

Formulation of a National Environmentally Sustainable Transport Strategy for the Philippines

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National Focal Agencies:

Department of Transportation and Communications

The Columbia Tower, Ortigas Avenue, Mandaluyong City, Philippines

Department of Environment and Natural Resources

Visayas Avenue, Quezon City, Philippines

Supporting Organizations:

United Nations Centre for Regional Development

Nagono 1-47-1, Nakamura-ku, Nagoya - 450-0001, Japan

Clean Air Initiative for Asian Cities

Unit 3504-05, 35th Floor, Robinson's-Equitable Tower
ADB Avenue, Ortigas Center, Pasig City, Philippines

Institute for Global Environmental Studies

2108-11 Kamiyamaguchi, Hayama, Kanagawa, 240-0115 Japan

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National Collaborating Center:

National Center for Transportation Studies

University of the Philippines, Diliman, Quezon City, Philippines

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National Collaborating Center:



National Center for Transportation Studies, University of the Philippines

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**Formulation of a National Sustainable Environmentally Sustainable
Transport Strategy for the Philippines – Final Report**

May 2011

Study Team:

Jose Regin F. Regidor – Study Team Leader

Cresencio M. Montalbo, Jr.

Ma. Sheilah G. Napalang

Hilario Sean O. Palmiano

Ricardo G. Sigua

Noriel Christopher C. Tiglao

Karl N. Vergel

Front cover photos by:

Raul Vibal

Printed by:

Design Plus

30 Narig St., Veterans' Village, Project 7, Quezon City, Philippines

All materials and reports relating to the project are also available online via the National EST Strategy Web Portal.

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For any questions or any information related to this publication, please contact the NCTS at:

up.ncts@gmail.com or +63-2-928-8305.

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Environmental Studies

National collaborating center:



National Center for
Transportation Studies,
University of the Philippines

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PREFACE

Asian countries face an increasing number of issues and challenges in the environment and transport sectors. Although the transport sector has played a significant role in contributing to Asia's remarkable economic growth, there are a number of pressing issues associated with the transport sector that need to be addressed. They include: energy security, air pollution, GHG emissions, traffic congestion, injuries and fatalities due to traffic accidents, freight inefficiencies, greater rural-to-urban migration, and loss in economic productivity due to congestion.

Climate change issues have emerged as one of the biggest threats to the survival of human beings due to their affects on food security and the water cycle. Over the past decade, the level of understanding of both global climate change and sustainable transport has advanced greatly. It is now recognized that urban transport represents one of the fastest-growing sources of GHG emissions.

It is estimated that transport-related carbon dioxide emissions are expected to increase 57 per cent worldwide during the period 2005-2030. Any serious effort to mitigate GHG emissions will have to include major reform of existing transport systems and, in particular, it will be necessary to take measures to reduce the increase in private motorized vehicles as the region undergoes rapid urbanization. Currently, 1.6 billion people, or 40 per cent, of Asians live in urban areas and by 2030, the majority (more than 60%) will live in cities and towns.

There is a need to promote environmentally sustainable transport (EST) as an alternative to uncontrolled motorization and its related problems and as an integrated package of public transport, high quality footpaths and cycleways, vehicle restriction measures, clean fuels, and road safety programmes along with a set of technologies and practices that encompasses world best practices in accessibility, mobility, affordability, and safety.

In this regard, it is considered a very opportune time that the Government of Philippines has come up with its National EST Strategy prepared through a participatory and consultative process

involving key transport stakeholders at the local and national levels, following the Administrative Order (No. 254) by the President of the Philippines dated 30 January 2009, which mandated the Department of Transport and Communications (DOTC) to lead the formulation of such an EST strategy.

At the same time, Asian countries are committed to achieving the goals set forth in the Bangkok 2020 Declaration, which was agreed on at the Fifth Regional EST Forum in Asia held in August 2010. It is the first joint declaration by Asian governments and other stakeholders in the Asian region with a clear time frame (2010-2020), a comprehensive set of goals on EST for this timeframe, and a set of indicators to assess progress in the implementation of the declaration.

We believe the Philippines National EST Strategy will not only complement the sustainable transport goals of such regional agreements, but also provide an important basis and framework to develop and realize EST activities as nationally appropriate mitigation actions (NAMAs) to take full benefit of the support provided by the international community in addressing the climate issue.

UNCRD/UN DESA would like to express their sincere gratitude to the Department of Transport and Communications (DOTC) and Department of Environment and Natural Resources (DENR) of the Government of the Philippines, National Centre for Transportation Studies, University of the Philippines (UP NCTS), the designated national collaborating centre, and CAI-Asia and IGES, key partners, for successfully developing the Philippines EST Strategy. UNCRD is also thankful to the Ministry of the Environment of Japan and the SUMA project of Asian Development Bank for their financial support towards this strategy formulation.

CHIKAKO TAKASE
Director, UNCRD



*United Nations Centre for
Regional Development*

“Any serious effort to mitigate GHG emissions will have to include major reform of existing transport systems and, in particular, it will be necessary to take measures to reduce the increase in private motorized vehicles as the region undergoes rapid urbanization.”

Republic of the Philippines
**DEPARTMENT OF
 TRANSPORTATION AND
 COMMUNICATIONS**

OFFICE OF THE SECRETARY

The Department of Transportation and Communications (DOTC) is pleased to have partnered with the Department of Environment and Natural Resources (DENR) as focal agencies for the formulation of the National Environmentally Sustainable Transport Strategy. This effort recognizes the need to re-visit existing policies and mandates that govern the transportation sector, especially in urban areas, including a new paradigm in tackling issues on energy efficiency, climate change mitigation and air quality management. Environmentally sustainable transport (EST) must be established to redirect the current development path to favor safe, efficient, low carbon, low pollution, and inclusive transport systems. The development of the National EST Strategy involved all stakeholders in the national and local levels. This approach was deemed as an important element to ensure that policies that promote energy efficient and environmentally-friendly transportation systems have the buy-in and support of the populace and see its implementation. The Final Report presents the strategies and action plans towards realizing and mainstreaming EST in the Philippines. More importantly, the report provides a framework that will provide the DOTC, the DENR and other agencies concerned with the sense of direction to guide them in

formulating and implementing programs and projects geared towards sustainable transport. This Department acknowledges the support provided by the United Nations Centre for Regional Development (UNCRD) and the Clean Air Initiative for Asian Cities (CAI-Asia), along with other partners that lent their expertise and resources for this endeavor. Finally, I would like to acknowledge the University of the Philippines National Center for Transportation Studies (UPNCTS) for their work as the National Collaborating Center for this project. This Department, together with DENR, is committed to advocating EST and providing guidance to local government units in mainstreaming sustainable transport at all levels of governance.


JOSE P. DE JESUS
 Secretary



“This effort recognizes the need to re-visit existing policies and mandates that govern the transportation sector, especially in urban areas, including a new paradigm in tackling issues on energy efficiency, climate change mitigation and air quality management.”

Republic of the Philippines

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

The transport sector plays a key role in national development by continuously responding to the country’s need for integrated transport to meet the daily challenges of moving passengers and goods in the country’s many islands. While this sector supports national development, it is also a major contributor to air pollution and greenhouse gas (GHG) emissions which pose negative impacts on the environment and public health.

While recently air quality has shown improvements, we still need to do more, as this is still not at par with healthful standards. Concentrations such as that of total suspended particulates (TSP) continue to be above the acceptable values. Unknown to many Filipinos, vehicular emissions account for the biggest chunk of discharges contributing to air pollution, even exceeding stationary sources like factories and industries.

There is, therefore, a need to establish an efficient and reliable transportation system that will enhance sustainable mobility and reduce GHG emissions by the transport sector. The formulation of a *National Environmentally Sustainable Transport (EST) Strategy for the Philippines* is indeed a welcome and timely development. With its detailed strategies on public health and social equity, roadside pollution, transport

planning, road safety, and advocacy and awareness, it serves as an important tool in achieving energy-efficient and low-carbon transportation systems for the country. It also comes in the wake of stepped up efforts to mitigate climate change and its perilous effects.

The collaboration among the Department of Transportation and Communications, UN Center for Regional Development, Clean Air Initiative for Asian Cities, UP National Center for Transportation Studies and the Department of Environment and Natural Resources to come up with this very useful resource is highly commendable. May this undertaking strengthen our efforts in building an eco-efficient and sustainable transport sector.

Mabuhay tayong lahat!



RAMON J. P. PAJE
Secretary



Department of Environment and Natural Resources



“There is, therefore, a need to establish an efficient and reliable transportation system that will enhance sustainable mobility and reduce GHG emissions by the transport sector.”

CAI-Asia MESSAGE Philippines EST

During the past decade, Asian countries, including the Philippines, faced rapid urbanization and motorization. In Metro Manila and many other Philippine cities, this has resulted to increased use of private cars and motorcycles, a decline in the quality of public transport and pedestrian facilities, and increased air pollution, road accidents and rising fuel consumption threatening fuel security. People need good access to work and services for the economy to continue to grow, and the way Philippines' cities and transport systems are currently being developed is taking us in the wrong direction.

We therefore welcome the launch of the Philippines National Environmental Sustainable Transport Strategy and Action Plan, which was developed with broad stakeholder participation from across the country. It has also been reflected in other national policies, such as the Philippine National Framework Strategy on Climate Change, which increases the chances of success.

We are proud to have supported the development of this Strategy and Action Plan, together with the United Nations Centre for Regional Development and through a grant from the Swedish International Development Cooperation Agency (Sida) and the Asian Development

Bank. We will continue to support government agencies and collaborate with other NGOs, universities and the private sector in its implementation.

SOPHIE PUNTE

Executive Director

Clean Air Initiative for Asian Cities
(CAI-Asia) Center

www.cleanairinitiative.org

“We therefore welcome the launch of the Philippines National Environmental Sustainable Transport Strategy and Action Plan, which was developed with broad stakeholder participation from across the country.”





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EXECUTIVE SUMMARY

1. Background

The Philippines is an archipelago of about 7,100 islands and divided into three major island groups, namely: Luzon, Visayas and Mindanao. Due to the country's geographic features, the various modes of transportation play distinct roles in the movement of passengers and freight in the country. Roads and water transport dominate in the flow of people and goods, respectively; while railways and air transport modes have their respective markets and geographic coverage.

It is well established that an efficient and reliable transportation services constitute a vital supportive system to national development. In the past years, there have been strong advocacies towards sustainable development. Directly related is environmentally sustainable transport (EST), which is defined as transport development that meets the needs of the present without preventing future generations from meeting their needs.

2. Objectives

The overall objective of this endeavor is to develop and mainstream EST strategies that are sensitive to future development scenarios. Strategies should be developed considering future development scenarios such as vehicle growth, level of urbanization, population density, and economic growth. The overall goal of the strategy may be seen in the following:

- Reduction of the annual growth rate of energy consumption and associated green house gas (GHG) and air pollutant emissions from the transport sector especially in urban areas of the country;
- Enhance sustainable mobility through the development of a viable market for environmentally sustainable transport (EST) goods and services, which involves, among others, the promotion of transportation systems of low carbon intensity and shift towards the use of more sustainable transport modes.

