDM and TOD Financing Requirements

The remaining thematic areas of TDM and TOD will be subject to further study during the development period of the PUMP. Both offer the potential to generate incomes that will support their delivery and the delivery of other component activities. For example, parking revenues, road user charging, and land value capture offer the possibility to develop sustainable streams of funding which are valuable to the implementation of the activities outlined within the PUMP.

Implementation of the PUMP

The PUMP will represent an ongoing process, drawing on policy framework and on plans and bringing together the agencies required to progress to implementation. This iterative process is shown below:

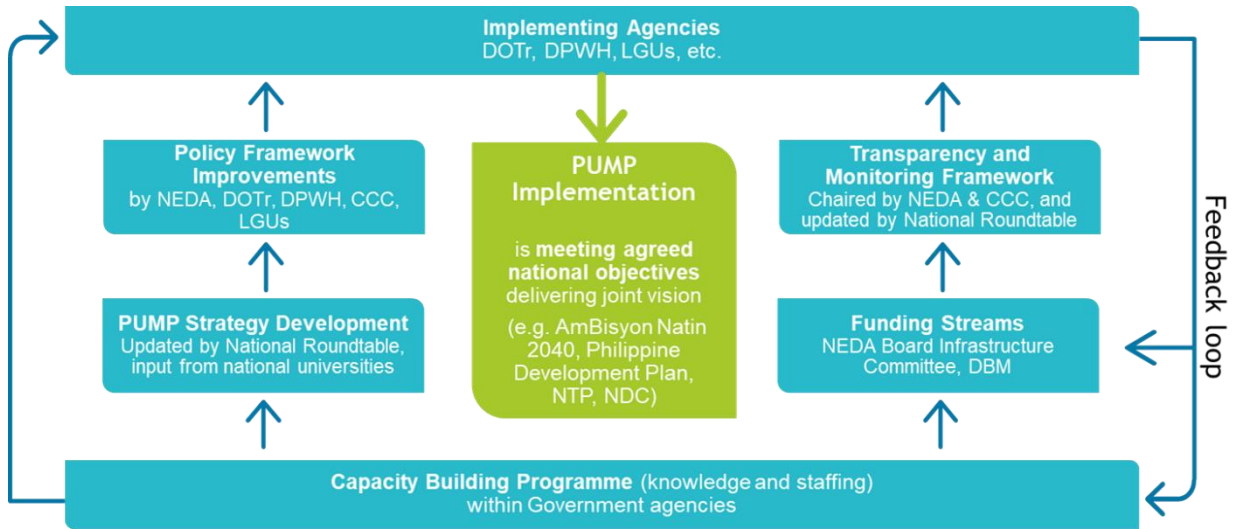


Figure 8. PUMP Implementation Process.

Environmental Impacts

Implementation of the outlined PUMP actions will deliver benefits to travellers and also significant environmental benefits by contributing towards meeting emissions reduction targets vital to tackling climate change. The figure below sets out the causal chain behind GHG reduction.

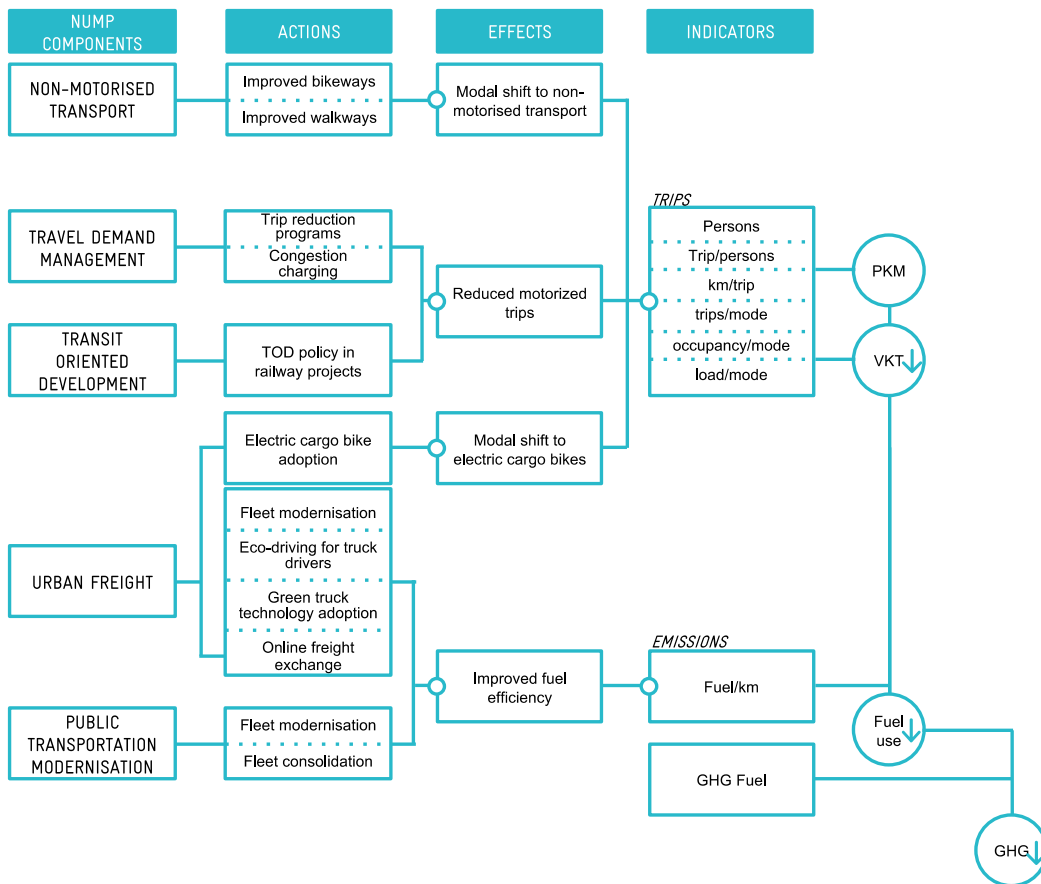


Figure 9. Causal chain for GHG emission reduction due to the PUMP.

The mitigation actions under the PUMP are expected to achieve accumulated GHG emission reductions in the range of **15.01 MtCO₂e** to **27.13 MtCO₂e** over 10 years between 2020 and 2030. This translates into an average annual GHG emission reduction of 1.5 MtCO₂e to 2.7 MtCO₂e until 2030. The implementation of the mitigation actions will reduce the total accumulated transport GHG emissions in the Philippines from 2020 to 2030 by 6% to 10%. The following table summarises the core numbers for the two different scenarios compared with the baseline scenario.

Table 1. GHG mitigation potential of PUMP.

PUMP Thematic Area	Geographical Area	Practical Scenario (in MtCO ₂ e accumulated over 10 years)	Optimistic Scenario (in MtCO ₂ e accumulated over 10 years)
A: Non-Motorised Transport	MUCEP Area, Metro Cebu, and all other HUCs	1.43	3.46
B: Public Transport	Philippines	6.50	9.20
C: Urban Freight	Philippines	1.61	5.00
D: Travel Demand Management	MUCEP Area, Metro Cebu, and all other HUCs	4.40	7.83
E: Transit Oriented Development	Provinces and HUCs traversed by rail projects	1.07	1.63
Total Savings (in MtCO₂e)		15.01	27.13

1. Introduction

The Philippines is the 13th most populous country in the world (Manila Bulletin, 2017), with 101 million inhabitants, of which 60% are under 30 years old (PSA, 2017). It has one of the most dynamic economies in the East Asia and Pacific region, having sustained an average economic growth rate of over 5% p.a. since the turn of the century. This growth brings it to the cusp of moving from lower-middle to upper-middle income in the medium term. Furthermore, the country's young population and growing middle class are helping drive economic growth and are factors in the increasing urbanisation.

Philippine cities are growing at an unprecedented pace. The United Nations estimates that by 2050, 68% of the population will live in cities, up from 55% today (United Nations, 2018). In the Philippines, 51.2% currently live in urban areas across 145 cities, of which 33 are classified as Highly Urbanised Cities (HUCs) (PSA, 2019). HUCs play a vital role supporting the country's economy, generating more than 70% of national income.

Current transport challenges in cities

Transport forms an important part of the urban daily life, with the movement of people and of goods being essential to meet the social and economic needs of people and of the economy. Transport also generates a number of undesirable impacts, including congestion, which is estimated to cost the Philippine economy over EUR 61.0 million daily in lost productivity, time, and unnecessary vehicle costs, according to the Japan International Cooperation Agency (CNN Philippines, 2018).



Photos by Jilson Tiu

In addition to congestion, the transport sector is a major polluter, contributing 76% to total particulate matter (PM10) emissions and exposing people to dangerous concentration levels (GIZ, 2018). The Department of Environment and Natural Resources (DENR) announced in 2017 that it considers transport-related air pollution to be the biggest environmental health threat facing the country.

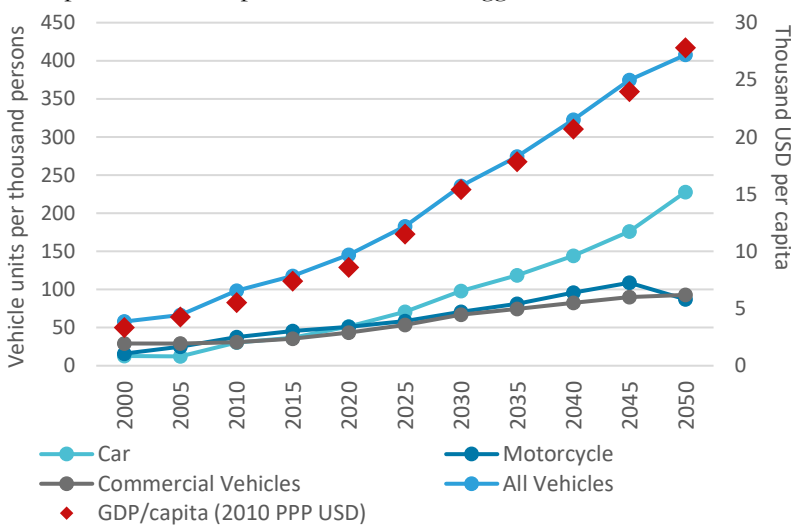


Figure 10. Car Ownership vis-à-vis Economic Growth. (GIZ, 2018)

Beyond local pollution impacts, transport is a major contributor to greenhouse gas emissions (GHG). Achieving the country's ambitious objectives for the Intended Nationally Determined Contributions (INDC) requires to strongly cut GHG emissions from transport, which is the second largest source of energy-related GHG emissions (30% and 28.4 MtCO₂ in 2015, annual growth of 8.5%) (GIZ, 2018). A steep further increase is expected, since the Philippine vehicle market is growing fast alongside the economy (Figure 10).

Road safety is also a key area of concern for the people and the economy. The World Health Organisation reports that pedestrians are the third most affected by road safety issues, comprising 19% of total road traffic deaths, while motorized 2- and 3-wheelers comprise 53% (GIZ, 2018). (Note: motorcycles are 16% of average daily traffic while cars and goods vehicles are 26% and 27% respectively) (GIZ, 2018).

Finally, making provision for the transport sector comes at a high cost in terms of the allocation of city space, with roads, skyways, and parking spaces all detracting from the cityscape as a place for people. Metro Manila, for instance, has a road density of 1.67 km/km² in national roads and 6.01 km/km² in local roads (GIZ, 2018). In comparison, the similarly sized Singapore has 5 km/km² of roads, but also has more expansive road and rail public transport (GIZ, 2018).

Observed trends

Without proactive intervention, transport challenges in Philippine cities will continue to worsen in the future. The pressures of a growing urban population and rising incomes may be expected to increase private motorisation rates, reducing efficiency of mobility for all.

Vehicle density is observed to be increasing much faster than available road space. In Metro Manila alone, vehicle density has reached 1,895 vehicles per kilometre of road (GIZ, 2018). Singapore, in comparison, has 230 vehicles/km (GIZ, 2018). Nationally, this has reached 281 vehicles per kilometre of road. By nature, space within cities is limited, so the ability to increase road-space for these vehicles is restricted. In any case, further roadbuilding as a solution to congestion has proved to be ineffective in cities around the world, as this just encourages private vehicles use and even more traffic.

The Philippine Urban Mobility Programme

Recognising the importance of effective support and planning for urban mobility to the vibrancy of both the urban areas and the country as a whole, a National Urban Mobility Programme (NUMP) for the Philippines has been developed to provide a clear vision of what a well-functioning and sustainable transport system should look like.

The rationale behind a NUMP is to set clear objectives and comprehensive support mechanism at the national level to assist cities implementing climate-friendly and sustainable urban mobility measures. To quote from the MobiliseYourCity guidance document (2018):

A National Urban Mobility Programme is a strategic, action-oriented framework for urban mobility, developed by national governments, enacted to enhance the capability of cities to plan, finance, and implement projects and measures designed to fulfil the mobility needs of people and businesses in cities and their surroundings in a sustainable manner.

Called the Philippine Urban Mobility Programme (PUMP), this NUMP has been developed through partnership between the Philippines' Department of Transportation (DOTr) and the German Development Cooperation (GIZ), following the process established by the MobiliseYourCity Partnership (MYC) and in consultation with the Philippines' National Economic and Development Authority (NEDA). MYC represents a globally operating partnership launched by the Governments of France and Germany and supported by the European Commission.

The MYC NUMP development process is presented below. This report marks the culmination of the tactical phase for the non-motorised and urban freight thematic areas of the PUMP, enabling the move to the operational phase and the implementation of the proposals.

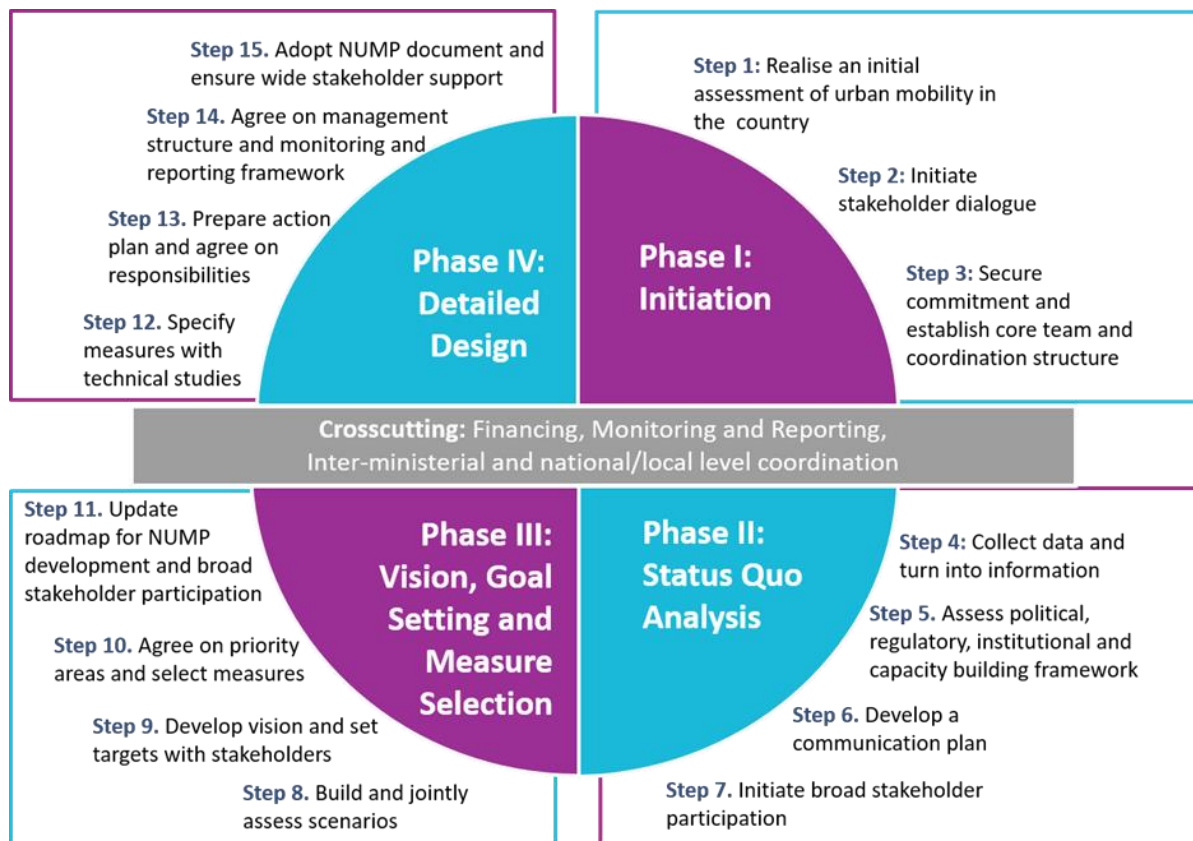


Figure 11. National Urban Mobility Programme Guidelines. (MobiliseYourCity, unpublished)

Whilst the PUMP covers a range of different modes and thematic areas of intervention, its initial implementation phase focuses on two areas lighted in the following infographic, namely:

- Active or non-motorised transport (e.g., walking and cycling); and
- Urban freight.

These have been identified as priority areas through engagement with the DOTr and set within the context of the broader nature of urban mobility planning, in which significant initiatives have already been taken on key thematic areas, such as the *Public Utility Vehicle (PUV) Modernisation Programme* which is focused on urban public transport.

The PUMP, which has a vision *towards people-first cities empowered by efficient, dignified, and sustainable mobility* supported by social, environmental, and economic objectives and targets, is presented on the next page. It should be noted that while the strategic vision, objectives, themes, and components have been approved by the Philippine government, the targets are subject to further review and refinement.

2. Sector Overview: Philippine Urban Mobility

2.1 Relevance of the Sub-Sector

According to the 2015 census conducted by the Philippine Statistics Authority (PSA), the Philippines has a population of 101 million, growing at an annual rate of 2% (2017). The archipelago covers 300,000 sq.km., with over 7,000 islands split into three groups—Luzon, Visayas, and Mindanao—and 16 regions, resulting in a population density of 337 persons/sq.km. Over half of the population (51.2%) live in urban areas (PSA, 2019).

Figure 13 presents the Philippine population and its growth rate from 1960 to 2015, while Figure 12 shows that there is an almost equal number of males (50.57%) and females (49.43%), with over 50% of the population under 25 years old (PSA, 2017).

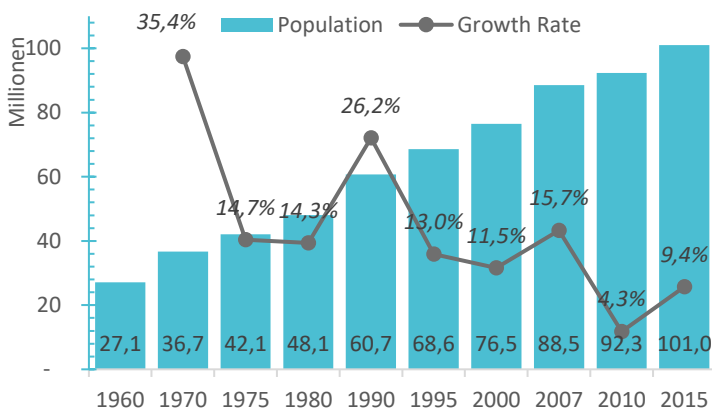


Figure 13. Population and Growth Rate (1960-2015). (PSA, 2017)

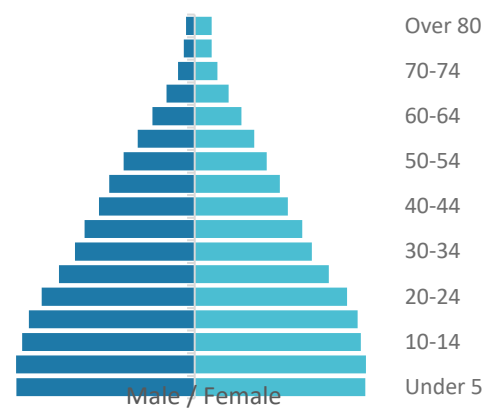


Figure 12. Population Age Pyramid (2015). (PSA, 2017)

Urbanisation has also increased from 45.3% in 2010 to 51.2% in 2015 (Figure 14) (PSA, 2019). These statistics consider urban areas to be barangays with populations over 5,000 or meeting certain employment size criteria. Of the 42,036 barangays nationwide, 18% are classified as urban. These include all barangays in Metro Manila (or the National Capital Region, 'NCR'), 17 HUCs, and three 'component cities' classified as entirely urban.

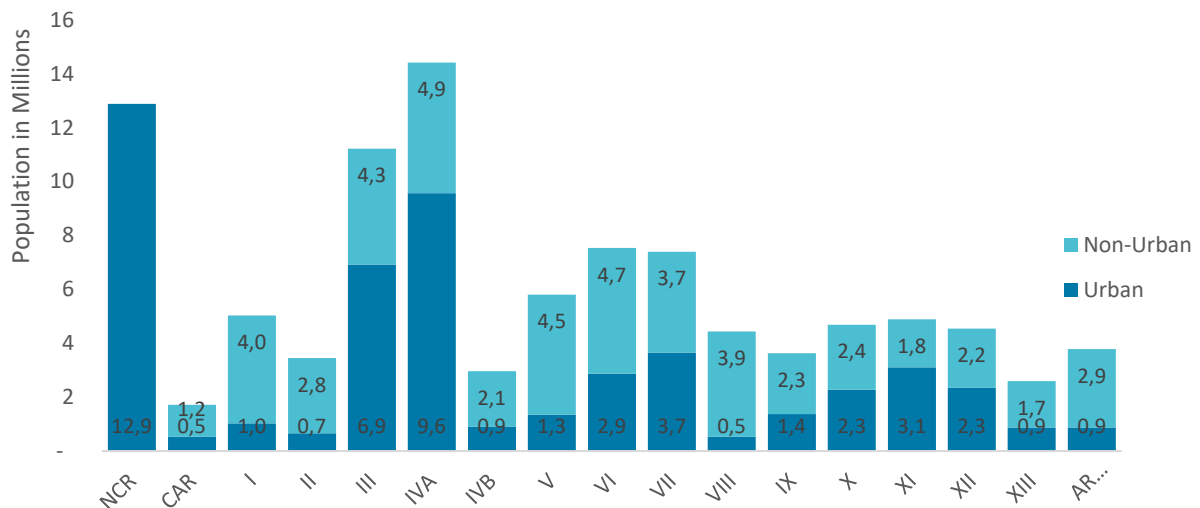


Figure 14. Urbanization per Region (2015). (PSA, 2019)

According to the PSA, the national GDP has been increasing at an annual rate of 6.3%—from EUR 92.26 billion in 2009 to EUR 160.36 billion in 2018 (2017)—and poverty incidence among families has decreased from 19.7% in 2012 to 16.5% in 2015 (2019). However, income class differences remain high, with a Gini coefficient of 0.44 (PSA, 2017).

Urban areas play a big role in economic growth, with 73.6% of the nationwide GDP attributable to the regions covering Metro Manila and its adjacent Regions III and IVA (36%, 9.8%, and 17%, respectively), Metro Cebu (Region VII, 6.5%), and Metro Davao (Region XI, 4.3%) (Figure 15) (PSA, 2019).

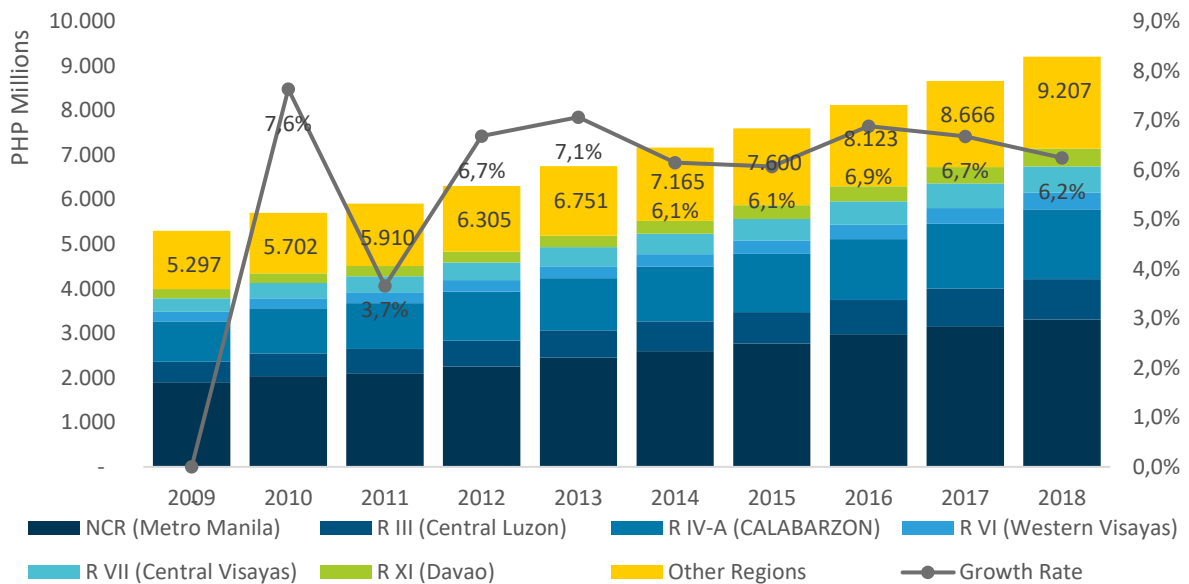


Figure 15. Philippine GDP from 2009-2018 (highlighting biggest regions). (PSA, 2019)

These six regions also have 63% of the 9.3 million registered vehicles as of 2016, with NCR having 26%, Region III 11.8%, Region IV-A 12.8%, Region VII 7.8%, and Region XI 4.6% (Figure 16) (PSA, 2017). A majority of these vehicles (57.6%) are motorcycles, including tricycles. Utility Vans (UVs) and cars make up 26.6% and 10.5%, respectively, while trailers (50,315 units) and buses (29,794 units) barely make up 1% of all registered vehicles (PSA, 2017).

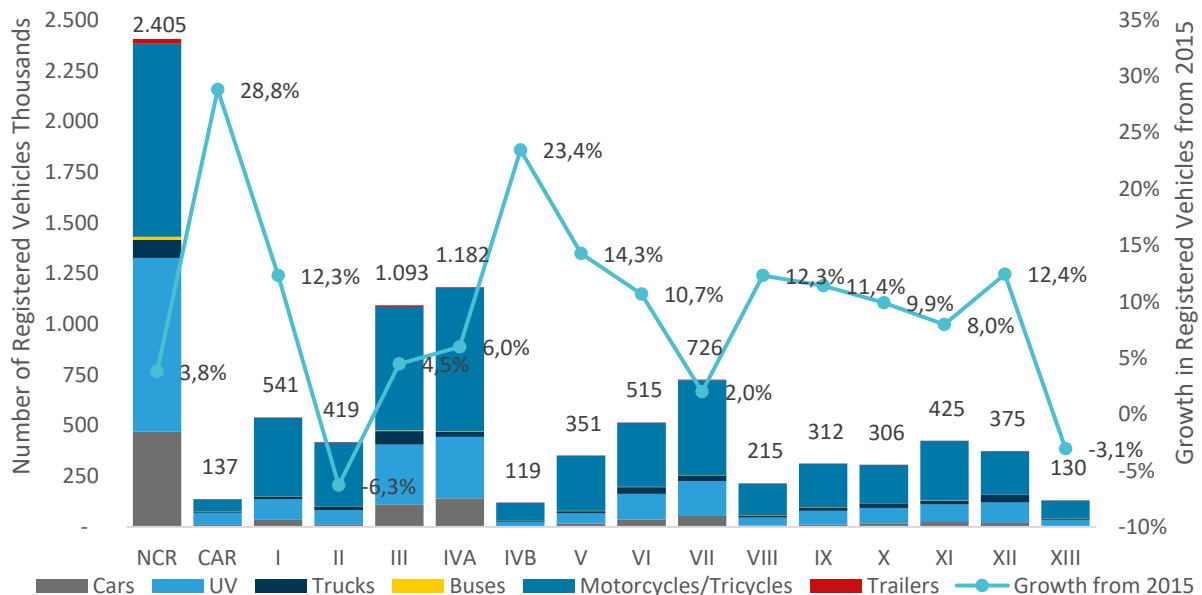


Figure 16. Registered Vehicles by Region (2016) and Growth Rate from 2015. (PSA, 2017)

The motorisation rate has increased from 57.9 vehicles/1,000 capita to 117.7 vehicles/1,000 capita from 2000 to 2015 (GIZ, 2018). This increase could be attributable to several factors, such as a growing middle class, an aspirational desire to own a car (either for comfort or as a symbol of success), relatively easy access to financing, and the lack of convenient public transportation alternatives.

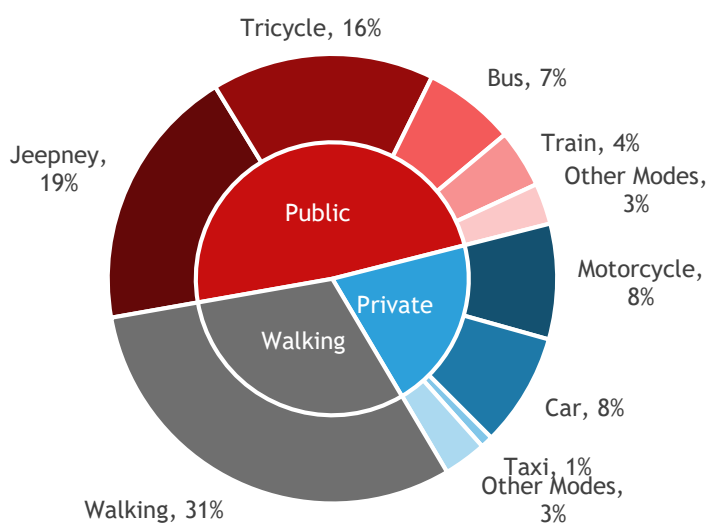


Figure 17. Modal Split of Daily Trips around Metro Manila. (JICA, 2015)

Metro Manila, for example, has all the three metro systems nationwide, and these span to a total of about 50 km. Additionally, 2014 household interview surveys conducted by the Japan International Cooperation Agency (JICA) show that there are 35.5 million daily trips around Metro Manila and from the surrounding provinces of Cavite, Laguna, Rizal, and Bulacan (Figure 17). Jeepneys are by far the most prevalent mode of motorised transport, accounting for almost 20% of all trips. Tricycles, typically used for last mile connections, account for 16% of trips — over twice as much as bus trips and four times as much as train trips. Private car and motorcycle trips, on the other hand, each make up 8% of all trips (JICA, 2015).

Looking at the effects, this rapid motorisation clearly links to congestion and poses strains to other aspects of mobility, such as increased fossil-based energy demand, increased GHG emissions, and worse air quality.

An inspection of the official energy balance from the country (Table 2) shows that the transport sector energy demand grew by 15% between 2000 and 2015. Gasoline demand experienced a much higher increase of 25% compared to diesel which increased by 12% (GIZ, 2018).

Table 2. Transport Energy Consumption and CO₂ Emissions.

	2000	2015
Energy Consumption (ktoe)	7,695.0	8,822.0
Diesel	4,323.0	4,839.0
Gasoline	2,575.0	3,216.0
LPG	-	42.0
Fuel Oil	471.0	178.0
Natural Gas	-	-
Electricity	5.0	10.0
Jet Fuel	322.0	538.0
CO ₂ Emissions (million tons)	31.9	59.1
CO ₂ per capita (tons/capita)	0.4	0.6
Particulate Matter (tons)	40.3	24.0
Nitrogen Oxides emitted (tons)	145.8	156.5

(GIZ, 2018)

Based on the Institute of Energy Economics Japan (IEEJ) Energy Balance Sheet for the Philippines, ADB Transport Data Bank.

In terms of GHG emissions, the World Resources Institute (WRI) Climate Access Indicators Tool (CAIT) Data Explorer shows that emissions from transportation grew 8.34% between 2000 and 2014, with a slight dip from 2006 to 2010 (WRI, 2019).

