CREATING SUSTAINABLE CITIES AND COMMUNITIES THROUGH EFFICIENT MASS TRANSPORTATION

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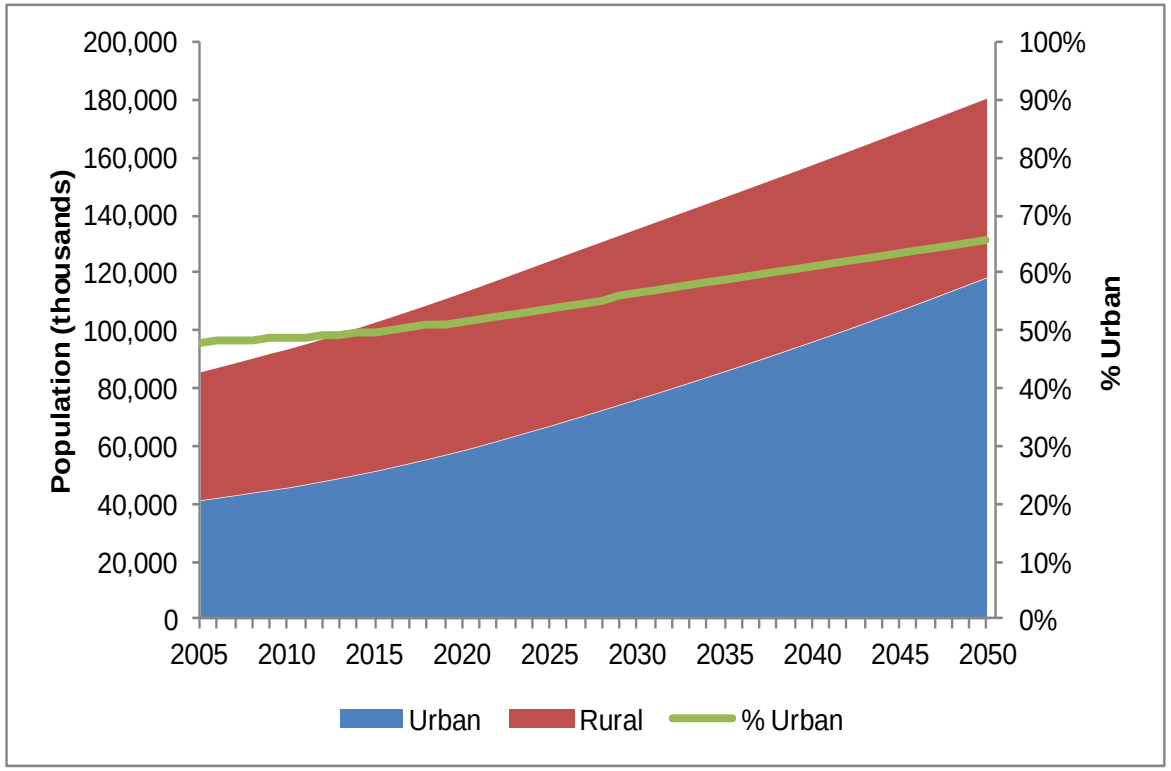
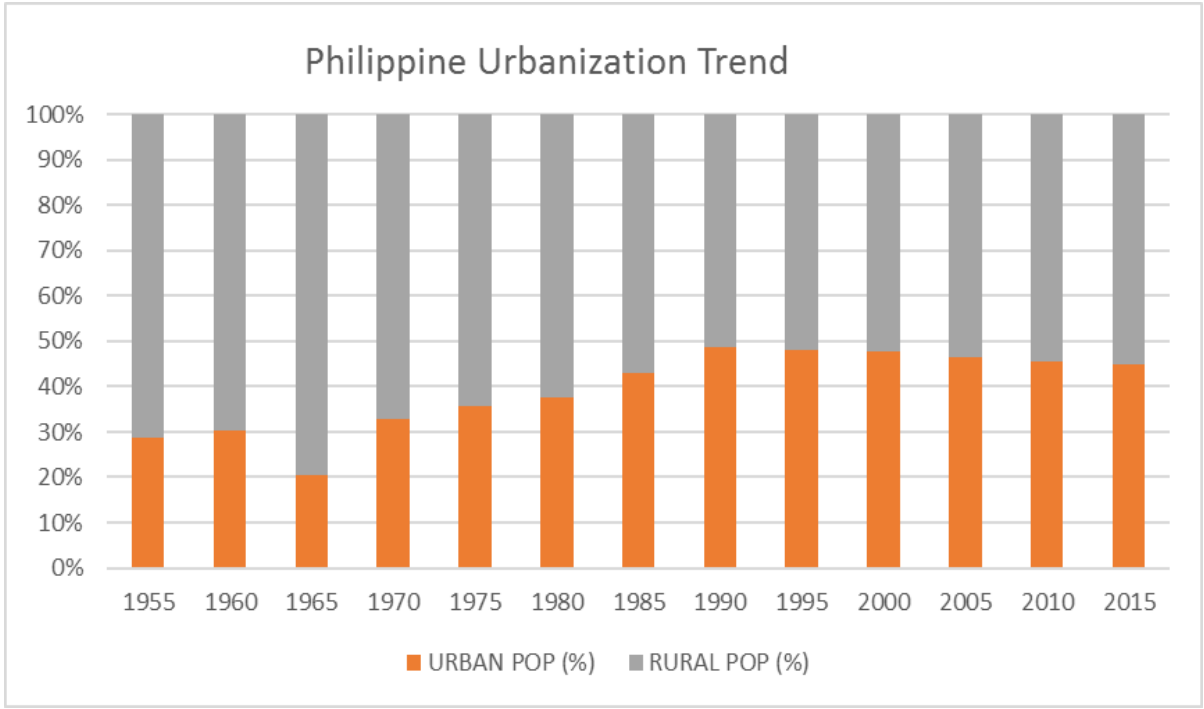
Outline of Presentation