The formulation of the national strategy is primarily intended for the identification of priority challenges in the context of EST that would need to be addressed through the formulation of strategies. These strategies will have specific targets, incorporate multi-sector commitments, and recommend measures for the promotion of EST in Philippines.

3. Current Conditions

In 2007, the estimated gross domestic product (GDP-purchasing power parity) of the country was US\$229.38 billion and it grew at an average growth rate of 3.6% and 1.1% in 2008 and 2009, respectively. Among its regional counterparts, the country's economy survived the 2008-2009 global relatively better due to its 'low dependence on exports, relatively resilient domestic consumption, large remittances from its overseas workers, and a growing business process outsourcing industry' (World Fact Book, CIA 2010). Its GDP per capita in 2007 was US\$3,379, relatively higher than Mongolia, India, Vietnam, and Pakistan in the lower middle-income group, as classified by World Bank (WDI, 2010). It is estimated the 1 out of every 100 family was lifted out of food poverty between 2006-2009 (NSCB, 2011).

In 2007, the road density of the Philippines was estimated to be 0.67 kilometers/ square kilometer, increasing from 0.54 km/sq. km in 2003 – the highest among Southeast Asian countries, except Singapore. The Philippine road network has been improved at the rate of 25% between 1990 and 2007. As of 2009, the estimated total length of roads in the Philippines is 213,351, of which 54,481 kms are paved and 158,670 kms unpaved. The country ranks 24th in the world in terms of total length of roads (The World Factbook-CIA, 2010). Although traffic congestion is

a main challenge in major urban centers, with an estimated 937,648 passenger cars registered nationwide, the rate of motorization (in passenger cars per 1,000 people) of the Philippines ranks 11th, one of the lowest among its Southeast Asian neighbors.

Based on the latest Census data of the National Statistical Coordinating Board, the population of the Philippines was 88,574,614. The annual average growth rate has declined from 2.35% between Census years 1980 and 1990 to 2.04% for the Census period between 2000-2007. Population growth rate higher than the national average for the latter Census period were recorded in the Autonomous Region in Muslim Mindanao (5.46%), Region IV-A (3.21%), Central Mindanao (2.41%), Central Luzon (2.36%), and the National Capital Region (2.11%).

In 2007, four highly urbanized centers housed population of more than 1 million. These are Quezon City, Manila City, Caloocan City of NCR and Davao City in Southern Mindanao. Meanwhile, other highly urbanized cities representing different regions in the country recorded populations well below 1 million including Cebu City. These include Baguio City in Cordillera Autonomous Region, Naga City in the Bicol Region, Iloilo City in Western Visayas, and Cagayan De Oro City in Northern Mindanao.

Emission from mobile sources has contributed 65% to the air pollution load nationwide, much more than the stationary sources. Mobile sources account for big chunk of particulate matter, carbon monoxide, nitrogen oxides, and volatile organic compounds (VOC). The time series data on total suspended particulate matter from 1976-2007 shows that the normal level has been exceeded since 1987 in most areas in Metro Manila. While air quality continues to improve since 2003, as evident in measurements by the DENR, concentrations such as that of TSP continue to be above the acceptable values. The national TSP trend from 2003 to 2007 is still above the Clean Air Act target of 90 µg/Ncm.

Transport consumes more energy than any other sector. In 2008, the transport sector accounted for 36.5% of total energy co. This increased to 37.7% in 2009, where road transport typically consumed about 80% of this share of the demand. Of the total energy demand, it was estimated that the transport sector accounted for over 70% of the country's petroleum products consumption.

Most Filipinos take public transport with an estimate of about 70% of the total person trips taking PT with as high as 80% in highly urbanized cities. There are currently over 23,000 buses, 36,000 taxis and about 217,000 jeepneys providing PT services throughout the country. Meanwhile, there are currently more than 90,000 tricycles in Metro Manila alone based on independent surveys by local government units. Other cities have more tricycles where this paratransit mode provides are the dominant form of transport for intra-city or intra-town travel.

Information on transport and traffic statistics are available from various sources including national agencies such as the DOTC, DPWH, DENR, NEDA and the DOH. The DOTC has several attached agencies with data holdings including the LTO, LTFRB, LRTA and OTC. The central repository of statistics from all these agencies is the National Statistical Coordination Board (NSCB), which publishes the Philippine Statistical Yearbook containing data on all sectors including transportation and demography.

Most databases are current, with the information regularly updated. Examples of these are data on vehicle registration (i.e., LTO) and public transportation services registered under the LTFRB. In certain cases, resources and facilities limit the regular collection of data such as those pertaining to air quality. Road traffic crash data are still unreliable due to under-reporting and information being quite limited to incidents along national roads.

Much information is with the local governments who are also involved in transport planning and traffic management at their jurisdictions. There are also databases with the private sector including data on expressways, logistics and land development. While private companies have traditionally held on data they have collected or generated, they are presently becoming more receptive to sharing information especially for collaborative work.

4. Impacts of Unsustainable Transport

The current transportation planning paradigm of ‘forecasting and providing’ has resulted in traffic congestion in urban areas which translates to about PHP 140 Billion (~2% of the country’s GDP) in 2008 in Metro Manila alone. This is economic cost is attributed to lost man-hours, additional fuel consumption, health costs, and lost investment opportunities. (NCTS, 2001). Figure E1 shows news items that dramatize the economic loss from traffic congestion and the risks from exposure to air pollution from mobile sources.

Apart from the negative environmental impact of transportation, the increase in road traffic accidents is another disbenefit of unsustainable transport system. The national annual cost of traffic accidents had been estimated to constitute 2.6% of the Gross Domestic Product of the Philippines in 2005, equivalent to about PHP 105 Billion. Accidents involving public transportation and freight vehicles are very often in the news even as accident occurrence continues to be under-reported for a variety of reasons that usually include lack of resources as well as a systematic disregard for minor accidents (i.e., those that involve only damage to property and minimal, if any, injuries). Figure E2 shows typical aftermaths of accidents involving public transport and trucks.

The occurrence of road crashes is still increasing and yet statistics are still found to be deficient as it is very difficult to reconcile statistics at the national level. The Traffic Accident Reporting and Analysis System (TARAS) of the DPWH while concentrating on road crashes along national roads that are collected by the PNP-HPG do not include reliable data from major cities like Cebu and Davao. It is also not linked to the Metro Manila Accident Reporting and Analysis System (MMARAS) that is managed by the MMDA that covers road crashes in the NCR.

5. EST: Developing Country Perspective

The concept of environmentally sustainable transport (EST) planning paradigm was first brought to the fore by the Organization for Economic Cooperation and Development (OECD) nations in the early 1960s to decouple economic growth from the negative externalities of transport. Under this policy approach, environmental protection is deemed equally important as other policy goals for the transport sector. There are 3 key differences between EST and the conventional approaches to transport planning and policy development. Firstly, the goals of EST are consistent with sustainable development, whereas that of conventional approaches are more for mobility and accessibility with mitigating measures prescribed to counter-act possible negative externalities of the resulting transport system, in short reactive. Secondly, EST views negative externalities in its entirety whereas conventional approaches tend to focus on mitigation of environmental impacts per transport activity unit. And thirdly, because of its pro active nature, the recommended policy instruments are aimed at restraining growth in the most environmentally damaging forms of transport activity. Thus, core to the EST approach is the development of long-term desirable scenarios and undertaking policies that will make these scenarios a reality using ‘*backcasting exercise*’.

However, the ‘backcasting exercise’ where a future desirable scenario is set as a target may not yet be fully applicable in developing countries such as the Philippines. Whereas, OECD nations have already achieved economic maturity and stability, thus have now moved on to a higher consciousness of environmental

protection, developing countries like the Philippines still struggle with the issue of economic survival in the operation of the transport sector. This is evidenced by the proliferation of two-stroke tricycles operating in the sub-urban and rural areas, especially in places where there is a gaping transport service gap. The popularity of such mode stems from the fact that acquisition and maintenance costs are low and traffic maneuver flexible. The latter becomes a huge factor especially in areas where public transportation system is highly inadequate. Thus, the challenge in localizing environmentally sustainable transport in the Philippines is to integrate the concept of sustainability in the transport concern of survival in the identification of recommended policies. Consciousness of the negative impact of transport must be slowly brought to the fore of major players of the transport sector through policies that will bring about financial survival in the short and medium term, with the ultimate goal of an environmentally sustainable transportation system in the long-term. The illustrations in Figure E3 depict this desired trend in relation to gross domestic product (GDP) and human development index (HDI).

6. Strategies, Indicators and Key Result Activities

The Office of the President of the Republic of the Philippines issued Administrative Order 254 – mandating the DOTC to formulate the national EST strategy. In the formulation of strategies, the corresponding indicators, and subsequently the action plans, stakeholders were grouped into five clusters in order to facilitate the consultation process. These were the public health and social equity, roadside pollution, transport planning, road safety, and advocacy and awareness clusters.

The participatory process employed yielded the priority strategies, indicators and key result activities shown in the following tables for each of the 12 EST thematic areas.

Table E1: Priority strategies, indicators and action plans for public health

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Formulate and promulgate Department (DOH) Administrative Orders (AO) on public health | a) Action and communications plan developed b) AO issued c) Guidelines and policies developed and circulated d) IRR issued/ circulated/ published e) Road map with time line formulated and mainstreamed | a) Create/ formulate of action and communication plan b) Issue/sign AO c) Prepare and formulate guidelines d) Prepare and formulate IRR e) Prepare/ formulate and mainstream road map and time line |
| b) Establish linkage/ partnership with concerned agencies/ groups/stakeholders including information and communication dissemination on public health hazards | a) Inter-agency links established b) Working group/s created c) Issuances of MOA with concerned agencies, including LGU's and NGO's d) Setting of incentives scheme e) Media support/ solicited/ tapped for information campaign | a) Create/ establish of steering committee and TWG b) Create working groups/ committee c) Issue/sign MOA d) Establish/set incentives scheme e) enter into MOA with media |

| | | |
|---|---|--|
| c) Fully implement EST program on public health | <ul style="list-style-type: none"> a) Number of community based organizations/ NGO's involved b) Number of LGU's capacitated and involved c) Medical package for PUV drivers and families integrated in the National Health Program d) No. of community based health facilities including health work force, strengthened and capacitated | <ul style="list-style-type: none"> a) Establish tie ups with NGO's and community based org b) Assess capacity and train identified LGU's. c) Conceptualize and incorporate medical package in the national health program d) Strengthen and capacities community based health facilities |
| d) Evaluate and monitor the EST Program | Evaluation and monitoring conducted | Convene participants to evaluate EST programs and come up with monitoring scheme, and identify additional researches necessary to update data |