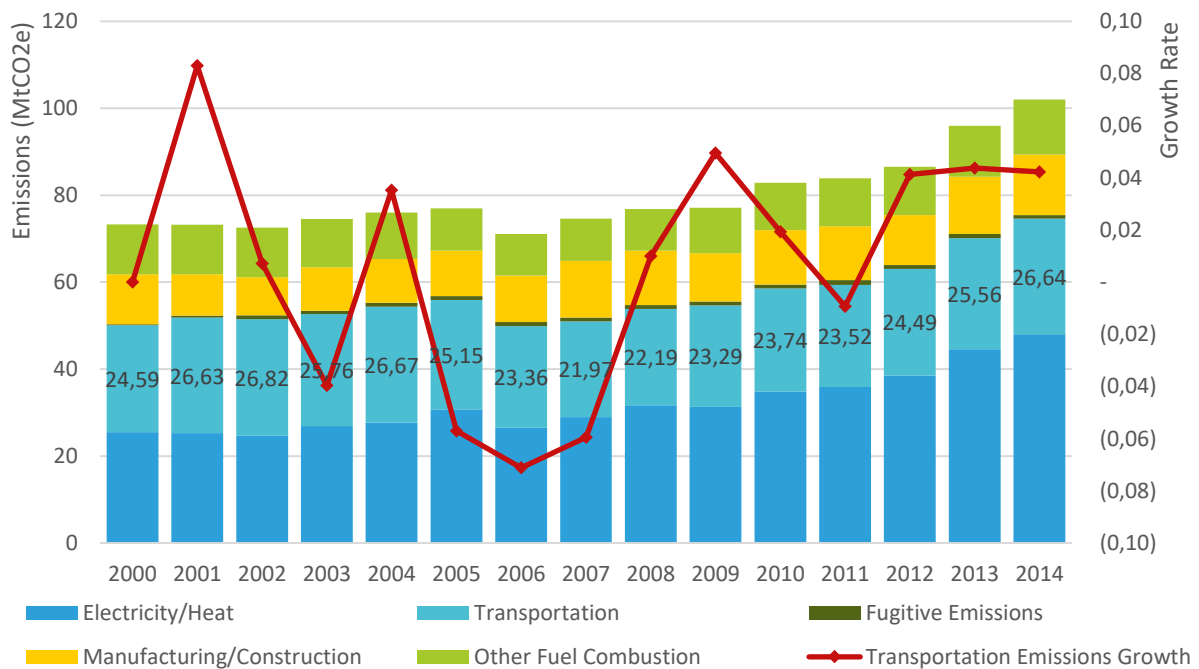


Figure 18. Philippines' GHG Emissions by Sector (2000-2014) and Growth of Transport Emissions. (WRI, 2019)

The full extent of these issues relating to urban mobility are difficult to describe quantitatively given the lack of available data on mobility, emissions, accidents and casualties, and the like. This can be attributed to the involvement of many different agencies in urban mobility and the lack of set guidelines for data collection and storage. Some of these stakeholders are more clearly enumerated in Section 2.2 below.

Despite the data gaps (e.g., modal split outside of Metro Manila is unclear), there is a clear understanding from the national and local government, private sector, academe, and civil society that sustainable urban mobility is important for social, environmental, and economic growth. Urban mobility is mentioned in key documents and in national policy, also described further in the following chapter.

Philippine cities are growing fast, supported by a young and increasing workforce. This results in many economic benefits such as high GDP growth. Due to the lack of proper mobility policies and infrastructure, however, the growth also causes negative side effects such as debilitating congestion, increased air pollution, and high GHG emissions.

2.2 Transport and Climate Policy Context

The Philippines, being an archipelago near the Pacific Ocean, is particularly vulnerable to climate-related risks such as typhoons and storm surges. In the past decade alone, the islands have been lambasted by numerous storms and over 80 typhoons, including some of the strongest cyclones to ever make landfall.

Acknowledging the reality of climate change and its related issues, the Philippine Government has passed several policies with the aim of mitigation and adaptation, including Republic Act No. 9729 or the Climate Change Act of 2009. As of 2017, the Philippines also had a tentative Nationally Determined Contribution (NDC) target to reduce GHG emissions by 40-67% from the 2010-2030 business-as-usual. The transport sector is estimated to be 16-20% of this target, considering the improvement of road transport efficiency, promotion of mass transit (rail and bus), shift to cleaner vehicles and fuels, promotion of active transport (walking and cycling), and reduction of vehicle demand.

Other policy documents and programmes that likewise recognise the important connection between urban mobility and climate change are summarised below:

Table 3. National Policies and Programmes relevant to Urban Mobility and Climate Change.

Year	Policy / Programme	Government; Others Involved	For Urban Mobility, Climate Change	Remarks / Status
1997	Clean Air Act of 1997 (RA 8749)	DENR, DOE, DOTr; Oil companies, vehicle manufacturers	Requires better quality fuel, with the standard being reviewed and, if needed, revised every two years (or as needed).	Updated implementing rules and regulations (IRR) through DENR AO 2015-04 requires Euro IV (passenger vehicles, etc.), Euro III (motorcycles).
2015	Intended Nationally Determined Contributions	CCC, DOTr, DOE; GIZ, UNDP, WB	Recognises the importance of sustainable transport in decreasing GHG emissions.	NDCs being finalised.
2016	AmBisyon Natin 2040	NEDA, all government agencies	Captures the desired lifestyle of Filipinos, considering aspects such as mobility, health, safety.	Described in greater detail in the following page.
2017	Philippine Development Plan 2017-2022	NEDA	Sets national development goals to guide and ensure coherence among the initiatives of agencies such as DOTr, DPWH.	Plan crafted per 6-year presidential term; currently undergoing mid-term review.
2017	National Transport Policy	NEDA, DOTr, DPWH, MMDA, LGUs	Sets out transport and mobility policies to guide DOTr, DPWH, MMDA, and all other agencies involved in transport.	First document setting out transport policy on a national level. IRR drafted in 2018, released in 2019.
2017	PUV Modernisation Programme	DOTr, DTI, DBP, Landbank; GIZ, WB	Increases efficiencies in jeepney sector; supports decrease of GHG emissions by improving jeepney business model and operations.	Modernised jeepneys deployed on pilot corridors; route rationalisation studies ongoing.
2017	Greenways	DOTr, BCDA, LGUs; ADB	Promotes construction of walkways and bike lanes to connect key areas.	Pilot corridors for EDSA and Taguig City undergoing design.
2018	Green, Green, Green, Programme	DBM, LGUs	Special fund to enable LGUs to improve their open spaces, connectivity.	2018 budget disbursed to eligible LGUs

Three of the documents shown in Table 3 were released by the National Economic and Development Agency (NEDA), the national government agency that sets out policy guidelines and documents, ensures coherence across government initiatives, approves infrastructure projects (above a certain scale), and monitors the performance indicators of other government agencies such as the DOTr. The relevance of these documents to mobility are given more detail in the following page.

1. **AmBisyon Natin 2040**, prepared by the National Economic and Development Authority (NEDA) through consultations held in 2015.

AmBisyon Natin 2040 “represents the collective long-term vision and aspirations of the Filipino people for themselves and for the country in the next 25 years.” It aims to guide development planning across four presidential administrations and has the main objectives of ensuring that Filipinos lead lives that are strongly rooted (*matatag*), comfortable (*maginhawa*), and secure (*panatag*).

In 2040, we will all enjoy a stable and comfortable lifestyle, secure in the knowledge that we have enough for our daily needs and unexpected expenses, that we can plan and prepare for our own and our children's future. Our family lives together in a place of our own, and we have **the freedom to go where we desire**, protected and enabled by a clean, efficient, and fair government.

NEDA AmBisyon Natin 2040



2. **Philippine Development Plan (PDP) 2017-2022**, also prepared by NEDA, which aims to accelerate infrastructure development for key areas including transport, and which recognizes that Filipinos “want to enjoy a comfortable lifestyle, including having a decent house with secure long-term tenure, convenient transport, and being able to travel for vacation.” NEDA is currently conducting a midterm update of the PDP.

- Enhance efficiency of the transport sector through providing adequate, accessible, reliable, and safe access for people and goods.
- Improve road-based transport to address traffic congestion through “engineering, enforcement, and education,” and upgrade road network to the highest quality standards.
- Encourage shift from private to public transport, especially on mass transport.
- Improve operational efficiency of airports and address constraints to optimal capacity utilization.
- Improve port facilities to ensure that inter-island shipping, including a stronger RORO network, will remain a viable option for transporting people and cargo.
- Improve safety and security of public transport system by adopting a universal security structure.

PDP 2017-2022

3. **National Transport Policy (NTP)**, approved by the NEDA Board in 2017, and the **NTP Implementing Rules and Regulations (IRR)**, currently being finalised. The NTP recognizes “the important role of transportation as an enabler and driver of socioeconomic development towards achieving inclusive and sustainable growth, and attaining the national development goals and objectives” and that the NTP would help “ensure effective and efficient inter-government coordination, local government participation and stakeholders collaboration.”

Environment-friendly transport systems shall be supported in order to promote environmental sustainability and protection. The use of clean and energy-efficient transport technology/fuels will be pursued. **Non-motorized means to achieve inclusive mobility and accessibility shall include transit-oriented development, prioritization of pedestrians, provision of support facilities that mainstream gender considerations, and inclusion of green ways network, i.e., elevated walkways, covered walkways, sidewalks and bike lanes.**

NTP

2.3 Governance, Market Organisation, and Stakeholders

There are numerous players or stakeholders in urban mobility, on different scales (i.e., government, private sector, civil society, and cooperation partners) and levels (e.g., local, national, and international). Figure 19 presents a map of the stakeholders that distinguishes among the different scales and the following categories (GIZ, 2015), focusing on the national level but also considering local and international organisations.

- **Key Actors:** actors involved in decision-making or who have significant skills, knowledge, or power relating to PUMP;
- **Primary Actors:** actors directly affected by the PUMP, whether positively or negatively;
- **Secondary Actors:** actors indirectly affected or only temporarily involved with PUMP; and
- **Veto Players:** actors whose support are critical for the success of the PUMP or who have the power to veto the PUMP; may be key, primary, or secondary actors.



Figure 19. Stakeholders for the Philippine Urban Mobility Programme.

The role of some of these actors are discussed in greater detail in Table 4.

Table 4. Actors in Sustainable Urban Mobility in the Philippines.

Actor		Responsibilities regarding PUMP
Key Actors		
DOTr [Veto Player]	Department of Transportation	<ul style="list-style-type: none"> - Primary national agency mandated with policy, planning, programming, coordinating, implementing, regulating, and administrative matters to promote, develop, and regulate dependable and coordinated networks of transportation systems; - Head agency of LTO, LTFRB
DPWH [Veto Player]	Department of Public Works and Highways	<ul style="list-style-type: none"> - Mandated with planning, design, and construction of national roads and bridges, flood control systems; - Mandated with planning for water resources and other public works; - Responsible for the administration and enforcement of the National Building Code, which lays out minimum design standards and requirements for all structures.
LGUs	Local Government Units	<ul style="list-style-type: none"> - Mandated to craft and implement land use plans; - Responsible for delivering basic services to its constituents, including planning, infrastructure provision, and traffic management.
LTFRB	Land Transportation Franchising and Regulatory Board	<ul style="list-style-type: none"> - Issues operating franchises to road-based vehicles for public use of both commuters and of goods, in accordance with safety regulations and standards
LTO	Land Transportation Office	<ul style="list-style-type: none"> - In-charge of the registration of vehicles, licensing of drivers, and the enforcement thereof of regulations
MMDA	Metropolitan Manila Development Authority	<ul style="list-style-type: none"> - Provides services which have impacts across the 17 LGUs or which entail huge expenditures, including transport and traffic management within Metro Manila
NEDA [Veto Player]	National Economic and Development Authority	<ul style="list-style-type: none"> - Premier socioeconomic planning body that provides high-level advice to policymakers in the Executive (e.g., DOTr, DPWH) and Congress; - Coordinates policies, plans, and programmes; - Reviews, evaluates, and monitors infrastructure projects
Primary Actors		
Cyclists		
DBM	Department of Budget and Management	<ul style="list-style-type: none"> - Formulates the annual national budget and also prepares a medium-term expenditure plan; - Conceptualizes and administers the government's compensation and position classification plan (i.e., <i>plantilla</i> positions)
DILG	Department of the Interior and Local Government	<ul style="list-style-type: none"> - Assists the President in supervising local governments and advises on the policies, rules, and regulations related to public order and safety; - Department overseeing the Philippine National Police, whose Highway Patrol Group (PNP-HPG) can enforce traffic rules
DOF	Department of Finance	<ul style="list-style-type: none"> - Formulates, institutionalises, and administers sound fiscal policies for government; - In-charge of tax collection
Freight Forwarders		
LRTA	Light Rail Transit Authority	<ul style="list-style-type: none"> - Oversees LRT operations and related construction projects in Metro Manila; - Main partner for ongoing concession of Line 1 (for operations, maintenance, rehabilitation, extension);

Actor		Responsibilities regarding PUMP
		- Operator of Line 2.
MARINA	Maritime Industry Authority	- Oversees the promotion and development of the maritime industry and the regulation of the shipping industry; - May be involved in the improvement of ferry systems.
Pedestrians		
PPA, CPA	Philippine Ports Authority; Cebu Ports Authority	- The PPA is responsible for the development, integration, and coordination of seaport operations and facilities nationwide; - The CPA administers Cebu provincial ports; - Both may be involved in the improvement of urban freight operations
PT Operators	Public Transport Operators	- Provide services that enable movement of people; - PT vehicles compete with freight vehicles and private vehicles for space, so demand management (e.g., time-based vehicle volume reduction schemes) is crucial to ensure efficiencies and safety.
PT Users	Public Transport Users	
PT, Freight Drivers	Public Transport and Freight Drivers	
Secondary Actors		
Academe	Including academic institutions, individual transport experts, etc.	- Institutions such as University of the Philippines National Center for Transportation Studies, including individuals from the academe
CCC	Climate Change Commission	- Leads the formulation of climate change policies; - Monitors and evaluates government programmes to ensure mainstreaming of climate change concerns
CSOs	Civil society organisations	- NGOs that advocate sustainable urban mobility are also important stakeholders who work with the national and local government, academe, private business, or each other to pursue their advocacies; - Example: bicycle use is advocated by the Firefly Brigade, Padyak, Bikes for the Philippines, the National Bicycle Organization, among others; - Example: road safety is advocated by SafeKids, Safety Organization of the Philippines, Automobile Association of the Philippines, among others.
Congress [Veto Player]		- Legislative arm of the Philippine government; - Refers to both the Senate (upper house) and the House of Representatives (lower house)
DENR	Department of Environment and Natural Resources	- In-charge of the exploration, utilisation, and conservation of natural resources; - Lead agency for the Clean Air Act (RA No. 8749)
Development Agencies	International aid agencies like GIZ and USAID	- International development agencies provide technical assistance for urban mobility interventions for cities, in line with the bigger objectives of economic growth, climate change mitigation, etc.
DOE	Department of Energy	- Supervises all government initiatives related to energy development, utilisation, etc.; - Together with DENR sets specifications for fuel, to improve fuel composition for increased efficiency and reduced emissions (in line with the Clean Air Act)
DTI	Department of Trade and Industry	- Releases product standards; - Protects consumer rights
E-Commerce, Deliveries		
HLURB	Housing and Land Use Regulatory Board	- Involved in land use planning through the preparation of guidelines for the Comprehensive Land Use Plans

Actor		Responsibilities regarding PUMP
		(CLUP) required from every LGU, as well as the review and ratification of CLUPs for Metro Manila, HUCs, and independent component cities.
	Media	
	Multilateral Banks	Organizations like Asian Development Bank, World Bank - Provides technical and/or financial assistance for sustainable urban mobility projects, such as the Cebu BRT (being undertaken by DOTr and the Cebu City government with the World Bank and the French Development Agency (AFD)) and the Mega Manila Subway (being undertaken by DOTr with JICA).
	OTC	Office of Transportation Cooperatives - Implements the transport cooperative program, building public transport sector representation for cooperative activities; - Involved in the PUV Modernisation Programme
	PNP	Philippine National Police - Under the DILG; includes the HPG which can enforce traffic rules as a result of a memorandum of agreement between DOTr and DILG
	Private Car Users	
	Real Estate Developers	- Property developers provide transport facilities that make their properties accessible to users. - Mall developers, for instance, provide space for public transport terminals within their premises aside from space allocated to private vehicles (which is required by the National Building Code). They work with LGUs to determine the scale and appropriate location of terminal facilities, ensuring that public transport services will be efficient and will be compatible with traffic management outside their premises.
	TESDA	Technical Education and Skills Development Authority - Agency to potentially conduct and issue certificates for fleet operator training
	TRB	Toll Regulatory Board - Regulates construction, operation, and maintenance of toll facilities and collection of related fees; - May be involved in improvement of urban freight corridors
	Vehicle Manufacturers	

Governance Structures: National, Local

This non-exhaustive list already includes several different government offices on varying levels, understandably making the development of proper urban mobility policies and projects difficult.

An **LGU** (i.e., city or municipality), for example, is directly headed by a mayor. These LGUs are then part of a province or an autonomous region headed by a governor (except for Metro Manila). Mayors and governors are elected every three years, with a maximum of two consecutive re-elections for a total of nine years. The Local Government Code of 1991 (RA 7160) gives LGUs the mandate over traffic and the franchising of tricycles within their areas.

On the other hand, urban mobility policies and projects on a national or cross-boundary level are typically handled by national agencies such as **NEDA**, **DOTr**, and **DPWH**, or by the **MMDA**. The heads of these agencies are appointed by the Philippine President, who is in turn elected every six years with no opportunity for re-election.

As of June 2019, the Philippines has 1,489 municipalities and 145 cities, of which 33 are highly urbanised cities (DILG, 2019). Cities typically have a planning office (usually the City Planning and Development Office) and a City Engineer's Office responsible for transport planning and for infrastructure provision and maintenance, respectively. There is usually then a separate office focused on traffic management under the Public Safety Department. Very few cities have offices dedicated to transport planning.

A 2017 Clean Air Asia survey that aimed to assess local government capacity, understanding, and existing activities in preparation for the development of Local Public Transport Route Plans (LPTRPs) was sent to all 145 cities through the League of Cities in the Philippines. Based on 60 responses (including 17 HUCs), the top transport issues are congestion, road accidents, and air pollution. Only a small portion of respondents identified public transport supply and the management of operators as concerns.

Private Sector

Private sector stakeholders also play an important role in Philippine urban mobility, perhaps in part due to the difficulties government agencies face.

For example: **real estate developers** prepare and execute residential and commercial master plans for large tracts of land, driving growth and traffic within certain areas (e.g., Alabang in Muntinlupa City, or the housing developments towards Rizal); most **public transport operators** are currently operating based on franchises that have no minimum service requirements; and a majority of **freight forwarders (trucks)** in the Philippines are part of one association. While the private sector is able to fill in key gaps in mobility—e.g., how Utility Vans and motorcycle taxis (*babal-babal*) started as informal transit—they understandably respond to a commercial opportunity, leaving certain gaps when services are not deemed profitable.

Academe, Civil Society, Development Organisations

The number of academic institutions teaching courses on urban mobility policy and infrastructure have been increasing in recent years, slowly working to fill in the vast knowledge and skills gap. While there are members of the academe who actively teach and publish studies on urban planning, and while there are numerous programmes focussing on technical skills such as architecture and engineering, there remains to be a need for programmes that will provide a holistic view of transport and its relation to people, their cities, and the environment as a whole.

There is also a lack of representation from **civil society** and **non-government organisations**, with no strong and collective voice representing the needs and demands of the public in terms of better mobility as users of active transport and public transport and as those affected by freight policies. This makes it more difficult for the public to effectively relay their needs and issues to government.

International development agencies also provide technical assistance and funding for urban mobility interventions in cities. Some mass transit projects are undertaken through the assistance of international agencies, such as the Cebu Bus Rapid Transit (BRT), which is being undertaken by the DOTr and the Cebu City government, together with organisations such as the World Bank and the French Development Agency (AFD).

There are a vast number of players involved in urban mobility matters in the Philippines – from national and local government agencies, to the private sector, academe, and civil society, to international organisations – but **there remains to be a need to strengthen some voices and to streamline collaboration** across different levels and organisations.

2.4 Finance and Current Business Model(s)

Urban transport infrastructure and services in the Philippines are developed and maintained with funding from the government, the public, the private sector, and international organisations:

National Government	<p>Transportation initiatives on the national level are typically implemented by the Department of Transportation (DOTr) and the Department of Public Works and Highways (DPWH).</p> <p>DOTr and DPWH receive most of their budget from the General Appropriations Act (GAA), which is annually proposed through the Department of Budget and Management (DBM), approved by both houses of Congress, and then ratified by the President. The GAA is supported by revenues from tax (e.g., from Bureaus of Internal Revenue, Bureau of Customs) and non-tax (e.g., from Bureau of Treasury) sources.</p> <p>Projects or programmes above a certain threshold (e.g., over PHP 2.5 billion for locally funded and PHP 300 million for public-private partnerships) require approval from the National Economic and Development Authority (NEDA) Board Investment Coordination Committee (ICC) prior to inclusion in the GAA.</p> <p>Government Financial Institutions such as the Development Bank of the Philippines and the Landbank of the Philippines are also involved through the PUV Modernisation.</p>
Local Government	<p>Local Government Units (LGUs) have fiscal and administrative autonomy. This means that while they receive funds from national internal revenue taxes, they can also levy local taxes and fees, and can create their own revenue sources.</p> <p>This autonomy also means that LGUs can allocate resources based on their own priorities. It does not, however, preclude supervision from national government to ensure consistency with nationwide goals. For example, LGU-implemented PPP projects over PHP 200 million must also seek confirmation from the NEDA ICC.</p>
General Public	<p>The general public contributes to funding transport infrastructure and services through fares (which are subsidised by national government for rail operations), fees (e.g., Motor Vehicle User's Charge), and taxes.</p>
Private Sector	<p>Transport operators (including operators of Utility Vans, jeepneys, or trucks)</p> <p>Commercial / real estate developers (through township projects that include residential, commercial, and industrial development on large tracts of greenfield land)</p> <p>Private sector investors (through participation in biddings or in public-private partnership projects, typically for the operations and maintenance of toll roads, airports, rail lines)</p>
Foreign/ International	<p>Foreign funding, or official development assistance (ODA), can come from bilateral and multilateral donor agencies and cooperation partners, who may fund projects or programmes through grants or loans.</p> <p>Foreign agencies in the transport sector include the: Asian Development Bank (ADB), German Development Cooperation (GIZ), Japan International Cooperation Agency (JICA), Korea International Cooperation Agency (KOICA) and Korean EXIM Bank (KEXIM), United Nations Development Programme (UNDP), and World Bank.</p>

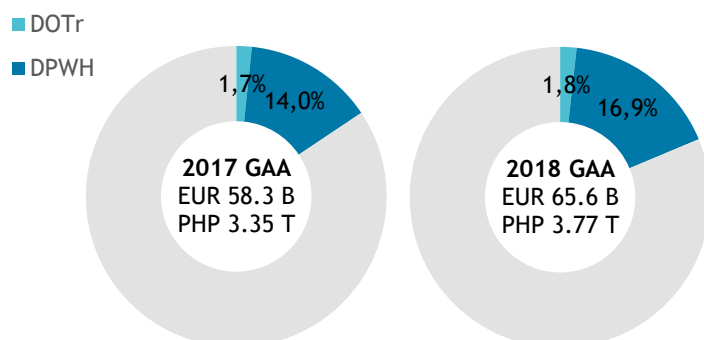


Figure 20. Share of DOTr, DPWH in 2017 and 2018 GAA. (DBM, 2017; DBM, 2018)

National Government

In 2018, the Philippine Government allocated PHP 704 billion (18.68%) of its PHP 3.77 trillion (EUR 65.6 billion) national budget to the DOTr and to the DPWH (DBM, 2018). DOTr and DPWH received EUR 1.2 billion and EUR 11.1 billion, respectively, marking an increase of 19% and 36% from 2017 (Figure 20). The total national budget increased by 12.45% (DBM, 2017; DBM, 2018).

A large part of the budget for DOTr and DPWH are for infrastructure, counting towards the EUR 18.6 billion (6.1% of the GDP) allocated for the *Build, Build, Build Programme* in 2018. The *Build, Build, Build Programme* also includes infrastructure for schools, flood control, irrigation, healthcare, water supply, power supply, and reforestation (Figure 21).



Figure 21. Infrastructure Budget for 2017 and 2018. (DBM, 2018)

Figure 22 and Figure 23 show highlights of the DOTr and DPWH budgets, which notably include the development of **BRTs** for Cebu (EUR 54 million), Quezon City (EUR 4.8 million), and EDSA (EUR 5.2 million); the construction and rehabilitation of **railways** for Mindanao (EUR 101 million) and Luzon (EUR 139.3 million); and the construction of new or widening of existing **roads** nationwide (EUR 3.3 billion).



Figure 22. Highlights of the 2018 DOTr Budget for Road and Rail Transport. (DBM, 2018)

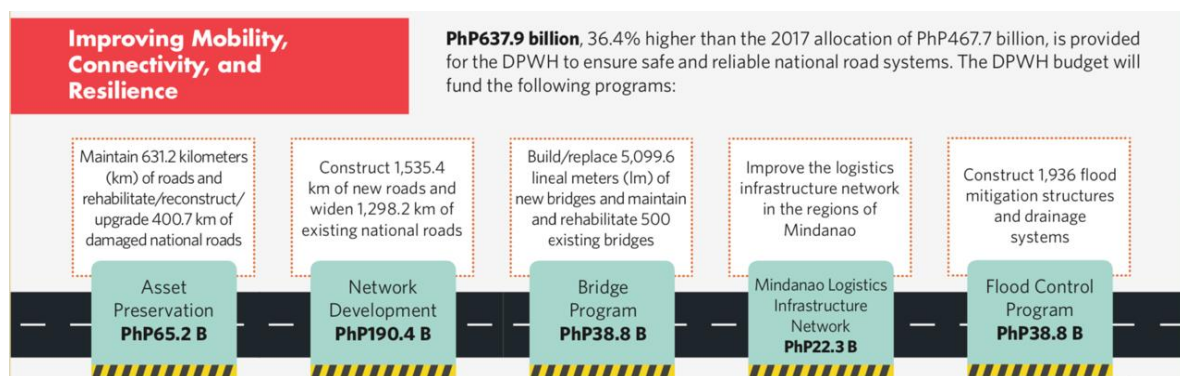


Figure 23. Highlights of the 2018 DPWH Budget. (DBM, 2018)

Rail operations also receive large operational **subsidies** from National Government due to low fares (PHP 11–30 / EUR 0.19–0.52). This causes issues, such as a debate on whether residents of other regions should pay for Metro Manila commuters (versus a user-pays system) and, for the privately-operated LRT Line 1, the need to either transfer money to the operator or have them shoulder losses.

Local Government

LGUs receive funding from national government primarily through the Internal Revenue Allotment (IRA), which according to RA 7160, should be allocated in the following manner: provinces: 23%; cities: 23%; municipalities: 34%; barangays: 20%. For 2018, the national budget includes PHP 581.2 billion (15.4% of the total) for LGU support. This includes EUR 45.3 million from the DBM's *Green, Green, Green Programme* (DBM, 2018), which can be used by qualified LGUs to finance the construction, rehabilitation, repair, or improvement of public open spaces.

In addition to having the autonomy (also due to RA 7160) to generate local revenues, LGUs can also finance through: ODA, partnerships the private sector (e.g., Joint Ventures), bond flotation, and borrowing/credit.

Since LGUs are not required to publish details of their expenditures and what limited data is available are presented in broad categories, making it difficult to determine where transport-related investments fall.

General Public

The Family Income and Expenditure Survey estimates that the annual total spending on transportation is EUR 6.3 billion (PHP 361 billion) (PSA, 2017). For an average family with an estimated annual expenditure of EUR 3,745 (PHP 215,000), transport amounts to approximately 6.2% (EUR 231.6 or PHP 13,300) of their expenses (PSA, 2017). Viewed another way, transportation is 5% of a household's average annual income of EUR 4,650 (PHP 267,000) (PSA, 2017).

In comparison, and to support the above information on expenses, annual revenues from tricycles, jeepneys, buses, and the three rail lines are estimated at EUR 6.79 billion (PHP 390 billion), while annual revenues from taxis are estimated at EUR 0.75 billion (PHP 43 billion) (GIZ, 2018).

Private Sector

As previously noted, the private sector plays a big role in Philippine transportation. This includes **transport operators** who rely on commercial viability (since government assistance for public transportation primarily covers the four rail lines and those participating in the PUV Modernisation Programme); **real estate developers** who sometimes build public transport terminals within their commercial compounds, or who partner with operators for Point-to-Point (P2P) bus services; and companies or investors participating in **Public-Private Partnership (PPP) projects**. There are 15 PPP projects related to urban mobility, including four unsolicited proposals currently being evaluated by the DOTr. Table 5 lists the other 11.

Table 5. Public-Private Partnership Projects Related to Urban Mobility.

Project	Approved Project Cost	Remarks / Status
Automatic Fare Collection System (DOTr)	PHP 1.72B / EUR 30M	Operational (Dec 2015)
Southwest (Parañaque) Integrated Terminal Exchange (DOTr)	PHP 2.5B / EUR 43.5M	Operational (Nov 2018)
South (Taguig) Integrated Terminal Exchange (DOTr)	PHP 5.2B / EUR 90.6M	Pre-construction ongoing
LRT Line 1 O&M and Extension (DOTr)	PHP 64.9B / EUR 1,130M	Pre-construction ongoing
MRT Line 7 (unsolicited) (DOTr)	PHP 62.7B / EUR 1,092M	Construction ongoing
LTFRB Information Technology Infrastructure (DOTr; LTFRB)	PHP 0.3B / EUR 5.2M	Procurement ongoing
Metro Manila Skyway Stage 3 (TRB)	PHP 2.23B / EUR 38.8M	Construction complete (Sept 2019)
Daang Hari-SLEX Link Road (Muntinlupa- Cavite) (DPWH)	PHP 17.93B / EUR 312M	Operational (July 2015)
NAIA Expressway (DPWH)	PHP 37.43B / EUR 651.9M	Operational (Sept, Dec 2016)
NLEX-SLEX Connector Road (DPWH)	PHP 23.2B / EUR 404.1 M	Pre-construction ongoing
Central Luzon Link Expressway Phase 1 O&M and Phase 2 (DPWH)	TBD	Undergoing studies

(PPP Center, 2019)

Foreign / International

The role of international players from the development sector (e.g., bilateral aid agencies, multilateral financial institutions) is presented in more detail in the following section.

DOTr and DPWH have seen large increases in budget, primarily for capital investments under the *Build, Build, Build* rather than programmes such as *PUV Modernisation Programme*. On the local level, LGUs have the administrative and fiscal autonomy to prioritise their budgets, but there are large data gaps regarding expenditures. On average, transportation expenses account of 6.2% of a household's expenses, or 5% of its income. The private sector is involved in urban transportation on varying scales, from individual operators to large corporations who develop townships or who partner with the government for the operations of toll roads or rail lines.

2.5 Related Initiatives

Several bilateral and multilateral development agencies are contributing to the development of sustainable urban mobility in the Philippines.

Foreign contributions or funding, referred to as official development assistance (ODA), are coordinated through and monitored by the National Economic and Development Authority (NEDA). As of 2017, there were 70 ongoing loans and 352 ongoing grants, amounting to EUR 10.96 million and EUR 2.23 million, respectively (NEDA, 2018). The DOTr and DPWH and the two agencies with the largest shares in this portfolio, with EUR 3,123.4 million and EUR 1,952.7 million, respectively:

	Loans		Grants	
	Qty	Total (EUR)	Qty	Total (EUR)
DOTr	11	3,111.7 M	4	11.8 M
DPWH	17	1,867.8 M	6	84.0 M

Figure 24 shows the number and total amount of loans for the DOTr and the DPWH, giving an indication of investments in transport infrastructure.

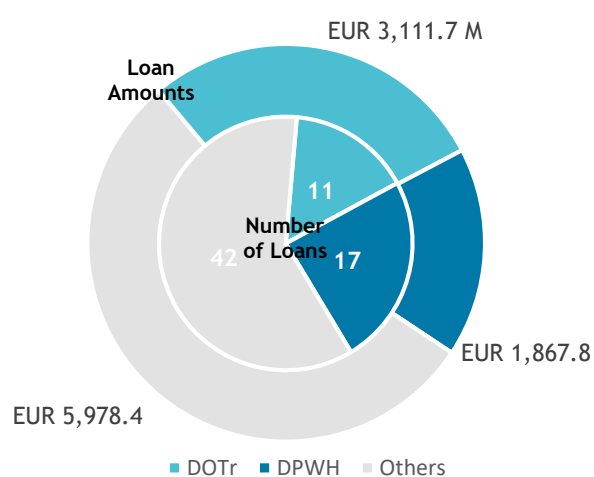


Figure 24. DOTr, DPWH Loan Count and Totals (2017). (NEDA, 2018)

In terms of fund source, the largest ODA contributions to all sectors in the Philippines are from:

- Japan International Cooperation Agency (JICA) – 36%, with EUR 4.75 billion for 36 loans/grants;
- World Bank (WB) – 21%, with EUR 2.73 billion for 26 loans/grants; and
- Asian Development Bank (ADB) – 20%, with EUR 2.65 billion for 37 loans/grants.

Details on some of these initiatives related to urban mobility are listed in Table 6, together with the international agencies involved and their partners from the Philippine government.

Table 6. Some Foreign-Assisted Initiatives in Philippine Urban Mobility.