- Introduction
- Mass transportation and sustainable communities
- Mass transit options
- Counterfactual of rail development in Metro Manila
- Strategies to support mass transit development

Introduction



Source: UN, 2012



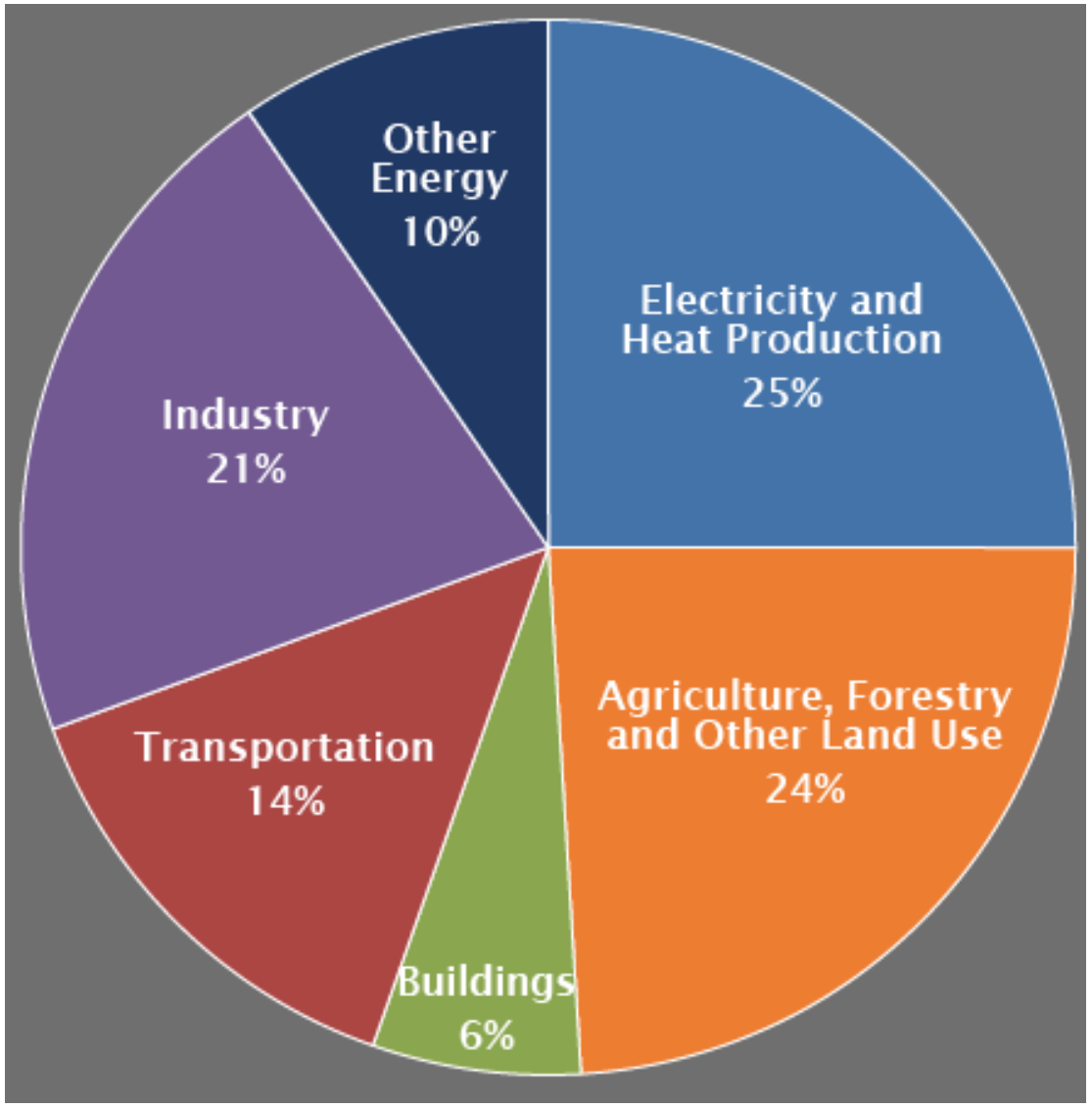
Source: http://www.worldometers.info/world-population/philippines-population/

Increasing mobility demand

Introduction

Source:
http://business.inquirer.net/130649/traffic-costs-p2-4b-daily

Introduction



Global Emissions by Economic Sector

Source: IPCC (2014); Exit EPA Disclaimer based on global emissions from 2010. Details about the sources included in these estimates can be found in the Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change .
http://www3.epa.gov/climatechange/ghgemissions/global.html