Table E2: Priority strategies, indicators and action plans for strengthening roadside air quality monitoring and assessment

| Strategies | Indicators | Key Result Activities |
|---|--|--|
| a) Monitor reduction of concentration of TSP and other criteria pollutants | Reduction in concentration of criteria pollutants (%) | Establish baseline data for other criteria pollutants; determine contribution of transport to emissions (inventory)-- emission factor development and AAQ modeling; source apportionment/ speciation |
| b) Purchase/Install PM10, PM2.5, HC, CO, NO2, SO2 (road side) equipment | Number of operational roadside air quality monitoring stations | Identify potential hotspots and prioritize establishment of stations |
| c) Capacitate local government units and other sectors on monitoring and assessment | <ul style="list-style-type: none"> a) Number of trained LGU personnel in basic air quality management b) Number of LGU AQM plans developed and implemented | <ul style="list-style-type: none"> a) Identify potential staff to be trained in the HUCs; b) Conduct trainings (e.g. use DENR mobile AQ monitoring van); conduct of action planning workshops on AQM |

Table E3: Priority strategies, indicators and action plans for traffic noise management

| Strategies | Indicators | Key Result Activities |
|---|-----------------------------|---|
| a) Amend/update of noise standards and compliance | Revised noise standards | Update of baseline roadside noise level data by 2010; set up IATWG |
| b) Strictly enforce motor vehicle noise regulations | Roadside noise level | Purchase of noise level meters; training on use of equipment and procedure of LTO and LGU personnel; issuance of MC/AO on noise regulations for inspection of in-use MVs; roadside apprehension procedures for LGUs |
| c) Enhance LGU capability/ enact local ordinances on noise [including ambient and source] | Enacted ordinances on noise | Disseminate template of ordinance (samples, ex. QC) |

Table E4: Priority strategies, indicators and action plans for vehicle emission control, standards, and inspection and maintenance

| Strategies | Indicators | Key Result Activities |
|--|--|--|
| a) Establish motor vehicle standards on fuel economy and roadworthiness (in-use) | a) Percentage (%) compliance of MVs to emission standards b) Developed fuel efficiency standards for public transport c) Developed vehicle roadworthiness standards for all vehicles | a) Develop fuel efficiency standards for PT vehicles/ fuel efficiency ratings for private modes (for PT, to aid in LTFRB fare setting) b) Develop vehicle scrappage program |
| b) Strengthen road side apprehension on {smoke-belchers and} polluting and non-roadworthy vehicles including organization of Anti Smoke Belching Units (ASBU) under CENRO office | a) Percentage (%) compliance of MVs b) No. of operational LGU ASBUs; | a) Encourage enactment of local ordinances to impose fees and set aside collection as a local clean air fund; b) Encourage creation of LGU ASBUs with training; facilitate deputation of LGU personnel by LTO |
| c) Mandatory vehicle inspection of public utility vehicles [2x a year] | Percentage (%) compliance to vehicle inspections | Issuance of policy directive requiring of mandatory twice a year inspection of PUVs; |

Table E5: Priority strategies, indicators and action plans for cleaner fuels

| Strategies | Indicators | Key Result Activities |
|--|---|---|
| a) Increase use of cleaner fuels for all vehicles (reduction of use of conventional fuels; improvement of specs) | a) Percentage (%) of vehicles using alternative fuels b) Number of distribution stations for alternative fuels | a) Provide of fiscal and non-fiscal incentives for producers and users of cleaner fuels; b) Provide incentives for assemblers of cleaner fuel vehicles; incentives for clean fuel conversion/retrofit companies); c) Develop standards for LPG conversion of tricycles Negotiate for sources of natural gas supply (e.g. Malampaya or imported); |
| b) Adoption of harmonized fuel quality standards (Euro regulations) | Euro 4 adoption | a) Harmonization of biofuel blends with Euro 4 standards; b) Study on appropriate fuels for motorcycles/ tricycles (e.g. conversion of 2-stroke to LPG); c) Suitability of E10 to carbureted vehicles |
| c) Improve distribution system of CNG | Number of daughter stations | Conduct of FS for additional CNG refueling stations; encourage investors for LNG terminals and pipeline distribution system |

Table E6: Priority strategies, indicators and action plans for public transport planning and travel demand management

| Strategies | Indicators | Key Result Activities |
|--|--|--|
| a) Integrate public transport system network (including efficient PT) | a) Inclusion in national plan b) Number of LGUs having PT planning integrated in local plans c) Number of LGUs with intermodal stations d) Presence of integrated ticketing system for Metro Manila's rail system | a) Integrate EST in NTPP2; b) DOTC to endorse NTPP2 to NEDA b) Develop of HLURB policy guidelines to integrate PT plan to LGU plan - mandatory to HUCs c) Develop policy guidelines |
| b) Develop and enhance appropriate freight transport policies | Number of development studies (e.g., logistics improvement plan) | Push studies for rationalized truck routes |
| c) Develop and implement appropriate TSM/ TDM measures (e.g., synchronization of traffic lights, road widening and paving, alternate routes) | a) Travel time reduction for public and private transport users b) Number of rationalized truck routes | a) Conduct studies to assess travel speeds along critical corridors/sections b) Assess truck routes in Metro Manila and other Highly Urbanized Cities (HUCs) |
| d) Develop mass transit systems especially BRT | a) Number of cities with appropriate mass transport b) Number of mass transport lines (e.g., BRT lines in Cebu and Davao by 2013) | a) Assess existing public transport system b) Push studies for mass transport including BRT and rail |
| e) Rationalize public transport systems and services according to public transport and road network hierarchies | Public transport mode and supply suitable to major corridor based on network demand estimates (to replace current RMC) | a) Assess existing public transport system b) Push studies for mass transport including BRT and rail |

Table E7: Priority strategies, indicators and action plans for non-motorized transport

| Strategies | Indicators | Key Result Activities |
|--|---|--|
| a) Develop policies and guidelines for pedestrian- and cycling-inclusive land use planning | a) Number of NMT-friendly cities b) Number and length of bike lanes constructed | a) Develop local indices b) Push for bicycle and walkway plans implementation by 2012 |
| b) Provide non-motorized transport (NMT) facilities | c) Number and length of pedestrian walkways constructed d) Percentage (%) or amount of budget provision or incentives on the use of NMTs (national and local government) | |

Table E8: Priority strategies, indicators and action plans for environment and people friendly infrastructure development

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Incorporate green architecture principles in the design of transportation infrastructure | a) Number of cities adopting or implementing environmentally sustainable transport infrastructure including green designs b) Increase in number/length of pedestrian walkways and other people friendly facilities | a) Develop local indices b) Prepare plans by 2011, implementation by 2013 |
| b) Incorporate "inclusive transport" principles in transportation infrastructure and vehicle design | a) % Reduction in accidents involving elderly, children, women and persons with disabilities b) % Increase in the number of public transport vehicles incorporating "inclusive" design c) # of cities adopting or implementing environmentally sustainable transport infrastructure including green designs d) Increase in #/Length of pedestrian walkways and other people friendly facilities | Strict implementation of provisions for PWD, senior citizens, pregnant women, etc. as stipulate in Philippine laws and design codes |
| c) Provide seamless and secure transport systems (e.g., seamless transfers) | a) Number of inter-modal terminals; b) Number of incidents concerning security in public transport systems | a) Develop indices b) Prepare inter-modal terminal plans c) Conduct diagnostic assessment |

Table E9: Priority strategies, indicators and action plans for social equity and gender perspective

| Strategies | Indicators | Key Result Activities |
|---|---|---|
| a) Monitoring and reinforcement of existing laws, rules, and regulations on gender, age, and PWD concerns | Level of compliance of concerned agencies, LGUs, and transport infrastructure and service providers | Convene concerned agencies to evaluate compliance |
| b) Installation of traffic and transport assistive devices including manpower components | Number of traffic and transport assistive devices installed, and manpower component assigned in key areas | a) Determine areas for installation and manpower requirements b) Installation of needed devices and assignment of personnel in these areas |

Table E10: Priority strategies, indicators and action plans for road safety and maintenance

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Road safety audit (RSA) | a) Number of road projects audited for road safety b) Percentage (%) of road-kilometers audited c) Number of RS auditors | a) Develop or RSA training module b) Conduct RSA training for national agency (DPWH) and local government units |
| b) Valuation of accident costs | Itemized accident cost components | Update costs of accidents (research) |
| c) Establish road traffic safety zones (TSZs) or traffic discipline zones (TDZs) (e.g. UP Model Safety Zone, Ayala-Alabang Village, Subic TDZ, The Fort TDZ, East Avenue TDZ, etc.) | Number of road traffic safety zones | a) Develop/Identify criteria for selecting candidate areas/corridors TSZ b) Conduct traffic management studies c) Provide legal support like issuance of LGU ordinances, or aids of legislation |

Table E11: Priority strategies, indicators and action plans for land use planning

| Strategies | Indicators | Key Result Activities |
|--|--|---|
| a) Capability building on integration of land use and transport policies | a) Case studies on EST and develop toolkits b) Number of trainings/seminars on land use and transport integration conducted c) Number of CLUPs/CDPs integrating EST d) Recognition of good practices of LGUs on EST | a) Detailed case study on the Marikina Bikeways in 2009 and search for EST leading practices of HUCs b) Development of EST training program and modules c) Develop and conduct advocacy activities for LGUs d) Develop and implement recognition mechanics |
| b) Promote mixed use development (compact, shorter trip distances) | a) Urban density (number of persons/area); b) Diversity of land uses in a given space; c) Trip lengths (unit distance) | a) Conduct transport surveys; b) Advocate diversification of land use by responsible agencies especially HLURB; c) Recognize local best practices in compact, mixed use development |

Table E12: Priority strategies, indicators and action plans for knowledge base, awareness and public participation

| Strategies | Indicators | Key Result Activities |
|--|--|---|
| a) Establish Center for Research in EST (CREST) | Established research center | Establish research center and allocate resources for multi-disciplinary studies |
| b) Establish "Building for EST" (BEST) Award | Annual awards for LGUs promoting and implementing EST good practices | Formulate guidelines and invite nominees from HUCs |
| c) Information build up on public health relatives | a) Number of IEC materials produced and disseminated; b) Number/name of tri-media tapped for information campaign | a) Conduct research on alcohol, and drug related accidents; b) Enter into MOA with media |

| | | |
|--|---|---|
| d) Reporting of air quality indices to the public (website) | Air Quality Indices - TSP, HC, CO, NO ₂ , SO ₂ , PM ₁₀ , PM _{2.5} | Development of web portal for reporting of air quality indices |
| e) Public awareness on hazards of noise | No. of advocacy materials used in quad-media | Develop IEC materials |
| f) Intensify promotion of alternative fuels and vehicles such as CNG, biofuels, AutoLPG, hybrid vehicles and EVs | No. of advocacy materials used in quad-media | Develop IEC materials |
| g) Road accident database system | Number of computerized database systems | a) Develop RADSys, b) Establish about 30 computerized accident database systems for tertiary hospitals c) Enhance TARAS to include accident data on local roads |
| h) Establish road safety research center | a) Established research center b) Number of researches conducted / disseminated | a) Formulate and submit proposal for a road safety research center b) Identify and conduct road safety research c) Disseminate activities like annual conferences, annual reports, and publications |
| i) Capability building on road safety at the LGU level | a) Number of training programs conducted b) number of LGU personnel trained | a) Develop RS training modules b) Trainors' training in MM c) regional RS training program/seminar |

7. Implementation and Financial Mechanism

It is important to recognize ongoing efforts related to EST. These efforts include facilities and resources that enable the formulation and implementation of EST plans, programs and projects. Meanwhile, there are also barriers that can be manifested in various forms including hindrances or obstacles. Initial resistance is expected considering the issues and challenges pertaining to the formulation and implementation of EST initiatives. EST touches on many sensitive issues particularly concerning the transport groups (e.g., compliance with EST principles concerning emission control, vehicle standards, inspection and maintenance, etc.).