Initiative	Implementing Partner/s (PH)	Funder	Initiative Details / Remarks / Status
Greenways	DOTr	ADB	<ul style="list-style-type: none"> - Improved walking and cycling facilities to connect major areas of interest (e.g. business districts), including elevated paths; - Includes EDSA Greenways (estimated cost PHP 9.7 billion / EUR 167 million).
Study on Land Value Capture (LVC)	DOTr, NCTS	ADB	<ul style="list-style-type: none"> - Analysis of the effects of the MRT Line 3 on land value of surrounding areas; - Study completed.
PUV Modernisation Programme	DOTr	GIZ, WB	<ul style="list-style-type: none"> - Improving the jeepney sector through the modernisation of route planning, franchising rules, vehicle units, and company operations.
Railway Construction	DOTr	JICA, ADB, China	<p>Includes the following:</p> <ul style="list-style-type: none"> - Metro Manila Subway Phase 1 (JICA: project cost PHP 357.0 billion / EUR 6.2 billion); - North-South Commuter Railway (JICA: project cost PHP 149.1 billion / EUR 2.6 billion); - North-South Commuter Railway Extension (JICA, ADB: project cost PHP 628.4 billion / EUR 10.9 billion); - PNR South Long Haul (China: project cost PHP 175.3 billion / EUR 3.1 billion)
Transit Oriented Development	DOTr	JICA	<ul style="list-style-type: none"> - Technical assistance for the preparation of TOD-ready stations along the North-South Commuter Railway corridor.
Low Carbon Urban Transport	DOTr	UNDP	<ul style="list-style-type: none"> - Policy support for and investment in low carbon urban transport systems, such as electric and hybrid buses and e-jeepneys.
Bus Rapid Transit	DOTr, LGUs	WB, AFD	<p>Includes the:</p> <ul style="list-style-type: none"> - Cebu BRT (WB, AFD: project cost PHP 16.3 billion / EUR 283.9 million) - Quezon Ave BRT (NCR) (WB: project cost PHP 5.5 billion / USD 95.8 million)
Road Safety	DOTr, DILG, MMDA	WB	<ul style="list-style-type: none"> - Promotion of open data systems for road safety reporting, data management, etc.
Road and Bridge Construction	DPWH	ADB, China, KEXIM	<p>Includes the:</p> <ul style="list-style-type: none"> - Iconic Bridge Projects for Socio Economic Development (ADB: project cost PHP 6 billion / EUR 104.5 million) - Binondo-Intramuros Bridge (China: project cost PHP 3.4 billion / EUR 59.2 million) - Estrella-Pantaleon Bridge (China: project cost PHP 1.5 billion / EUR 26.1 million)

The Philippine Government has **international loan commitments of as much as EUR 5 billion for DOTr and DPWH**, which includes urban mobility investments in railways, bridges, BRTs, and greenways. In addition to these, there are also ongoing grants from bilateral and multilateral development agencies to promote low-carbon transport and road safety.

3. Barriers to Sustainable Urban Mobility in the Philippines

Sustainable urban mobility, while generally accepted as an important topic by key actors in the Philippines due to its important role in both economic growth and climate change mitigation, still faces various barriers in policy making and implementation.

This chapter discusses barriers considering the eight aspects listed below, first in general terms for Philippine urban mobility, and then in the more specific context of the five themes of the Philippine Urban Mobility Programme (PUMP), namely: non-motorised transport, public transport, urban freight, travel demand management, and transit-oriented development.



3.1 Barriers to Sustainable Urban Mobility in the Philippines

Political Barriers

Following the discussion on key actors (i.e., NEDA, DPWH, DOTr, LTO, LTFRB) and veto actors (i.e., NEDA, DPWH, DOTr, Congress) in the previous chapter, it is clear that government—especially national government—plays the most important role in Philippine urban mobility. Even with the autonomy local government units (LGUs) enjoy, national government still lays out policy documents (e.g., the National Building Code), gives funds to LGUs, and is in the best position financially and administratively to implement projects that cross jurisdictions.

Additionally, it should be noted that the heads of national government agencies in the executive branch are appointed by the President (who can only be elected once, for a six-year term), while those in Senate can be elected for two consecutive six-year terms (with elections happening in two batches every three years), and those in Congress and in LGUs can stay in office for three consecutive three-year terms.

These suggest the following:

- (1) a presidential administration has about four years to implement—assuming that the first of six years is for planning and the last is for preparing to turnover—unless there is certainty that the next administration will continue their existing initiatives;
- (2) election and campaign periods happen quite often, making it important for officials to be able to immediately say that they have delivered projects—requiring a delicate balance between planning and implementation;
- (3) continuity in programmes is possible because there are overlaps in terms, but turnover between administrations must be done properly and institutions (as will be discussed in more detail below) need to be strong; and
- (4) Congress and LGUs are directly accountable to the constituents who voted for them, while heads of national transport agencies answer more directly to the President.

These political circumstances, coupled with the years of turmoil that was followed by rapid economic growth in the recent decades, has led to a situation where government all at once needs to address old issues, catch up to meet current demands, and plan for future requirements.

It is perhaps due to this situation that government priorities are presently centred on building heavy infrastructure. There have been two presidential administrations since 2010 and both have focused heavily on subways, expressways, airports, and the like—large projects that are, first, more likely to catch the eye and praise of the electorate, and second, a stark contrast to the absence of new transportation infrastructure in the early 2000s. These further emphasise that the Philippine political setup, where decision makers often change, makes it difficult to ensure that programmes, policies, and projects are continued or consistent.

Regulatory Barriers

The Philippines has various policies and regulations related to urban mobility, but many of these unfortunately need to be revised to consider sustainable urban mobility principles. Key documents such as the National Building Code (Presidential Decree No. 1096) and its Implementing Rules and Regulations, for example, have guidelines that could promote car use (e.g., parking minimums) instead of public or active transport (e.g., by requiring bicycle lanes).

The priorities in these policies and regulations are reflected in available studies. For additional reference, Annex 1: gives an overview of the studies relating to transport from as early as 1973, as well as a list of recently adopted recent policies. It should be noted that while policies and regulations can be issued by both national and local government, most of the comprehensive studies are conducted on a national level or for the metropolitan areas of Manila, Cebu, and Davao. For various reasons (e.g., budget availability), local governments are not as empowered to conduct comprehensive studies on mobility. The barrier caused by a lack of knowledge and capacity is discussed further below.

On an encouraging note, policies are shifting towards sustainable and people-centred mobility, with documents such as the National Building Code currently being reviewed to potentially consider sustainability issues (PIA, 2017). Other policies on urban mobility also need to consider social safeguards and financial mechanisms for on-the-ground implementation, as well as coordinated enforcement mechanisms to make sure the policies are fully carried out.

Institutional Barriers

In an environment where personalities matter, institutional barriers are inevitably tied to actors and political barriers. Considering institutions in the sense of organisations and mandates, urban mobility is most affected by local government for daily operations and smaller-scale projects, and by national government for policies and larger-scale or cross-boundary projects.

While there might be barriers in terms of coordination between agencies on different levels, there are also opportunities for discussion, such as through the *Regional Development Council (RDC)*. RDCs set the direction for economic and social development efforts (as a regional level of the NEDA Board) and are typically chaired by a mayor or governor (NEDA, n.d.). Government agencies can also coordinate on the same level through forums such as the *NEDA Inter-Agency Technical Committee on Transport Planning (IATCTP)* or the *League of Cities*. The IATCTP, which will play a key role in the implementation of the Philippine Urban Mobility Programme, is chaired by the NEDA Deputy Director-General for the National Development Office and includes DOTr, DPWH, PPA, MARINA, PNR, LRTA, MMDA, CAAP, and UP-NCTS as its members (Office of the President, 2011). Opportunities such as the RDC, IATCTP, and League of Cities, however, do not guarantee that efforts will be aligned, because they are primarily for coordination or for approval of policies or large-scale projects.

This means that while committee meetings can take place regularly, attendance can depend on the individual agencies and participation can depend on the seniority of the representative. For example, while Undersecretaries (i.e., Vice-Ministers) are invited, it is not uncommon for them to have other engagements and to instead send an Assistant Secretary or a Director who may not be comfortable speaking up in the committee meeting.

There are also institutional barriers within agencies: the DOTr, for example, is still in the process of increasing its *plantilla* positions (i.e., part of the approved staff list of a government agency, whether permanent or co-terminus with the appointing authority). Like many other agencies growing faster than the budgeted could directly cover, the DOTr has had to employ staff through six-month long consultancy or job order contracts in the absence of approved civil service positions. The lack of job security faced by these employees negatively affects their performance, causes high attrition and turnover rates, and leads to a lack of continuity within the organisation.

Considering this setup and the many other challenges faced by government on a daily basis (again due to the lack of proper investment in transport in the past decades), there is a predictable scarcity in government personnel who can focus on sustainable urban mobility.

Financial and Fiscal Barriers

The discussion on financing (Section 2.4) already presents some barriers for sustainable urban mobility: large infrastructure projects get more attention; there is insufficient funding for short-term projects on active transport; and local governments have varying capacities for investing in initiatives.

The *Green, Green, Green Programme*, for example, was an exemplary initiative by national government (through DBM) to allocate budget (EUR 45 million or PHP 2.5 billion in 2018) for LGUs to develop their own public open spaces. The Programme faced uncertainty after a change in leadership, and while it will now be included in the 2020 budget, its experience highlights three things: first, programmes can be fleeting and greatly affected by leadership or personalities; second, local governments are interested in improving their urban space; and, third, LGUs can generate their own revenue but still need support—whether due to a small pool of resources or to a lack of awareness about other potential sources.

Other barriers include the lack of transparency in local government spending and the lack of clear linkages between national and local government financing, both of which hamper a clear assessment of the appropriateness of current expenditure patterns.

There is, overall, a need to allocate more budget to sustainable urban mobility initiatives and also to promote financial mechanisms that will incentivise national government, LGUs, and the private sector to pursue such initiatives.

Social, cultural and awareness barriers

AmBisyon Natin 2040, which captures the long-term vision of Filipinos based on consultations with various sectors, notes that people want ‘the freedom to go where we desire.’ Supporting documents, however, show that 77% of Filipinos would prefer their own car while only 23% would prefer good public transport. This hints at the negative perceptions of public transport and the aspirational value of owning a vehicle. Considering the current state of public transport in the country, it is not difficult to understand why the general consensus is that someone only takes the train, bus, or jeep when they cannot afford a private car or a taxi. While there are increasing numbers of cyclists, cycling is still not widely accepted and can even be frowned upon by private establishments who are accustomed to allowing in cars but not bicycles.

Information, education, and communication (IEC) campaigns on the widespread and cross-cutting benefits of sustainable urban mobility are necessary to promote awareness across different sectors and age groups.

Lack of knowledge, capacity

The lack of knowledge and capacity for sustainable urban mobility initiatives is at once a result of other barriers (particularly: political, institutional, financial) and a barrier in itself. There is a vicious cycle where actors are not able to focus on the right solutions, which in a rapidly growing economy means that problems get worse faster than projects can be implemented, which in turn pushes actors to attempt more temporary and haphazard solutions...and so on. One of the means to break this cycle is by building the knowledge and capacity of the key actors.

This barrier refers to the need for both an improvement in the know-how and skills of actors, and also an increase in the staffing of the actors (especially for government agencies and transport operators). The previous barriers highlighted that personalities are important, and this one brings in a wider appreciation for all the individuals necessary to plan and implement sustainable urban mobility initiatives.

It is also essential to bridge the knowledge of the local academe with policy makers in order to upgrade their technical and technological expertise for evidence-based policies, particularly in sustainable urban planning and shifting away from the current focus on heavy infrastructure and vehicle speed. The importance of establishing baseline data must also be stressed for all elements of sustainable urban mobility.

Technological barriers

Technological advancements, while seen in the prevalence of comforts such as ride-hailing and online shopping, are not very widespread in the Philippines—especially in the transport sector. For example: there are, as mentioned, only three metro lines and they are all within the confines of Metro Manila; RFID

payments are available on certain public transport modes and in all major toll roads, but market penetration is low and inoperability is not guaranteed (sometimes even along connected roads); and, after over a decade of planning, construction is only about to start on the first subway, BRT, and comprehensive motor vehicle inspection system.

Barriers to new technology can either be due to the lack of necessary support infrastructure (such as reliable internet connectivity) or simply due to a resistance to change, either out of a sense of discomfort or a desire to evade regulation (such as when public utility vehicles cut trips instead of traversing the entire route specified on their franchise). Considering these reasons, technological barriers can be expected to affect government actors more than the private sector. Driven by commercial sense, private sector can be expected to be more responsive to new trends and to adjusting their internal capacities as appropriate (e.g., ride-hailing services, freight operators using software to optimise their trips, etc.).

MRV related barriers

Data on transportation in the Philippines is difficult to acquire, since what little data there is available is typically either paper-based or in unorganised digital files. While there have been efforts to use geospatial and big data (e.g., from mobile trip planners such as Waze) to improve the planning of transport infrastructure and services, use of such technologies is still in the infancy stage.

For example: route planning and fleet management are still largely done manually, while real-time tracking is a technology that is available but hardly not utilised—i.e., new jeepneys and buses are required to have location trackers, but there is yet to be a system to receive their data. Similarly, data from the automatic fare collection system (locally branded as the *Beep* card) is gathered and stored, but yet to be analysed to understand travel patterns and improve operations.

To address this gap, the DOTr plans to establish a data centre that will receive data from public transport vehicles, which will help in route planning and in case there are emergencies. This admirable initiative will need to be given proper funding and support, so that it can be maintained properly and can tie in with the government open data initiative launched in 2014.



3.2 Barriers Specific to PUMP Themes

Barriers to Non-Motorised or Active Transport

Following the discussion in the previous section, there are crucial barriers to non-motorised transport (NMT) in terms of:

1. Lack of a national NMT policy;
2. Limited data to monitor and properly plan NMT initiatives;
3. Limited staffing within agencies in charge of NMT such as DOTr, LGUs;
4. Limited focus given to NMT during planning process;
5. Lack of political support;
6. Insufficient funds and funding options;
7. Limited NMT planning and design guidelines;
8. Lack of laws that enable NMT;
9. Cultural perceptions and behaviour discouraging NMT; and
10. Limited NMT capacity (i.e., skills) within DOTr, LGUs, etc.

One of the key barriers is the perception that public transport use, walking, and cycling are for the less privileged and, at the opposite end of the spectrum, that having a car is a sign of success. This is tied to another ubiquitous barrier—subconsciously known by every Filipino—which is the fear of sweating and “smelling bad” (Ocampo, 2016). These sociocultural issues of class and perception pervade government policies and priorities, which is perhaps the reason behind limited support for active transport despite the important role that walking plays in many journeys across the Philippines.

The limited political and regulatory support for NMT is clear in: (1) how the comfort of car owners is often still promoted over encouraging active transport, (2) how existing guidelines for sidewalks—when they are enforced—are not enough to comfortably accommodate heavy foot traffic; and (3) how there is little funding allocated to active transport, whether on the local or national level.

These lead to the main barrier to active transport even for those who want to walk, cycle, or take a scooter: the absence of proper infrastructure. While the proposed Greenways projects aim to address this issue, certain principles should be noted: e.g., walkways should be accessible even to those who have difficulty climbing stairs, and, extensive networks are necessary to promote active transport for daily trips. On a policy level, there is the National Transport Policy and several bills that have been filed to promote pedestrian and commuter rights, but these still have to be implemented.

Another clear barrier is capacity. It has been reported that there are currently less than ten individuals working on NMT schemes in the DOTr: five in the Rail Sector and two to three in the Road Sector. This manpower is insufficient for the required NMT work, which includes the development of design guidelines, the development of walkability and cyclability assessment guidelines, and the monitoring and evaluation of NMT projects. These staff and all subsequent hires may likewise need NMT-specific skills training.

Hiring and training, as with putting up infrastructure, is also an issue due to the lack of funding, especially since government positions—particularly in national agencies—need budget allocation (applied for at least a year in advance) and follow civil service guidelines. On the local level, LGUs have more flexibility with their budget allocation, but may have limitations in terms of funding sources. Skills training for government agencies should therefore include modules on financing and organisational management.

Barriers to Sustainable Public Transport

The barriers to public transport use are similar to those of NMT in terms of social perception. However, there is an added barrier considering the level of comfort provided by public transport vehicles versus private vehicles. This system is likely due to the franchising structure that allows transport operators to focus on commercial profits rather than on delivering a service. There is no subsidy given to privately operated transport modes and—except for LRT Line 1 which is under a public-private partnership contract—government is not able to regulate minimum performance standards of the levels of service. On top of this, drivers of buses, jeepneys, and even taxis typically rent vehicles for a daily ‘boundary’ that they have to pay net of fuel and vehicle maintenance.

The *PUV Modernisation Programme* aimed to help improve the financing of road-based public transport, and while it has helped some operators who have modernised (GIZ, 2019), the lack of budget in 2020 may cause difficulties for its continued roll-out (Rappler, 2019).

Technological barriers were also mentioned as a general barrier, and this is even more evident in public transport. The motor vehicle manufacturing industry of the Philippines is still burgeoning and needs to mature for technologically related investments to make sense. Data on motor vehicle production shows that the Philippines is lagging behind its ASEAN neighbours (ASEAN Automotive Federation) and may need government intervention to spur this economy forward.

Other barriers to sustainable public transport include: a highly fragmented (often individualised) industry, lack of financial literacy, lack of subsidies, absence of fleet renewal schemes, and on-street competition.

Barriers to Sustainable Urban Freight

There are five key barriers to making urban freight in the Philippines sustainable:

1. Lack of data on freight operations, especially considering geographical locations;
2. Insufficient policy framework to support sustainable freight;
3. Lack of appropriate vehicle standards and regulation;
4. Fragmented industry and regulation structure; and
5. Lack of necessary capacity (i.e., manpower and skills).

Freight modernisation is widely discussed by key actors once in a while, most recently with the government talking about modernising trucks in the interest of improving road safety (DOTr, 2017; UNTV, 2018). However, priorities can shift to other urgent issues and, coupled with the absence of staff dedicated for sustainable urban freight, progress on this theme remains slow.

In addition to modernising the fleet, improving freight efficiency can also refer to the optimisation of operations and the decrease of “empty miles” travelled, which is already being considered by private sector operators. On the part of government, urban planning policies on both the national and local levels need to take into account freight vehicles and their routes for greater efficiency and economy.

Freight also has a fragmented industry both for the private sector and government. There is, for example, no clear government agency to handle freight matters. The DOTr (through LTO and LTFRB) is concerned with vehicle registration and regulation; the DPWH is concerned with road networks and capacities; the DTI is concerned with freight movement; the DOF (through the Bureau of Customs) is concerned with importing; and LGUs are concerned about traffic flow within their cities.

Barriers to Travel Demand Management

Efforts to ease traffic congestion have been at the forefront of government priorities for several years. However, the primary policy being implemented is a coding scheme that limits the number of vehicles based on their plate numbers, and while this is initially helpful it can ultimately promote car purchase and use. More sophisticated options for managing travel demand and changing travel behaviour such as congestion pricing have been explored by both national government and private sector, but concrete plans have yet to be made for such a scheme.

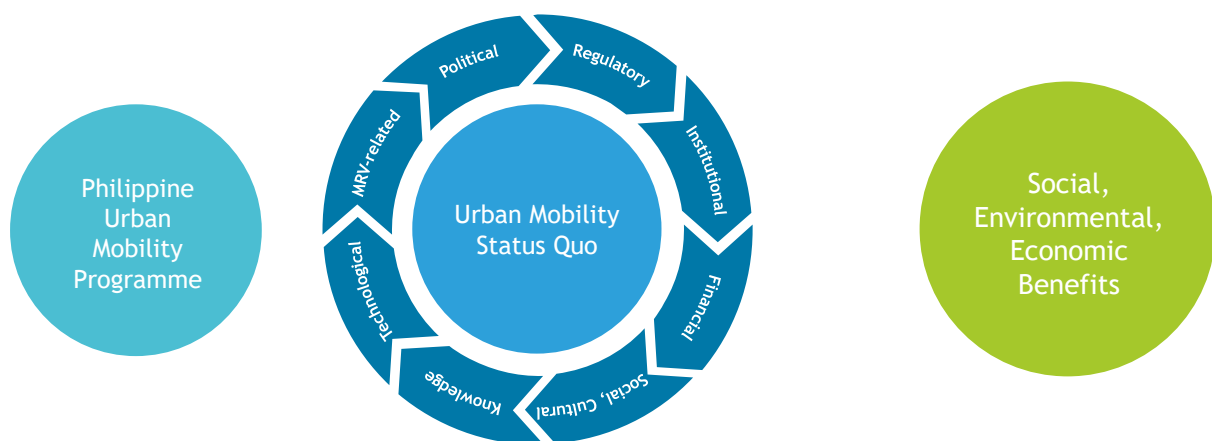
Travel demand can also be managed through the implementation of policies such as the Telecommuting Act (RA No. 11165), which allows employees to work remotely, thereby decreasing work-related trips.

Barriers to Transit Oriented Development

Transit oriented development (TOD) covers concepts such as land use planning, land value capture (LVC), and urban regeneration. These are all relatively new ideas in Philippine transport, with the Housing and Land Use Regulatory Board (HLURB) including a module on mobility in its most recent comprehensive land use plan guidelines and with the Asian Development Bank (ADB) recently completing a study on the effects of MRT Line 3 on surrounding land values (Abiad, Farrin, & Hale, 2019).

While the key barrier to TOD is the lack of awareness about concepts and lack of skills to maximise any increase in values, there are promising developments: the DOTr, for example, is working with the Japan International Cooperation Agency (JICA) to plan for TOD and consider LVC in the development of the North-South Commuter Railway; and LGUs such as Quezon City have likewise expressed interest to learn more about LVC.

Barriers to Sustainable Urban Mobility and the Philippine Urban Mobility Programme



4. The Philippine Urban Mobility Programme

The Philippine Urban Mobility Programme (PUMP) provides mechanisms by which National Government is able to support Local Government to plan schemes which support sustainable urban mobility. This chapter presents an overview of the PUMP concept and objectives, the thematic areas forming part of the programme, and the detailed actions and activities which will achieve the identified objectives.

4.1 Vision and Objectives

The PUMP sets out packages to support its vision for urban mobility in the Philippines, which was developed through studies, stakeholder engagement, and a series of workshops.

Vision

With the active participation of wide-ranging stakeholders, the collective developed an overarching vision for the desired outcomes of the PUMP. This vision is to achieve:

people-oriented cities empowered by efficient, dignified, and sustainable mobility.

The vision for urban mobility touches on three distinct social, environmental, and economic objectives that are important to delivering the desired outcomes. These are discussed below.

Social Objectives

People should be at the heart of the urban mobility strategy. Planners have for many years focused on the movement of vehicles, whilst overlooking the fact that it is actually people who should be at the centre of planning decisions. A better understanding of the negative impacts of the outdated vehicle-centric focus on people's health and wellbeing has led to a paradigm shift in the approach to transport planning in the most forward-thinking cities worldwide.

Considering the travel experience at a personal level is therefore essential to achieving the aspirations defined in the vision for urban mobility and is embodied in the following objective statement:

A people-first approach, which ensures inclusive, comfortable, safe and dignified access to public services.

Environmental Objectives

Managing and mitigating the impacts of people and goods movement on the environment, both local and global, is critical to protect the health and well-being of the population and to sustainability. Therefore, we must seek to develop:

An urban transport system which reduces its negative impacts imposed on the environment and on public health towards "healthy cities."

Economic Objectives

Transport plays an important role in supporting the national economy which in turn leads to opportunity and prosperity for the people. To support these objectives, we need:

Efficient, affordable and economically sustainable transport, which supports economic vitality for the individual and for the city.

The success in achieving the identified objectives will be both observable and quantifiable. PUMP activities are aimed at achieving the following positive impacts:

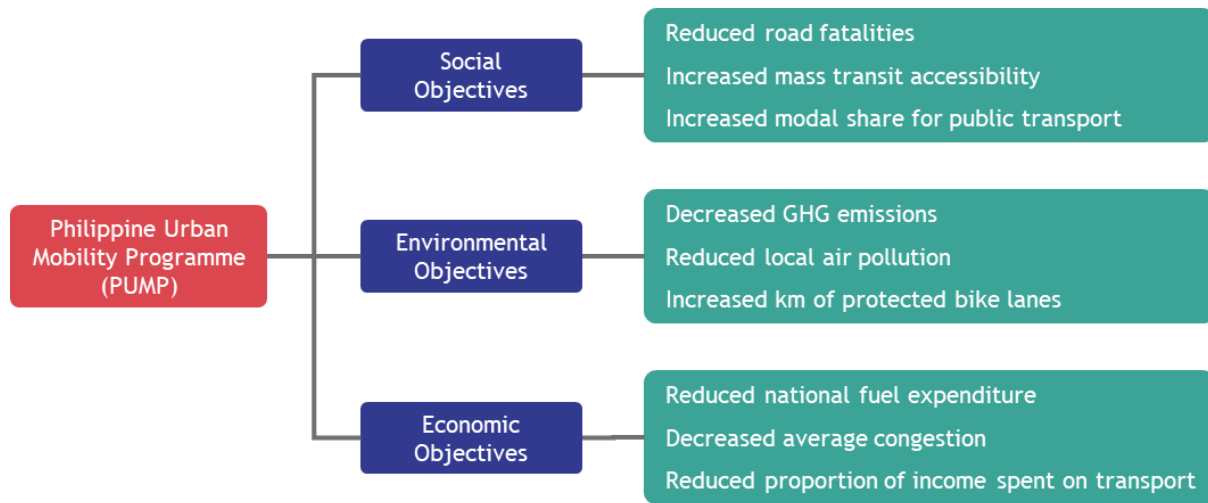


Figure 26. Objectives and Targets of PUMP Activities.

4.2 Themes and Components

In order to achieve the vision and objectives of the PUMP, thematic areas, and components have been identified for targeted action. The PUMP covers five thematic areas: NMT, public transport, urban freight, TDM and TOD. The figure overleaf presents the PUMP concept.

Ultimately, PUMP implementation will extend across all five thematic areas. Initial implementation has however commenced with the launch of the *Public Utility Vehicle (PUV) Modernisation Programme*, a national public transport reform programme which sees the modernisation of the Jeepney sector and fleet. This was developed from the Jeepney+ NAMA.

The next priority areas of focus for the PUMP are non-motorised transport and urban freight. Specifically, the aims of PUMP activities are two-fold:

- To increase the attractiveness of active travel through increased provision of walking and cycling infrastructure, enabling a shift from motorised modes of travel and thereby reducing carbon emissions; and,
- To increase efficiency in the freight sector through a package of complementary measures which support freight operators in the modernisation of both the fleet and logistical operations.

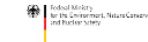
In order to achieve transformative change in both active travel and in freight operations, the PUMP activities involve both physical investments and also enabling changes in the institutional and regulatory status quo. Mechanisms by which National Government is able to support Local Government to plan schemes that support sustainable urban mobility and financing streams to enable delivery are key components of the PUMP.



Bayanihan:

NATIONAL URBAN MOBILITY PROGRAM VISION AND STRATEGY

SUPPORTED BY: ON BEHALF OF:



Vision: Towards people-first cities empowered by efficient, dignified, and sustainable mobility.

Objectives



SOCIAL

A people-first approach which ensures inclusive, comfortable, safe and dignified access to public services



ENVIRONMENTAL

An urban transport system which reduces its negative impacts on the environment and on public health, towards healthy cities



ECONOMIC

An efficient, affordable and economically sustainable transport which supports economic vitality for the individual and for the city

Targets [ADJUSTED BY BASELINE STUDY]

	2025	2030
Reduce road fatalities	FROM BASELINE	FROM 2025
Increase mass transit accessibility for vulnerable users	FROM BASELINE	FROM 2025
Increase modal share of public transport	FROM BASELINE	FROM 2025

	2025	2030
Decrease GHG emissions per passenger km	-10%	-15%
Reduce local air pollution	FROM BASELINE	FROM 2022
Increase km of protected bike lanes	+100%	+300%

	2025	2030
Reduce national fuel expenditure	FROM BASELINE	FROM 2025
Decrease average congestion (mins/km)	6	5
Decrease % of income spent on transport	10%	8%

Themes & Components

NON-MOTORIZED TRANSPORT



Walking



Cycling



E-Scooters

PUBLIC TRANSPORT



New Jeep



Bus



Rail



Ferries

URBAN FREIGHT



Light Goods Vehicle



Heavy Goods Vehicle



Non-Motorized Freight



Motorcycle Deliveries

TRAVEL DEMAND MANAGEMENT



Information



Pedestrian Zones



Road User Charging



Telecommuting

TRANSIT ORIENTED DEVELOPMENT



Land Use Planning



Land Value Capture



Urban Regeneration

Figure 27. The Philippine Urban Mobility Programme (PUMP) Vision and Strategy.

4.3 Scope

The PUMP activities are focused principally on road-based transport, and on the development of an urban environment which facilitates efficient and environmentally responsible urban mobility. The scope of coverage of the measures and actions covers all urban areas, with the implementation of public transport and freight fleet modernisation extending beyond urban boundaries to all areas of the country.



Figure 28. Scope of geographical coverage of PUMP components.

The timeline for PUMP implementation extends until 2030. Enabling steps and actions are identified for the short term (to 2022), medium term (to 2026) and long term (to 2030).



Figure 29. Time Horizon for PUMP Implementation.

The PUMP builds on activities which are already underway. Roll-out of the *PUV Modernisation Programme* is underway. The two areas (i.e., NMT and urban freight) are identified for the next phase of activity, with the remaining areas (i.e., TDM and TOD) forming part of the long-term vision for the PUMP.

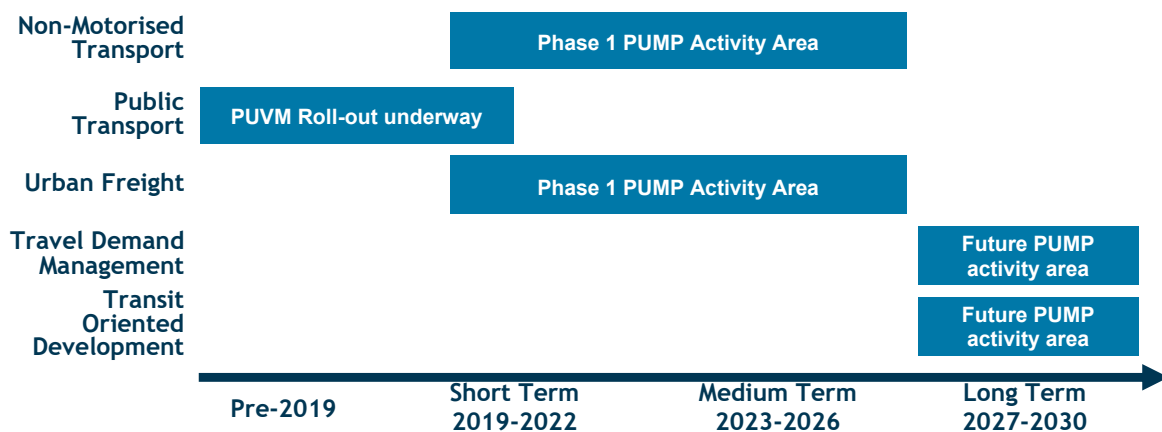


Figure 30. PUMP Implementation Phasing.

4.4 Non-Motorised Transport Activities and Actions

The activities and actions which form part of the PUMP action plan to improve provision for non-motorised transport have been developed with direct reference to the identified barriers and challenges experienced in the delivery of this objective. Ten actions have been identified, responding to the ten challenges and barriers identified.

The PUMP approach to enhancing NMT is set out in Figure 31 below:

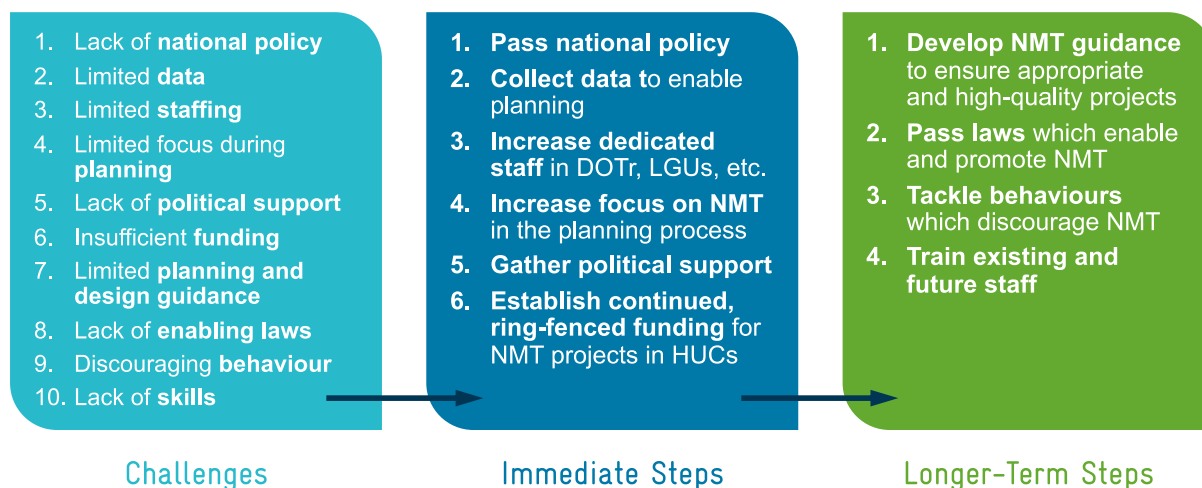


Figure 31. Actions and Activities Identified under the NMT Theme.

The NMT actions represent supporting and enabling activities as opposed to direct mitigation measures. However, these enablers are vital in fostering the necessary environment to bring about an increase in active travel, and to deliver greenhouse gas reduction as a result of this modal shift. Details of the ten component activities are set out below:

N1: Pass national policy

The benefits of NMT can be maximised by giving it a central role in Filipino National Transport Policy. Development of a national NMT policy will show the commitment to addressing the issues currently faced by pedestrians and cyclists in urban areas of the Philippines. The policy will be developed by DOTr with assistance from other Government departments and appropriate national or international NMT experts. The policy objectives for the national policy are that by 2030 to:

- Increase walking activity;
- Increase cycling activity; and
- Reduce the level of pedestrian and cyclist road accident fatalities on roads in the Philippines.