Major issues in transport as outlined in the NIP on Environment Improvement in the Transport Sector Low Pollution Pollution-Low Emission (DOTC, 2012)

- Increasing number of motor vehicles and ridership that lead to higher emissions
- High percentage (38%) of total greenhouse gas (GHG) emissions from transport sector and more than 90% air pollutant emissions such as VOCs, CO, and NOx
- High share of road passenger trips (98.14%) from road transport and low share by railways (0.15%) lead to higher emissions from the transport sector
- Public utility jeepneys (PUJs) are the major source of GHG (37% of transport total)
- Motorcycles and tricycles are major contributors of VOC

Energy Use in the Transport Sector

- The transport sector in Malaysia, Philippines, Thailand, Indonesia, Singapore and Vietnam accounted for 17-35% of total energy consumption in 2009.
- Transport consumption has increased commensurately with economic growth

Country	Transport Sector Energy Consumption (% of total energy consumption)
Malaysia	35.1
Philippines	35.0
Thailand	25.1
Indonesia	21.6
Singapore	20.3
Vietnam	17.3

Source: International Energy Agency (IEA), (2011)

Energy demand projected to grow at an annual rate of 3.5% (DOE, 2017)

Melissa Low, 2012

Mass Transportation and Sustainable Development

Sustainable Development Agenda

Goal 11.

Make cities and human settlements inclusive, safe, resilient and sustainable

11.2 - By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, **notably by expanding public transport**, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Sustainable transport context

Movement of people and goods in ways that are environmentally, socially and economically sustainable through:

1. Planning **dense and human scale** cities;
2. Developing **transit-oriented** cities;
3. **Optimizing the road network** and its use;
4. Encouraging **walking and cycling**;
5. **Controlling vehicle use**;
6. Implementing **transit improvements**;
7. **Managing parking**;
8. Promoting **clean vehicles**;
9. **Communicating solutions**; and
10. Approaching the challenges **comprehensively**.

[Reference: GIZ]

Efficient use of urban space

The amount of space required to transport
the 60 persons by different modes

***Source*: Poster in City of Muenster Planning Office, August 2001 (http://paulmajorana.com)**

Co-benefits of Efficient Public Transportation

American Public Transport Association (Sept. 2016)

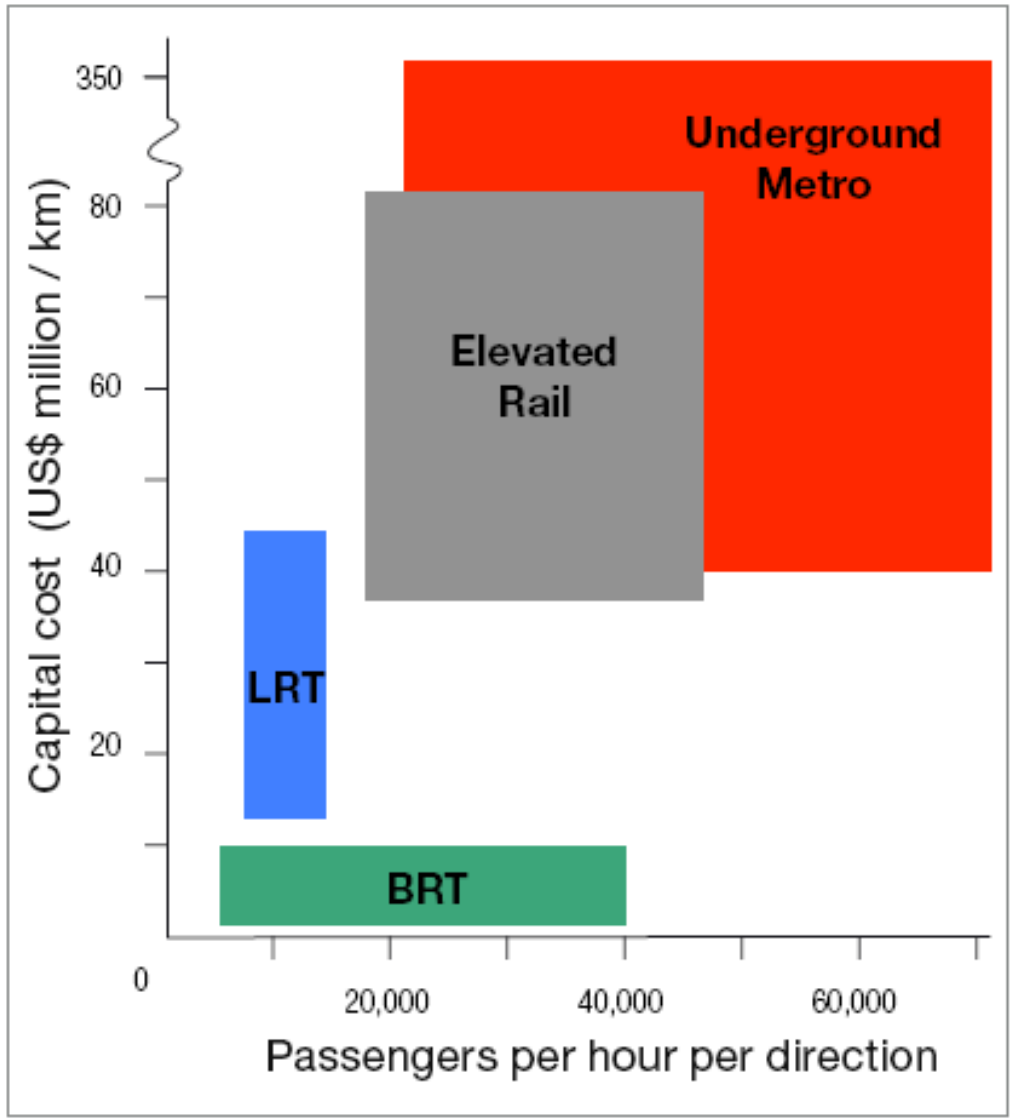
- Offer an alternative to drunk driving
- Reduce fatigued driving
- Reduce distraction
- Reduce traffic congestion