Local governments are also more concerned with their development and EST, much like traffic impact assessment can be viewed as an additional requirement, which, if the results or recommendations point towards additional measure, can be regarded as a hindrance to development. This is very much related to the concepts of survival and sustainability discussed in this report and it should be understood that social marketing of EST must target these issues and concerns to overcome barriers at the local level.

At the national level, there will be a need for the DOTC and DENR to step up and lead the way for national government agencies to adopt EST. This co-leadership would require stronger linkages and a reconsideration of functions and responsibilities consistent with the mandates of these agencies. Only, since EST focuses on the transport sector, it is recommended that DOTC be the lead agency in mainstreaming EST in government processes as well as advocating EST to the private sector and the general public. In fact, the agency is now formulating the National Implementation Plan on Environment Improvement in the Transport Sector with assistance from JICA. The National Implementation Plan incorporates the essential elements of the National EST Strategy.

It is imperative to touch base with a broad range of stakeholders with the aim of establishing linkages or building partnerships. These partnerships, in as far as government is concerned, should be at all levels as represented by national government agencies and local government units. Communities need to be involved and empowered in the formulation and implementation of EST plans and programs. The participatory process involving all sectors would ensure that ownership is established, which in turn is a requirement to increase the chances of success for EST initiatives.

The roles of non-government organizations and the private sector are also recognized. In fact, NGOs and the private sector can also initiate EST programs and projects. However, these should be in close coordination with pertinent agencies that should provide the framework and guidance for the involvement of NGOs and the private sector in various EST initiatives. Such an approach in cooperative work will also diminish the potential for wastage of resources allocated for EST.

These linkages will form the foundation for mainstreaming EST in national and local processes and systems. Establishing partnerships will employ social marketing concepts that would introduce EST and help current and potential partners appreciate its co-benefits concerning environmental, social and economic elements.

International linkages would include those in relation to the Clean Air Initiative for Asian Cities (CAI-Asia) and the Partnership for Sustainable Low Carbon Transport (SLoCaT). These partnerships have initiated several activities and programs that encourage discussions and dialogue towards attaining objectives that have blended transport and climate change. These include identification of country specific targets and the sharing of knowledge at expertise in as far as dealing with the challenges posed by climate is concerned.

It is important to mention at this stage that partnerships between the academe and government (i.e., both at the national and local levels) should be pursued, established and nurtured. This is perhaps a general strategy that should be considered that includes capacity building for LGUs by cooperating with local universities. Such as strategy has been explored by the NCTS in cooperation with the Mindanao State University – Iligan Institute of Technology in Iligan City, Northern Mindanao together with the local government of that city.

In 2006, the GEF implemented the Resources Allocation Framework (RAF) as a mechanism to effectively provide funds for beneficiary countries. The RAF is based on a system that prioritizes the country's potential to generate global environmental benefits as well as the level of their capacity, policies and approaches to successfully implement GEF projects. The RAF ended in June 2010 and the newly replenished GEF trust fund, known as GEF 5, is now open for utilization based on the newly developed System for Transparent Allocation of Resources (STAR). The GEF 5 funds will be available from July 1, 2010 to June 30, 2014.

The GEF 5 funds will be accessed and provided based on its consistency and relevance with the STAR's strategic objectives. The GEF 5 will also use the GEF Benefit Index (GBI) and GEF Performance Index (GPI) as parameters for determining specific country allocations. The GBI measures the potential of each country to generate global benefits in a particular focal area while the GPI measures a country's technical capacity, policies and practices considered relevant to GEF projects. The GEF 5 has four Strategic Goals, namely.

- Strategic Goal 1: Conserve, sustainably use and manage biodiversity, ecosystems and natural resources globally taking into account the anticipated impacts of Climate Change;
- Strategic Goal 2: Reduce global climate change risks by: i) stabilizing atmospheric GHG concentration through emission reduction actions; ii)

- assisting countries to adapt to climate change, including variability;
- Strategic Goal 3: Promote the sound management of chemicals throughout their life cycle to minimize adverse effects on human health and the global environment;
- Strategic Goal 4: Build national and regional capacities and enabling conditions for global environmental protection and sustainable development.

The GEF 5 STAR will mainly support three focal areas: Biodiversity, Climate Change, and Land Degradation. The GEF 5 Philippine Portfolio states that the overall goal of the climate change focal area is to mitigate climate change and support developing countries and economies in transition toward a low-carbon development path. Five objectives are mentioned that is relevant to EST:

- Promote the demonstration, deployment and transfer of advanced low carbon technologies through enabling policy environment and mechanisms, and by avoiding GHG emissions;
- Promote market transformation for energy efficiency in industry and the building sector through appropriate policy, legal and regulatory frameworks, sustainable financing and delivery mechanisms, and avoiding GHG emissions;
- Promote investment in renewable energy technologies (RETs) through favorable policy and regulatory environment for RE investments, and avoiding GHG emissions;
- Promote energy efficient, low-carbon transport and urban systems through sustainable transport and urban policy and regulatory frameworks, investments in less-GHG intensive systems, and avoiding GHG emissions; and,
- Conserve and enhance carbon stocks through sustainable management of land use, land use change, and forestry, good management practices, restoration, and avoiding emissions and sequestering carbon.

The Clean Technology Fund (CTF) Investment Plan for the Philippines is another possible source for supporting EST programs and projects. It is actually being tapped for the development of Bus Rapid Transit (BRT) systems in Metro Manila, Metro Cebu and Metro Davao.

The ADB has also set aside funds to support initiatives that are linked with Climate Change Mitigation and Adaptation. These include funding for electric vehicle initiatives like support for the delivery and deployment of electric tricycles intended to replace conventional tricycles that are currently the dominant mode of transport in many rapidly developing Philippine cities. The ADB published the Operational Plan for its Sustainable Transport Initiative in 2010 that should serve as a guide for formulation and implementation of EST plans and programs as well as the engagement of donor agencies such as the ADB to support these endeavors.

Meanwhile, guidance may also be derived from publications most notably from the GTZ including:

- Accessing Climate Finance for Sustainable Transport: A Practical Overview, Sustainable Urban Transport Technical Document #5 (November 2010); and
- Financing Sustainable Urban Transport, Module 1f, Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities (July 2010).

Such documents are available from the GTZ homepage and may be referred to by national agencies and local governments when seeking possible funding from international sources.

8. Conclusions

The various provisions of the National EST Strategy and Action Plan has been used as inputs to the formulation or crafting of various policy documents including the following:

- 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); and
- Medium Term Philippine Development Plan (MTPDP) for 2011-2016.
- National Implementation Plan on Environment Improvement in the Transport Sector

A major challenge for most countries is how to include EST in climate change discussions. Too often, decision-makers are not generally aware of the impacts or contribution of transport as mobile sources of pollution. In the Philippines, Executive Order 774 was issued, reorganizing the Presidential Task Force on Climate Change with the DOTC identified to head the Task Group on Fossil Fuels. In subsequent meetings of this Task Group as well as the Presidential Task Force, the DOTC made presentations on the formulation of the National EST Strategy. It is in this manner that EST has been included in climate change discussions in the national level.

At the local level, there have been a variety of efforts in mainstreaming EST particularly in the area of air pollution as an implication of the implementation of the provisions of the Clean Air Act. There is still a need to inculcate the basic elements for all other thematic areas, recognizing that there is still the struggle at the local level for reconcile between survival and sustainability in as far as transportation is concerned.

The regional consultations will provide the appropriate venue to thresh out issues and concerns at the local level – both from the perspective of local governments and the regional offices of the national agencies. Experiences from past and recent initiatives on mainstreaming and social marketing of EST at the local levels would be very useful in engaging local governments, especially as EST is explained in the context of climate change.

The National EST Strategy and Action Plan was included as input to the Philippine National Report for CSD 18, particularly on the Transport sector. The Climate Change Commission of the Philippines has submitted the National Framework Strategy for Climate Change in early 2010, and the 12-year plan (2010-2022) was approved by the previous administration. Transport is mentioned for mitigation and EST is explicitly mentioned including the strategic priority of having a National EST Strategy. It is expected that such and other similar initiatives and actions will pave the way for the efficient mainstreaming of EST in climate change discussions and programs in the country. More recently, there is the report on policy options and actions to facilitate the implementation of projects and programs that was developed for presentation in the 19th Session of the Commission on Sustainable Development. The document discusses, among others, the need for an enabling environment for implementing programs and projects and the policies necessary for sustainable transport to be realized.

The elements of the National EST Strategy are consistent with the provisions of the Bangkok Declaration for 2020. In fact, the priority strategies could be reclassified according to the goals listed in the Bangkok Declaration.

This report recognizes the importance of Information and Communications Technology (ICT) considering that these can be used as tools for leverage against the challenges posed on transportation and traffic systems. The case of Singapore, for example, can be used as a model for the deployment of Intelligent Transport Systems (ITS) for a wide range of applications. Current applications in the Philippines as well as in other countries in Asia are still limited and should be aggressively pursued, perhaps in partnership with the private sector. The latter initiative would be consistent with the Philippine government's current policy

to pursue Public Private Partnerships (PPP) to develop its infrastructure and capabilities, and this can be applied as well to EST.

Goals pertaining to freight are also very relevant considering the issues on logistics like TDM schemes that tend to restrain logistics services (e.g., truck bans) and concerns pertaining to truck overloading and their impacts on road pavements and bridges. Intermodal transport is also well noted despite this report focusing mainly on road transport. All of the above concerns are already covered by the National Implementation Plan on Environment Improvement in the Transport Sector that is being formulated by the DOTC, which includes all modes of transportation, and would be implemented by air, maritime, rail and road agencies attached to the DOTC, in close cooperation with other agencies and stakeholders.



Photos by Danielle Guillen



1. INTRODUCTION

1.1 Background

The Philippines is an archipelago of about 7,100 islands and divided into three major island groups, namely: Luzon, Visayas and Mindanao. Due to the country's geographic features, the various modes of transportation play distinct roles in the movement of passengers and freight in the country. Roads and water transport dominate in the flow of people and goods, respectively; while railways and air transport modes have their respective markets and geographic coverage.