N2: Collect data to enable planning

Present NMT policy and planning activities is held back by low availability of data relating to active travel activity and to the extent and quality of provision of infrastructure to enable active travel. In order to address this barrier, local government units (LGUs) will take a lead in undertaking an audit of existing NMT infrastructure, surveying of current walking and cycling usage levels, and analysing accident data to provide an accurate assessment of the baseline situation. Assessment of the current conditions for active transport will be established by undertaking walkability and cycling audits to identify key barriers and blackspots.

The implementation of this activity will follow the approach adopted for the Local Public Transport Route Plans (LPTRPs). Guidance on the collection of NMT data and a survey 'toolkit' will be developed by the DOTr, with training provided to LGUs for the collection of necessary data (see capacity building activities below). LGUs will have a responsibility for the collection and reporting of the data, alongside the requirement to submit LPTRPs. The data collected will link to the database system for government agencies introduced in the National Transport Policy. Table 7 sets out the data which will be collected.

Table 7. NMT Data Collection Requirements.

Type	Requirements	Format	Responsibility
Existing walking facilities	Location, type, condition	Excel / GIS	LGU
Existing cycling facilities	Location, type, condition	Excel / GIS	LGU
Existing walking usage	Location, date, time of day, number	Excel / GIS	LGU
Existing cycling usage	Location, type, condition	Excel / GIS	LGU
Existing land uses	Location, type, size	Excel / GIS	LGU
Proposed land uses	Location, type, size		
Pedestrian accident data	Area, Location, Severity, Gender, Age, Day of Week, Time of Day, Road	Excel / GIS	LGU
Cyclist accident data	Type, Description		

N3. Increase in dedicated NMT staffing within national and local government

Resourcing constraints have been identified as a major barrier to the development and implementation of NMT related policies and measures. In order to undertake the activities outlined within the PUMP, it will be necessary to increase the number of staff who plan, design, and deliver NMT schemes on both the national and local levels.

At the national level, additional staffing requirements of at least five roles focussing on focused roles has been estimated, through a resourcing evaluation. The roles undertaken by these new staff would include:

- a. Support in the development of NMT related policy and strategy;
- b. Development of guidance materials to assess walkability and cyclability, creation of pedestrian networks of sidewalks/walkways, creation of cycling networks, installation of cycle parking at key destinations, and monitoring and evaluation of NMT projects; and
- c. Providing support and assistance to LGUs in the collection of data and in fulfilling their local role in development and delivery of NMT related measures.

At the local level, a need for increased capacity has been identified across almost all LGUs. Local staff will have a wide-ranging role in supporting NMT enabling measures, including the following tasks:

- a. Coordinate the clearance of sidewalks and bike lanes of illegal structures and obstructions alongside relevant departments;
- b. Coordinate the audit of existing NMT facilities;
- c. Coordinate walkability and cyclability assessments of the urban area;
- d. Coordinate the prepare of a geocoded map of all existing NMT facilities, accidents and key destinations;
- e. Identify key interventions such as missing links or dangerous junctions;
- f. Coordinate the preparation of a plan setting out proposed pedestrian and cycling networks to connect residential areas and key destinations;
- g. Identify network improvements;
- h. Develop a wayfinding strategy for the NMT network;
- i. Calculate the potential demand for each of the proposed links which make up the network;
- j. Prioritise implementation of schemes based on an appraisal of the costs and benefits of each scheme;
- k. Develop a programme of work for the individual schemes which develops a coherent network;
- l. Oversee the procurement process for construction of schemes and installation of directional signage;
- m. Plan and coordinate promotional activities for all the NMT improvements;
- n. Plan and promote cycling related events such as conferences and workshops;

- o. Arrange the collection of all data as part of the monitoring and evaluation process;
- p. Plan and arrange the maintenance of all NMT infrastructure;
- q. Coordinate the preparation of applications for scheme funding; and
- r. Meet regularly with NMT advocacy groups and other stakeholders.

With great variation in size and needs across the HUCs and secondary cities, estimated staffing requirements have only been broadly estimated, but should be established through needs assessment on a city by city basis. The estimated requirements, as used in developing costings, are presented in the table below:

Table 8. Estimated NMT staff requirements for LGUs.

LGU Population	Estimated NMT staff
200,000 – 400,000	2
400,000 – 600,000	3
600,000 – 800,000	4
800,000 – 1,000,000	5
>1,000,000	6

N4: Increased focus of NMT in the planning and financing process

Shortcomings in the inclusion of appropriate NMT facilities at the planning phase requires rectification within the planning process and also in the appropriate enforcement of planning requirements. The development of Comprehensive Land Use Plans (CLUPs) is already a requirement for LGUs and the National Urban Development and Housing Framework (NUDHF) is due for completion imminently.

Breaches in planning control must be pursued and penalised in order for the planning requirements to be effective. This may include:

- Issuing an injunction against proceeding with construction works where the relevant regulation has not been complied with;
- Issuing an injunction against using an object that has been erected in contravention of the regulations; and
- Obliging a developer to remove a building that has been erected in contravention of the regulations.

N5: Address lack of political support for NMT

The challenges in passing draft NMT bills into law highlights a lack of political support amongst policy makers. In order to address this, there is a need to increase awareness of the wide-ranging benefits of facilitating active travel both to politicians and to the general public to garner wider support. This will be achieved through the following activities:

- Preparation of report for politicians outlining the benefits of increasing NMT levels;
- Meetings with key politicians to outline benefits and garner support;
- Study tours for high level national and local decision makers to places renowned for increasing NMT levels; and
- Working with advocacy groups for pedestrians and cyclists to make NMT a political topic.

Notably, a draft Magna Carta for Commuters (in the broad sense that includes pedestrians and all road-users) has recently been filed by several legislators in the House of Representatives and in the Senate.

N6: Continued, ring-fenced funding for NMT projects

There are a number of NMT scheme financing initiatives underway which have allocated funding for the delivery of enhanced infrastructure provision for walking and cycling. These are summarised in Table 9.

Table 9. NMT initiatives currently underway.

	Scope	Lead Agency	Funding	Location
National Greenways	Development of standards for eco-friendly spaces, with pilot areas	DOTr	ADB loan for technical assistance; Estimated cost: EUR 175 million	Urban areas nationwide
Metro Manila Greenways	Promotion of NMT within Metro Manila	DOTr	National Government (GAA); Estimated cost: EUR 136 million	Cities of Marikina, Quezon, Pasig, Makati, Taguig, Mandaluyong, Parañaque
Green, Green, Green Programme	Enrichment of open spaces in LGUs	DBM	National Government (2018 GAA); Budget of EUR 45.3 million	LGUs nationwide
Transit Oriented Development	NMT access within 800m of proposed railway stations	DOTr	JICA grant assistance for studies	Initially for commuter line from Manila to Clark

Whilst the Greenway programs feature specific funding for the design and implementation of Greenways in specific locations, the DBM's *Green, Green, Green Programme* offers bid-based funding to LGUs for the development of their own local initiatives to improve the urban realm. This empowers local government to deliver locally relevant schemes and forms an effective model which can be scaled with increased funding to support more NMT schemes. The bidding process for the fund is outlined in Figure 32.



Figure 32. *Green, Green, Green Programme* application process.

Despite the ongoing NMT related initiatives, the delivery of enhanced NMT infrastructure has to date been hampered by insufficient funding and also shortcomings in the successful disbursement of funding allocated within the abovementioned funds. The *Green, Green, Green Programme* has several ongoing projects through the 2018, but the Greenways programs are yet to deliver the full projected investment. This highlights the need for sustainable and ring-fenced funding streams allocated specifically for the provision of NMT infrastructure and the enhancement of the urban realm.

Achieving transformative impact requires expenditure and implementation at the local level to enable coverage to extend beyond a handful of flagship schemes. This should however be supported in the allocation of funding from central government. A mechanism to achieve this has already been established in the form of the *Green, Green, Green Programme*, which allows LGUs to develop and bid for funding for local projects.

Benchmark analysis of appropriate expenditure on NMT related infrastructure investment, adjusted to the Philippine income levels identifies a target expenditure of EUR 4.6 per head over the PUMP time horizon, equating to EUR 500 million (PHP 28 billion) in 2030.

To deliver this desired level of impact, it is therefore necessary to increase the annual budgetary allocation to the *Green, Green, Green Programme* fund, and also to commit to ongoing annual expenditure of this level. The recently implemented TRAIN taxation programme provides increased government revenues through (in large part) the increased taxation on motorists and vehicle related levies. The increased funding is justified by the need to invest in the current *Build, Build, Build Programme* of national infrastructure investment. Investment in NMT facilities, widely demonstrated to achieve greater benefit to cost ratio and recognised to facilitate sustainable positive impacts on modal shift and hence traffic congestion, unlike the short-term alleviation from road construction, provides the rationale behind NMT infrastructure investment taking a greater priority in government expenditure.

N7: Develop NMT guidance to ensure appropriate & high-quality projects

Whilst some examples of best practice in the design of NMT infrastructure are seen in certain cities in the Philippines, there is an identified lack of appropriate guidance on planning and design of NMT infrastructure and networks. To address the limited guidance, a focus on the development of context appropriate guidance in these areas will form a primary role of the NMT staff within DOTr. The following guidance documents will be required:

- Guidance on assessing walkability and cyclability;
- Guidance on the development of pedestrian networks of sidewalks/walkways;
- Guidance on the development of cycling networks;
- Guidance on the provision of cycle parking; and
- Guidance on the monitoring and evaluation of NMT projects.



Figure 33. Example of pedestrian sidewalk provision in Salcedo Village, Makati City.

N8: Pass laws which enable NMT

At present there are no national laws which aim to improve NMT across the country. Attempts have been made by some politicians to introduce laws aimed at making LGUs improve NMT conditions, but there appears to be some difficulty in passing NMT-related bills into law. Several Acts which aim to improve conditions for pedestrians and cyclists have been submitted for approval since 2010. Without laws set at a national level requiring LGUs to improve conditions for NMT, there is limited incentive for them to work to improve current conditions.

At a local level LGUs are able to create their own laws and policies which are known as local or zoning ordinances. In some cases, ordinances have been implemented by LGUs which restrict the use of NMT. For example, City Government of Baguio banned the use of bicycles in 2016 due to increasing numbers of accidents involving motorcycles. The removal of laws which are detrimental to encouraging NMT travel should be undertaken and steps taken to prevent such laws being passed in the future.

It will be necessary to work with sponsors of NMT-related bills to boost political support and, potentially, to adapt existing bills or create new bills to make them more politically palatable so that they are enacted into law. To hasten the process of getting a bill enacted, it is possible to submit a bill simultaneously to the House of Representatives and to the Senate, so that both chambers can consider the bill.

The legislation should set out mandatory requirements for both DOTr and LGUs. Legislation should make it mandatory for DOTr to carry out the following:

- Develop guidance on assessing walkability and cyclability;
- Develop guidance on the development of pedestrian networks of sidewalks/walkways;
- Develop guidance on the development of cycling networks;
- Develop guidance on the provision of cycle parking at key destinations; and
- Develop guidance on the monitoring and evaluation of NMT projects.

The legislation should also make it mandatory for LGUs to undertake the following:

- Clear sidewalks and bike lanes of illegal structures and obstructions;
- Undertake an audit of existing NMT facilities;
- Prepare a geocoded map of all existing NMT facilities;
- Undertake a walkability assessment of the urban area;
- Undertake a cyclability assessment of the urban area; and
- Prepare a plan setting out proposed pedestrian and cycling networks to connect residential areas and key destinations.

Current amendments to the Sustainable Transportation System Act appear to mandate the construction of elevated walkways instead of at-grade pedestrian walkways and prevents the construction of pedestrian islands. This amendment acts contrary to the prioritisation of people movement over vehicular movement and should be removed, in line with the National Transport Policy (NTP), the NTP Implementing Rules and Regulations, and the newer bills on commuters' rights.

N9: Tackle behaviours which discourage NMT

Inconsiderate and illegal behaviours such as speeding and failure to stop at pedestrian lanes are a common feature of motorised vehicle activity in Filipino cities. This behaviour discourages the uptake of NMT. Challenging the poor behaviour that disincentivises active travel, in order to promote walking and cycling, requires a multi-faceted approach through education and enforcement, including:

- Marketing and enforcement;
- Driving standards and training; and
- Planning control.

Marketing and enforcement will include the development and delivery of awareness campaigns via different media to ensure people are aware of traffic and parking regulations, and review of the enforcement procedures to ensure effective enforcement and penalties for non-compliance.

Review of driving standards and driver training in the Philippines to identify ways in which NMT users can be safe guarded will be carried out by the Land Transport Office.

Improving driving behaviour through effective design will form part of the best practice planning guidance, reducing the ability for poor and unsafe driving behaviour.



Figure 34. Example of a well-designed junction which reduces the potential for poor driving behaviour.

N10: Train existing & future staff on NMT planning

Training for transport engineers and transport planners in the Philippines has had greater focus on catering for the needs of motorised traffic as opposed to that of non-motorised modes. It is necessary therefore to build up local expertise by developing a comprehensive programme to improve the NMT-related knowledge of existing transport engineers and planners, as well as those of the future, by providing relevant education and training opportunities.

Ensuring that existing transport engineers and planners are the requisite NMT-based skills will be achieved through the following measures:

- Training courses to develop skills to design and deliver NMT schemes and NMT-friendly schemes;
- Study tours to places renowned for providing for NMT (e.g. Denmark or the Netherlands);
- Attendance of national and international conferences on NMT; and
- Ensuring staff are able to access up to date NMT-related information.

Training courses will be developed at the national level by DOTr, with support of academia, with training delivered to staff at LGUs on implementing the guidance. It is estimated that approximately five staff will be required at DOTr. Initially at least, it is envisaged that staff will require the support of international NMT experts in completing the required tasks.

It will also be necessary to ensure that future transport engineers and planners have the skills to develop NMT-promoting policies and design appropriate NMT infrastructure. In the short term this could involve scholarships for transport engineering and transport planning courses to places with courses which have a strong focus on developing NMT-friendly infrastructure.

NMT Measures Summary

A summary of the actions and activities comprising the NMT thematic area of PUMP is set out in Table 10.

Table 10. Summary of NMT challenges and proposed actions.

No.	Challenge	Solution	Tasks
N1	Lack of national NMT policy	Develop national NMT policy	Draft national policy to increase the usage of NMT by developing NMT infrastructure and through the use of complementary, revenue projects.
N2	Limited data to monitor and properly plan NMT initiatives	Collection of NMT data in urban areas.	Establish data collection toolkit for use by LGUs Determine current NMT usage levels. Determine current NMT accident levels. Audit of existing NMT infrastructure. Prepare a geocoded map of all existing NMT facilities. Walkability assessments of urban areas. Cyclability assessments of urban areas.
N3	Limited staffing within agencies in charge of NMT such as DOTr, LGUs	Increase NMT capacity at DOTr and LGUs	Identification of staffing shortage within DOTr to deliver planning and support functions in relation to implementation of NMT policy and measures
N4	Limited focus given to NMT during planning process	Ensure adherence to the National Urban Development and Housing Framework (NUDHF) so design prioritises movements of pedestrians and cyclists.	Preparation of report for developers outlining the benefits of increasing NMT levels. Meetings with key developers to outline benefits of NMT. Review of land use planning process Review of planning control process.
N5	Lack of political support	Increase political support for NMT nationally and locally.	Preparation of report for politicians outlining the benefits of increasing NMT levels. Meetings with key politicians to outline benefits and garner support. Study tours for high level national and local decision makers to places renowned for increasing NMT levels. Work with advocacy groups for pedestrians and cyclists to make NMT a political topic.
N6	Insufficient funds and funding options	Allocate specific ring-fenced funding for investment in NMT infrastructure	Ramp-up the <i>Green, Green, Green Programme</i> enabling LGUs to access funding for compliant schemes to support NMT, with a target multi-year committed budget allocation of PHP28bn.
N7	Limited NMT planning and design guidance	Develop national NMT design standards/guidance.	DOTr to develop national NMT design guidance with assistance from NMT experts including: Assessing walkability and cyclability; Developing pedestrian networks; Developing cycling networks; Installation of cycle parking; and Monitoring and evaluation. Provide training sessions on implementation of design guidance for LGU staff.
N8	Lack of laws that enable NMT	Introduction of laws to encourage NMT usage.	Work with sponsors of NMT-related bills to boost political support.

N9	Cultural perceptions and behaviour discouraging NMT	Challenge poor behaviour through education and enforcement.	<p>Review of traffic offences.</p> <p>Awareness campaigns targeting driver behaviour.</p> <p>Enforcement of driving laws.</p> <p>Awareness campaigns targeting main causes of sidewalk obstructions.</p> <p>Enforcement action to prevent obstructions of sidewalks.</p> <p>Review of driver standards and training.</p>
N10	Limited NMT capacity within DOTr and LGUs	Increase NMT capacity at DOTr and LGUs	<p>Assessment of existing NMT skills in DOTr and LGUs.</p> <p>Training courses to develop skills to design and deliver NMT schemes.</p> <p>Study tours to places renowned for NMT.</p> <p>Improved staff access to up to date NMT information.</p> <p>Attendance to national, international conferences on NMT.</p> <p>Scholarships for transport engineering and transport planning courses which focus on developing NMT-friendly infrastructure.</p> <p>Increase emphasis of NMT in transport engineering and transport planning courses.</p>

Impact Chain

The measures identified above include actions and enabling measures covering the legislative framework, institutional capacity and financing of projects measures which will lead to increased effectiveness in the planning and delivery of improved facilities for walking and cycling.



Figure 35. Public park in Legazpi Village, Makati City.

In terms of mitigation impact, the causal chain of these measures can be summarised as follows:

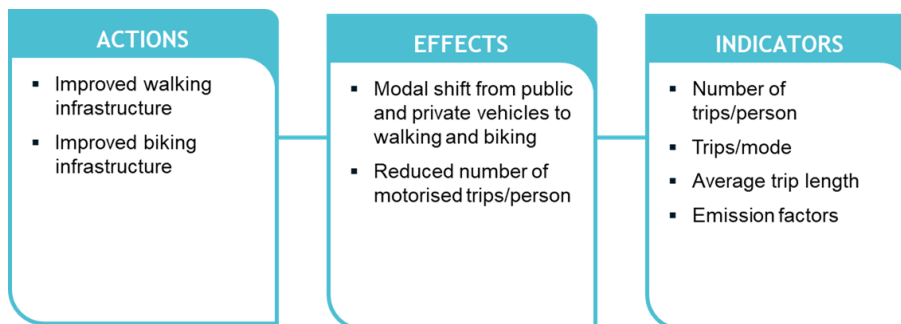


Figure 36. Cause-Impact Chain for Non-Motorised Transport.

Short-Term Action Plan

Immediate activities have been identified across all thematic areas. The action plan for the immediate term is set out in Figure 37.

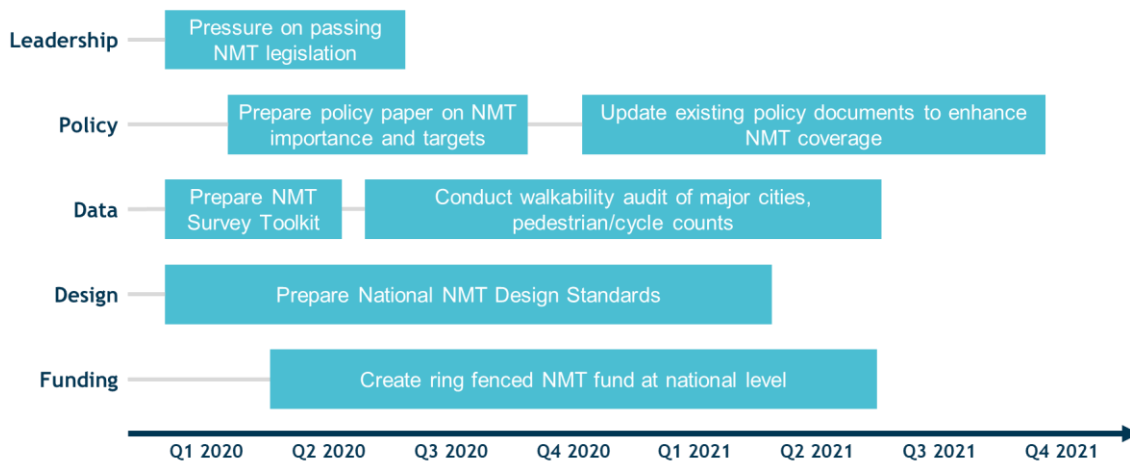


Figure 37. Short-Term Action Plan for NMT Supporting Measures.

4.5 Public Transport Activities and Actions

PUMP activities to deliver enhanced urban public transport consist of an ambitious public transport reform programme which will see the consolidation and professionalisation of transport operations not only in the main cities but nationwide.

The focus on reform of the informal transport operating structure is based on a recognition that formalisation is a key step in the delivery of improved service levels and the pathway towards decarbonisation of public transport. As outlined in Figure 38, a consolidated industry is a pre-condition in the delivery of electrified public transport at scale.

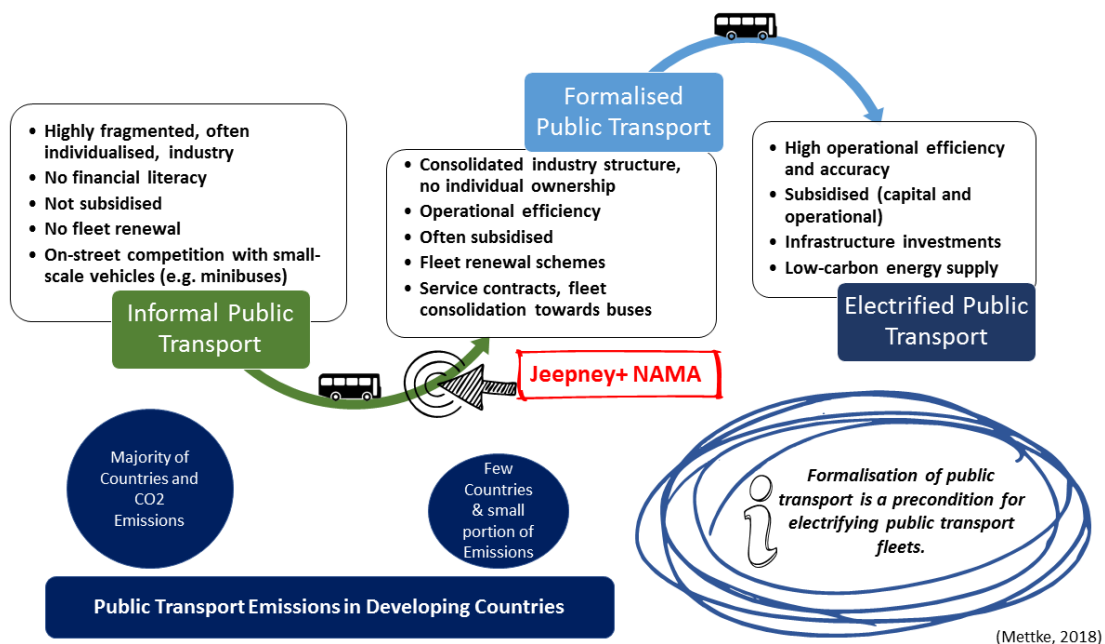


Figure 38. Low-carbon pathway for road-based public transport. (GIZ, 2018)

The *PUV Modernisation Programme* is a national initiative focused on the transformation of public transport service provision. Developed as a Nationally Appropriate Mitigation Action (NAMA), the PUV Modernisation Programme forms a core component of the PUMP.

The initiative, which has now been passed into law, will, from 2020, see the prohibition of public transport vehicles over fifteen years old from public service, and require operators to utilise new vehicles conforming to the new minimum standards in relation to safety and emissions, and equipped with in-vehicle technology requirements in order to be issued with route franchises. With approximately 180,000 jeepney vehicles operating nationally, the majority of which already exceeding the 15-year age threshold, the scale of fleet renewal is sizable.

Beyond vehicle modernisation, the PUV Modernisation Programme includes wider reform with the planning and rationalising of public transport routes, transforming route franchise issuing procedures and promoting industry consolidation and professionalisation to enhance service levels. The figure below outlines the programme's components.



Figure 39. Public Transport Components (through the PUV Modernisation Programme). (DOTr, 2017)

Summary of Impacts

The PUVMP will bring about a transformative change in public transport operations through the modernisation of jeepney vehicles, and also the consolidation and rationalisation of routes and operating structures. The impact chain is summarised in the figure below:

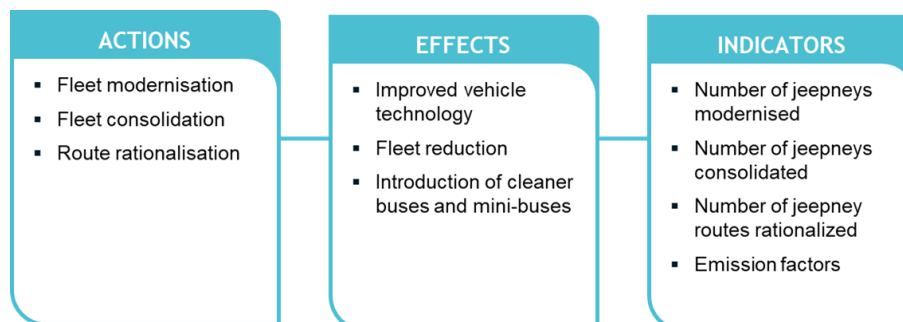


Figure 40. Cause-Impact Chain for Public Transport.

4.6 Urban Freight Activities and Actions

The objective of the urban freight theme is to increase freight efficiency through a package of complementary measures which support freight operators in the modernisation of both the fleet and logistical operations.

Whilst NMT activities focused on supporting and enabling measures, the urban freight theme features both a direct mitigation action, in the form of supported fleet modernisation and supporting activities to complement the mitigation action.



Figure 41. Actions and Activities for Sustainable Urban Freight.

As with the NMT theme, the package of measures identified for urban freight respond directly to the challenges and barriers identified within the freight sector, as outlined in Chapter 3.

F1: Develop Freight Data Collection Mechanism

A major challenge in the support of the freight sector and in the monitoring of freight activity is the significant data gaps relating to freight operators and the freight vehicle fleet in operation presently. The lacking information includes:

- Freight Vehicle
 - Type of freight vehicle – present classification is available by broad category including ‘truck’ or ‘tractor-head’ with no means of categorising into light goods and heavy goods vehicles.
 - Vehicle characteristics – no information is available to classify vehicles by weight or by number of axles, which are the typical means of grouping freight vehicles according to type.
 - Vehicle age – whilst the age of the vehicle must be specified at first registration, the date used is often the date of import. Given the high number of second-hand vehicles entering the fleet, the age-based classification is rendered almost meaningless, as old vehicles are recorded as being 0 years old or ‘new’ upon entry to the country.
 - Vehicle technology – no details of vehicle technology found to be available. Therefore, vital information e.g., vehicle emissions standards, transmission, and engine capacity are unknown.
- Operator characteristics
 - Knowledge of the composition of the logistics sector is limited to small-scale surveys and franchise data for the ‘for-hire’ sector which constitutes only 30% of the logistics market.
- Freight activity
 - Gaining a detailed picture of freight movement patterns is a challenge in cities worldwide, with the rapidly changing nature of these patterns, including same-day delivery and the rise of delivery services (e.g., Lalamove, GrabExpress, etc.), disrupting the urban logistics market.



Figure 42. Freight vehicles on the streets of Metro Manila.

An early activity is to develop a more comprehensive inventory of freight fleet and the operating sector is of high importance in enabling the implementation of the other activities and enabling measures. The actions required are as follows:

- a. Data mining exercise drawing on the existing vehicle import and registration databases;
- b. Review of the freight franchising requirements, and inclusion of wider information requirements in the franchise application process;
- c. Engagement and partnership with freight operating bodies and unions to share information; and
- d. Review of urban traffic data to draw estimates of scale of urban freight activity.

F2: Develop and Implement Vehicle Standards

At present, the freight sector vehicle fleet consists of many ageing and polluting vehicles, although exact age profile and vehicle technology composition is not well understood, due to the aforementioned data gaps. As an important initial step in the path towards a cleaner and more efficient vehicle fleet, implementing restrictions on the new or imported vehicles entering the vehicle fleet will prevent further growth in inappropriate vehicles.

Appropriate vehicle standards should be developed in consultation with the freight industry. Alignment with the requirement for public utility vehicles—which are required to comply with Euro VI emissions standards and certain safety standards at a minimum—should be considered as an appropriate starting point for discussion.

F3: Develop Interagency Council of Freight Modernisation

An important early step in bringing the identified freight efficiency measures to fruition is to define the preferred approach towards the delivery by establishing how responsibilities can be best allocated. This requires the establishment of an interagency council, or a ‘National Freight Forum’ consisting of a steering group (SG) and wider interest group (WIG).

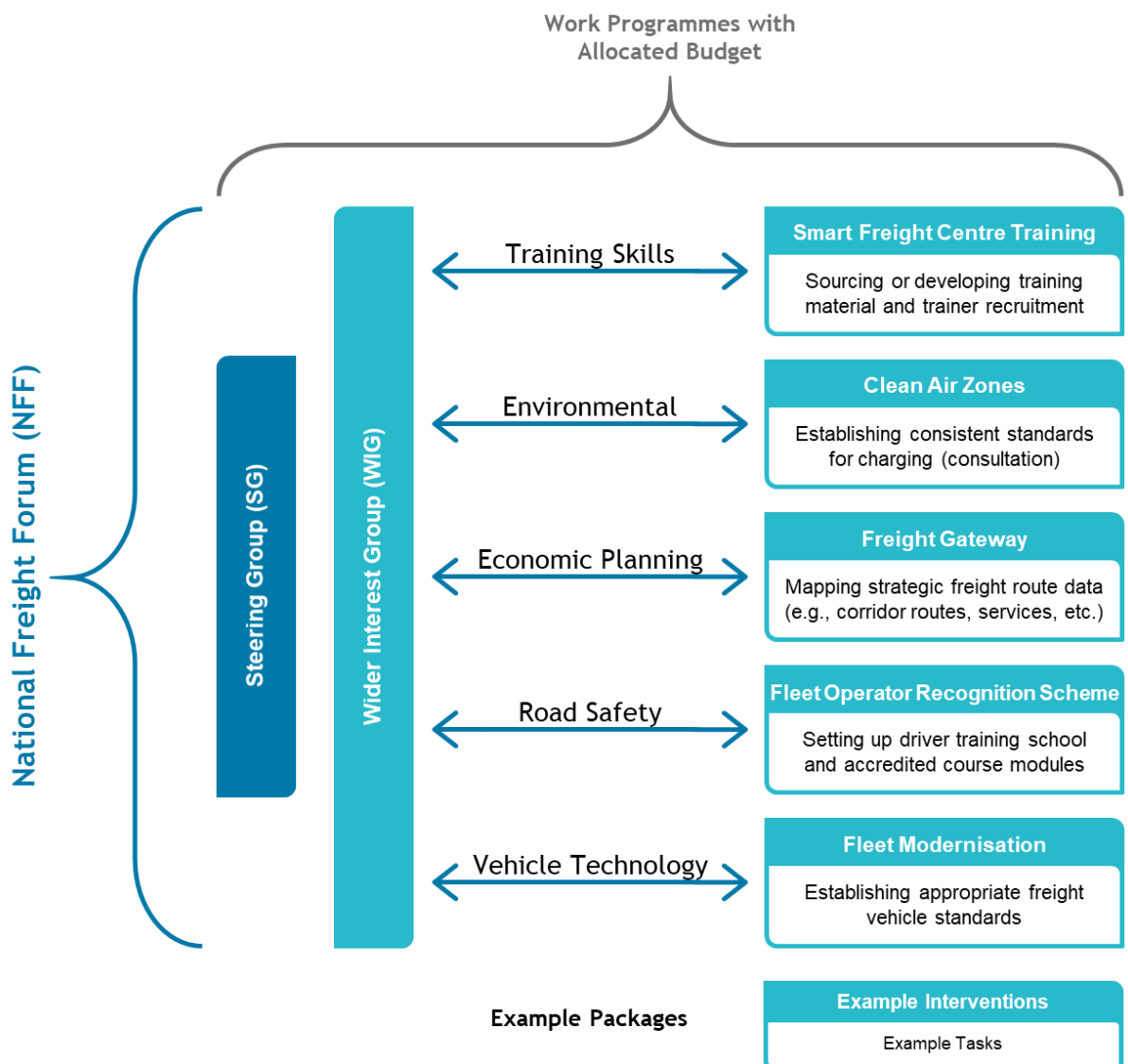


Figure 43. Institutional Structure for Urban Freight Programme Delivery.