Impacts of efficient Public Transportation on the environment:

- Improve air quality by reducing overall vehicle emissions and the pollutants that create smog;
- Reduce greenhouse gas emissions
- Facilitate compact development, conserving land and decreasing travel demand
- Save energy

Source: https://www.transit.dot.gov/

Figure 21: Passenger capacity and capital cost for mass transit options



Source: GTZ, BRT Planning Guide

What if Metro Manila Devel a Comprehensive Rail Transit Network?

12th International Conference of Eastern Asia Society for Transportation Studies

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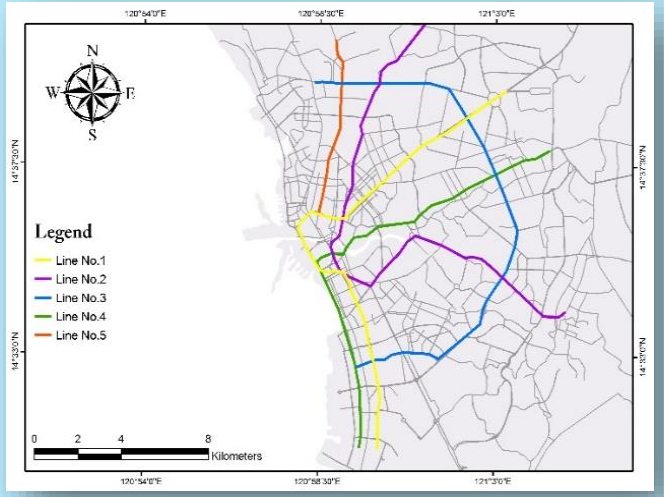
ALEXIS M. FILLONE
KERVIN JOSHUA C. LUCAS