It is well established that an efficient and reliable transportation services constitute a vital supportive system to national development. In the past years, there have been strong advocacies towards sustainable development. Directly related is environmentally sustainable transport (EST), which is defined as transport development that meets the needs of the present without preventing future generations from meeting their needs.

The Philippines is committed to identify, promote and undertake Environmentally Sustainable Transport (EST) strategies and initiatives, in support of national progress and development. In fact, the country is a signatory to various conventions and declarations. The Philippines has undertaken various programs and activities towards achieving sustainable development and addressing climate change since its signing to the United Nations Framework Convention on Climate Change (UNFCCC) Agreement in Rio de Janeiro in 1992. These activities eventually led to the formulation, legislation and implementation of Republic Act No. 8749 or the "Philippine Clean Air Act of 1999," which provides for environmentally sustainable transport through harmonization of national emission standards with the international standards.

The Philippines is a signatory to the Manila Statement of 2004 that welcomes, among others, the initiatives of the United Nations Centre for Regional Development (UNCRD) in extending assistance to the countries of the region, especially the developing countries, in preparing national strategies and action plans to promote environmentally sustainable transport, and to facilitate annual high-level meetings and expert group meetings.

The Philippines is also a signatory to the Aichi Statement of 2005 that recognizes, among others, the need for both national and local level governments to develop and adopt integrated policies, strategies, and programs incorporating key elements of environmentally sustainable transport. The Aichi Statement defines these key elements of EST into twelve (12) thematic areas including:

- (1) Public health;
- (2) Strengthening roadside air quality monitoring and management;
- (3) Traffic noise management;
- (4) Vehicle emission control, standards, and inspection and maintenance;
- (5) Cleaner fuels;
- (6) Public transport planning and travel demand management;
- (7) Non-motorized transport;
- (8) Environment and people friendly infrastructure development;
- (9) Social equity and gender perspectives;
- (10) Road safety and maintenance;
- (11) Knowledge base, awareness, and public participation; and
- (12) Land use planning.

The identification and work on these thematic areas seek to address challenges in the transport sector through EST.

1.2 Objectives

The overall objective of this endeavor is to develop and mainstream EST strategies that are sensitive to future development scenarios. Strategies should be developed considering future development scenarios such as vehicle growth, level of urbanization, population density, and economic growth. The overall goal of the strategy may be seen in the following:

- Reduction of the annual growth rate of energy consumption and associated green house gas (GHG) and air pollutant emissions from the transport sector in urban areas of the country;
- Enhance sustainable mobility through the development of a viable market for environmentally sustainable transport (EST) goods and services, which involves, among others, the promotion of transportation systems of low carbon intensity and shift towards the use of more sustainable transport modes.

The formulation of the national strategy is primarily intended for the identification of priority challenges in the context of EST that would need to be addressed through the formulation of strategies. These strategies will have specific targets, incorporate multi-sector commitments, and recommend measures for the promotion of EST in Philippines.

The EST Strategy-cum-Action Plan should establish linkage between and the ongoing local and national activities, including initiatives of international agencies, addressing issues of vehicular pollution as well as other elements of EST. In order to avoid duplication in efforts, the national EST strategy-cum-action plan should as far as possible build on/complement already existing sectoral plans/strategies/initiatives, if any, addressing transport related issues. The strategy-cum-action plan should recommend country specific realistic/feasible actions/measures which could stimulate the national government policy making bodies as well as the international donor agencies. The national strategy should take into consideration potential financial resources and recommend financial mechanisms to generate required resources for implementation of the strategy-cum-action plan.

1.3 Current Conditions

Economy

In 2007, the estimated gross domestic product (GDP-purchasing power parity) of the country was \$229.38 billion and it grew at an average growth rate of 3.6% and 1.1% in 2008 and 2009, respectively. Among its regional counterparts, the country's economy survived the 2008-2009 global relatively better due to its 'low dependence on exports, relatively resilient domestic consumption, large remittances from its overseas workers, and a growing business process outsourcing industry' (World Fact Book, CIA 2010). Its GDP per capita in 2007 was \$3,379, relatively higher than Mongolia, India, Vietnam, and Pakistan in the lower middle-income group, as classified by World Bank (WDI, 2010). It is estimated the 1 out of every 100 family was lifted out of food poverty between 2006-2009 (NSCB, 2011).

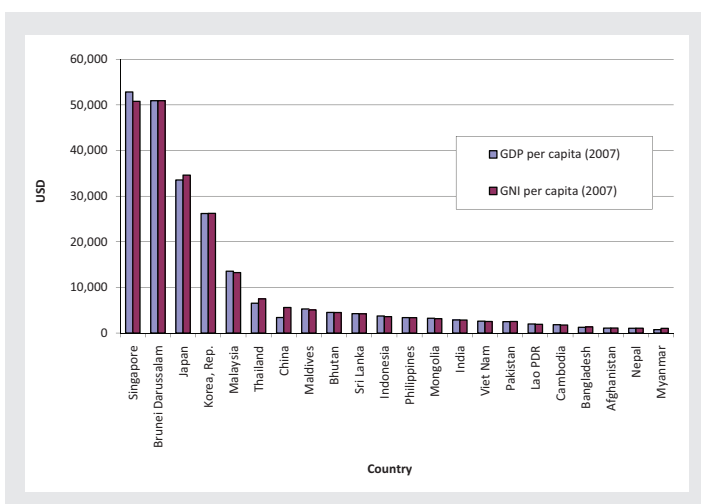


Figure 1.1: Gross domestic product and gross national income per capital of selected countries (WDI, 2010)

Transport

In 2007, the road density of the Philippines shown in Figure 1.2 was estimated to be 0.67 kilometers/square kilometer, increasing from 0.54 km/sq. km in 2003 – the highest among Southeast Asian countries, except Singapore.

The Philippine road network has been improved at the rate of 25% between 1990 and 2007. As of 2009, the estimated total length of roads in the Philippines is 213,351, of which 54,481 kms are paved and 158,670 kms unpaved. The country ranks 24th in the world in terms of total length of roads (The World Factbook-CIA, 2010).

Although traffic congestion is a main challenge in major urban centers, with an estimated 937,648 passenger cars registered nationwide, the rate of motorization (in passenger cars per 1,000 people) of the Philippines ranks 11th, one of the lowest among its Southeast Asian neighbors. This is illustrated in Figure 1.3.

Population

Based on the latest Census data of the National Statistical Coordinating Board, the population of the Philippines was 88,574,614. The annual average growth rate has declined from 2.35% between Census years 1980 and 1990 to 2.04% for the Census period between 2000-2007. Population growth rate higher than the national average for the latter Census period were recorded in the Autonomous Region in Muslim Mindanao (5.46%), Region IV-A (3.21%), Central Mindanao (2.41%), Central Luzon (2.36%), and the National Capital Region (2.11%). These statistics are shown in Figure 1.4

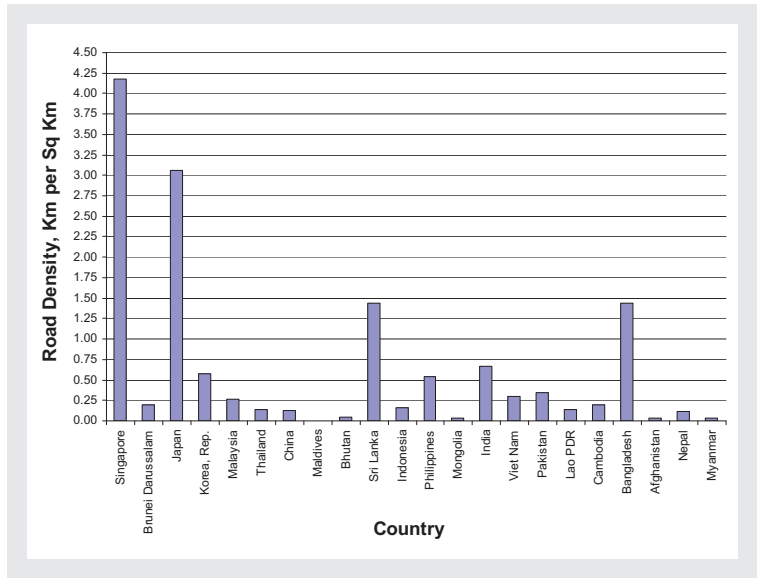


Figure 1.2: Road densities of selected countries (ADB, 2008)

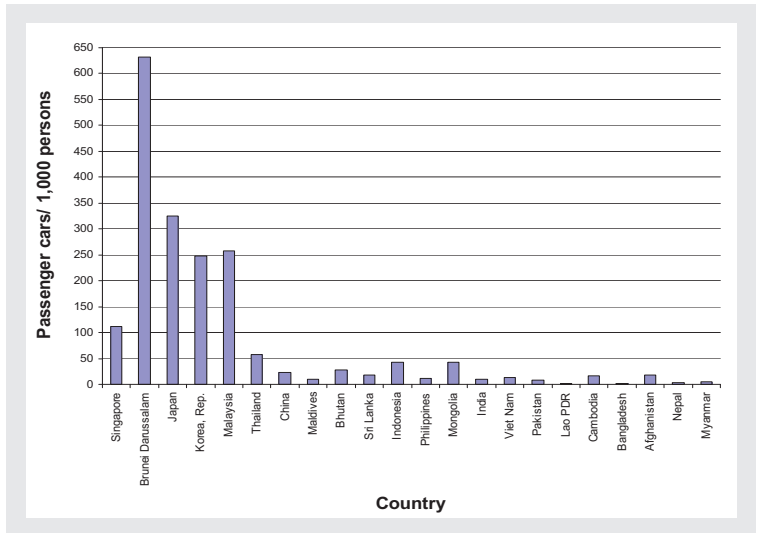
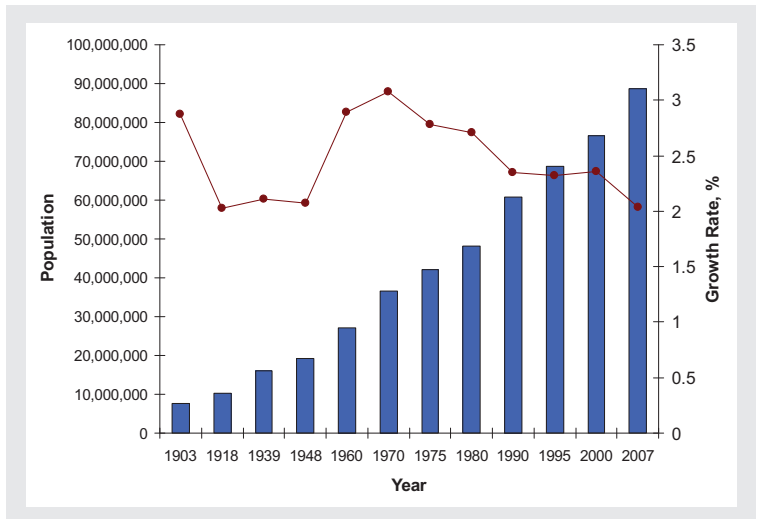