Taskforce teams should comprise of representatives from the WIG who are best suited for the project tasks which should, in turn, be developed by those with the most experience in that field. The ideal makeup for the delivery of specific interventions is to have each task force team a mix of public, private, and industry representatives from the WIG. This will help with fashioning a mutually beneficial relationship for resourcing developments, leveraging capital and aspiring to best practice freight and logistics solutions for the Philippine context. The taskforce teams should be quite contained; comprising of 4-6 people from across the WIG who can work together to devise, develop, and deliver (the three 'D's) the individual tasks and to feedback progress directly to the WIG.

F5: Restrict Age or Technology of Used Vehicles

Of the 350,000 registered trucks registered in the Philippines (as of 2013) it is estimated that 80-90% of vehicles may be over 15 years old (NLMP, 2017). Many are imported second hand from other Asian countries.

The setting of minimum vehicle standards on imported and registered trucks and vans (as per freight policy F2 above) serves to prevent the proliferation of unsuitable vehicles. However, these restrictions would not have impact on the existing fleet until the vehicles are replaced. This requires regulation to be extended to the vehicles in operation.

Legislation is in place which sets an age limit of a maximum of 15 years on road freight vehicles. Despite the order being passed into law under the Department Order 2007-009, there remains little evidence of implementation within the freight sector, or the necessary enforcement to ensure compliance. Industry resistance is in large part responsible for the lagging implementation of the legislation. With the support of the enabling activities set out in the following freight policies, industry adoption of this policy, and more effective enforcement becomes achievable.

F6: Support the consolidation and professionalisation of the Freight Sector

The fragmented nature of the freight industry, as well as the lack of skills and formal training of various actors, represent a major barrier to increasing efficiency within the freight sector. The barrier analysis identified the lack of capacity, as exhibited in the World Bank Logistics Performance Index scoring of Logistics competence. The initiative to enhance professionalism is split into three strands:

Stream One: Institutional ‘in House’ Training

- Development of national skills and competence gap initiative across key areas in transport and logistics to understand the key training areas for development to meet strategic economic, social and environmental objectives. An education on key interventions proposed.
- Bringing together professional bodies (e.g. the Chartered Institute of Logistics and Transport in the UK) and trade associations (e.g. CPAT) to assess the scale and nature of potential skills shortage and development areas and elements around business planning/behaviour.

Stream Two: Company: External Training

- Umbrella programme for engaging with road fleet operators on several levels including the dissemination of case study best practice and support toolkit material, access to technology trials (suppliers of new vehicle support systems, demo for Euro engines) and guidance of fuel managements specifically for the profile of the Philippines trucker industry (in partnership with the Confederation of Truckers Association of the Philippines, PIFSA and ongoing efforts to develop a training school and freight forwarding training).
- Developing a useful conduit to promote and implement training on smart truck fleet management, encompassing the 5 pillars of truck fleet efficiency – fuel management, driver skills development, vehicle specification and preventative maintenance, use of IT support systems and performance monitoring.

Stream Three: Mentoring

- Building better relationships between academic/educational institutions and professional bodies and companies operating within the freight and logistics sector to develop a stream of placement opportunities to compliment an enhance course material/ education syllabus for undergraduate students to cover both operative/labour based vocational skills and managerial skills/technicalities.
- Developing a programme of adult and continuing professional development learning opportunities through small ‘satellite’ training schools delivered by professional bodies and funded through membership fees. Opportunity to look at mentoring opportunities across the sector to share best practice, particularly between multinationals and smaller sole proprietors.

F7: Establish a Motor Vehicle Inspection System (MVIS)

The ability to test roadworthiness and emissions levels of vehicles on the road is a key priority for the DOTr through the Land Transport Office (LTO). Implementation challenges have hampered the initiative, and the suspension of the 15-year age limit for goods vehicles was made on the premise that these vehicles would be tested for roadworthiness with newly licensed private MVIS centres, an aspiration which is only now beginning to materialise, for implementation within 2020.

MVIS testing is an important complementary action to vehicle registration/import standards and the in—use vehicle restrictions. Without periodic testing, the compliance with these requirements is left to on-road enforcement and will be less effective.

F8: Promote and assess modern fleet pioneers

A freight operator recognition scheme will enable operators who demonstrate industry leading practices to be recognised for their achievement and also offer the means of development and dissemination of best practice.

This voluntary accreditation scheme will be overseen by a separate community partnership (non-profit body) funded through member subscriptions across the freight/logistics/haulage sector, namely those who manage their own vehicle fleets. The information ‘portal’ is designed to ultimately raise road safety standards and environmental and operational standards through the provision of training, toolkits and knowledge sharing. Membership will enable access to a pool of resources that businesses can take upon themselves to complete for ultimately managing operations to reduce work related road risk. The accreditation—set across a tiered system (Gold, Silver, Bronze)—demonstrates to customers and supply chains that a company is committed to exceeding the industry standard.

F9: Explore Scrappage Scheme and buyback incentive programmes

New vehicle standards and age restriction will place a requirement on the freight operating industry to modernise the vehicle fleet. Support in meeting this investment requirement may be offered through fiscal incentives to retire ageing vehicles. Scrappage schemes have been used as a means of providing the necessary incentive to modernise. The lack of vehicle fleet data hampers the detailed development of a scrappage scheme. However, with PUMP activities to address the data issues and increase engagement with operators, the development of a scrappage scheme is identified as a potential long-term action.

F10: Develop vehicle modernisation incentive regime

In addition to the scrappage scheme, it is likely that many freight operators will require additional support in meeting the fleet investment requirements resulting from the new vehicle standards. As seen with the *PUV Modernisation Programme*, financing support enabling operators to access vehicle finance on terms which can be supported with the cashflows generated through typical operation is likely to be pivotal to enabling the industry to modernise.

The development of an appropriate modernisation incentive regime will require an improved understanding of the typical freight operator business model, and the investment requirements which will be defined by the vehicle standards.

Summary of Freight Activity Impact Chain

The identified PUMP actions with regard to urban freight have been developed to achieve an improvement in freight sector efficiency. This impact chain is summarised as follows:

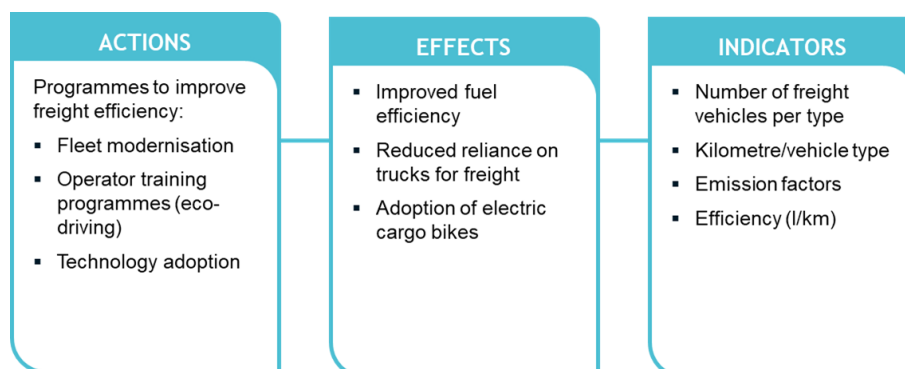


Figure 44. Cause-Impact Chain for Urban Freight.

4.7 Travel Demand Management

With Philippine cities experiencing increasing congestion driven by growth in private car ownership and motorisation rates, improvements in NMT provision, public transport and freight efficiency must also be supported by policy which discourages unsustainable and inefficient trip making.

Demand management forms an important aspect of sustainable urban mobility policy. Measures to manage and reduce motorised trips under the PUMP should include:

- Parking policies;
- Congestion charging; and
- Measures to encourage work from home set-up or telecommuting.

The anticipated impact chain for TDM measures is set out in the figure below:

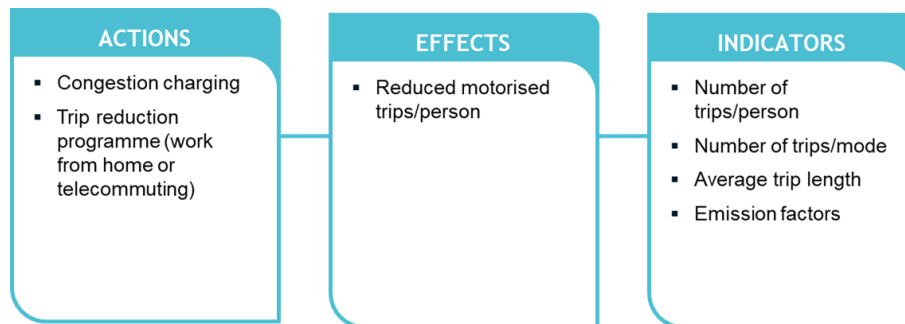


Figure 45. Cause-Impact Chain for Travel Demand Management.

4.8 Transit Oriented Development

The planning of land use within cities has a key role to play in reducing the need to travel and ensuring that necessary travel can be undertaken sustainably. Measures to ensure effective land use and spatial planning should be considered as part of the transit-oriented development (TOD) thematic area of the PUMP.

Initiatives are already underway to apply TOD policy in the expansion of the rail network in Metro Manila, with station accessibility planning, densification within proximity to stations and land value capture considered as part of the expansion planning.

Improved land use planning can significantly reduce the number of vehicle-kilometres travelled, through the avoidance of the need to travel and the modal shift of necessary trips. The impact chain of the rail related TOD policies is outlined below.

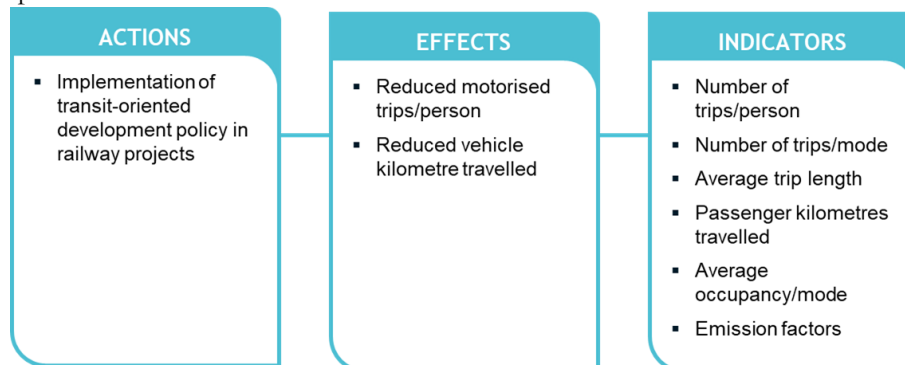


Figure 46. Cause-Impact Chain for TOD.

4.9 Implementation Arrangement (organisational measures)

Whilst the initial activities for three of the PUMP thematic areas have been developed and costed, the implementation of the PUMP represents an ongoing process, drawing on the policy framework and on the plans and bringing together the agencies required to progress to implementation.

This iterative process is outlined in the figure below:

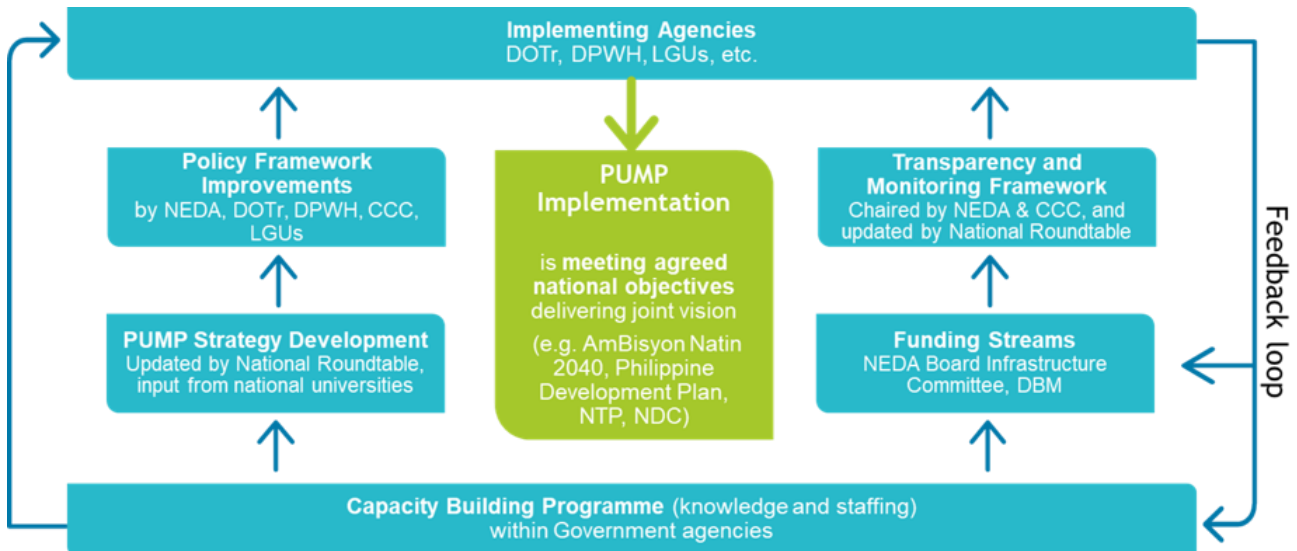


Figure 47. PUMP Implementation Process.

Following the suggestion of the National Economic and Development Authority (NEDA), the PUMP implementation process can be monitored through the NEDA Inter-Agency Technical Committee on Transport Planning (IATCTP).

As shown in Figure 48 (and mentioned in Section 3.1), the IATCTP has representatives from different government agencies involved in transportation and reports to the NEDA Board Committee on Infrastructure, which in turn reports to the President-led NEDA Board. This structure, along with the regular meetings, makes IATCTP the ideal Steering Committee for PUMP implementation.

The PUMP is comprehensive in nature and, as recognised by DOTr, it operationalises the ideas put forth in the National Transport Policy. Considering this, it would be ideal for updates and decisions on PUMP to be included in the regular agenda of the IATCTP. Moving forward, immediate discussions will have to include a decision on the social, environmental, and economic targets, and updates on the implementation of active transport (e.g., Greenways) and urban freight (e.g., freight modernisation) initiatives.

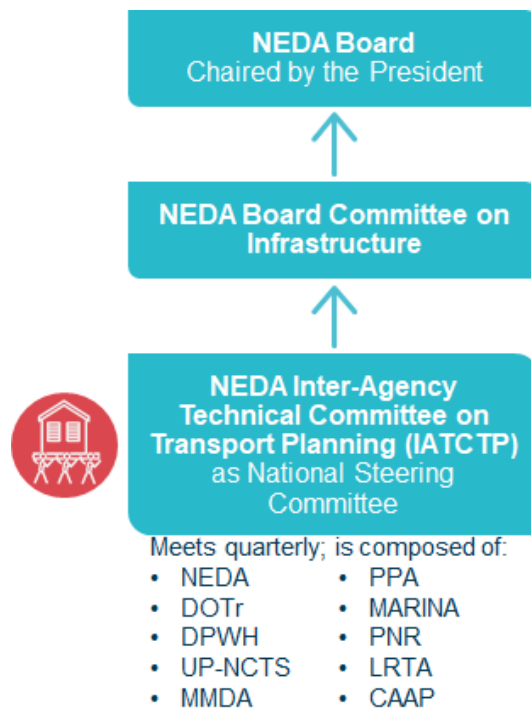


Figure 48. PUMP Implementation Committee Structure

5. Financing Concept

The current situation with regard to funding of initiatives relating to the five thematic areas of the PUMP have been outlined in Chapters 2 and 3. The most prevalent points are as follows:

Non-Motorised Transport (NMT)

- Provision for NMT facilities typically falls to the LGU budgetary spending, supported by the budget allocated from National Government and by local taxation. There is however a lack of transparency in the scale of expenditure in this area, and provision for pedestrians and cyclists is generally poor, indicating a lack of sufficient investment.
- Initiatives to support NMT and public realm enhancement have been promoted by national government, including the Greenways programs supported by international donors and GAA budgetary allocation and the *Green, Green, Green Programme* extending funding to LGUs through the DBM. However, whilst the funding initially allocated under these schemes exceeded EUR 348 million, the scale of disbursement has been just a fraction of the allocation, with just a handful of identified schemes progressing to implementation. The status of the remaining schemes and funding remain uncertain.
- Staffing and resourcing within the local government units in roles which have an impact on the urban realm including development control, enforcement of construction standards and design and development of NMT facilities varies by LGU but in general is sparse and insufficient to ensure the delivery of appropriate provision for walking and cycling.

Public Transport

- Road based public transport is non-subsidised and must operate on a commercial basis.
- Ageing, low-capacity vehicles and small-scale operators lead to increased operating cost per passenger-kilometre.
- Congestion, on-street competition and fares suppressed to socially acceptable levels places pressure on commercial returns achievable.
- Low creditworthiness amongst many operators, limiting the ability to borrow to invest in fleet modernisation.

Urban Freight

- The freight sector is characterised by a fragmented structure with many smaller fleet operators, and an ageing vehicle fleet indicating underinvestment in capital.
- Barriers to investment include poor creditworthiness of many operators in the eyes of financial institutions and a lack of incentive to modernise. With new franchises for for-hire vehicles only issued for new goods vehicles, the option to modernise through investment in a newer second-hand vehicle is precluded, acting as an incentive to keep franchised vehicles on the road beyond their economic life.
- Investment would have an impact on day-to-day cashflow and the efficiency savings from purchase of modern vehicle through reduced fuel consumption would not offset the investment cost.
- Fragmentation in the mandate for institutional oversight and support for the freight sector not only challenges the development of a clear and comprehensive policy for the freight sector but also impedes the allocation of funding for freight specific schemes.
- Training and capacity building within the freight sector is lacking and could be supported by increased investment.

Travel Demand Management

- An emphasis on increasing the provision of highway infrastructure to meet the increasing rates of motorisation is generating further unsustainable motorised trips
- Poor land use planning, focus on accessibility by private car, and high levels of parking provision are contributing to deteriorating urban mobility
- Low cost or free parking represents an implicit subsidy to private car, with travellers not faced with the true social cost of their trip making.

Transit Oriented Development

- Disjointed historical planning and design of mass transit has led to transit hubs largely detached from the local land use.
- Poor pedestrian access limits impact of transit hubs.
- Development driven by commercial interests without sufficient consideration of the linkage with the transport network.

5.1 Implementation Costs and Revenues

Implementation of the policies and activities identified within the PUMP can only be achieved with the necessary allocation of funding and resources.

- The implementation of measures to improve the environment for walking and cycling in cities requires planning, action and expenditure at the local level. However, national government also has a role to play in incentivising and enabling local investment to occur.
- Delivering transformative change to public transport in the Philippines, as outlined under the *PUV Modernisation Programme*, requires investment in the modernising of the vehicle stock at levels not seen in the sector to date.
- Modernisation of the freight sector and implementation of activities to improve the efficiency of freight operations and to support capacity development within the freight sector will require a tripart engagement and investment by the freight sector operators, the government and the main clients of freight sector activities.

Each of the actions for the three areas of initial focus within the PUMP (NMT, Public Transport and Urban Freight) as outlined within Chapter 4 has been costed and the initial capital costs and ongoing operating costs are presented below for the NMT and urban freight thematic areas.

5.2 Non-Motorised Transport (NMT)

Costing of NMT Measures

The costs associated with the implementation of the ten actions identified to improve NMT in the Philippines consist of the following:

- Capital expenditure in infrastructure improvement; and
- Ongoing operating expenditure relating to
 - Increased resourcing within national and local government to enable sufficient focus on NMT related policy, planning and enforcement; and
 - Training, knowledge base development and capacity building, including consultancy support, to enable effective policy development, drafting of guidance documentation, preparation and enacting of regulatory changes and delivery of awareness raising and marketing campaigns.

High level cost estimates of the ten activities are presented in Table 11.

Table 11. Costs of Non-Motorised Transport Activities.

No.	Measure	Cost Component	CAPEX (EUR, total)	OPEX (EUR, p.a.)
N1	Develop National NMT Policy	DOTr staff resource (incl. in N4) and consultancy support in policy drafting		EUR 200,000
N2	Collect data to enable planning	DOTr staff resource to develop data collection toolkit (incl. in N4), with consultancy support, training for LGU staff		EUR 300,000
N3	Increase Dedicated staff in DOTr & LGUs	Increase staffing numbers DOTr, additional 6 full-time staff HUC LGU's additional 200 FT staff and second tier cities a further 160 staff		EUR 5.5 million annual – total EUR 55 million to 2030
N4	Increase focus on NMT in planning process	Stakeholder engagement with developers Review of planning regulations with consultancy support		EUR 200,000
N5	Address Lack of Political Support	Development of policy paper Field visits to showcase best practice		EUR 100,000
N6	Continued ring-fenced funding for NMT projects in HUCs	Commitment to multi-year funding allocation for <i>Green, Green, Green Programme</i> to EUR 488 million to 2030 to support NMT and urban realm enhancement	Approx. EUR 50 million annual allocation, over 10 years – total EUR 500 million	
N7	Develop NMT Guidance	DOTr staff resource (including in N4) and consultancy support in NMT design guide drafting		EUR 200,000
N8	Pass laws in support of NMT	Engagement with sponsors of legislation, awareness raising and lobbying (incl. in N4)		
N9	Tackle behaviours which Discourage NMT	Review of traffic offences, driver awareness campaign, enhanced enforcement through increased staffing of traffic officers		EUR 500,000 per annum to 2030 Total – EUR 5million
N10	Train existing and future staff on NMT Planning	Developing and conducting training for NMT staff within central government and local government units		EUR 1 million
Total			EUR 500 M	EUR 62 M

The costed activities under the PUMP NMT thematic area amount to a total capital expenditure of approximately EUR 500 million ring-fenced for enhancement of NMT facilities, supported by a further EUR 62 million for supporting activities and increased capacity and resourcing within central and local government for the effective delivery of NMT policy.

Financing Mechanism and Structure

Financing for NMT related activities has taken three main forms to date; general government budget allocation, local government expenditure and donor agency support through concessional loan.

The activities outlined relate to increased resourcing and capacity building at both national and local level. To enable local government units to fulfil their expanding mandate on NMT planning and provision will require increased funding from the national level. For the main investment requirement, which is that of new NMT infrastructure and scheme capital expenditure, the mechanism already established under the *Green, Green, Green Programme* should be continued and scaled up.

The fund release process is shown below:

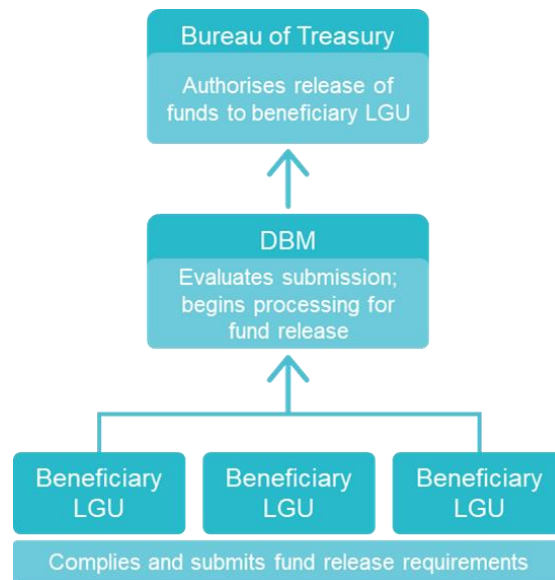


Figure 49. *Green, Green, Green Programme* Fund Release Process. (DBM, 2018)

5.3 Public Transport

Implementation of the *PUV Modernisation Programme* entails large scale investment in fleet modernisation, and funding for enabling measures.

According to LTFRB franchise data, there are in the order of 180,000 jeepney vehicles operating nationally, of which more than 90% will be older than 15 years by 2020 and therefore will no longer continue to operate in public service. The replacement of more than 160,000 jeepney vehicles is therefore necessary to maintain the levels of provision. Consolidation of the vehicle fleet and move to larger vehicles will allow a reduced ratio of new vehicles, although larger vehicles come at increased investment cost so overall capital cost remains broadly similar under differing levels of consolidation.

Exiting operator business model

The cost purchasing a second hand jeepney with franchise can vary from PHP 270,000 (EUR 4,700) to over PHP 500,000 (EUR 8,700) depending on the characteristics and profitability of the franchised route, with a 'typical' franchise valued at around PHP 350,000 (EUR 6,100). The jeepney unit is estimated to represent around PHP 200,000 (EUR 3,500) of this overall value (although the true market value of the unit is difficult to estimate given the lack of market for a unit without an associated franchise). By means of comparison, a newly built jeepney vehicle without franchise is estimated to cost around PHP 650,000 (EUR 11,300).

The operator is responsible for maintaining the vehicle. Maintenance tends to be carried out on a reactive rather than pro-active/preventative basis. The table below shows the estimated annual maintenance costs

identified in the Jeepney Market Study. Industry feedback suggesting typical maintenance costs of PHP 50,000 – 65,000 (EUR 900 – 1,150) per annum corroborate these figures.

Table 12: Annual maintenance cost of baseline jeepneys by route

Item	< 5 km	5 - 10 km	10 - 20 km	> 20 km
Engine Maintenance	PHP 8,344.5 (EUR 148.1)	PHP 13,740 (EUR 243.5)	PHP 26,037.6 (EUR 461.5)	PHP 31,161.9 (EUR 552.4)
Mechanical Maintenance	PHP 10,311.7 (EUR 182.8)	PHP 16,985.0 (EUR 301.1.3)	PHP 32,176.0 (EUR 570.5)	PHP 38,508.4 (EUR 682.6)
Total	PHP 18,656.3 (EUR 330.9)	PHP 30,729.8 (EUR 544.7)	PHP 58,213.6 (EUR 1,031.0)	PHP 69,670.3 (EUR 1,235.0)

(Biona, 2015)

Revenues for jeepney operation are generated by the carriage of fare paying passengers. Typical farebox revenues are in the region of PHP 3,000 – 4,000 (EUR 52.3 – 70.0) per day depending on the route. This revenue does not all go to the operator. The revenue received by the operator depends on the operating arrangements, and in particular whether the owner is an operator-driver or whether the unit is rented out.

Where the operator does not also drive (for example in the case of an owner of more than one unit) the income takes the form of a 'boundary payment. Under the boundary system, the revenue to the operator is the rental value of the unit. The typical boundary value ranges from PHP 500 – 1,200 (EUR 8.7 – 20.9) per day, dependent on the route characteristics.

Financing Mechanism

Recognising the need for sectoral support in financing new vehicles, both from an operator perspective and to achieve the desired aims of the program, the Philippine Government has partnered with the Development Bank of the Philippines (DBP) and the Landbank of the Philippines, to develop a financial assistance programme to support operators in making the necessary investment in modern Jeepney vehicles.

The development banks have put in place a credit facility to support the financing of modern jeepney vehicles, with the Philippine government allocating funds from the GAA as a grant to operators to support the down-payment requirement.

The financing model, which has colloquially been badged as the '5,6,7,' has the following loan attributes:

- 5% down-payment,
- 6% annual interest (typical rate – Landbank will in some cases demand a higher rate), and
- 7-year amortisation term (with a six-month initial grace period).

The government currently offers a subsidy of PHP 80,000 (EUR 1,400) or up 5% of vehicle cost for surrendering old franchise, but there have been talks of increasing this subsidy through the road users' tax (The Philippine Star, 2019).

A summary of the financing mechanism is shown in Figure 50.

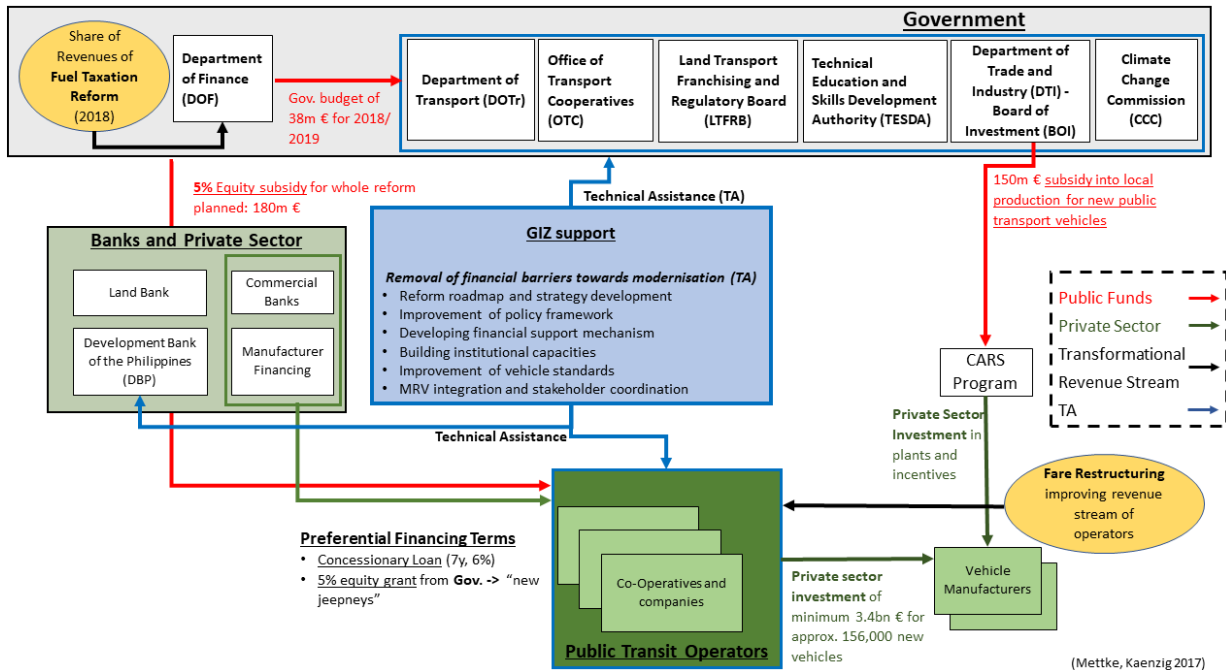


Figure 50. Public Transport (PUV Modernisation Programme) Financing Mechanism. (GIZ, 2018)

Modernised vehicle operating model

Evidence from the early implementation experience finds the purchase cost of modern "Type 2" jeepney vehicle complying with the new vehicle standards to lie within the range EUR 32,000 – 42,000. With a minimum route vehicle requirement of 15 vehicles, an operator is therefore anticipated to require a minimum investment of around EUR 0.5 million to be able to take on a modernised route franchise.

In total, the cost of replacement of more than 160,000 ageing jeepney vehicles is estimated to be in the region of **EUR 5.8 billion**. The cost of fleet modernisation will fall principally to the jeepney operating sector, with a financial support package to assist the sector in meeting the investment requirement. Without an operating subsidy for road based public transport service provision, the investment must be supported by the revenues generated from modernised jeepney operations.

The Type 2 jeepney vehicles are of greater capacity than the traditional jeepney, with a typical 24 seats and a maximum capacity of 30 by comparison with the 14-22 seated traditional jeepney (no standing). Evaluation of early operating experience suggests that the increased vehicle capacity, combined with increased rates of utilisation through shift-based operation by salaried on-vehicle staff leads to increased daily revenues per vehicle, with EUR 70 – 121 (PHP 4,000 – 7,000) typically achieved.

Differing operating cost structures to traditional jeepney operations include the increased investment/financing cost of the vehicle, the shift and salaried based staffing, new in-vehicle overhead including GPS and AFCS subscription fees, and wider non-vehicle overheads for fleet maintenance, depot and management structure. The typical monthly operating cost structure for diesel and electric jeepney are set out Table 13.

Table 13. Modern jeepney operating costs per month

PHP (EUR)	Class 2 Diesel Jeep (AC)	Electric Jeepney
Vehicle purchase price	1,925,000 (34,470)	1,850,000 (33,127)
Interest and depreciation	19,838 (355)	19,065 (341)
In-vehicle staff costs	59,500 (1,065)	24,750 (443)
Fuel cost	30,288 (542)	7,500 (134)
Maintenance	5,625 (101)	6,625 (119)
Other vehicle overheads	6,520 (117)	6520 (117)
Non-vehicle overheads	10,000 (179)	10,000 (179)
Total	131,771 (2,360)	74,460 (1,333)
Operated km/year	45,000 km	30,000 km
Cost/km	35 (0.63)	30 (0.54)

Source: Table by authors (2019)

The commercial viability of modernised operations has been evaluated based on the early experiences observed on the first routes. Initial findings demonstrate strong commercial viability.

Financial Viability Assessment

In order to establish the commercial viability of modern jeepney operations, the typical revenues and operating costs collected from the early operational experience has used to evaluate the commercial viability over the life of the vehicle using standard measures of commercial performance. For comparison, the financial returns from investing in a traditional jeepney using micro-finance (a common route to vehicle ownership for jeepney drivers). This comparison is detailed in the table below.

Table 14. Commercial Performance of Operations over 15-year Period (PHP/EUR)

Vehicle type	Traditional Jeepney	Modern Jeepney	
	Jeepney + Franchise	Euro IV Diesel Jeepney	Electric Jeepney
Investment	PHP 350,000 (EUR 6,200)	PHP 1,925,000 (EUR 34,000)	PHP 1,850,000 (EUR 32,750)
Financing source	Micro-Finance	DBP Finance	DBP Finance
Financial Internal Rate of Return (FIRR)	32%	55%	52%
Net present value @12%	PHP 629,000 (EUR 11,100)	PHP 881,000 (EUR 15,600)	PHP 1,167,000 (EUR 20,600)

Source: Table by authors (2019)

The analysis demonstrates that with the financial support package outlined under the financing mechanism, that modern jeepney vehicle operations can be profitable and offer strong return on investment. It should be noted that the very high rates of return are to a large extent reflecting the small investment requirement resulting from the high loan-to-value of the development bank loan, and the grant to support the operator deposit.