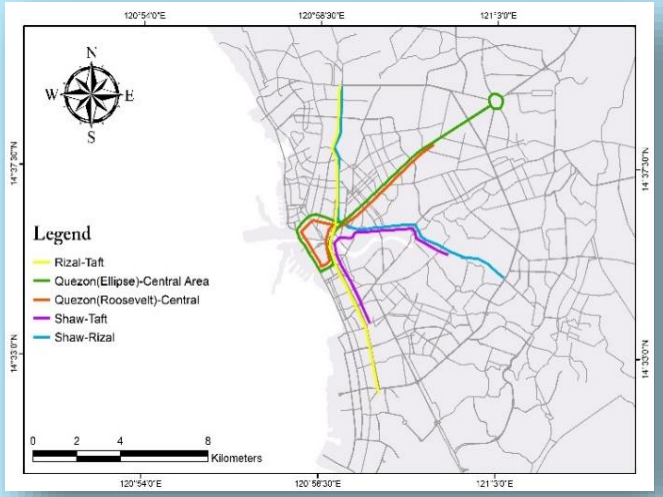
METHODOLOGY

SCENARIO MODELING



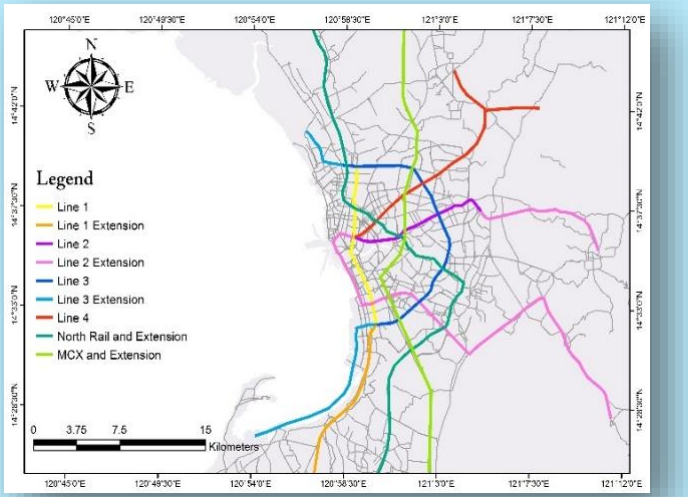
UTSMMA

Mar 1971 ~ Sept 1973



MMETROPLAN

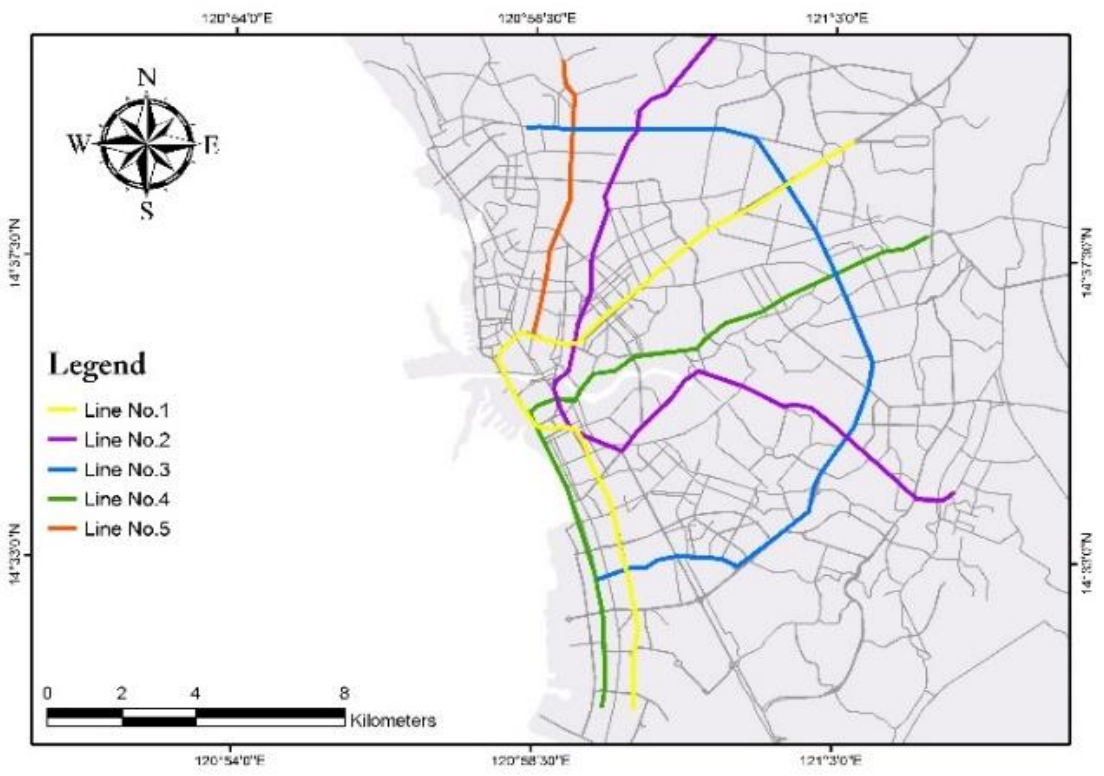
Jan 1976 – Feb 1977



MMUTIS

Mar 1996 – Mar 1999

RAIL TRANSIT PLANS FOR METRO MANILA

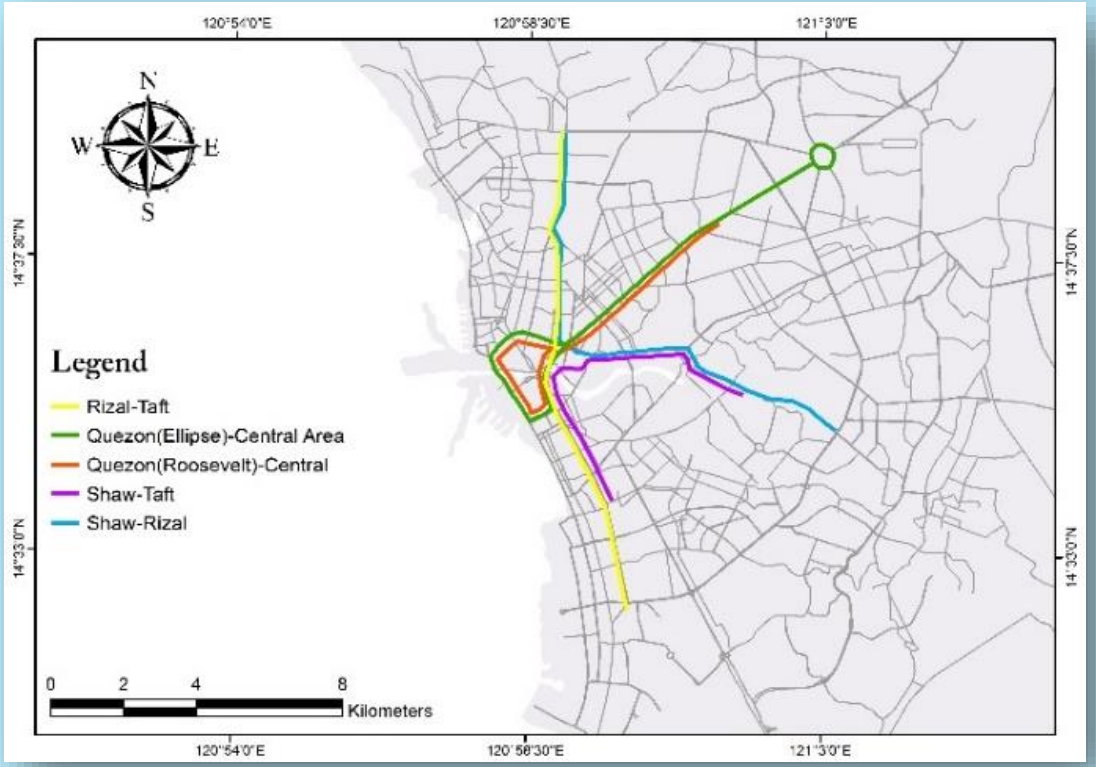


PROPOSED	DISTANCE (km)	DESCRIPTION
Line No. 1	27.1	from Construction Hill to Talon via central Quezon Boulevard, Manila downtown and the International Airport
Line No. 2	36.0	from Novaliches to Cainta via Manila downtown and Pasig