Figure 1.3: Car ownership in selected countries (ADB, 2008)

Figure 1.4: Population and population growth rate of the Philippines (NSCB, 2010)



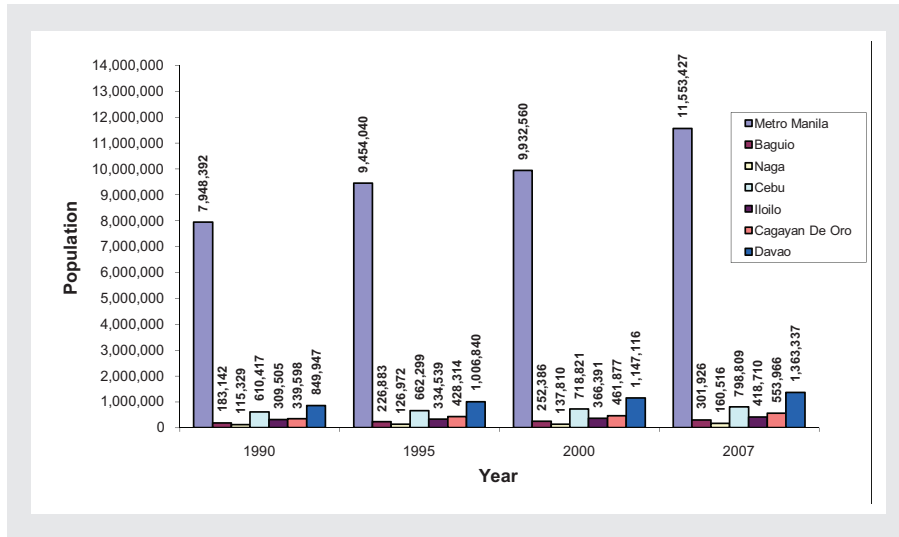


Figure 1.5: Populations of major cities in the Philippines (NSCB, 2010)

In 2007, four highly urbanized centers housed population of more than 1 million. These are Quezon City, Manila City, Calocan City of NCR and Davao City in Southern Mindanao. Meanwhile, other highly urbanized cities representing different regions in the country recorded populations well below 1 million including Cebu City. A comparison of the populations of these cities from 1990 to 2007 is shown in Figure 1.5. These include Baguio City in Cordillera Autonomous Region, Naga City in the Bicol Region, Iloilo City in Western Visayas, and Cagayan De Oro City in Northern Mindanao.

Air Quality

Emission from mobile sources has contributed 65% to the air pollution load nationwide, much more than the stationary sources. As can be seen from Figure 1.6, mobile sources account for big chunk of particulate matter, carbon monoxide, nitrogen oxides, and volatile organic compounds (VOC). The time series data on total suspended particulate matter from 1976-2007 shows that the normal level has been exceeded since 1987 in most areas in Metro Manila.

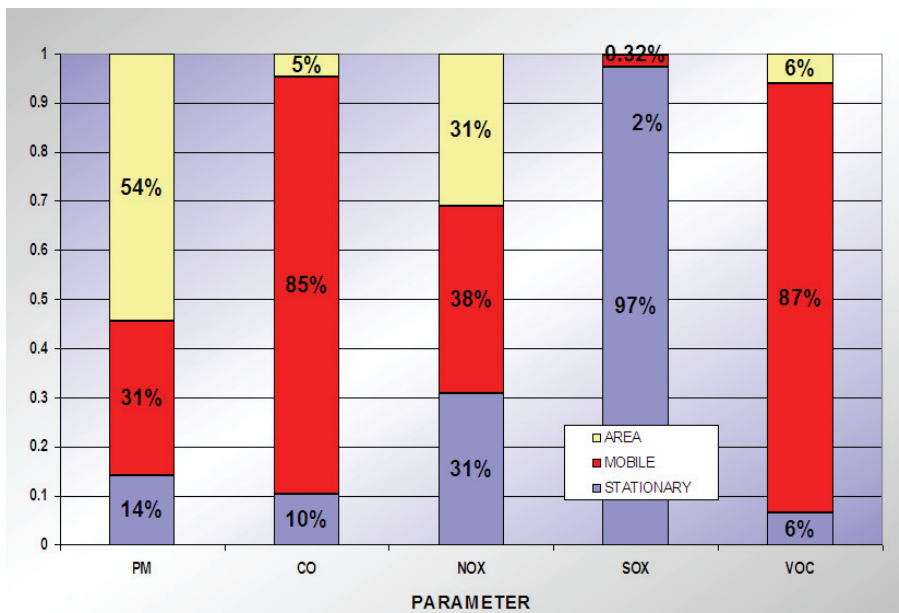


Figure 1.6: 2007 National emission inventory by pollutant (Source: DENR)

While air quality continues to improve since 2003, as evident in measurements by the DENR, concentrations such as that of TSP continue to be above the acceptable values. Figure 1.7 shows the national TSP trend from 2003 to 2007 still being above the Clean Air Act target of 90 ug/Ncm.

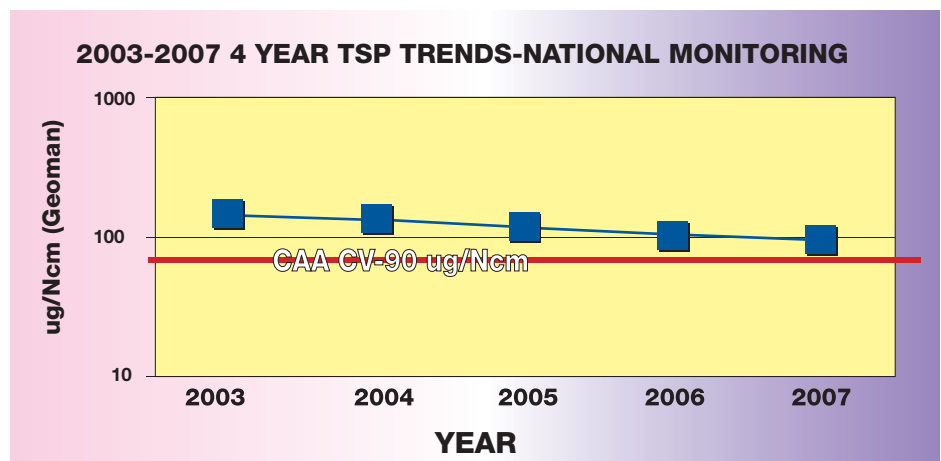


Figure 1.7: Trend in total suspended particulates (Source: DENR)

Energy Consumption

Transport consumes more energy than any other sector. In 2008, the transport sector accounted for 36.5% of total energy co. This increased to 37.7% in 2008 (Figure 1.8), where road transport typically consumed about 80% of this share of the demand. Historical data for total energy consumption are shown in Figure 1.9.

Of the total energy demand, it was estimated that the transport sector accounted for over 70% of the country's petroleum products consumption. Figure 1.10 shows the share of the transport sector in as far as petroleum products consumption is concerned for the years 2008 and 2009. Meanwhile, historical trends for petroleum consumption are shown in Figure 1.11.

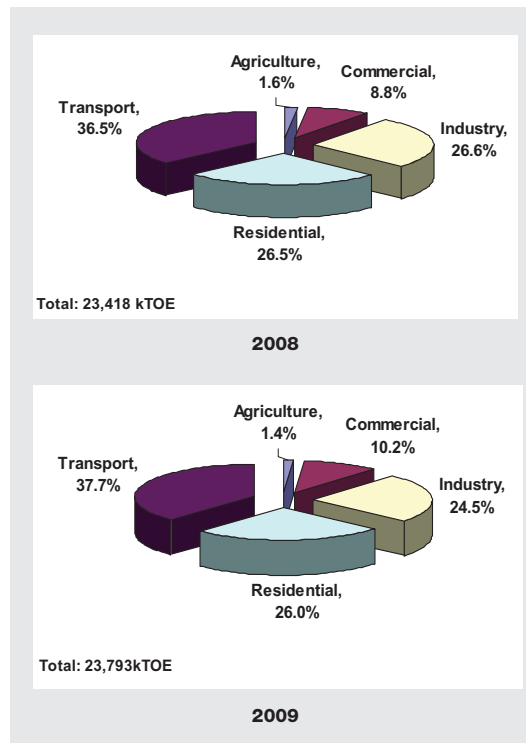


Figure 1.8: Energy consumption by sector in 2008 and 2009 (Source: DOE, 2010)

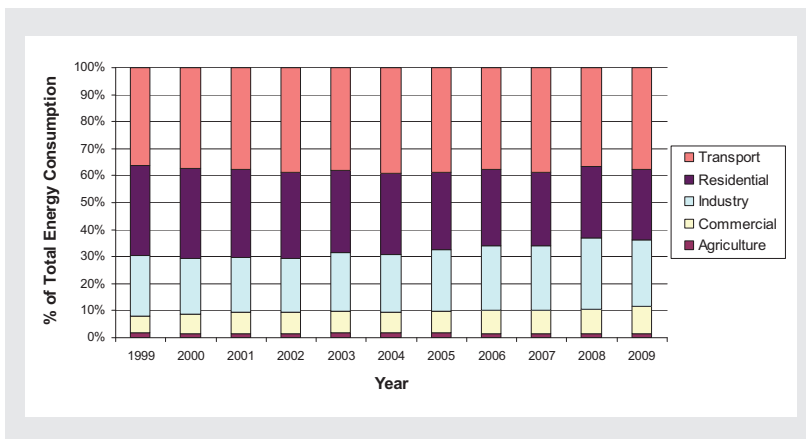


Figure 1.9: Historical total energy consumption by sector (Source: DOE, 2010)

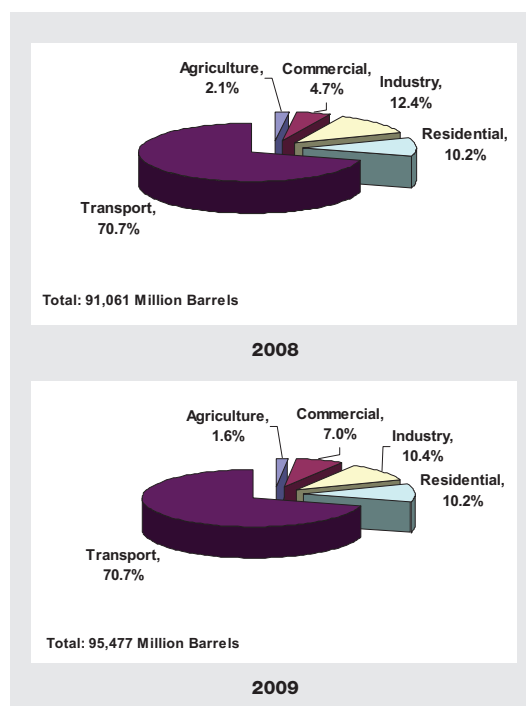


Figure 1.10: Sectoral consumption of petroleum products in 2008 and 2009 (Source: DOE, 2010)