5.4 Urban Freight Costs and Revenues

The costs associated with the implementation of the ten actions identified to improve freight efficiency in the Philippines consist of the following:

- Operating expenditure relating to
 - Increased resourcing to strengthen the institutional structures and inter-agency co-ordination,
 - Increase in activities promoting closer freight industry engagement, and
 - Training, development of resources for operator development and capacity building, including consultancy support; and
- Capital expenditure on
 - Modernised vehicle fleet, and
 - Testing facilities related to Motor Vehicle Inspection System.

Existing Business Model

A lack of baseline data on freight sector operator characteristics and freight activity severely hampers the determination of typical operator business model, operating activity and commercial performance.

The quantification of likely fleet investment requirements is undermined by a lack of knowledge relating to fleet composition and age, and hence the scale and type of investment required. Broad estimates have therefore necessarily been based on the limited available data including total number of goods vehicles and generic costings drawing on typical types of vehicles observed to be operating.

The freight fleet operating today is now likely to be far in excess of the 350,000 freight vehicles registered as of 2013. Based on the best estimate that 80-90% already exceed the specified maximum age limit of 15 years, the implementation and enforcement of the existing legislation relating to the age limit on freight operations would see the enforced replacement of at least 300,000 goods vehicles.

The cost of goods vehicles varies widely according to vehicle specification and category, with goods vehicles ranging from small car-based vans to tractor-trailer units. Establishing typical costs without fleet composition data is necessarily a simplification. An indicative cost of EUR 30,130 (PHP 1.7 million) is taken as an indicative typical vehicle cost. Based on this, the scale of investment required to modernise the fleet will total EUR 9 billion (PHP 510 billion).

Costings of Urban Freight Activities

Beyond fleet modernisation, the ten identified actions within the urban freight thematic area involve increased resourcing of sectoral support activities and expenditure on measures which are targeted at improving efficiency within the sector.

High level costings for the ten identified urban freight actions are set out in Table 15.

Table 15. Costs of Urban Freight Activities.

No.	Measure	Cost Component	CAPEX (EUR, total)	OPEX (EUR, p.a.)
F1	Develop Freight Data Collection Mechanism	Review and data mining of import, registration and franchising data and enact revision to reporting requirements		EUR 200,000
F2	Develop and Implement Vehicle Standards	Impact assessment and drafting of revised legislation		EUR 300,000
F3	Establish inter-agency council on freight modernisation	Improved inter-agency co-ordination		N/A
F4	Establish national freight operator dialogue forum	Industry engagement, awareness raising and hosting of forum		EUR 300,000
F5	Restrict age and technology of imported used vehicles	Enforcement of legislation		N/A
F6	Support consolidation and professionalisation of the freight sector	Training and support for NGO led initiatives		EUR 300,000
F7	Establish a motor vehicle inspection system	Implementation of the MVIS scheme	EUR 340 million	
F8	Promote and assess modern fleet pioneers	Government support for NGO led initiative		EUR 200,000
F9	Explore scrappage and buyback program	Industry engagement and feasibility study		EUR 200,000
F10	Develop vehicle modernisation incentive regime	Develop financial assistance package to support fleet modernisation		TBD
Total			EUR 340,000	EUR 1.5 M

6. Expected Benefits and MRV Approach

This Measurement, Reporting, and Verification (MRV) study was developed to understand the key data elements necessary to develop ex-ante greenhouse gas (GHG) estimations for the Philippine Urban Mobility Programme (PUMP), focusing on active or non-motorised transport (NMT) and on urban freight. A monitoring plan will subsequently be developed that would enable relevant data to be gathered for future reporting purposes of potential GHG reductions for these two areas. Non-GHG reduction co-benefits associated with the implementation of the PUMP will also be briefly discussed here. Lastly, this also presents primary back-of-the-envelope calculations for the remaining two PUMP themes, namely travel demand management (TDM) and transit-oriented development (TOD).

The NMT thematic area of the MRV Study is valuable as a reference to build capacity among transport practitioners in the Philippines, particularly among transport and urban planners both at the national and local levels. Moreover, it is envisioned that this MRV study would lead to an improvement in the collection of relevant data for urban mobility planning in the future. Finally, by making information available for enhanced decision making, the objective is to increase investment in urban realm enhancement projects with an emphasis on walking and cycling as mainstream provisions in Highly Urbanized Cities (HUCs).

For urban freight, the sub-objective of the study is to provide foundational information that would lead to fleet modernisation. As with the sub-objective of the NMT thematic area, it is intended that this study underlines the need for data collection critical for long-term freight planning for the Philippines. The study may also serve as a reference for transport planners which could provide the necessary data allowing for evidence-based decisions to be made in national urban mobility planning.

This study may also contribute to future freight programs such as a training “centre of excellence,” a fleet operator recognition scheme, or infrastructure support mechanisms including “freight gates” and clean air zones.

6.1 Cause-Impact Chain

This section presents the different cause-impact chains for each of the five themes under the PUMP. Comprehensive discussions are available for both NMT and urban freight thematic areas since these two are the focus of this MRV study.

Non-Motorised Transport (NMT)

Walking and cycling as fundamental modes of mobility allow citizens to travel from one point in the city to another. In the Philippines, metropolitan areas such as Metro Manila, Metro Cebu, and Metro Davao have no tradition of biking and subsequently, the infrastructure for biking is available only in small pockets within the metropolis. Moreover, there is a social stigma associated with these modes of mobility whereby walking and biking are often viewed as mobility means used by poorer segments of society (Bakker et. al., 2017).

Encouraging biking as a mode of transportation has the potential of reducing air pollution by an estimated 1.48% by shifting from the use of motorized internal combustion engine (ICE) vehicles to a mode that has no emissions (Vergel and Tiglao, 2013). Shifting from ICE transport modes to biking and walking has the potential to reduce fuel combustion in from traditional ICEs thereby reducing greenhouse gas emissions. It has been recommended that a holistic planning approach to mobility planning be developed with specific guidelines on NMT structure design and operations (Mejia et. al. 2017).

As illustrated in the causal chain diagram below, improving infrastructure for walking and biking would result in avoided motorised trips per person and in some cases reduced trip length when used in first mile and/or last mile situations. In evaluating the GHG emission impacts from such a shift, data indicators include the number of trips per person, number of person trips per mode, the length of each trip, and emission factors. A key parameter – passenger kilometre travelled for each transportation mode – is needed (Eichhorst, et al. n.d.).

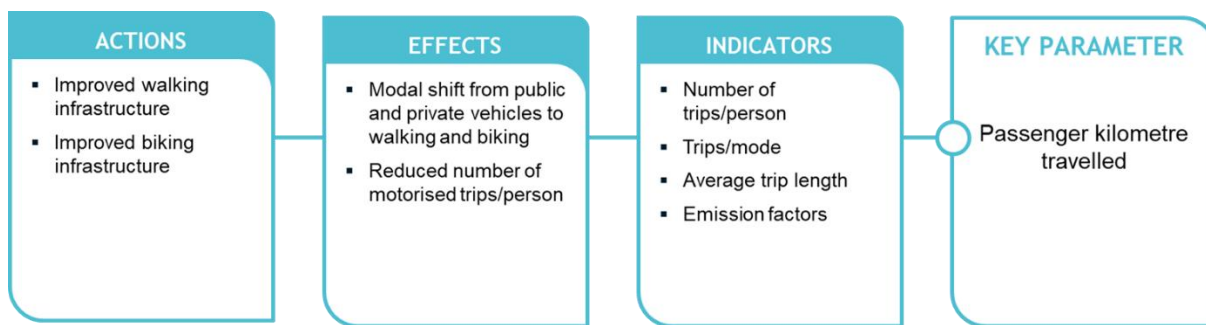


Figure 51. Cause-Impact Chain for Non-Motorised Transport.

Noting that walking and biking infrastructure are not a significant part of the urban planning practice in the Philippines, it is not a surprise that data availability in this area is sparse. Data is available in key metropolitan areas in the Philippines such as Metro Manila and Metro Cebu. However, for other areas (even highly urbanised cities), data collection is not practiced as part of regular operations of a city. Nonetheless, from census data, it is possible to obtain population data for HUCs. It can be assumed that the travelling population of a city are those 5-year-old and above travelling twice per day using an array of transportation modes.

Public Transport

The sustainable public transport theme of the PUMP focuses on jeepneys and buses to modernise public transport in the Philippines (through the *PUV Modernisation Programme*). Under this, there are two main approaches:

1. fleet consolidation and rationalisation of public transport routes in favour of cleaner buses and minibuses; and
2. more efficient city buses and modernisation of the current jeepney fleet.

Both approaches are expected to improve vehicle technology and reduce the number jeepneys (due to consolidation of operations and additional seating capacity). Figure 52 shows the cause-impact chain for public transport.

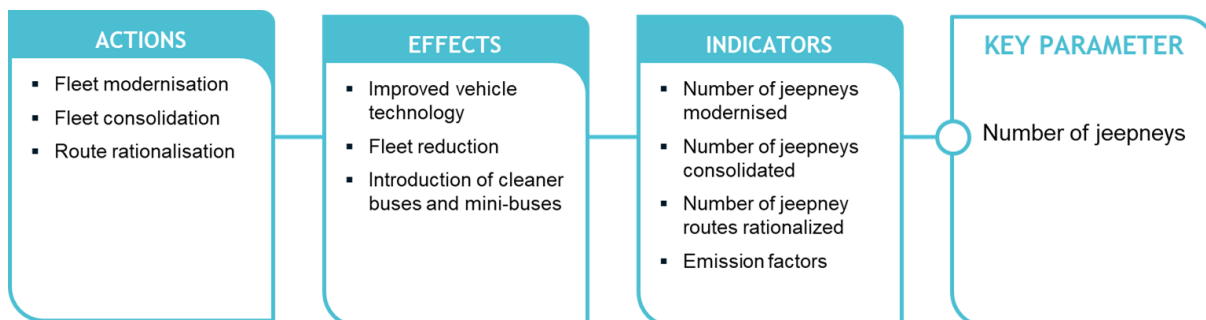


Figure 52. Cause-Impact Chain for Public Transport.

Urban Freight

The primary source of GHG emissions for freight systems is the combustion of fossil fuel during the operations of freight vehicles in transporting goods from one point to the other. Interventions may include improvements in technological efficiencies, optimizing technology efficiencies through behavioural nudging, and reducing empty trips/miles. All intervention types will ultimately lead to a reduction of fuel consumption. This reduction in fuel consumption would then be the basis for calculating emissions reduction from the PUMP intervention (Kaenzig, 2018).

This thematic area involves a mix of interventions and supporting activities to facilitate the realization of a more sustainable road freight transport sector in the Philippines. It is primarily hinged on the development

of a Green Freight Program, which will be the mechanism by which the mitigation measures are to be implemented.

A key recommendation of the 2018 study on the “Green Freight and Logistics Policy Development in the Philippines” was the improvement of truck efficiency pointing out that as much as 90% of trucks in the Philippines are more than 15 years old partly due to the imports of second-hand trucks into the country. Truck use optimisation was also recommended through the minimization of empty miles and by professionalising the logistics industry including eco-driver training.

One intervention that is ready to be implemented is the upgrade of the current road-freight fleet mandated by DOTr Department Order (DO) 2007-009 mandating the age limit of road freight vehicles to a maximum 15 years. Policy legislation is currently in place through this DO yet, implementation and enforcement are lagging behind. This MRV study therefore considered a package of efficiency interventions including fleet renewal, fleet operator training, technology adoption and the emission reduction potential of such interventions. The causal chain diagram below illustrates the key indicators necessary for such interventions.

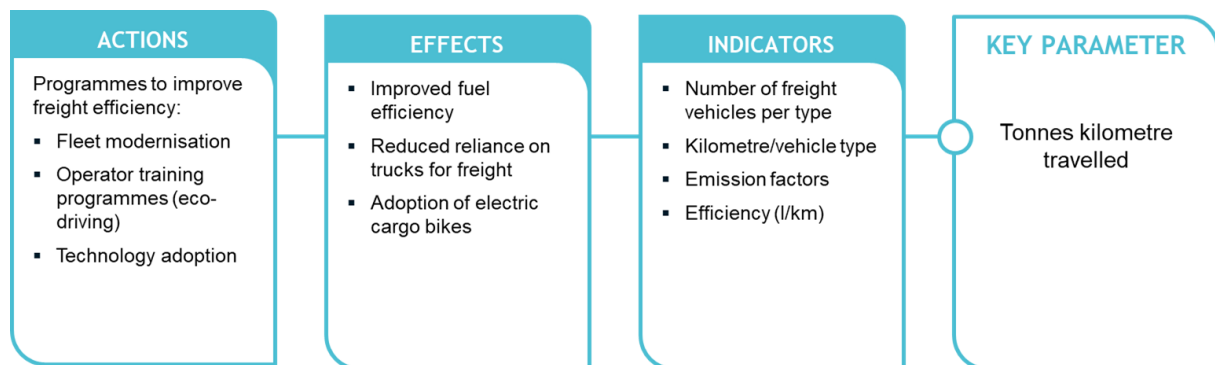


Figure 53. Cause-Impact Chain for Urban Freight.

The causal chain diagram above illustrates that the important indicators in evaluating and monitoring a fleet efficiency/fleet upgrade intervention would include the number of freight vehicles per type, annual kilometres travelled per vehicle type, efficiency per vehicle type and fuel emission factor for diesel used within the project boundary. Ideally, in-country emission factors should be used if available. Finally, the key parameter for this MRV study on freight is the annual tonnes kilometre travelled (TKT).

Travel Demand Management (TDM)

Measures to manage and reduce motorised trips of people within a given area such as congestion charging and establishment of a work from home set-up or telecommuting may be considered by the government under TDM. Key indicators for the calculation of GHG reduction resulting from such interventions include the number of trips per person, trips per mode of transportation, average trip length, and emission factors. The key parameter considered was passenger kilometre travelled. Figure 54 shows the cause-impact chain for TDM.

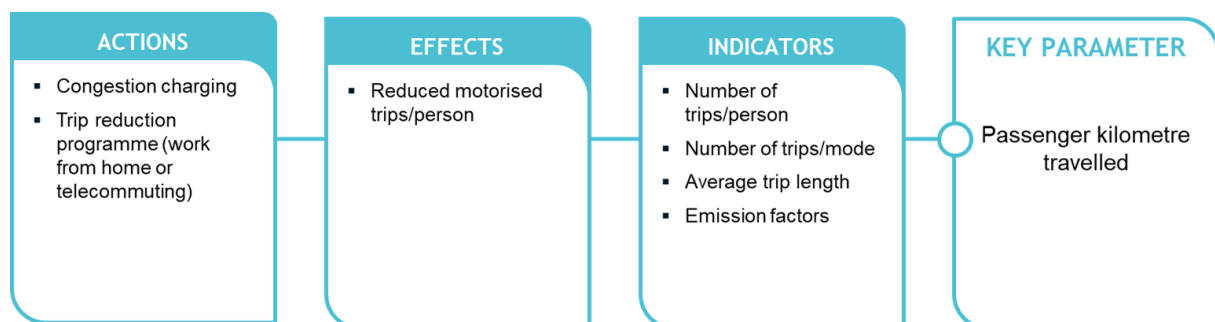


Figure 54. Cause-Impact Chain for Travel Demand Management.

Transit Oriented Development (TOD)

Land-use planning, spatial planning, and land value capture are among the measures which may be considered as part of TOD. These measures allow public transport to be the main means of travel, complemented by active transport. According to the Center for Clean Air Policy (n.d.), such measures could potentially result in 20% to 30% reduction in vehicle kilometres travelled. The indicators considered in calculating the emission and pollutant reduction resulting from such measures include number of trips per person, number of trips per transport mode, average trip length, passenger kilometres travelled, average occupancy per mode of transportation, and emission factors. The key parameter considered was vehicle kilometre travelled. The diagram below shows the cause-impact chain for TOD.

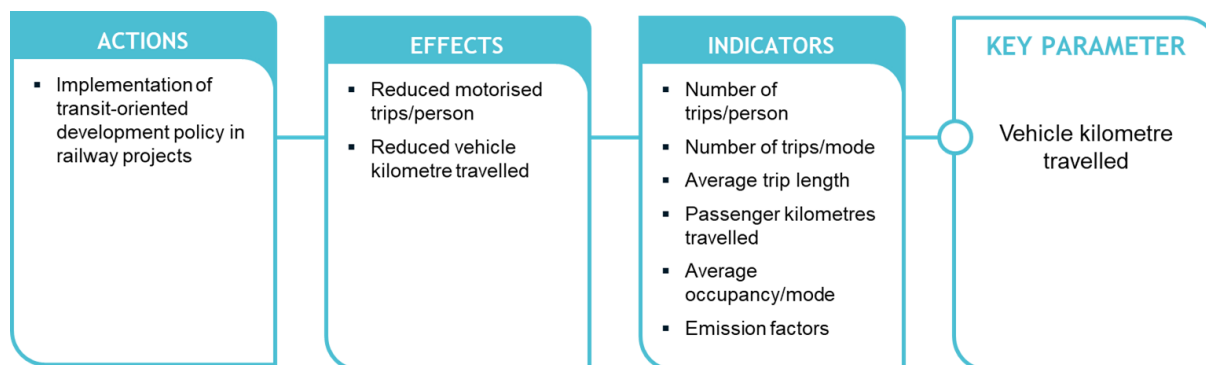


Figure 55. Cause-Impact Chain for Transit Oriented Development.

6.2 Assessment Boundaries

This presents the scope and limitations of this MRV study by specifying the boundaries for each of the five PUMP themes. Boundary elements include temporal, sectoral, territorial, emissions, and pollutants covered.

Non-Motorised Transport (NMT)

The tank-to-wheel (TTW) emission savings resulting from the improvement of bikeways and walkways were considered as the main interventions under the NMT thematic area. The analyses only covered the person-trips within the MUCEP Area, Metro Cebu, and other Highly Urbanized Cities (HUCs) in the Philippines. Assessment of pollutant emission savings also include PM and NO_x, shown in Table 16.

Table 16. Assessment boundaries for Non-Motorised Transport.

Boundary elements	Description
Temporal boundary	2020-2030
Sectoral boundary	The assessment covers reduced emissions due to the modal shift to non-motorised transport arising from the implementation of NMT programs such as improved bikeways and walkways.
Territorial boundary	MUCEP Area, Metro Cebu, and other Highly Urbanized Cities in the Philippines
GHG included	The focus is on direct, activity-based GHG emissions. The monitoring covers tank-to-wheel CO ₂ emissions Indirect upstream emissions for fuel production or vehicle manufacturing are not covered.
Sustainability effects included	Estimates of pollutant emissions cover particulate matter (PM) and nitrogen oxide (NO _x).

(Clean Air Asia, 2019)

Public Transport

The assessment boundaries for public transport, as presented Table 17, are based on the previous study of GIZ (2016). Tank-to-wheel (TTW) emissions were considered within the boundaries of this MRV study and covers jeepneys, buses, and minibuses.

Table 17. Assessment boundaries for Public Transport.

Boundary elements	Description
Temporal boundary	2020-2030
Sectoral boundary	The assessment covers road based public transport activities, in particular by jeepneys, buses, and minibuses.
Territorial boundary	<p>Due to the nature of the mitigation activity, the territorial boundary distinguishes between two layers of analysis:</p> <p>At the national level, the territorial boundary includes all pilot cities and their respective territorial assessment boundary.</p> <p>At the city level, for each city implementing consolidation and modernisation of their public transport services a suitable territorial boundary is determined, which can differ between component A and B.</p> <p>For Metro Manila, the exact routes to be covered in the ex-post analysis will depend on the choice of pilot applications for component A and B.</p>
GHG included	<p>The focus is on direct, activity-based GHG emissions. The monitoring covers tank-to-wheel CO₂, CH₄ and N₂O and CO emissions, as well as emissions related to electricity generation, which are also included as direct emission source in the case of electric jeepneys.</p> <p>Indirect upstream emissions for fuel production or vehicle manufacturing are not covered.</p>
Sustainability effects included	<p>Estimates of pollutant emissions cover particulate matter (PM), nitrogen oxide (NO_x), sulfur oxide (SO_x), carbon monoxide (CO), and non-methane hydrogen compounds (NMHC) from road-based public transport activities within the territorial boundaries.</p> <p>In addition, road accidents and formal employment created vs. jobs lost / income developments of drivers and operators are also monitored.</p> <p>Energy security is assessed based on the net fuel savings of the mitigation activities, which are calculated anyhow for GHG emissions assessment.</p>

(Clean Air Asia, 2019)

Urban Freight

The assessment boundaries for urban freight have been limited to road freight systems. Due to the limitations in data availability, no distinction between urban and rural freight systems was done in this study. As such, the freight system for the entire Philippines has been chosen as the project boundary for subsequent calculations. Only tank-to-wheel (TTW) emissions were considered within the boundaries of this MRV study. Indirect sources of emissions such as from the transport of fuel from refinery to the filling stations and fuel processing were not included in the analyses. Table 18 below shows the assessment boundaries for urban freight.

Table 18. Assessment boundaries for Urban Freight.

Boundary elements	Description
Temporal boundary	2020-2030
Sectoral boundary	The assessment covers freight efficiency improvement programs such as eco-driving, truck modernisation, technology adoption, online freight exchange, and electric cargo bike adoption.
Territorial boundary	Entire Philippines
GHG included	The focus is on direct, activity based GHG emissions. The monitoring covers tank-to-wheel CO ₂ emissions Indirect upstream emissions for fuel production or vehicle manufacturing are not covered.
Sustainability effects included	Estimates of pollutant emissions cover particulate matter (PM), nitrogen oxide (NO _x), volatile organic compounds (VOC), and carbon monoxide (CO).

(Clean Air Asia, 2019)

Travel Demand Management (TDM)

The MRV assessment boundaries for TDM has been limited to the avoided person-trips due to the implementation of congestion charging in the MUCEP Area and work from home law or the Telecommuting Act (Republic Act 11165). The areas covered are the MUCEP Area, Metro Cebu, and other HUCs in the Philippines. Table 19 shows the assessment boundaries for TDM.

Table 19. Assessment boundaries for Travel Demand Management.

Boundary elements	Description
Temporal boundary	2020-2030
Sectoral boundary	The assessment covers avoided person-trips due to the implementation of congestion charging and work from home law.
Territorial boundary	MUCEP Area, Metro Cebu, and other Highly Urbanized Cities in the Philippines
GHG included	The focus is on direct, activity-based GHG emissions. The monitoring covers tank-to-wheel CO ₂ emissions. Indirect upstream emissions for fuel production or vehicle manufacturing are not covered.
Sustainability effects included	Estimates of pollutant emissions cover particulate matter (PM) and nitrogen oxide (NO _x).

(Clean Air Asia, 2019)

Transit Oriented Development (TOD)

The assessment boundaries for TOD has been limited to provinces in the Philippines which are expected to be affected by the rail projects of the DOTr. A list of rail projects in the pipeline of the department was used as basis in identifying the said provinces. The assessment focused on the avoided vehicle kilometres travelled due to the implementation of transit-oriented development programs in these railway projects. Table 20 shows the assessment boundaries for TOD.

Table 20. Assessment boundaries for Transit Oriented Development.

Boundary elements	Description
Temporal boundary	2020-2030
Sectoral boundary	The assessment covers avoided vehicle kilometres travelled due to the implementation of transit-oriented development programs in railway projects.
Territorial boundary	Provinces with rail projects
GHG included	The focus is on direct, activity based GHG emissions. The monitoring covers tank-to-wheel CO ₂ emissions. Indirect upstream emissions for fuel production or vehicle manufacturing are not covered.
Sustainability effects included	Estimates of pollutant emissions cover particulate matter (PM) and nitrogen oxide (NO _x).

(Clean Air Asia, 2019)

6.3 Ex Ante Impact Assessment

6.3.1. Baseline and Mitigation Scenarios

This section describes the baseline or business as usual scenario (BAU) and the different mitigation scenarios (optimistic and practical) for the different PUMP themes. The development of different parameters (CO₂ emissions, co-benefits, and non-GHG emissions) under the BAU scenario shows how these parameters are expected to develop in the absence of any intervention, i.e., without implementing the measures conforming these mitigation actions. Baselines are required to determine the impact of the mitigation actions compared with a reference case (the baseline). The calculation of the GHG mitigation potential and the estimation of the sustainable development benefits are based on the following scenarios and main assumptions. Since this assessment is realised before implementing the mitigation action, it is called *ex ante* impact assessment.

Table 21. BAU and Mitigation Scenarios.

Scenario	Main assumptions and sources	Uncertainties
Business-as-usual Scenario (BAU)	<ul style="list-style-type: none"> ▪ The sustainable public transport programme will not be implemented ▪ The same modal share for all person-trips (2015 census of population, MUCEP data, Metro Cebu data) ▪ The freight modernisation programme (DOTr DO 2017 – 009) will not be implemented ▪ TDM policies (work from home and congestion charging) will not be implemented by the government or adopted by employers (2015 census of population, MUCEP data, Metro Cebu data) ▪ TOD policy for railway stations will not be implemented (2015 census of population, MUCEP data, Metro Cebu data, DOTr rail data) 	<ul style="list-style-type: none"> ▪ Status quo

<p>Scenario 1 “Practical Scenario”</p>	<ul style="list-style-type: none"> ▪ The public transport modernisation programme will result in the consolidation of 70% of the total jeepneys in the Philippines and modernisation of 70% of the total jeepneys in the Philippines (GIZ, 2015) ▪ Improved bikeways and walkways will result in 10% increase in the mode share for NMTs in Metro Cebu and other HUCs; BAU modal share for the MUCEP area (2015 census of population, MUCEP data, Metro Cebu data) ▪ Truck modernisation programme will result in the replacement of the worst 1% of truck population, enable access to green technologies for 5% of trucks, increased fuel efficiency because 10% of trucks will be driven by drivers trained as part of a fleet operator recognition scheme, participation of 10% of the fleet in the online freight exchange, and introduction of 10,000 e-cargo bikes. ▪ TDM policies, work from home (all areas) and congestion charging (MUCEP area), will be implemented and will result in 10% reduction in work-related trips and reduction in emissions – 13% Co2, 11% PM, and 8% NOx (2015 census of population, MUCEP data, Metro Cebu data, ADB data) ▪ TOD policy for railway projects will be implemented and will result in 20% reduction in vehicle kilometres travelled. However, since there is no clear indication from the DOTr about their targets on TOD implementation, only 10% of the actual GHG and pollutant reduction is assumed to be achieved during the specified timeline (2015 census of population, MUCEP data, Metro Cebu data, DOTr rail data, CCAP Guidebook) 	<ul style="list-style-type: none"> ▪ Uncertainty in the scaling up of non-motorised transport projects outside the MUCEP area. ▪ Uncertainty in the adoption of e-cargo bikes ▪ Uncertainty in requiring truck drivers to undergo training ▪ Uncertainty in the implementation of congestion charging within the MUCEP area ▪ Uncertainty in the adoption of work from home policies by the employers ▪ Uncertainty in the implementation of TOD policy all in railway projects
<p>Scenario 2 “Optimistic Scenario”</p>	<ul style="list-style-type: none"> ▪ The public transport modernisation programme will result in the consolidation of 100% of the total jeepneys in the Philippines and modernisation of 100% of the total jeepneys in the Philippines (GIZ, 2015) ▪ Improved bikeways and walkways will result in 20% increase in mode share for NMTs in Metro Cebu and other HUCs; 2% increase modal share for NMTs in the MUCEP area (2015 census of population, MUCEP data, Metro Cebu data) ▪ Truck modernisation programme will result in the replacement the worst 2% of the truck population, enable access to green technologies for 10% of the trucks, fuel efficiency because 100% of trucks will be driven by drivers that have been trained, participation of 20% of the fleet in the online freight exchange program, and introduction of 10,000 e-cargo bikes. ▪ TDM policies, work from home (all areas) and congestion charging (MUCEP area), will be implemented and will result in 20% reduction in work-related trips and reduction in emissions – 	<ul style="list-style-type: none"> ▪ Uncertainty in the scaling up of non-motorised transport projects outside the MUCEP area. ▪ Uncertainty in the adoption of e-cargo bikes ▪ Uncertainty in requiring truck drivers to undergo training ▪ Uncertainty in the implementation of congestion charging within the MUCEP area ▪ Uncertainty in the adoption of work from home policies by the employers ▪ Uncertainty in the implementation of TOD

	<p>22% Co₂, 19% PM, and 13% NO_x (2015 census of population, MUCEP data, Metro Cebu data, ADB data)</p> <ul style="list-style-type: none"> TOD policy for railway stations will be implemented and will result in 30% reduction in vehicle kilometres travelled. However, since there is no clear indication from the DOTr about their targets on TOD implementation, only 10% of the actual GHG and pollutant reduction is assumed to be achieved during the specified timeline (2015 census of population, MUCEP data, Metro Cebu data, DOTr rail data, CCAP Guidebook) 	policy all in railway projects
--	---	--------------------------------

6.3.2. Methodology for Calculation

This section presents the over-all methodology used for calculating the GHG and non-GHG impacts of all PUMP thematic areas. The Activity, Structure, Intensity and Factor (ASIF) method is used in calculating emissions.

In broad terms, ex-ante emission reductions were calculated as follows:

$$ER = BE - PUMP \text{ Emissions}$$

Total emission reduction (ER) is calculated as a result of the difference between baseline emissions (BE) less emissions from the PUMP interventions (PUMP Emissions). The baseline scenario for all PUMP thematic areas is the business-as-usual scenario whereby no interventions occur from now until the end of the calculation period. This means that emissions will continue into the future without any form of reduction while keeping key parameters and calculation rates constant.

As mentioned, the ASIF method was utilized for the calculation of emissions per scenario for all PUMP components, to wit:

$$\text{Emissions} = \text{Activity (A)} \times \text{Structure (S)} \times \text{Energy Intensity (I)} \times \text{Emission Factor (F)}$$

where:

Activity = person-trips based on existing data and population projections; tonnes-kilometer based on assumptions; vehicle kilometres travelled based on existing data and population projections

Structure = based on MUCEP, Metro Cebu, and General Santos City modal share

Energy Intensity = person-trips per mode based on existing data and population projections; tonnes-kilometer per freight type based on assumptions; vehicle kilometres travelled per mode based on existing data and population projections

Emission Factor = emission per passenger kilometre travelled based on the TEEMP model and calculations by Mejia (2015); emission per vehicle kilometre travelled based on the calculations by Mejia (2015)

6.3.3. Data

This section presents the data utilised for calculating the GHG and non-GHG impacts of all the PUMP themes. For public transport, the calculations in the previous MRV study (GIZ, 2016) were used.

Non-Motorised Transport (NMT)

The ADB database includes information for the transport sector of the Philippines that covers key data parameters such as vehicle ownership, length of roads, as well as data for passenger activity such as passenger-kilometre travelled. The data, however, goes beyond the defined project boundary for walking and biking within HUCs. Other data sources would, therefore, need to be explored.

A significant amount of data exists for key urban centres in the Philippines, namely, Metro Manila and Metro Cebu. Research shows that studies in these urban areas started as far back as the early 70's and as recently as 2018 (GIZ, 2018). Unfortunately, these data sets do not provide data on smaller HUCs which are part of the project boundary for walking and biking.

Since 2017, a capacity building programme on route rationalization planning has been undertaken by DOTr following the publication of Local Public Transport Route Planning Manual (LPTRP Manual). This programme has empowered cities to gather key data on inter-city trips, and origin/destination studies including inter-regional public transport planning. Some cities have already begun gathering local data however only a handful have submitted their final studies. It is expected that after the completion of the LPTRPs for each of the LGUs, more data on NMT will become available for use in policy making.

However, pending the finalization of these route plans, this study utilized census data of HUCs without available transportation data as substitute values. To calculate for the person-trips figures per HUC, the study team used population data (i.e. population of 5 years old and above multiplied by two) of each city. The passenger-kilometres per area were then estimated by multiplying the assumed person-trips and the average trip length based on the MUCEP model.

Urban Freight

Data was evaluated from existing, publicly available literature as well as official data. Official data from the Land Transportation Franchising and Regulatory Board (LTFRB) made available the number of registered trucks and trailers in the country. These categories, however, are not disaggregated into other sub-categories that would be useful in providing a more accurate picture of GHG emissions (LTFRB, 2018). Moreover, it is estimated that as much as 30% of freight trucks in the country operate with being officially registered. (Interview with Engr. Sheila Javier, NCTS)

The earliest and most comprehensive study on freight in the Philippines was the Survey on Inter-Regional Passenger and Freight Flow (SIRPAFF). This was a comprehensive, country wide survey conducted by the National Center for Transportation Studies (NCTS) in 2004 involving person-trip, origin-destination survey. The survey yielded data for Ton-Km Travelled of 34,643, 567.46 million tons per annum or 99.97% of commodities transported in the country. (SIRPAFF, 2005). This was the same data quoted in the GIZ published "Philippine Stocktaking Report on Sustainable Transport and Climate Change" (Mejia, Dematera Contreras, Guillen, Villaraza, & Bakker, 2016).