Line No. 3	24.3	Along Highway 54 (C-4): half a circle route about 12 km from Manila downtown
Line No. 4	30.1	from Marikina to Zapote via Cubao, Manila downtown and the Manila Bay area
Line No. 5	17.6	from Meycauayan to Manila downtown running between Line No. 2 and PNR

Urban Transport Study in Manila Metropolitan Area (UTSMMA)

March 1971 - September 1973

RAIL TRANSIT PLANS FOR METRO MANILA

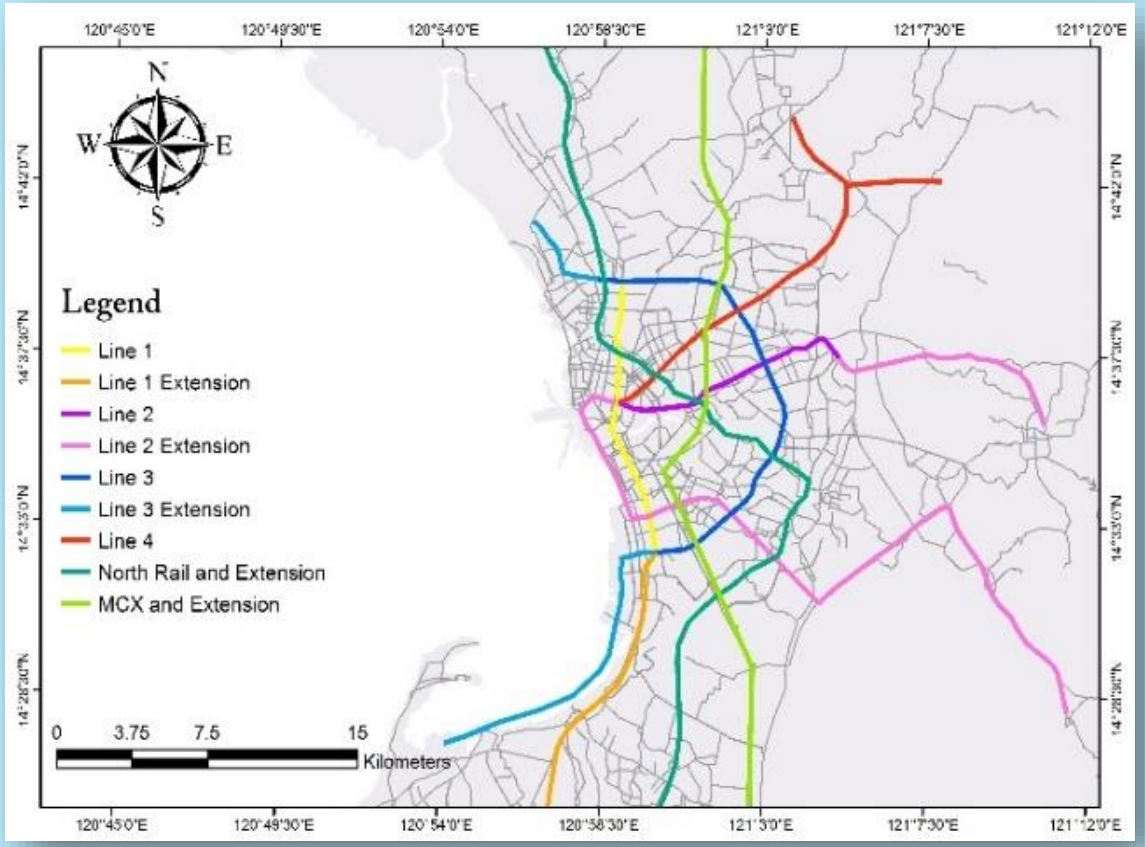


ROUTE	DESCRIPTION	DISTANCE (km)
A	Rizal - Taft	13.84
B	Quezon (Ellipse) - Central - Quezon (Ellipse)	23.5
C	Quezon (Roosevelt) - Central - Quezon (Roosevelt)	14.4
D	Shaw - Taft	11.6
E	Shaw - Rizal	15.0