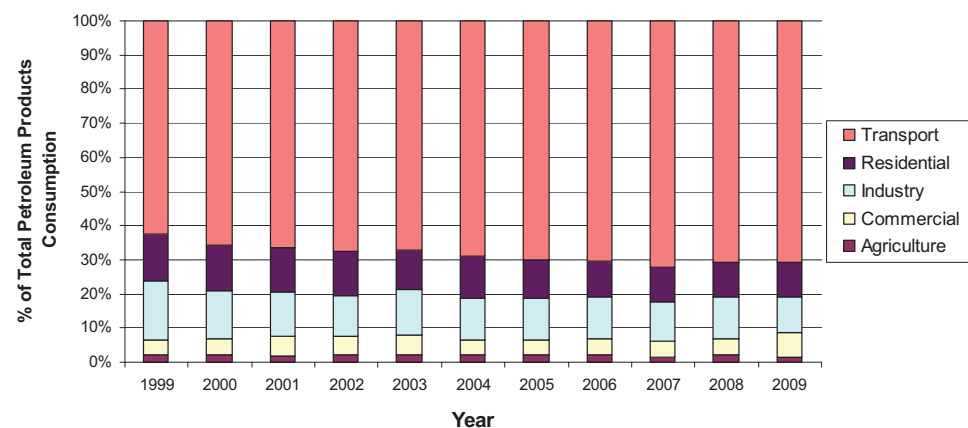


Figure 1.11: Historical petroleum product consumption by sector
(Source: DOE, 2010)

Public transport

Most Filipinos take public transport with an estimate of about 70% of the total person trips taking PT with as high as 80% in highly urbanized cities. Table 1.1 shows the distribution of road transport services in the country. There are currently over 23,000 buses, 36,000 taxis and about 217,000 jeepneys providing PT services throughout the country.

| SERVICES | Public Utility Bus | | Mini Bus | | Public Utility Jeepney | | Taxi | | Fil Cab | |
|--------------|--------------------|---------------|--------------|--------------|------------------------|----------------|---------------|---------------|---------------|---------------|
| | Franchise | Units | Franchise | Units | Franchise | Units | Franchise | Units | Franchise | Units |
| CO | 1,900 | 15,537 | 52 | 133 | 9,021 | 11,232 | 13,896 | 17,984 | 58 | 85 |
| NCR | 0 | 0 | 0 | 0 | 48,701 | 49,549 | 3,879 | 4,402 | 3 | 3 |
| I | 1,337 | 1,697 | 1v2 | 14 | 9,965 | 11,025 | 0 | 0 | 26 | 26 |
| II | 859 | 1,607 | 135 | 152 | 11,318 | 11,875 | 0 | 0 | 341 | 345 |
| III | 12 | 99 | 328 | 977 | 25,412 | 29,765 | 4 | 36 | 0 | 0 |
| IV | 369 | 1,108 | 709 | 1,004 | 41,012 | 43,458 | 45 | 190 | 804 | 889 |
| V | 885 | 1,663 | 73 | 104 | 7,558 | 8,050 | 20 | 21 | 2,161 | 2,262 |
| VI | 583 | 839 | 1,336 | 1,408 | 13,741 | 14,959 | 1,937 | 2,621 | 977 | 1,037 |
| VII | 1,061 | 2,143 | 26 | 26 | 10,807 | 12,587 | 2,864 | 5,161 | 4,063 | 5,594 |
| VIII | 804 | 1,161 | 1,003 | 1,091 | 5,618 | 6,854 | 100 | 122 | 4,367 | 4,574 |
| IX | 105 | 213 | 505 | 588 | 3,700 | 4,246 | 16 | 10 | 345 | 357 |
| X | 6 | 730 | 196 | 237 | 5,333 | 6,844 | 888 | 1,700 | 1,051 | 1,279 |
| XI | 140 | 816 | 125 | 145 | 8,741 | 9,887 | 1,652 | 3,743 | 678 | 696 |
| XII | 7 | 29 | 148 | 200 | 2,410 | 2,898 | 77 | 125 | 2,579 | 2,799 |
| CAR | 58 | 62 | 29 | 31 | 3,388 | 3,388 | 2,472 | 2,472 | 34 | 34 |
| CARAGA | 8 | 51 | 690 | 698 | 857 | 876 | 0 | 0 | 0 | 0 |
| TOTAL | 8,134 | 27,755 | 5,367 | 6,808 | 207,582 | 227,493 | 27,850 | 38,587 | 17,487 | 19,980 |

Source: Land Transport Franchising Regulatory Board, 2010

Figure 1.7: Trend in total suspended particulates
(Source: DENR)

There are currently more than 90,000 tricycles in Metro Manila alone based on independent surveys by local government units. Other cities have more tricycles where this paratransit mode provides are the dominant form of transport for intra-city or intra-town travel.

Database

Information on transport and traffic statistics are available from various sources including national agencies such as the DOTC, DPWH, DENR, NEDA and the DOH. The DOTC has several attached agencies with data holdings including the LTO, LTFRB, LRTA and OTC. The central repository of statistics from all these agencies is the National Statistical Coordination Board (NSCB), which publishes the Philippine Statistical Yearbook containing data on all sectors including transportation and demography.

Most databases are current, with the information regularly updated. Examples of these are data on vehicle registration (i.e., LTO) and public transportation services registered under the LTFRB. In certain cases, resources and facilities limit the regular collection of data such as those pertaining to air quality. Road traffic crash data are still unreliable due to under-reporting and information being quite limited to incidents along national roads.

Much information is with the local governments who are also involved in transport planning and traffic management at their jurisdictions. There are also databases with the private sector including data on expressways, logistics and land development. While private companies have traditionally held on data they have collected or generated, they are presently becoming more receptive to sharing information especially for collaborative work.

Impacts of Unsustainable Transport

The current transportation planning paradigm of ‘forecasting and providing’ has resulted in traffic congestion in urban areas which translates to about PHP 140 Billion (~2% of the country’s GDP) in 2008 in Metro Manila alone. This is economic cost is attributed to lost man-hours, additional fuel consumption, health costs, and lost investment opportunities. (NCTS, 2001). Figure 1.12 shows news items that dramatize the economic loss from traffic congestion and the risks from exposure to air pollution from mobile sources.

Figure 1.12: News items on traffic congestion and air pollution





Figure 1.13: Road traffic accidents

Apart from the negative environmental impact of transportation, the increase in road traffic accidents is another disbenefit of unsustainable transport system. The national annual cost of traffic accidents had been estimated to constitute 2.6% of the Gross Domestic Product of the Philippines in 2005, equivalent to about PHP 105 Billion. Accidents involving public transportation and freight vehicles are very often in the news even as accident occurrence continues to be under-reported for a variety of reasons that usually include lack of resources as well as a systematic disregard for minor accidents (i.e., those that involve only damage to property and minimal, if any, injuries). Figure 1.13 shows typical aftermaths of accidents involving public transport and trucks.

The occurrence of road crashes is still increasing and yet statistics such as those shown in Figure 1.14 are still found to be deficient as it is very difficult to reconcile statistics at the national level. The Traffic Accident Reporting and Analysis System (TARAS) of the DPWH while concentrating on road crashes along national roads that are collected by the PNP-HPG do not include reliable data from major cities like Cebu and Davao. It is also not linked to the Metro Manila Accident Reporting and Analysis System (MMARAS) that is managed by the MMDA that covers road crashes in the NCR.

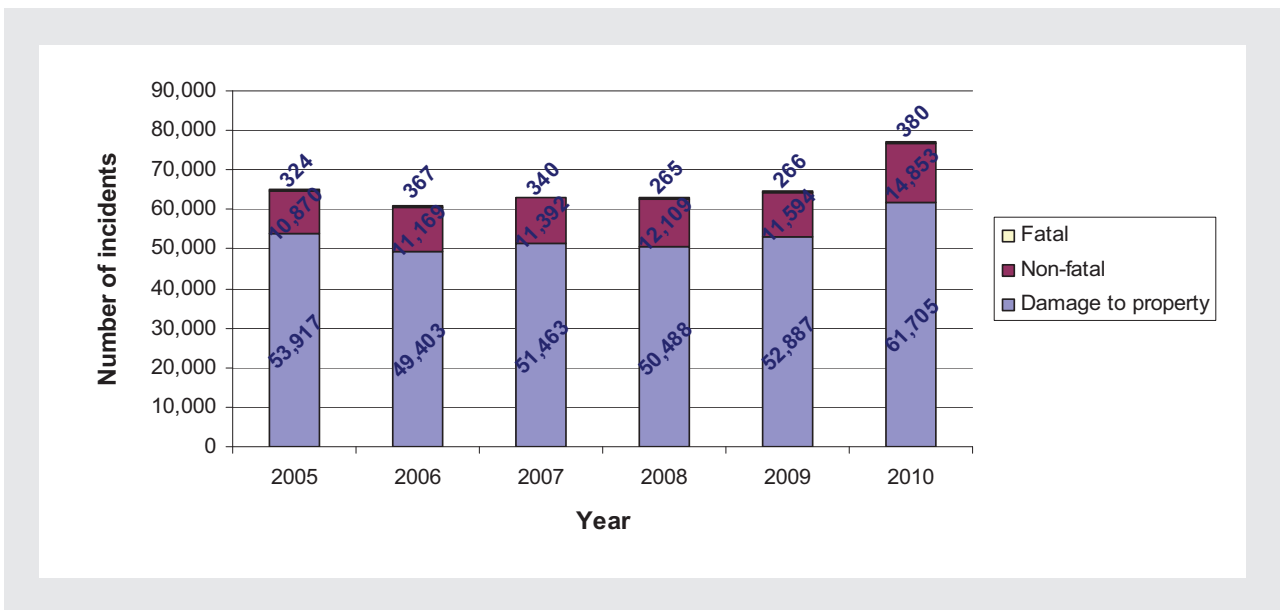


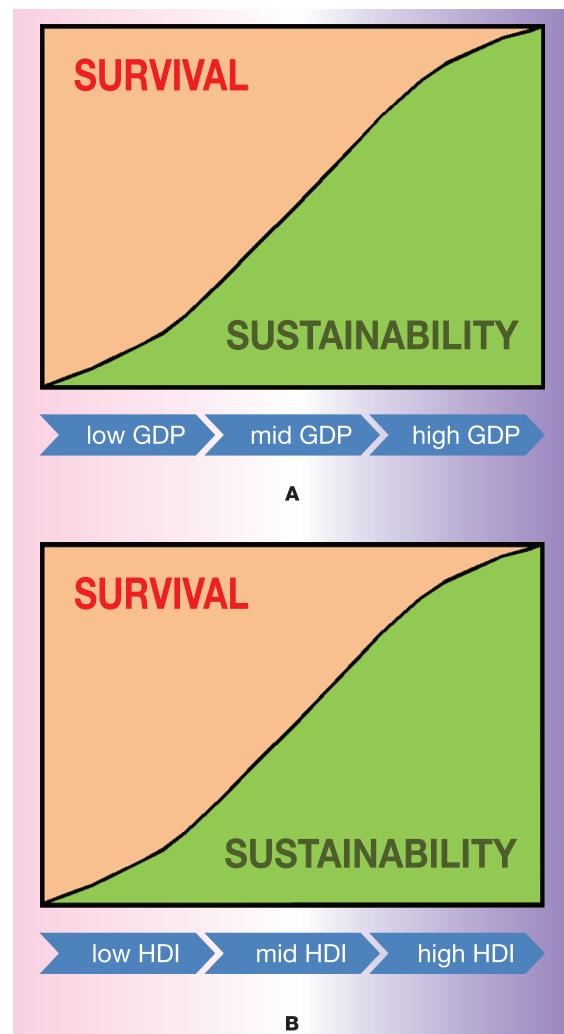
Figure 1.14: Statistics on road crashes in Metro Manila (MMDA, 2010)