Once the total registrations have been projected, new registrations—in this study, it is assumed that new registrations equal sales, for simplicity—are estimated. This is done by subtracting the remaining vehicles from previous registrations from the estimated total registrations. The remaining vehicles are estimated using retirement factors based on the EFFECT model (Rogers, n.d.). Vehicle stock matrixes for each of the sub-categories were constructed using this curve, as well as historical data (new, renewal, and total registrations). The availability of such matrixes allows for the estimation of impacts of age-based policies (e.g. age restrictions, or targeted replacement schemes based on age), as well as the impacts of other policies that require age information such as the implementation of more advanced emission standards at the national level.

Once the vehicle (and age) matrixes have been estimated (type-category-fuel type), vehicle activity in the form of vehicle-kilometres travelled (VKT) were estimated. Base VKT values were borrowed from the EFFECT model (Rogers, n.d.), as well as the vehicle activity deterioration factors. These factors essentially recognize the fact that older vehicles tend to perform lower levels of activity than newer ones.

Travel Demand Management (TDM) and Transit Oriented Development (TOD)

The first back of the envelope calculations for travel demand management and transit-oriented development utilized the same data used in calculating the GHG and non-GHG impacts of the NMT thematic area. Population data from the 2015 census, MUCEP data, Metro Cebu data, and General Santos City data were used as the primary sources of information in calculating for passenger transportation activities in the areas covered by the TDM and TOD themes. A list of railway projects was also obtained from the DOTr and served as a guide in determining the provinces which will benefit from TOD policies.

Table 22 summarises all the data utilised in the calculation of GHG and non-GHG benefits resulting from the PUMP interventions.

Table 22. Data utilised to calculate for GHG and non-GHG benefits of PUMP.

Parameter	Notation	Value and unit	Source
Activity and Structure	A/S	Population	Philippine Statistics Authority (2015)
Activity and Structure	A/S	Trip/person	Assumption
Activity and Structure	A/S	Person-trips	Population data and assumptions
Activity and Structure	A/S	Average trip length (km/trip)	MUCEP data (JICA, 2014), Metro Cebu data (JICA, 2014), and General Santos City data (GenSan LPTRP, 2018)
Activity and Structure	A/S	Modal share (trips/mode)	MUCEP data (JICA, 2014), Metro Cebu data (JICA, 2014), and General Santos City data (GenSan LPTRP, 2018)
Activity and Structure	A/S	Average occupancy (occupancy/ mode)	MUCEP data (JICA, 2014) and Metro Cebu data (JICA, 2014)
Activity and Structure	A/S	Average load (load/ mode)	EFFECT model (Rogers, n.d.)
Activity and Structure	A/S	Passenger kilometre (pkm)	Own calculations and assumptions
Activity and Structure	A/S	Tonne kilometre (tkm)	Own calculations and assumptions
Activity and Structure	A/S	Vehicle kilometre travelled (vkt)	Own calculations and assumptions
Activity and Structure	A/S	Fuel split (% fuel type)	LTO data and EFFECT model (Rogers, n.d.)
Activity and Structure	A/S	Technology split (% technology type)	LTO data LTO data and EFFECT model (Rogers, n.d.)
Intensity	I	Fuel consumption (L/km L/100km)	EFFECT model (Rogers, n.d.)
Factor of emissions (GHG)	F	GHG Emission (GHG/km) GHG/pkm GHG/tkm GHG/vkt)	EFFECT model (Rogers, n.d.) and TEEMP model (Clean Air Asia et al., n.d.)
Factor of emissions (non-GHG)	F	Non-GHG Emission (non-GHG/km) non-GHG/pkm non-GHG/tkm non-GHG/vkt)	EFFECT model (Rogers, n.d.) and TEEMP model (Clean Air Asia et al., n.d.)

6.3.4. Expected Benefits

6.3.4.1. GHG Mitigation Impact

The mitigation actions under the PUMP are expected to achieve accumulated GHG emission reductions in the range of 15.01 MtCO_{2e} to 27.13 MtCO_{2e} over 10 years between 2020 and 2030. This translates into an average annual GHG emission reduction of 1.5 MtCO_{2e} to 2.7 MtCO_{2e} until 2030. The implementation of the mitigation actions will reduce the total accumulated transport GHG emissions in the Philippines from 2020 to 2030 by 6% to 10%.

Table 23 summarises the core numbers for the two different scenarios compared with the baseline scenario.

Table 23. Ex-ante GHG Impact Assessment 2020-2030.

PUMP Thematic Area	Geographical Area	Practical Scenario (in MtCO _{2e} accumulated over 10 years)	Optimistic Scenario (in MtCO _{2e} accumulated over 10 years)
A: Non-Motorised Transport	MUCEP Area, Metro Cebu, and all other HUCs	1.43	3.46
B: Public Transport	Philippines	6.50	9.20
C: Urban Freight	Philippines	1.61	5.00
D: Travel Demand Management	MUCEP Area, Metro Cebu, and all other HUCs	4.40	7.83
E: Transit Oriented Development	Provinces and HUCs traversed by rail projects	1.07	1.63
Total Savings (in MtCO_{2e})		15.01	27.13

(Clean Air Asia, 2019)

As seen in Table 23, a significant portion of the GHG emission reduction would result from the implementation of the public transport improvements. This focuses on the modernisation of the jeepneys, rationalisation of public transport routes, and consolidation of the jeepney industry. For this PUMP theme alone, a total of 6.50 MtCO_{2e} could be reduced under the practical scenario and as high as 9.20 MtCO_{2e} under the optimistic scenario.

Implementing congestion charging within the MUCEP area and work from home or telecommuting (mitigation actions under TDM) could also significantly contribute to the GHG emission reduction efforts of the government. Based on the calculations, around 4.40 MtCO_{2e} could be reduced under the practical scenario and 7.83 MtCO_{2e} under the optimistic scenario.

Other PUMP themes could reduce GHG emissions by around 1.43 MtCO_{2e} to 3.46 MtCO_{2e} for NMT, 1.61 MtCO_{2e} to 5.00 MtCO_{2e} for urban freight, and 1.07 MtCO_{2e} to 1.63 MtCO_{2e} for TOD.

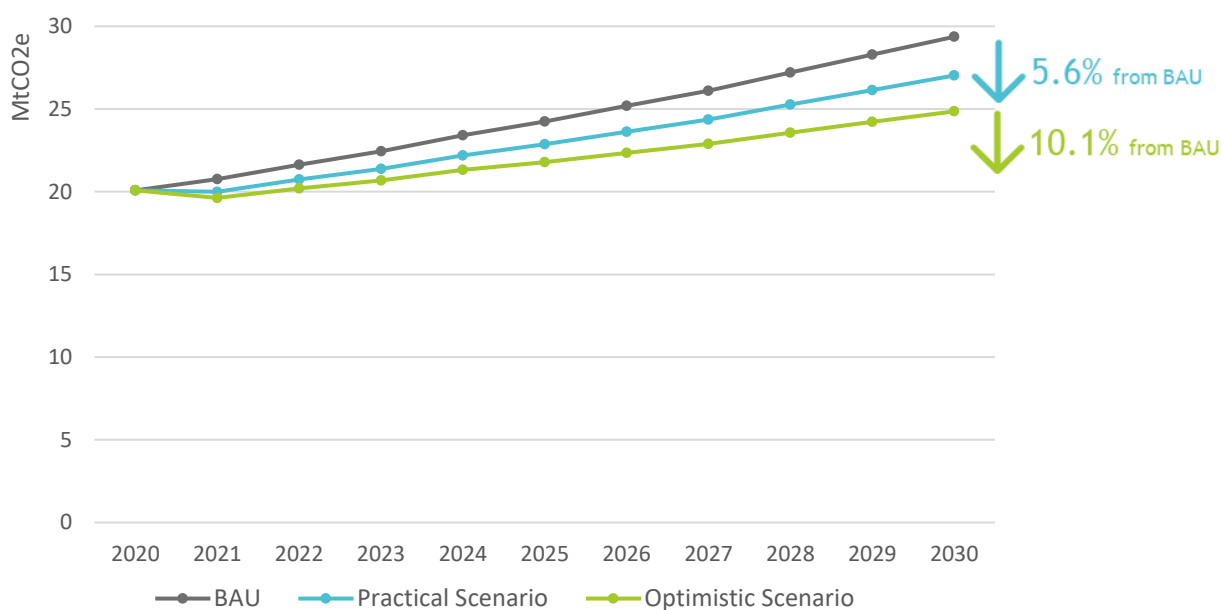


Figure 56. Philippine Road Transport GHG Emissions per Scenario (2020-2030).

Figure 56, on the other hand, compares the different scenarios in terms of the total GHG emissions from the transport sector from 2020 – 2030. Under the BAU scenario, a total of 268.7 MtCO_{2e} is the expected emission from the transport sector during the said period. This could potentially be reduced to 253.7 MtCO_{2e} (5.6% from BAU) if the government will implement PUMP in line with the practical scenario. The transport GHG emissions could be further reduced to 241.6 MtCO_{2e} (10.1% from BAU) if PUMP implementation will be according to the assumptions in the optimistic scenario.

6.3.4.2. Sustainable Development Benefits

The mitigation actions are also expected to achieve non-GHG emission reductions such as particulate matter (PM), carbon monoxide (CO), nitrogen oxide (NO_x), sulfur oxide (SO_x), and non-methane hydrogen compounds (NMHC). The table below summarises the core numbers for the two different scenarios compared with the baseline scenario.

Table 24. Total Pollutant Emissions Avoided from 2020 to 2030 (accumulated tonnes over 10 years)

PUMP Theme	Scenario	PM	CO	NO _x	SO _x	NMHC
Non-Motorised Transport	Practical	2,915	-	19,131	-	-
	Optimistic	7,741	-	53,501	-	-
Public Transport	Practical	384	2,515	922	1	764
	Optimistic	549	3,593	1,317	9	1,095
Urban Freight	Practical	381	2,569	7,772	1,365	-
	Optimistic	1,111	7,599	24,703	4,047	-
Travel Demand Management	Practical	12,244	-	74,923	-	-
	Optimistic	22,071	-	131,606	-	-
Transit Oriented Development	Practical	4,473	-	32,161	-	-
	Optimistic	6,040	-	44,031	-	-
Total Savings (in tonnes)	Practical	20,397	5,084	134,908	1,366	764
	Optimistic	37,511	11,191	255,158	4,055	1,095

(Clean Air Asia, 2019)

As seen in Table 24, NO_x emissions could be reduced by around 4% to 7.8% equivalent to 134,908 to 255,158 tons under the practical and optimistic scenarios, respectively. Particulate matter emissions on the other hand could be reduced by around 4.9% equivalent to 20,397 tons under the practical scenario and by around 9% equivalent to 37,511 tons under the optimistic scenario. Other pollutants are also expected to be reduced such as CO (5,084 tons to 11,191 tons reduced), Sox (1,366 tons to 4,055 tons reduced), and NMHC (764 tons to 1,095 tons reduced).

Aside from the expected non-GHG emission reductions, the mitigation actions could also result in non-GHG co-benefits as elaborated in the table below which include measures ranging from improvement of walking and biking conditions, increased NMT activity, reduced automobile travel, and more compact communities. The Philippine Green Freight Assessment also recommended several areas for the overall improvement road freight in the Philippines. The recommendations are expected to result in both GHG and non-GHG benefits as outlined in the same table below:

Table 25: Qualitative assessment of co-benefits (sustainable development benefits)

Main co-benefits	Relative importance	Justification
Socio-economic		
Improved NMT Conditions	High	<ul style="list-style-type: none"> Improved user convenience and comfort Improved accessibility for non-drivers, which supports equity objectives Higher property values
Increased NMT Transport Activity	High	<ul style="list-style-type: none"> User enjoyment Improved public fitness and health Increased community cohesion (positive interactions among neighbors due to more people walking on local streets) which tends to increase local security
Reduced Automobile Travel	High	<ul style="list-style-type: none"> Reduced Traffic congestion Road and parking facility cost savings Consumer savings Reduced Chauffering burdens Increased traffic safety Energy Conservation Pollution reduction Economic development
More Compact communities	High	<ul style="list-style-type: none"> Improved Accessibility, particularly for non-drivers Transport Cost Savings Reduced sprawl costs Open space preservation More liveable communities
Improved trucking data collection, monitoring and reporting framework	High	Improved policy decision making and transport planning
Professionalized Logistics Industry	High	Improved safety
Improved truck efficiency in operations	High	<ul style="list-style-type: none"> Increased transactional efficiency Reduction of transaction cost
Consolidated SMEs in trucking industry	Moderate	Fuel and other cost savings
Reduced empty miles	Moderate	Fuel and other cost savings
Decongested Manila, improved efficiency of freight operations in other urban areas	Moderate	<ul style="list-style-type: none"> Fuel and other cost savings Reduced air pollution

Enhanced multimodal freight transport connectivity	Moderate	Fuel and other cost savings
Established public-private partnerships through green freight programs	Moderate	Cross sectoral knowledge transfer and collaboration
Environmental		
Reduced traffic related air pollution (NO _x , SO _x and particulate matter)	High	Stringent vehicle standards, reduced fuel consumption and emissions due to optimized number of road public transport vehicles, as well as potential shifting of trips from private modes.
Rational use of scarce resources, e.g. fossil fuels	High	Stringent vehicle standards, reduced fuel consumption and emissions

Source: Litman (2013) as cited by Gota (2013); and Romero and Agatep (2018)

6.4 Monitoring and Reporting Plan

This section presents the ideal monitoring and reporting plan including the indicators that shall be monitored during the implementation of the mitigation actions. A discussion on the current institutional set-up within the Department of Transportation of how monitoring and reporting is conducted pursuant to the Department Order 2018-001 otherwise known as the “*Institutionalization of Greenhouse Gas (GHG) Inventory Team of the Transport Sector (Air, Rail, Water & Road)*” is also presented in this section.

Table 26 below presents the target groups for the monitoring and reporting of the GHG impacts resulting from the mitigation actions presented in this study. The targets range from the internal reporting within the DOTr to the NDC reporting requirements submitted to the Climate Change Commission and subsequent submission to the UNFCCC.

Table 26. Target groups for GHG impact monitoring and reporting.

Target Group	Objective	Required Information
DOTr GHG Inventory Team	Annual GHG reporting pursuant to DOTr DO 2018-001	GHG emissions from the combustion of mobile sources such as road and rail transportation (land transport), aviation (air transport), navigation (water transport), off-road, and pipeline
DOTr Planning (Management Information Service)	Secretariat function pursuant to DOTr DO 2018-001	All statistics/ data inputs and results of the GHG inventory calculations
Climate Change Commission	Reporting requirements from the transport sector in compliance with the Philippine Greenhouse Gas Inventory Management and Reporting System	Completed report from the DOTr on the GHG calculations on the mitigation action plans, programs, and projects related to climate change and environment protection; Periodic submission of the DOTr in compliance with the reportorial requirements to the Philippine Greenhouse Gas Inventory Management and Reporting System
International donors and potential funders	Access on financing (ex-ante) Reporting requirements for funded projects (ex-post)	Estimated emission reductions resulting from mitigation action plans, programs, and projects. Other information may be required depending on the donor requirements

UNFCCC	International reporting on efforts to address climate change	Information on mitigation actions in design and implementation phases both have to be reported. In the design phase, the estimated emission reductions of each mitigation action must be provided. In the case of mitigation actions already being implemented, information on current progress must also be reported
--------	--	---

Meanwhile, Table 27 below shows the ideal data which should be collected by various government agencies and key stakeholders involved in the transport sector. The collection of such data is crucial in monitoring the GHG impact of the mitigation actions presented in this study and all other future transport projects of the government.

Table 27 may also be considered by the LGUs during the preparation and/or updating of their respective Local Public Transport Route Plans (LPTRP) in compliance with the requirements of the DOTr and the Department of the Interior and Local Government (DILG) in relation to the implementation of the PUV Modernisation Programme. For instance, in determining the total passenger demand per route for the finalization or updating of the LPTRP, the concerned LGU may use person trips data through household travel survey or the ridership data through passenger or operator surveys. Changes in trip patterns observed through the travel survey data (e.g. increased mode share of walking and cycling and subsequent decrease in the mode share of motorised transport) may also contribute in the national impact GHG monitoring, especially if such data are those from the provincial LPTRPs.

Table 27. Parameters for GHG impact monitoring.

Data	Notation	Indicator	Unit	Source / Data Collection Method	Collection Frequency	Collecting Agencies
Population	A/S	The number of people per area	Persons	Census	Quinquennial	PSA
Motorisation rate	A/S	The number of vehicles per 1000 population	Vehicles/ 1000 population	Through vehicle registration and population data	Annual	DOTr/ MMDA/ LGUs
Person trips	A/S	The number of trips made for all modes of transportation in a given measurement year	No. of person trips	Household travel survey	Quinquennial	DOTr/ LGUs
Passenger kilometres	A/S	The number of person trips multiplied by the average trip length	pkm	Household travel survey	Quinquennial	DOTr/ LGUs
Vehicle kilometres	A/S	The vehicle population multiplied by the average trip length	vkm	Odometer measurements	Annual	DOTr/ LTO/ LGUs
Tonne kilometres	A/S	The vehicle population for freight multiplied by the average load	tkm	Through vehicle registration	Annual	DOTr/ LTO
Vehicle population	A/S	The number of registered vehicles (new and renewal)	No. of vehicles	Through vehicle registration	Annual	LTO

Vehicle trips	A/S	The trips made per public transport vehicle in a specified route/corridor	No. of trips/ Vehicle/yr.	Self-monitoring report/ Operator survey	Daily	Operators/ MMDA/ LGU
Average trip length	A/S	The distance travelled per vehicle per trip	km/trip	Odometer / GPS installations per unit / Sample surveys	Daily	Operators/ MMDA/ DOTr/ LGUs
Average occupancy	A/S	The number of passengers per mode of transportation	Passengers/ vehicle	Sample surveys	Daily	DOTr
Average load	A/S	The average tonnage per mode of freight transportation	Tonnes/vehicle	Sample surveys	Daily	DOTr/ LTO
Ridership	A/S	The number of passengers per mode of transportation in a given measurement year	Passengers/ Year	Self-monitoring report / Sample surveys for operators	Annual	Operators/ LTO/ OTC
Operating days	A/S	Number of days in operation per vehicle	Days/ vehicle	Self-monitoring report of operator	Annual	Operators/ DOTr
Speed	A/S	The average speed per vehicle	Km/h	Odometer measurements	Daily	MMDA/ DOTr
Fuel split	A/S	The frequency distribution of the vehicle population per fuel type i.e. Diesel, Gasoline, Electric, etc.	% Fuel type	Vehicle registration forms	Annual	LTO
Technology Split	A/S	The frequency distribution of the vehicle population per technology type i.e. Euro I, Euro II, Euro III, etc.	% Technology type	Vehicle registration forms	Annual	LTO
Fuel consumption	I	The total fuel consumed per vehicle	km/L; L/100km	Self-monitoring reports from operators	Ad hoc	Operators/ DOTr/ DOE
Electricity consumption (e-vehicles)	I	The total electricity consumed over the distance travelled per electric vehicle	kWh/day	Self-monitoring reports from operators based on daily charging	Daily	Operators/ DOTr
Emission factors	F	The amount of CO2 per unit of measure	gCO2/litre; gCO2/MJ; gCO2/pkm; gCO2/vkm; gCO2/tkm	Lab measurement (Vehicle inspection / PETC)	Ad hoc	UP NCTS/ VRTL

Monitoring the non-GHG impacts, co-benefits, and sustainable development impacts of the mitigation actions is also important. Table 28 below presents the proposed indicators and data which should be collected in monitoring such benefits. The ideal government agency to collect the necessary data are also indicated in the same table.

Table 28. Monitoring parameters for sustainable development impacts.

Sustainable Development Benefit	Indicator(s)	Unit	Source / Data Collection Method	Collection Frequency	Collecting Agencies
Air quality	Estimated amount (tons) PM, NO _x , SO _x , CO, NMHC; Mg/m ³ levels for selected pollutants (as monitored by the available air quality stations in Metro Manila PM, SO ₂ , NO ₂)		Calculated on the basis of average emission factors based on fuel savings calculated for the emission reductions AQ monitoring stations	Annually Aggregated annually	EMB / LGUs
Road safety	Road accidents (ideally on the affected roads)	Fatalities/ 100,000 inhabitants; Fatalities/ 100,000 cars; Fatalities/ 100,000,000 VKM	Based on city statistics	Every five years	MMDA / PNP / LGUs
Formal employment	Number of new formal jobs created through consolidation		Public transport cooperatives	Annually from the start of pilot implementation	DOTr / LTFRB / OTC / CDA
	Number of jobs lost		Own survey	Annually	DOTr / LTFRB / OTC / CDA
Energy security	Net fuel savings		Taken from calculations for emissions reductions	Annually	DOE

Source: Own table

The DOTr in January 2018 released an order institutionalizing the GHG inventory team for the transport sector which includes the different sectors within the Department and its attached agencies. The team is primarily composed of the steering committee and the technical working group. The steering committee is headed by the Undersecretary for Planning and Project Management while the heads of the different attached agencies are members. The main functions of the steering committee are:

1. to provide the overall direction and guidance in the formulation and implementation of accounting and reporting system of GHG emissions;
2. to develop a system for the archiving, reporting, monitoring, and evaluating GHG inventory of the transport sector;
3. to facilitate continuous capacity building initiatives;
4. to approve the periodic submission of the department to CCC; and,
5. to establish a system of collection and management of GHG inventory among the sectoral and attached agencies.

The technical working group (TWG) on the other hand is headed by the Assistant Secretary for Planning and Project Management and is primarily responsible for providing the necessary technical assistance and support to the steering committee. The different sectors within the department and the attached agencies are also represented in the TWG. Figure 57 shows the structure of the DOTr GHG Inventory Team.

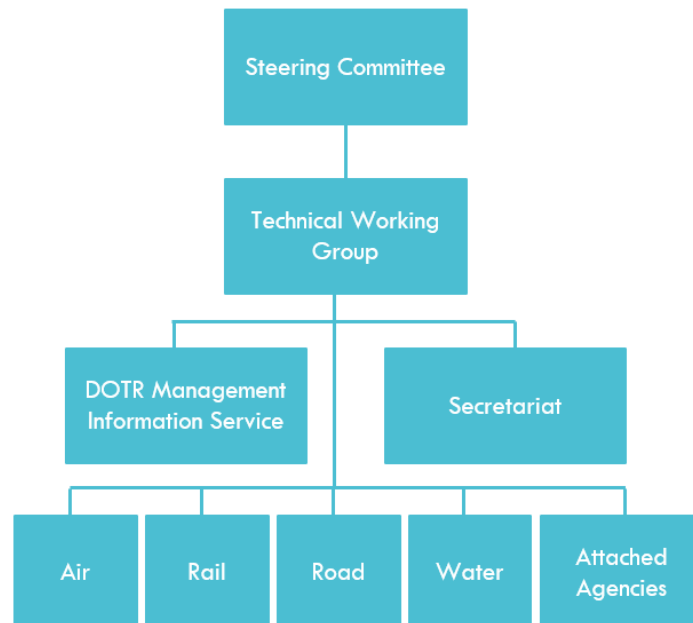


Figure 57. DOTr GHG inventory team structure.

As seen in the figure above, the TWG is then supported by the Management Information Service Division of the department and the Environmentally Sustainable Initiative Transportation Unit (ESITU) as the secretariat. The former is tasked to serve as repository of all statistics and data inputs and results of the GHG inventory calculations while the latter is responsible for the GHG inventory reports. ESITU was however dissolved in 2018 and plans to re-establish the said unit has not materialized. Considering the important tasks of the secretariat as indicated in DO 2018-001, the DOTr should either push for the re-establishment of ESITU or create/choose another unit to serve as secretariat.

Bibliography

- Abiad, A., Farrin, K., & Hale, C. (2019, April). *Sustaining Transit Investment in Asia's Cities*. Retrieved from Asian Development Bank: <https://www.adb.org/sites/default/files/publication/496991/sustaining-transit-investment-asia-cities.pdf>
- Amelsfort, Dirk Van. (2015). *Introduction to Congestion Charging: A Guide for Practitioners in Developing Cities*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Asian Development Bank. Retrieved from: <https://www.adb.org/sites/default/files/publication/159940/introduction-congestion-charging.pdf>
- ASEAN Automotive Federation. (n.d.). *Sales: 2018*. Retrieved 2019, from ASEAN Automotive Federation: http://www.asean-autofed.com/files/AAF_Statistics_2018.pdf
- ADB [Asian Development Bank]. (2003). *Policy Guidelines for Reducing Vehicle Emissions in Asia*. Mandaluyong: Asian Development Bank.
- ADB [Asian Development Bank]. (2017). *Pathways to Low-Carbon Development for the Philippines*. Mandaluyong: Asian Development Bank.
- Air Quality Expert Group. (2011). *Road Transport Biofuels: Impact on UK Air Quality*.
- Bangko Sentral ng Pilipinas. (2019). *Philippine Peso Cross Rates (Annual and Monthly)*. Retrieved from: http://www.bsp.gov.ph/printpage.asp?ref=http://www.bsp.gov.ph/statistics/statistics_exchrates.asp
- City of General Santos. (2018). *City of General Santos Local Public Transport Route Plan*. Retrieved from: <http://www.spgensantos.ph/wp-content/uploads/2018/05/PO18180261A.pdf>
- Clean Air Asia. (2018). *Green Freight and Logistics Policy Development in the Philippines: Assessing Freight Transportation in Support of a National Green Freight Program*.
- Clean Air Asia. (2019). *Philippine National Urban Mobility Programme (PUMP) Monitoring, Reporting, and Verification Report*. Manila.
- CNN Philippines. (2018, February 23). *PH loses ₱3.5B a day due to Metro Manila traffic – JICA*. Retrieved from CNN Philippines: <https://cnnphilippines.com/transportation/2018/02/23/JICA-P3.5-billion-traffic.html>
- DBM. (2017, February). *2017 People's Budget*. Retrieved 2019, from Department of Budget and Management: <https://dbm.gov.ph/index.php/budget-documents/2017/2017-people-s-budget/2017-people-s-budget>
- DBM. (2018, February). *2018 People's Budget*. Retrieved 2019, from Department of Budget and Management: <https://dbm.gov.ph/index.php/budget-documents/2018/2018-people-s-budget/2018-people-s-budget>
- DBM. (2018, March 14). *DBM launches "Green, Green, Green!" city public open spaces assistance program*. Retrieved from Department of Budget and Management: <https://www.dbm.gov.ph/index.php/secretary-s-corner/press-releases/list-of-press-releases/766-dbm-launches-green-green-green-city-public-open-spaces-assistance-program>
- DBM. (2018, March 26). *Local Budget Circular No. 116-A*. Retrieved 2019, from Department of Budget and Management: <https://www.dbm.gov.ph/index.php/205-latest-issuances/local-budget-circular/2018/782-local-budget-circular-no-116-a>
- Diekers, G., Silsbe, E., Stott, S., Winkelman, S., and Wubben, M. (n.d.). *CCAP Transportation Emissions Guidebook*. Retrieved from: [http://www.ccap.org/guidebook/CCAP%20Transportation%20Guidebook%20\(01\).pdf](http://www.ccap.org/guidebook/CCAP%20Transportation%20Guidebook%20(01).pdf)
- DILG. (2019, July 22). *Regional and Provincial Summary - Number of Provinces, Cities, Municipalities and Barangays as of 30 June 2019*. Retrieved from Department of the Interior and Local Government:

- <https://dilg.gov.ph/facts-and-figures/Regional-and-Provincial-Summary-Number-of-Provinces-Cities-Municipalities-and-Barangays-as-of-30-June-2019/32>
- DOTr. (2017, April 27). *Department Order No. 2017-009*. Retrieved 2019, from Department of Transportation: <https://drive.google.com/file/d/0Bx283SS6qJi2cWJocW91bjNVMzg/view>
- DOTr. (2017, December 1). Road-Based Public Transport Reform Program. *PUVMP Workshop*. Metro Manila: Department of Transportation.
- GIZ. (2015). *Cooperation Management for Practitioners: Managing Social Change with Capacity WORKS*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- GIZ. (2018). *NAMA Support Project Outline: Jeepney+ NAMA*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- GIZ. (2018). *An Inventory and Assessment of National Urban Mobility in the Philippines*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- GIZ. (2018). *National Sustainable Urban Mobility Program in the Philippines*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
- GIZ. (2019, November). *Reforming the (semi-)informal minibus system in the Philippines*. Retrieved from Changing Transport: <https://www.changing-transport.org/publication/reforming-the-semi-informal-minibus-system-in-the-philippines/>
- Gota, S., Anthapur, S.K., and Bosu, P. (2013). *Promoting Non-Motorized Transport in Asian Cities: Policy Makers' Toolbox*. Pasig: Clean Air Asia
- ISSRC. (2008). *International Vehicle Emissions Model Users' Manual Attachment A: Development of Base Emission Rates for Use in the IVE Model Version 1.2*.
- JICA [Japan International Cooperation Agency]. (2015). *The project for capacity development on transportation planning and database management in the Republic of the Philippines MMUTIS update and capacity enhancement project (MUCEP): technical report*. Japan International Cooperation Agency. Retrieved from <https://libopac.jica.go.jp/search/detail.do?rowIndex=2&method=detail&bibId=1000024316>
- JICA [Japan International Cooperation Agency]. (2015). *The Roadmap Study for Sustainable Urban Development in Metro Cebu*.
- Jorna, R., & Mallens, M. (2013). *Current situation analysis*. Retrieved from http://www.pro-e-bike.org/wpcontent/uploads/2013/06/D.2.1.MOB_EN_2013-11-13.pdf.
- Land Transportation Office (LTO). (2001). *LTO-MIS Guidelines on Motor Vehicle Registrations*.
- Manila Bulletin. (2017, July 27). *PH 13th most populated country in the world*. Retrieved from Manila Bulletin: <https://news.mb.com.ph/2017/07/27/ph-13th-most-populated-country-in-the-world/>
- Mejia, A., Dematera Contreras, K., Guillen, D., Villaraza, C., & Bakker, S. (2016). *The Philippines Stocktaking Report on Sustainable Transport and Climate Change: Data, Policy and Monitoring*. Manila: GIZ.
- Mejia, A. (2016). *Assessing the Emission Pathways of the Philippine Road Transport Sector*. https://www.academia.edu/32733277/i_assessing_the_emission_pathways_of_the_philippine_road_transportation_sector
- MobiliseYourCity. (2018). *National Level*. Retrieved from MobiliseYourCity: <http://mobiliseyourcity.net/national-level-numps/>
- MobiliseYourCity (unpublished). *National Urban Mobility Programme Guidelines*.
- NEDA. (2018). *ODA Portfolio Review Report 2017*. Retrieved 2019, from National Economic and Development Authority: <http://www.neda.gov.ph/wp-content/uploads/2019/09/ODA-As-of-November-7-2018.pdf>
- NEDA. (n.d.). *The Regional Development Council*. Retrieved 2019, from National Economic and Development Authority: http://www.neda.gov.ph/wp-content/uploads/2018/11/FAQs_Regional-Development-Council.pdf

- Ocampo, A. (2016, April 8). *Smell and the Filipino identity*. Retrieved from Philippine Daily Inquirer: <https://opinion.inquirer.net/94187/smell-and-the-filipino-identity>
- Office of the President. (2011, October 26). *Memorandum Order No. 25, s. 2011: Reconstituting the LATCTP*. Retrieved 2019, from Official Gazette: <https://www.officialgazette.gov.ph/2011/10/26/memorandum-no-25-s-2011/>
- The Philippine Star. (2019, October 14). *P25 billion from road tax eyed for PUV modernization*. Retrieved 2019, from The Philippine Star: <https://www.philstar.com/business/2019/10/14/1959885/p25-billion-road-tax-eyed-puv-modernization>
- PIA. (2017, September 13). *DPWH reconstitutes National Building Code Review Committee*. Retrieved from Philippine Information Agency: <https://pia.gov.ph/news/articles/1000242>
- PSA. (2017, January). *Family Income and Expenditure Survey*. Retrieved 2019, from Philippine Statistics Authority: <https://psa.gov.ph/content/family-income-and-expenditure-survey-fies-0>
- PSA. (2017, June 30). *Philippine Population Surpassed the 100 Million Mark (Results from the 2015 Census of Population)*. Retrieved from Philippine Statistics Authority: <https://psa.gov.ph/population-and-housing/statistical-tables/title/Philippine%20Population%20Surpassed%20the%20100%20Million%20Mark%20%28Results%20from%20the%202015%20Census%20of%20Population%29>
- PSA. (2017, October). *Philippine Statistical Yearbook*. Retrieved from Philippine Statistics Authority: https://psa.gov.ph/sites/default/files/PSY_2017_Jan%2016%202018.pdf
- PSA. (2019). *Economic Accounts*. Retrieved from Philippine Statistics Authority - OpenSTAT: http://openstat.psa.gov.ph/PXWeb/pxweb/en/DB/DB__2B__GP__IN__PHL/?tablelist=true
- PSA. (2019, March 21). *Urban Population in the Philippines (Results of the 2015 Census of Population)*. Retrieved from Philippine Statistics Authority: <https://psa.gov.ph/population-and-housing/node/138311>
- PPP Center. (2019, October). *Summary of PPP Projects*. Retrieved from Public-Private Partnership Center of the Philippines: https://ppp.gov.ph/wp-content/uploads/2019/11/PPPC_REP_Projects-List-20191031.pdf
- Rappler. (2019, October 7). *PUV modernization gets no budget in 2020: Who suffers?* Retrieved from Rappler: <https://www.rappler.com/nation/241904-dotr-no-budget-puv-modernization-2020-who-suffers>
- Republic Act No. 7160: The Local Government Code of 1991*. (1991, October). Retrieved from <https://www.officialgazette.gov.ph/1991/10/10/republic-act-no-7160/>
- Rogers, J. (n.d.). EFFECT Model Application Data and Results for the Philippines.
- Romero, Jane and Agatep, Pia May (2018). *Green Freight and Logistics Policy Development in the Philippines: Assessing Freight transportation in Support of a National Green Freight Program*.
- Schipper, L., Marie-Lilliu, C., and Gorham, R. (2000). *Flexing the Link between Transport and Greenhouse Gas Emissions: A Path for the World Bank*.
- Transportpolicy.net website. www.transportpolicy.net
- UNTV. (2018, April 25). *DOTr pushes for truck modernization program*. Retrieved 2019, from UNTV News & Rescue: <https://www.untvweb.com/news/dotr-pushes-for-truck-modernization-program/>
- United Nations Framework Convention on Climate Change (UNFCCC). (n.d.). *Clean Development Mechanism AMS – III. C Small-scale methodology - Emission reductions by electric and hybrid vehicles*. https://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid48.pdf
- United Nations. (2018, May 16). *68% of the world population projected to live in urban areas by 2050, says UN*. Retrieved from United Nations: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>
- United States Environmental Protection Agency (USEPA). (2014). *Speciation of Total Organic Gas and Particulate Matter Emissions from ON-Road Vehicles in MOVES 2014*.