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

January 1976 - February 1977

RAIL TRANSIT PLANS FOR METRO MANILA



PROPOSED	DESCRIPTION
Line 1 Extension or Line 6	The line will extend to Dasmariñas, Cavite in the south (30 km elevated).
Line 2 Extension	The line will extend to Antipolo in the east (12 km elevated) and to the west across Line 1 to the Port Area from where the line passes along Roxas Boulevard and Buendia to link Makati and Fort Bonifacio (17 km underground). Then the line will further lead to Binangonan in the east (20 km elevated/at-grade).
Line 3 Extension	The line will extend to Navotas and Obando (16 km elevated) in the north across Line 1 and PNR. The line in the south will extend to the reclamation area across Line 1 and further extend to Kawit (15 km elevated/at-grade) in the south.
Line 4	The line will extend to San Mateo in the north via a branch line. In the city center, instead of terminating on Recto Avenue, it can take over the extension portion of Line 2.
North Rail and Extension	A suburban commuter service will be provided between Malolos and Caloocan (30 km at-grade). From there, the line links Fort Bonifacio (20 km underground) and extends to General Trias in the south (25 km underground/elevated/at-grade).
MCX and Extension	A suburban commuter service will link Calamba with Alabang (28 km at-grade) from where the line will be elevated up to Paco (42 km). The line will then proceed toward the north across EDSA (11 km underground) and further extend northward to San Jose del Monte (18 km elevated).

Metro Manila Urban Transportation Integration Study (MMUTIS)

March 1996 - March 1999

RAIL TRANSIT PLANS FOR METRO MANILA

Assumptions

- PESSIMISTIC AND OPTIMISTIC SCENARIOS OF MODE SHIFTS FROM PRIVATE TO PUBLIC ARE 5% AND 20%, RESPECTIVELY.
- STATIONS ARE IN MAJOR INTERSECTIONS WITH STATION SPACING OF 800-1,200 M.
- FARES ARE THE SAME AS THE CURRENT

MODEL OUTCOMES

Table 1. Results of the modeling (2014), peak hour trips.

PARAMETERS	BASELINE	UTSMMA		MMETROPLAN		MMUTIS	
		PESSIMISTIC 5% SHIFT	OPTIMISTIC 20% SHIFT	PESSIMISTIC 5% SHIFT	OPTIMISTIC 20% SHIFT	PESSIMISTIC 5% SHIFT	OPTIMISTIC 20% SHIFT
PRIVATE TRIPS (OD)	1,077,680	1,022,900	861,562	1,022,900	861,562	1,022,900	861,562
PUBLIC TRANSIT TRIPS (OD)	2,700,570	2,755,340	2,916,680	2,755,340	2,916,680	2,755,340	2,916,680
AVERAGE TRAVEL SPEED, KPH	13.97	15.67	18.58	15.59	18.59	15.92	18.85
VCR	1.365	0.793	0.666	1.021	0.665	0.758	0.637
VHT (VEH-HR)	4,667,566	2,893,236	1,275,911	2,841,470	1,254,075	2,502,129	1,111,829
VDT (VEH-KM)	11,084,477	10,586,890	8,623,877	10,586,740	8,617,979	10,281,763	8,406,410

CONCLUSION

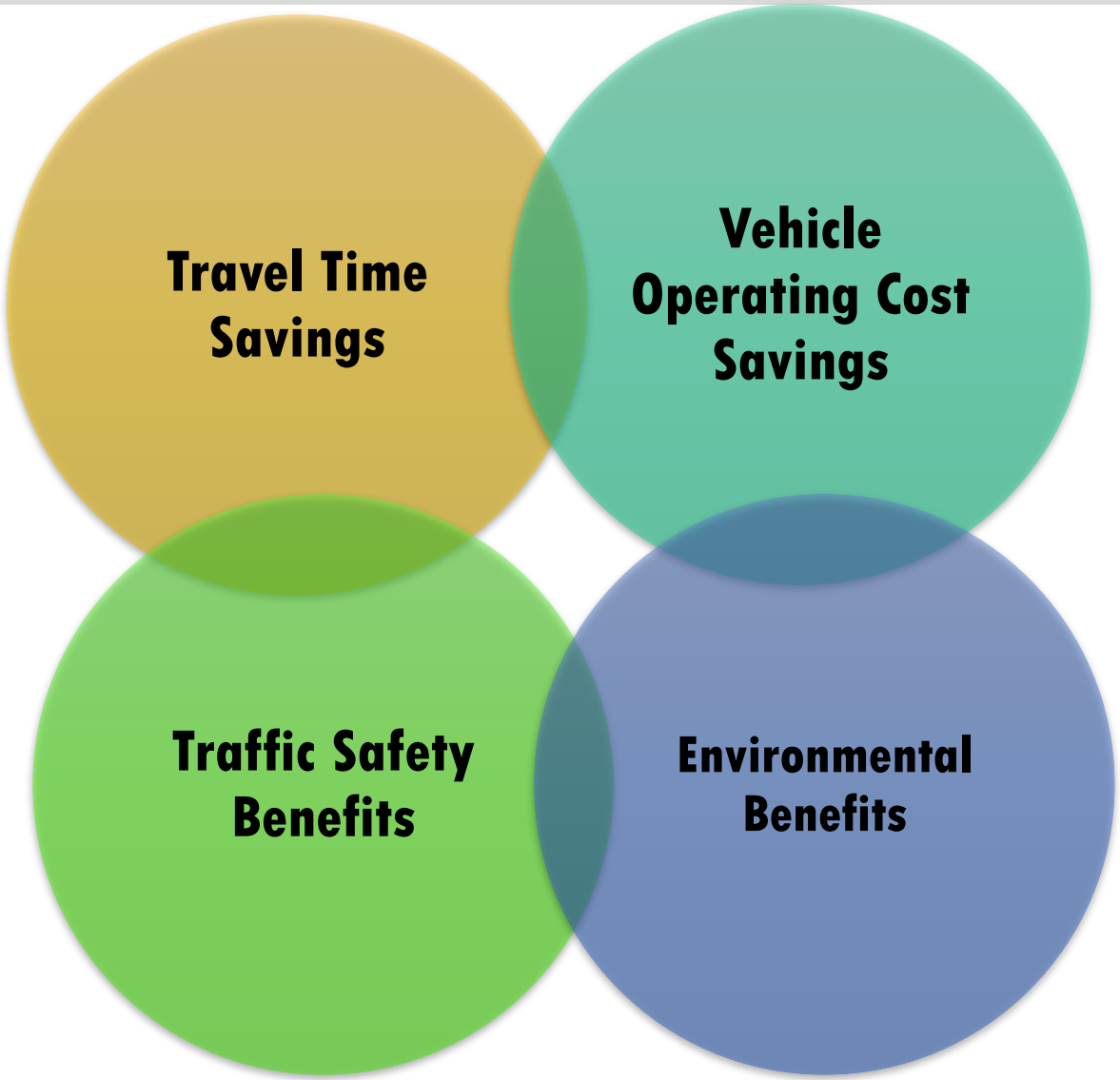
- ✓ MMUTIS would have provided the greatest improvement.
- ✓ More significant shift from private to public modes of transport has been observed.
- ✓ The rail network plan layout is important in capturing the demand or the mode shift.

RE-IMAGINING METRO MANILA: POTENTIAL IMPACTS OF MASS TRANSIT FOR A MEGALOPOLIS

DOMINIC S. ALOC
JOSE REGIN F. REGIDOR

TRANSPORT CO-BENEFITS GUIDELINES

Benefits derived together from a single measure or set of measures. (US Environmental Protection Agency 2004)



RESULTS AND DISCUSSION

Table 1. Co-benefits in UTSMMA.

CO-BENEFIT	Without Project	With Project	SAVINGS
Travel Time Cost (PHP/year)	4,917,080,362,199.46	3,053,884,087,455.21	1,863,196,274,744.25
Vehicle Operating Cost (PHP/year)	730,547,473,270.32	698,740,771,470.00	31,806,701,800.32
Traffic Safety Cost of private (PHP/year)	320,568,753,452.64	306,181,745,210.84	14,387,008,241.80
NO_x of private (PHP/year)	112,150,876.38	106,620,065.13	5,530,811.25
CO of private (PHP/year)	6,653,572,523.07	5,918,948,752.48	734,623,770.59
CO_2 of private (PHP/year)	46,715,797,354.35	41,699,890,008.35	5,015,907,346.00
		TOTAL (PHP/year)	**1,915,146,046,714.21**

RESULTS AND DISCUSSION

Table 2. Co-benefits in MMETROPLAN.

CO-BENEFIT	Without Project	With Project	SAVINGS
Travel Time Cost (PHP/year)	4,917,080,362,199.46	2,999,953,606,585.71	1,917,126,755,613.75
Vehicle Operating Cost (PHP/year)	730,547,473,270.32	698,740,330,228.80	31,807,143,041.52
Traffic Safety Cost of private (PHP/year)	320,568,753,452.64	306,181,545,607.87	14,387,207,844.77
NO_x of private (PHP/year)	112,150,876.38	106,665,792.26	5,485,084.13
CO of private (PHP/year)	6,653,572,523.07	5,922,012,329.20	731,560,193.87
CO_2 of private (PHP/year)	46,715,797,354.35	41,681,851,224.09	5,033,946,130.26
		TOTAL (PHP/year)	**1,969,092,097,908.29**

RESULTS AND DISCUSSION

Table 3. Co-benefits in MMUTIS.

CO-BENEFIT	Without Project	With Project	SAVINGS
Travel Time Cost (PHP/year)	4,917,080,362,199.46	2,267,439,621,432.73	2,649,640,740,766.73
Vehicle Operating Cost (PHP/year)	730,547,473,270.32	669,415,776,443.28	61,131,696,827.04
Traffic Safety Cost of private (PHP/year)	320,568,753,452.64	293,124,206,138.88	27,444,547,313.76
NO_x of private (PHP/year)	112,150,876.38	102,104,780.33	10,046,096.06
CO of private (PHP/year)	6,653,572,523.07	5,559,942,078.59	1,093,630,444.47
CO_2 of private (PHP/year)	46,715,797,354.35	38,935,334,446.41	7,780,462,907.94
		TOTAL (PHP/year)	**2,747,101,124,356.00**

Strategies to support mass transit development

- Density and mix of land uses
- Enhancing pedestrian environment
- Adequate transit speeds and headways
- Passenger amenities and information

Thank you for your attention☺