United States Environmental Protection Agency (USEPA). (n.d.). *How to Develop a Green Freight Program: A Comprehensive Guide and Resource Manual*. <https://cleanairasia.org/wp-content/uploads/2015/10/Green-Freight-Manual.pdf>

WRI. (2019). *Data Explorer: Philippines Historical Emissions*. Retrieved 2019, from Climate Watch: <https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=34&historical-emissions-gases=143&historical-emissions-regions=PHL&historical-emissions-sectors=All%20Selected&page=1>

Annex 1: Transport Plans, Programmes, Policies

Taken from An Inventory and Assessment of National Urban Mobility in the Philippines (GIZ, 2018).

Evolution of Transport Policies

Innumerable policies, programs, and plans have been crafted over time demonstrating the government’s thrust to develop an efficient and effective urban transport system for the country’s cities. These interventions have been undertaken by different government departments and agencies as guided by their mandates, supported by stakeholders from the private sector (business, operators), civil society, and international development agencies. They have also been shaped by the national government’s commitments to international agreements on sustainable transport. The matrix below shows these major interventions. A more detailed list of interventions or inventory of transport policies is included in the appendix, describing the policy/plan, focus/orientation, responsible agency, implementation period, description, status, and identified gaps.¹

Table X. Policies, Strategies, & Plans on Urban Mobility

Period	Priorities, foci	Policy, strategy, plan (National)	Policy, strategy, plan (Local)
2016-present	EST, BRT, NMT, P2P buses, urban rail Infrastructure, urban expressways	NTP, NIP, PUV Modernization, NESTs, Greenways, TNVS, BBB	
2010-2016	EST, BRT, NMT, urban rail, P2P buses, urban expressways	NIP, PUV Modernization, TNVS, NCCAP, NESTs,	MUCEP, MMDA Green Print
2004-2010	EST, BRT, NMT, urban rail	NESTs, NIP	
1998-2004	MRT3 and LRT2 opening, Bikeways of Marikina		MMUTIS
1992-1998	BOT for mass transit, phase-out of dilapidated taxis	Early version of PPP, Bus liberalization/deregulation	
1986-1992	Import of city buses, creation of LTRFB		UTDP, 1990-2000.
Pre-1986	Road infrastructure, car priority, 1 st urban rail in Metro Manila, PNR commuter rail		UTSMMA, 1973. MMETROPLAN, 1977. MMUTIP, 1981. MMUTSTRAP, 1983. JUMSUT I, 1984 and JUMSUT II, 1985.

Over the years, the focus of the government in providing people with mobility has evolved from one on road infrastructure development, mass transit development, public transport improvement, and NMT. While there were numerous studies and projects happening consecutively or simultaneously, the need to improve the existing public transport system and the importance of high-quality mass transit systems as well as NMT has become increasingly prominent in national government policies as well as local government actions.

Over the years, the focus of government in providing people with mobility has evolved from one on road infrastructure development, mass transit development, public transport improvement, and NMT.

Marikina City with the assistance of the World Bank developed a master plan for 50 kms of bicycle facilities covering the whole city, strongly advocated by the local chief executive at that time (early 2000s). Aside from infrastructure development, the program also included soft components such as the creation of the

¹ Torayno. Inventory of Transport Policies in the Philippines, GIZ, 2017

Marikina Bikeways Office (MBO) and IEC activities (information, education, & communications) to promote bicycle use in the city.

Past Transport Studies and Plans in Metro Manila, Cebu, and Davao

Over the decades, the DOTr or its predecessors have commissioned numerous studies that impact on urban transport since the 1970s until the present, focusing on the primate cities of the country. These studies include the following².

There is no dearth of transport studies that have been done in the country's major cities of Metro Manila, Cebu, and Davao.

Urban Transport Study in Manila Metropolitan Area (UTSMMA, 1973)

The first comprehensive urban transport master plan study for Metro Manila, this was undertaken by Japan's Overseas Technical Cooperation Agency (OTCA) which later became the Japan International Cooperation Agency (JICA).

It proposed five (5) rail-based mass transit systems in addition to the upgrading of the Philippine National Railways (PNR), urgently recommending that the line that was to ply Quezon Avenue should be undertaken first. It also recommended that the railway be underground in areas along EDSA, and elevated outside EDSA. The study envisioned the bus and jeepney services to function as feeder modes to the rail-based mass transit network in the metropolis. The following rail lines were recommended:

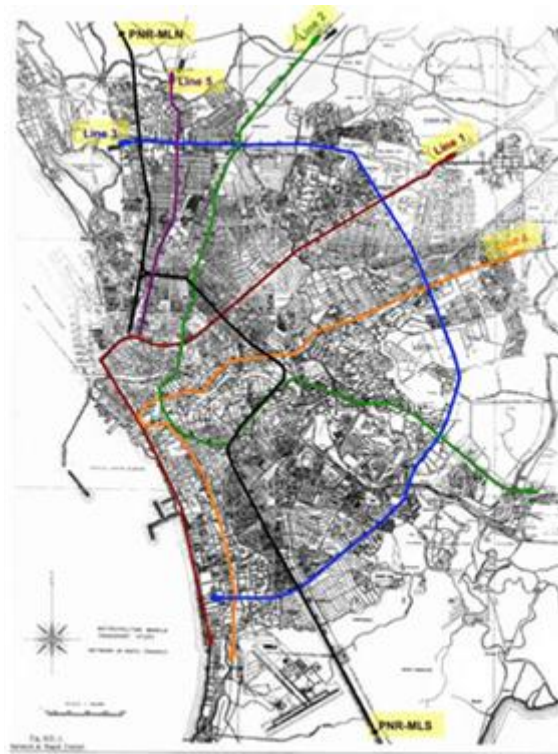


Figure X. Proposed Rapid Transit Railway (RTR) Network

Source: UTSMMA 1973

Metro Manila Transport, Land Use and Development Planning Project (MMETROPLAN, 1977)

This was conducted from January 1976 to February 1977. It focused on the enhancement and management of the franchising of bus and jeepney services as well as cordon pricing, bus lanes, and an LRT system along Rizal Avenue. It contradicted the recommendations of the earlier UTSMMA on its RTR (Rapid Transit Railway), concluding that the earlier recommendations were not economically viable due to their high costs

² World Bank, Transport in Metro Manila – A Strategic Review. 2013

and expected low ridership. It recommended an LRT system on Rizal Avenue which would later become the LRT Line 1 as it is called today. It also recommended to have many small operators for buses and jeepneys.

Metro Manila Urban Transport Improvement Project (MMUTIP, 1981)

This was undertaken from July 1980 to August 1981. It focused on the improvement of the franchising system and in particular protection of franchise records as well as improvement in the efficiency in the granting of franchises. It also recommended additional bus and jeepney routes and proposed that additional buses were needed in major thoroughfares. It recommended jeepneys to be kept from major routes which were to be served by buses. It also recommended deregulation of jeepney services entry to non-bus routes. This study's focus was on the soft side of public transport operations such as management and franchising and not on the infrastructure aspects of the system.

Metro Manila Urban Transportation Strategy Planning Project (MMUTSTRAP, 1983)

Conducted from November 1982 to April 1983, this study contradicted the earlier recommendation of the MMETROPLAN's recommendations pushing for deregulation of entry of bus and jeepney operators. It recommended that profit is not the main objective of public transport services and public service should take precedence over profit. The study recommended a prioritized list of public transport and road infrastructure projects for Metro Manila.

Metro Manila Transportation Planning Study I and II (JUMSUT I, 1984 and JUMSUT II, 1985)

These were also known as the JICA Update on Manila Study on Urban Transport (JUMSUT I & II, conducted from November 1982 to March 1984 and June 1984 to March 1985) which focused on the planning, traffic management, and public transport route restructuring for LRT 1 that would be plying Rizal Avenue and Taft Avenue. These studies recommended the restructuring of bus and jeepney routes so that they would not compete with but complement the LRT.

Metro Manila Urban Transport Development Plan (1990-2000) Project (UTDP)

This was undertaken from 1990 onwards to identify the needed transport interventions to improve urban transport in Metro Manila. It involved the various transport-related government agencies at that time. This consisted of a suite of studies the most notable of which is the study on identifying the suitable mass transit system on EDSA. The study recommended a bus-based system instead of a rail-based system. The bus system, now known as a bus rapid transit (BRT) system, was at that time becoming a popular mass transit option in different parts of the world. Eventually, the government would opt for an LRT system for EDSA.

Metro Manila Urban Transport Integration Study (MMUTIS, 1996)

The MMUTIS was conducted from 1996 to 1999 is the most comprehensive urban transport master plan study conducted in Metro Manila. It involved the conduct of a comprehensive household interview survey (HIS) involving 40,000 households all over Metro Manila equivalent to 2.5% sampling rate. It developed a transport master plan for a 15-year planning horizon (until 2015) which consists of rail lines, road infrastructure, bus systems, integrated public transport terminals, etc. It also recommended travel demand management measures in addition to transport supply enhancement measures. It proposed more objective and informed planning and metropolitan governance models, underscoring the importance of land use planning integrated with transport planning. It pushed for financing transport infrastructure through private sector involvement, use of official development assistance (ODA), and integrated urban development. It also recommended the use of fiscal instruments to discourage car use and promote the use of public transport.

Aside from these master plan-type studies for Metro Manila, there were also thematic or focused studies that were undertaken, either transport system-specific or corridor specific. Among these are as follows:

Pre-Feasibility Study for a Bus Rapid Transit in the Greater Metro Manila Area (2007)

Funded by the USAID-ECAP (Energy and Clear Air Project) and undertaken from June 2006 to July 2007, this study identified and prioritized BRT corridors for Metro Manila, recognizing the advantages of BRT over rail-based mass transit systems in terms of lower cost, faster implementation times, flexibility, and possibility for incremental development, among other strengths. Potential BRT corridors were identified

and prioritized using the following criteria – Passenger demand, availability of road space, traffic congestion, land use plan, potential for travel demand growth.

EDSA Bus Revalidation Survey (2005)

This study undertaken in 2005 assessed the bus services plying EDSA which is the major bus route in Metro Manila. It concluded that routes overlap resulting in an oversupply of buses serving the corridor. It recommended EDSA bus route restructuring to address the issue of oversupply and the conduct of a feasibility study for an EDSA BRT.

Mega Manila Public Transport Study (MMPTS, 2007)

A follow-up to the EDSA Bus Revalidation Study, this JICA study undertaken from November 2006 to April 2007 looked at the different issues that public transport in Mega Manila faces such as mismatch between supply and demand, need for route restructuring, etc. It also looked at the disconnect between the records of the LTFRB (franchising) and the LTO (vehicle registration), in effect recommending the integration of the databases of the two transport agencies.

Formulation of National Environmentally Sustainable Transport Strategies (NESTS, 2011)

This was undertaken by the UP National Center for Transportation Studies for the DOTr, then the Department of Transportation and Communications (DOTC). It identified transport strategies that aim to a) reduce the annual growth rate of fuel consumption and associated GHG emissions and b) mainstream environmentally sustainable transport systems that have low carbon intensity and promote environment-friendly transport modes.

The strategies were grouped into 12 thematic areas: Public Health; Strengthening Roadside Air Quality Monitoring and Assessment; Traffic Noise Management; Vehicle Emission Control, Standards, and Inspection and Maintenance; Cleaner Fuels; Public Transport Planning and Travel Demand Management (TDM); Non-Motorized Transport (NMT); Environment and People Friendly Infrastructure Development; Social Equity and Gender Perspectives; Road Safety and Maintenance; Knowledge Base, Awareness and Public Participation; and Land-Use Planning.

The NESTS study would later inform studies and policies that emerged afterwards³ –

- National Transport Plan and Policy (NTPP)
- Clean Technology Fund Investment Plan for the Philippines
- National Road Safety Action Plan (NRSAP)
- National Framework Strategy on Climate Change (2010)
- Medium Term Philippine Development Plan (MTPDP) for 2011-2016
- National Implementation Plan on Environment Improvement in the Transport Sector

Development of a Mega Manila Public Transport Planning Support System (MMPTPSS)

This DOTC-funded study undertaken by the University of the Philippines developed a dynamic model that can be used in determining the optimum number of public transport vehicles in a corridor that would a) serve passenger demand, b) within the volume capacity of the corridor, and c) with make for reasonable profitable operations. This is intended as an improvement over the use of the route measured capacity (RMC) which does not take into account overlapping routes, corridor capacity constraints, and network dynamics. The study also recommended the kind of mass transit system that is optimum for various ranges of passenger demand. The categories cover rail-based systems, BRTs, and conventional road-based public transport systems.

MMUTIS Update and Capacity Enhancement Project (MUCEP, 2014)

The MUCEP updated the person-trip database and the transport master plan developed by the MMUTIS. It also expanded the study area to include the provinces immediately at the outskirts of Metro Manila – Bulacan and Pampanga in the north, Rizal in the east, and Cavite, Laguna, and Batangas in the south. This

³ UNCRD. Formulation of National Environmentally Sustainable Transport Strategies. 2011

MUCEP study area is now termed as Mega Manila. The so-called JICA Dream Plan consists of plans for road infrastructure, rail systems, bus rapid transit, and other transport infrastructure for Mega Manila.

Studies in Cebu and Davao

Transport studies have also been done in the two other primate cities of the country – Cebu and Davao.

In Cebu, the *Metro Cebu Land Use and Transport Study (MCLUTS, 1978)* was the first comprehensive land use and transport master plan preparation for what is called the Metro Cebu—an agglomeration of 7 cities and 6 municipalities which comprise the main urban center of Cebu Province. It was commissioned by the then-Ministry of Public Works, Transportation and Communication (MPWTC) with technical assistance from the Government of Australia. The study recommended 4 alternative plans, namely: *Plan 1: Concentrated, Without Reclamation*; *Plan 2: Concentrated, With Mainland Reclamation*; *Plan 3: Linear Dispersed, With Mainland Reclamation*; and *Plan 4: Mactan Expansion, With Mainland and Mactan Reclamation*. The Metro Cebu Council adopted Plan 2, which recommended the development of radial-circumferential road network and new traffic signalization system.

The *Metro Cebu Development Project (MCDP, 1989)* was undertaken by the Japan Bank for International Cooperation (JBIC). It was the first comprehensive study for Cebu City and the rest of Metro Cebu.

The *Cebu Public Transport Terminals Study (2003)* was conducted by the National Center for Transportation Studies of the University of the Philippines (UP-NCTS). The objectives of the study were a) to assess the suitability of proposed or existing sites/locations of inter-city public transport terminals; b) to determine the scale of the terminals such as number of berths or required floor/land area necessary to meet the demand, and; c) to review existing institutional and management structures of public transport terminals in Cebu City.

The *Cebu Metropolitan Region Public Transport Strategic Plan (2009)* commissioned by the then-DOTC identified mass transit options for Metro Cebu. The Cebu BRT Pre-feasibility Study (2010) and the Feasibility Study (2012) conducted by the World Bank for the DOTC have been the basis of the current Cebu BRT Project that will be the first BRT system in the country.

The *Roadmap Study for Sustainable Urban Development in Metro Cebu (Metro Cebu Roadmap, JICA 2015)* is Metro Cebu's blueprint for sustainable economic development. It has seven (7) sub-roadmaps including that for highway network and public transport development.

In Davao, the *JICA Davao City Urban Transport Cum Land Use Study (1983)* was then the only comprehensive urban transport study undertaken for Davao City with extensive transport and land use surveys, travel demand modelling, and transport plan formulation and evaluation. The study recommended a diversion road linking Bunawah and Toril which eventually was implemented. The study also recommended the introduction of city buses to replace jeepneys for medium- to long-distance routes. On public transport improvements, the master plan proposed the introduction of city buses to replace the jeepneys for medium- to long-distance routes and eventually, exclusive lanes for some bus routes.

The *Davao City Transport and Traffic Management Plan (2000)*, prepared by the UP-NCTS, proposed road and public transport interventions for the short, medium, and long terms.

The ADB supported the project “*Promoting Sustainable Urban Transport in Asia (SUTRA)*” which included Davao as one of its three case study cities. Completed in July 2011, this study recommended the urgent modernization of Davao's public transport system and operations. Included in the study is a pre-feasibility study of a BRT system for the city.

The *Davao Sustainable Urban Transport Project (2013)* aimed to develop a Comprehensive Public Transport Strategy (CPTS) which consists of transport operations and network structure, infrastructure provision and management, procurement, institutional and legislative framework, capacity development, and social impacts management.

The *Davao High Priority Bus System Feasibility Study (2018)* was conducted by the ADB to develop a high-quality bus-based public transport system that will eventually replace jeepneys on some arterial roads of the city. It is part of the Davao City Public Transport Modernization Project.

Recent Transport Policies

The **National Transport Policy (NTP)** was developed by the NEDA and the DOTr to articulate the government's vision for the country's national transport system along with its objectives and coverage.

The **National Implementation Plan for Environmental Improvement in the Transport Sector (NIP) 2016-2020** aims to preserve the environment through sustainable passenger and goods movements propelled by clean energy. Some of the aforementioned NESTS study's provisions were used as input to the NIP. Together, the policies embodied in the NIP and the NESTS support the National Climate Change Action Plan (NCCAP) of the government.

The policies of the government have resulted in programs and projects that are aligned with the goals of urban mobility. Foremost of these interventions are the following:

The **PUV Modernisation Programme** is the DOTr's flagship program aimed to modernize the country's road-based public transport system through the following components:

1. Regulatory reform
2. LGU Local public transport planning with capacity building
3. Route rationalization
4. Fleet modernization
5. Industry consolidation
6. Financing
7. Vehicle useful life or scrappage program
8. Pilot implementation
9. Stakeholder support
10. Communications

The PUV Modernisation Programme is empowered by the **Omnibus Franchising Guidelines** which was issued by the DOTr in June 2017 to accomplish two things: to “shift the determination and provision of public transportation services from the private sector to the public sector; this, in effect, would remove the longstanding exclusive reliance on the private sector in planning our local, regional, and national transportation systems” and to devolve the responsibility of public transport route planning from the national government, i.e. DOTr, to local governments⁴. The Local Public Transport Route Planning Manual (LPTRP) was developed to equip local governments in their new role of planning local transport.

The following are the salient points of the Omnibus Franchising Guidelines and the LPTRP:

- Part of the PUV Modernisation Programme, with local public transport planning assigned to local governments
- Local knowledge of local governments
- Focused on intra-city or intra-municipality trips
- Provincial LGUs to plan inter-city and inter-municipality trips
- DOTr to assist in inter-province and inter-region public transport planning
- DOTr to rationalize public transport planning for the Mega Manila (or MUCEP) area in the interim, with LGUs focusing on intra-trips
- Transfer public transport planning from private sector to public sector
- Change in institutional responsibilities

The “**Build Build Build**” is the overarching program of the national government to develop and implement infrastructure projects in the country including major transport infrastructure projects such as rail, bus rapid transit, intermodal bus terminals, and others.

The **Greenways project** aims to promote the use of NMT through the provision of high-quality walking and bicycle facilities in Metro Manila and the highly urbanized cities (HUCs) of the country.

⁴ DOTr, Omnibus Franchising Guidelines, June 2017

The **National Urban Development and Housing Framework (NUDHF) 2017-2022** prepared by the UN-Habitat for the HLURB counts as among the strategies for Urban Planning and Design the integration of mobility and transport planning in land use planning. The NUDHF advocates the shift from car-oriented to people-oriented mobility. A new hierarchy of transportation and mobility is introduced, prioritizing pedestrians first, then non-motorized vehicles such as bicycles, followed by public transport, commercial vehicles, taxis, and single occupancy vehicles⁵.

The UN-Habitat is assisting the HLURB in capacity development for local government units in the area of planning sustainable transport and land use development. The DOTr collaborating with the HLURB can serve as a very good opportunity for the mainstreaming of sustainable urban mobility in local areas.

The NUDHF recommends the integration of mobility and transport planning in land use planning. The NUDHF advocates the shift from car-oriented to people-oriented mobility. The DOTr collaborating with the HLURB can serve as a very good opportunity for mainstreaming sustainable urban mobility in local areas. A potential area of collaboration is capacity development for local government in the area of sustainable transport planning and land use development.

⁵ UN Habitat. The National Urban Development and Housing Framework (NUDHF 2017-2022)

Annex 2: Barriers to Non-Motorised Transport

The current barriers to changing the existing conditions of non-motorised of active transport are summarised below.

Taken from National Urban Mobility Programme: Non-Motorised Transport Implementation (GIZ, 2019).

Lack of political support

There appears to be limited political support for encouraging NMT in the Philippines. Without high-level political support at a national level it will be difficult to challenge the barriers to improving existing conditions and thereby encouraging more people to walk and cycle. Political support for NMT will allow decisions to be taken to address the current challenges.

The important role that walking currently has in many journeys across the Philippines needs to be recognised by politicians and the challenging conditions pedestrians face addressed to increase more people to make short journeys on foot. Whilst currently a largely niche activity in most urban areas of the Philippines, cycling has the ability to form a key role in a multi-modal transport system, catering for longer journeys than walking and taking up less space than a vehicle whilst in motion as well as whilst parked.

Lack of NMT enabling laws

At present there are no national laws which aim to improve non-motorized transport across the country. Attempts have been made by some politicians to introduce laws aimed at making LGUs improve NMT conditions but there appears to be a difficulty passing NMT-related bills into law. Since 2010 several Acts have been submitted for approval which aim to improve conditions for pedestrians and cyclists; however, they have not been passed into law. Without laws set at a national level requiring LGUs to improve conditions for NMT, there is limited incentive for them to work to improve current conditions.

At a local level LGUs are able to create their own laws and policies which are known as local or zoning ordinances. In some cases, ordinances have been implemented by LGUs which restrict the use of NMT. For example, City Government of Baguio banned the use of bicycles in 2016 due to increasing numbers of accidents involving motorcycles. The removal of laws which are detrimental to encouraging NMT travel should be undertaken and steps taken to prevent such laws being passed in the future.

Lack of national NMT policy

The national government can help implementation of walking and cycling policies in local areas by establishing a national NMT policy. The policy should summarise the benefits NMT improvements can provide, sets out the objectives of the policy, the actions for the various stakeholders who will need to be involved and the basis for the monitoring and evaluation of policy implementation by authorities at both a national and local level. A national NMT policy can also help to raise awareness of the benefits of NMT and show political commitment to improvements at the national level.

Limited data

At present limited NMT data exists in the Philippines and consequently data collection at both a national and local level. Data on current usage and accidents, coupled with assessments of the current conditions, are vitally important in determining the current barriers to NMT use in each HUC and therefore the most appropriate approaches to implement to improve existing conditions.

Limited NMT capacity

There is limited staff capacity to deliver NMT-related schemes at DOTr and at Local Government Units (LGUs). As outlined in Section 3, there are at present only a small number of staff at DOTr whose role focuses on NMT. It has been reported that there are currently only 5 working on NMT schemes in the

Rail Department and a further 2-3 staff based in the Road Transport department. The current number of staff is not sufficient to undertake the NMT work required which will include:

- Developing NMT design guidance;
- Developing guidance on assessing walkability;
- Developing guidance on assessing cyclability; and
- Monitoring and evaluation of NMT projects.

It is more difficult to determine the current numbers of staff in LGUs focussing on delivering NMT schemes as the capacity levels and structure of each LGU varies; however, in general they have limited capacity to design and implement NMT schemes.

The limited capacity at DOTr and at LGUs restricts the number of NMT schemes which can be delivered. There is therefore a need for additional NMT capacity at DOTr and at LGUs.

Limited NMT skills

It is believed that the current resource has limited knowledge of the planning, design and implementation of NMT schemes both within DOTr and the LGUs of the HUCs. The education and training of transport engineers and planners in the Philippines has focused on developing the provision for motorised traffic with limited focus on NMT schemes. DOTr will require staff with the requisite skills in NMT to devise policies and develop guidance to deliver NMT infrastructure and complementary revenue measures.

At the local level technical skills are required to ensure the design and implementation of transport infrastructure is appropriate and of high quality. It will be necessary to build up local expertise by upskilling current staff in NMT and ensuring the education of future employees provides them with the required NMT-related skills.

Insufficient funding

Only recently has allocation of funding for schemes specifically prioritising walking and cycling as a sole objective, rather than as part of wider provision for vehicles, become more evident in budget allocation. The review of NMT funding outlined earlier identified that there is presently funding of over PHP20bn (US 370m) allotted specifically for NMT infrastructure (greenways) although the most recent news suggests that the status of much of this funding is now uncertain.

However, whilst flagship schemes can transform the urban realm within the local area in which schemes are delivered, and increase usage and typical travel behaviour within the vicinity, the vast majority of walking (and also to some extent cycling) will continue to take place in non-intervention areas, and a real transformative change to NMT conditions will require investment in small scale changes with extensive coverage, in addition to ensuring that any new development provides the necessary infrastructure as a matter of course.

Establishing present investment in the more comprehensive NMT provision in this latter example is challenging, as much of this relates to local government spending on urban roads and cityscape. A present lack of transparency in such spending, and on the disaggregation of this spending means that it is almost impossible to establish what proportion of local government expenditure relates to support for NMT.

The lessons which can be drawn from recent experience in NMT funding and in how the PUMP funding mechanisms should be developed are as follows:

- Without a sustainable source of funding identified, the financing of NMT schemes will remain precarious. Of the funding allocated in 2018 for Greenway programs (mainly financed by multilateral development banks), the majority is now presently uncertain and much of the proposed amount is likely not to materialise.
- A lack of transparency with present funding arrangements will hamper any attempt to audit expenditure on NMT.

- The majority of NMT provision is likely to be delivered within wider infrastructure investment and as such, may not be easy to disaggregate. This places greater emphasis on strong design standards.
- Specific funding allocation for NMT can be made more comprehensible and transparent by defining a target 'spend per head' which can be audited against outturn expenditure.

Limited design guidance

A barrier to the development of appropriate pedestrian and cycling infrastructure is the limited design guidance for pedestrian and walking infrastructure. Appropriate design guidance on the design of cycling infrastructure is required to ensure that the schemes which are designed and implemented at a local level are of a high quality and meet the needs of users, as well as ensuring that the infrastructure implemented is consistent. Design guidelines are particularly important given the limited experience in delivering NMT infrastructure.

Behaviour

Poor and illegal behaviour can discourage NMT. The obstruction of sidewalks by illegally parked vehicles and vendors reduces the attractiveness of travelling on foot. Similarly, illegal and inconsiderate driver behaviour such as speeding and failure to give way at pedestrian crossings can affect people's perception of whether NMT is a safe travel option.

Improving the safety of NMT and the perception of safety of NMT will help to create conditions which encourage more people to travel on foot and by bike. Poor adherence to traffic regulations can be tackled through actions such as stricter enforcement of existing traffic regulations and marketing campaigns. The introduction of new traffic regulations such as banning the use of mobile phones whilst driving could also be considered to help improve safety for people travelling by NMT.

Limited enforcement in planning process

There is limited emphasis on the inclusion of NMT in the planning process for new developments. Revising the current guidance to ensure that all new developments must provide access for non-motorised travel modes will help to develop networks for walking and cycling across urban areas and encourage the use of NMT for a variety of journey purposes. The inclusion of appropriate infrastructure as part of new developments is usually much easier than retrofitting infrastructure into existing developments as the reallocation of road space may be required. It is also important to ensure NMT is considered in the design of major infrastructure schemes, particularly transport schemes.

Annex 3: Detailed Assumptions

Sustainable Transport Program

- The total GHG emission reduction calculated from 2016 to 2026 was assumed to be carried over to 2020 to 2030. The DOTr Department Order 2017 – 011 otherwise known as the Omnibus Franchising Guidelines, institutionalizing the PUV Modernisation Programme of the government, was just signed in June 2017. To date, only few jeepneys have been modernized through replacement method (most of the modernized jeepneys launched under the program were assigned to developmental routes, which means that there were no old jeepneys replaced). Route rationalization studies for the MUCEP area and other highly urbanized cities were also delayed. Only a small fraction of LGUs have also submitted their respective LPTRPs. Thus, it is safe to assume that the calculations made by GIZ in 2016 for the 2016 to 2026 timeline may also be applicable for the 2020 to 2030 timeline under the same assumptions.

Non-Motorised Transport, Travel Demand Management, and Transit Oriented Development

- The total person trips per HUC and province for the NMT, TDM, and TOD thematic areas of the PUMP were mostly calculated by multiplying the population (5 years old and above) of each LGU by two (assumed number of trips/ person/ day). Actual person trips and modal share for the MUCEP area, Metro Cebu, and General Santos City were however utilized.

The actual modal share for the remaining LGUs were then assumed to be the same with that of Metro Cebu. The average trip length for each mode of transportation were based on the MUCEP study by JICA in 2014 and the TEEMP tool developed by Clean Air Asia et al. in 2010. Emission factors (gCO₂e/pkt) per mode of transportation were also based on the TEEMP tool.

For the NMT scenarios, the ideal modal share for walking and cycling were based on the mean/median modal shares from 140 cities worldwide as compiled by UITP et al.

For the TDM thematic area, congestion charging emission reductions were based on the paper *“Introduction to Congestion Charging: A Guide for Practitioners in Developing Cities”* published by ADB and GIZ in 2015.

Lastly, the VKT reduction assumptions resulting from the implementation of the TOD thematic area were based on the *Center for Clean Air Policy (CCAP) Transportation Emissions Guidebook* published by CCAP with support from the US Environmental Protection Agency & the Surdna Foundation.

Urban Freight

- The urban freight thematic area of the PUMP assumes that that the new vehicles to be procured are 20% above the average on-road efficiencies of the existing fleet. The project scenario also assumes an average of 5% improvement in on-road fuel efficiency due to improved driving patterns (fleet operator training, eco-driving) delivered through operator training and fleet operator recognition programs. For the online freight exchange program, it is assumed that freight vehicles are running empty 25% of the time, and that a quarter of such empty miles can be reduced through the participation in such scheme.

As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by:

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn

Friedrich-Ebert-Allee 36+40
53113 Bonn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15
E info@giz.de
I www.giz.de

Author/Responsible/Editor, etc.:

Robin Kaenzig
Christian Mettke
Patricia Mariano

Design/layout, etc.:

Patricia Mariano

Photo credits/sources:

Robin Kaenzig
Jilson Tiu
Patricia Mariano
Christian Mettke

URL links:

This publication contains links to external websites. Responsibility for the content of the listed external sites always lies with their respective publishers. When the links to these sites were first posted, GIZ checked the third-party content to establish whether it could give rise to civil or criminal liability. However, the constant review of the links to external sites cannot reasonably be expected without concrete indication of a violation of rights. If GIZ itself becomes aware or is notified by a third party that an external site it has provided a link to gives rise to civil or criminal liability, it will remove the link to this site immediately. GIZ expressly dissociates itself from such content.

Maps:

The maps printed here are intended only for information purposes and in no way constitute recognition under international law of boundaries and territories. GIZ accepts no responsibility for these maps being entirely up to date, correct or complete. All liability for any damage, direct or indirect, resulting from their use is excluded.

Printing and distribution:

Printed on 100% recycled paper, certified to FSC standards.

Eschborn, 2019



Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ)
GmbH

Registered Offices
Bonn and Eschborn

Friedrich-Ebert-Allee 36+40
53113 Bonn, Germany

T +49 228 44 60-0
F +49 228 44 60-17 66

E info@giz.de
I www.giz.de