1.4 Environmentally Sustainable Transport: Developing Country Perspective

The concept of environmentally sustainable transport (EST) planning paradigm was first brought to the fore by the Organization for Economic Cooperation and Development (OECD) nations in the early 1960s to decouple economic growth from the negative externalities of transport. Under this policy approach, environmental protection is deemed equally important as other policy goals for the transport sector. There are 3 key differences between EST and the conventional approaches to transport planning and policy development. Firstly, the goals of EST are consistent with sustainable development, whereas that of conventional approaches are more for mobility and accessibility with mitigating measures prescribed to counter-act possible negative externalities of the resulting transport system, in short reactive. Secondly, EST views negative externalities in its entirety whereas conventional approaches tend to focus on mitigation of environmental impacts per transport activity unit. And thirdly, because of its pro active nature, the recommended policy instruments are aimed at restraining growth in the most environmentally damaging forms of transport activity. Thus, core to the EST approach is the development of long-term desirable scenarios and undertaking policies that will these scenarios a reality using 'backcasting exercise'.

However, the 'backcasting exercise' where a future desirable scenario is set as a target may not yet be fully applicable in developing countries such as the Philippines. Whereas, OECD nations have already achieved economic maturity and stability, thus have now moved on to a higher consciousness of environmental protection, developing countries like the Philippines still struggle with the issue of economic survival in the operation of the transport sector. This is evidenced by the proliferation of two-stroke tricycles operating in the sub-urban and rural areas, especially in places where there is a gaping transport service gap. The popularity of such mode stems from the fact that acquisition and maintenance costs are low and traffic maneuver flexible. The latter becomes a huge factor especially in areas where public transportation system is highly inadequate. Thus, the challenge in localizing environmentally sustainable transport in the Philippines is to integrate the concept of sustainability in the transport concern of survival in the identification of recommended policies. Consciousness of the negative impact of transport must be slowly brought to the fore of major players of the transport sector through policies that will bring about financial survival in the short and medium term, with the ultimate goal of an environmentally sustainable transportation system in the long-term. The illustrations in Figure 1.15 depict this desired trend in relation to gross domestic product (GDP) and human development index (HDI).

Figure 1.15: Desired trend towards sustainability with respect to (a) gross domestic product and (b) human development index



2. ISSUES AND CHALLENGES IN THE TRANSPORT SECTOR

2.1 Public Health

Based on the World Health Organization /Asian Development Bank Study (2004), 50 to 80% of air pollutants are from mobile sources. Health impacts of pollutants include adverse effect on the mental development of children and negative impacts on the kidney, liver, and reproductive system from lead, respiratory difficulties from nitrogen oxides, sulfur dioxides, and particulate matters, and increased morbidity and reduction of fertility and workers' production due to absorption of carbon monoxide. In the early 1990s, several studies conducted in Metro Manila, the National Capital Region of the Philippines, established that chronic obstructive pulmonary disease (COPD) were found to be more than twice prevalent among jeepney drivers as compared to commuters or drivers of air-conditioned buses (Subida and Torres, as quoted in the 'Public Health Monitoring' pamphlet issued by ADB/WHO/DOH, 2004, pg. 1). The same study also indicated that jeepney drivers have twice the risk of contracting abnormal pulmonary function. The combined effect of roadside environment and low socio-economic status of child vendors in Metro Manila expose them to higher risks of having respiratory diseases, as compared to other child groups (Subida and Torres, 1994, as quoted by ADB/WHO/DOH, 2004, pg. 1).

From the studies cited above and many more, an environmentally sustainable transport strategy should seek to reduce air pollutants from mobile sources through the reduction of private car usage, promotion of use of public transport use, clean fuels, and non-emissions can eliminate such health harmful impacts.

In the baseline health study conducted in 2000 for Metro Manila, it was validated that inadequate recording and reporting of health statistics occur, especially at the barangay health centers and city/municipal health offices. Even government and private hospital records are not exempt from this problem. Thus, it was evaluated that health statistics are incomplete. This is compounded by lack of reliable data on air quality. There have been initial efforts to establish the relationship between air pollution and its health impacts in Metro Manila. Most notable is the Metro Manila Air Quality Improvement Sector Development Program (2007).

Under its 'Institutional Strengthening and Capacity Building' component, the Department of Health was granted funds to procure equipments for monitoring health impacts of air quality to target three key areas:

- Health risk assessment
- The Epidemiological Study on Sentinel Communities; and
- Health Risk Perception Survey.

Major findings and conclusions of the health risk assessment included:

- Coarse and fine particulate matters (PM 10 and PM 2.5) and tropospheric ozone pose considerable health risks to the population in Metro Manila;
- Motor vehicles are the major source of particulate pollution in Metro Manila, thus is considered to be a more important contributor to poor air quality the stationary sources;
- Considerable morbidity and mortality due to respiratory and cardiovascular diseases could be prevented with better air quality in Metro Manila;
- Self-monitoring report (SMR) analysis showed that for mortality, incidence rates for respiratory and natural mortality increase by 2.6% and 3.9%, respectively, for every 10 μ m/m³ increase in PM 10. For morbidity, 17% and 6.5% excess risks for asthma and acute bronchitis were seen.

It was, however, tragic that the initial success of this sub-component of the

MMAQISDP was not sustained to a shift in the priorities of the lead agency, DOH. It is therefore considered that one of the tracks that must be pursued in the development of an EST strategy for the Philippines would be to coordinate with DOH and follow up on agency's activities in this area. An important challenge for the public health sector therefore is the establishment of baseline data on transport-related human health conditions for a more accurate evaluation of the impacts of recommended strategies.

2.2 Strengthening Roadside Air Quality Monitoring and Assessment

The Environmental Management Bureau (DENR-EMB) has been monitoring air quality to generate data and information for air quality management as parts of its functions under the Philippine Clean Air Act of 1999 that includes the preparation of the annual National Air Quality Status Report and as central repository of all data and information related to air quality. As of 2006, 11 manual stations and 1 automatic station monitoring mainly TSP (total suspended particulates) were operating in Metro Manila. At least 9 stations are considered "traffic" stations since they are located close to a major arterial road. Outside Metro Manila, 52 TSP monitoring stations were operational with one automatic station in Cagayan de Oro City and one automatic station in Cebu City. As of October 2004, the Metro Manila Air Quality Improvement Sector Development Program (MMAQISDP) assisted the DENR in establishing 9 fixed automatic air quality monitoring stations (online) and 1 mobile automatic station that monitor criteria pollutants such as PM10, SO₂, CO, NO₂, O₃, Pb and non-criteria pollutants including benzene, toluene, xylene, and meteorological parameters. The operation of the said automatic stations was stopped in March 2006.

The Philippine Nuclear Research Institute (DOST-PNRI) through its Analytical Measurements Research Section has been monitoring fine particulates such as PM_{2.5} and PM₁₀, and has been analyzing particulate elemental composition and particulate source contributions. It had 7 monitoring stations in Metro Manila and as of 2005, 4 stations were in operation where majority were located along roadside areas.

Major roadside air quality monitoring was conducted under the Metro Manila Urban Transportation Integration Study (MMUTIS) Environmental Impact Analysis Study in 1997 where the National Center for Transportation Studies of the University of the Philippines (UP-NCTS) measured concentration of carbon monoxide (CO), nitrogen dioxide (NO₂), suspended particulate matter (SPM) and lead (Pb) for several days at 5 roadside sites located at major arterial roads in Metro Manila using the automatic recorder-analyzers and gas samplers of the mobile air pollution monitoring system donated by the Japan International Cooperation Agency (JICA). Simultaneously with the air pollution level monitoring, wind speed and wind direction and 24-hour traffic volume count were undertaken. The five (5) survey sites are located on major thoroughfares that carry heavy traffic load and another three (3) survey sites were selected as background to comparison with the data of roadside environment. Air pollution and wind speed and direction surveys were conducted on several days in February and April of 1997 at the various sites using the Horiba. Based on the results of the surveys, it is concluded that Metro Manila is fast becoming highly polluted due to the increase in motorized transit and population growth.

Another major roadside air quality monitoring followed through the Japan Society for the Promotion of Science (JSPS)-funded 5-year research project called "Impact Analysis of Metropolitan Policies on Development and Environmental Conservation in the Philippines" that conducted short-term air quality surveys on roadside sections at 22 locations in Metro Manila in 1998.

It can be observed that various agencies and organizations have been conducting roadside air quality monitoring but there has been a lack of integration of air

quality data coming from the different agencies and organizations. Furthermore, air quality and transportation activity data have not been linked for environmental assessment.

From the National Conference on Environmentally Sustainable Transport (EST) held in December 2007, environmental quality assessment monitoring is a policy issue wherein baseline air quality data is still generally lacking at the local level especially in cities and urbanized towns which hampers the assessment of existing quality of environment. The problem is how to establish assessment and monitoring frameworks at the local level. On the part of the DENR, the department is setting up 4 new Air Quality continuous monitoring stations in Metro Manila in the end of 2010.

2.3 Traffic Noise Management

There is currently no institutionalized traffic noise monitoring system in the country. The last known metropolitan-wide monitoring of traffic noise was done under the Metro Manila Urban Transportation Integration Study (MMUTIS) Environmental Impact Analysis Study in 1997 where the National Center for Transportation Studies of the University of the Philippines (UP-NCTS) conducted roadside noise level measurements for several days at 6 major arterial roads in Metro Manila. Other noise measurements were conducted as part of project environmental impact assessment such highways and airports. Research on traffic and transportation noise have also been conducted by UP-NCTS dealing on noise generated by three-wheelers (tricycles) in residential areas and those from aircraft operation in the vicinity of airports.

The regulation of noise pollution is provided for in Presidential Decree No. 984 (National Pollution Control Decree of 1976) issued in 1976. Under Section 78 of the said Rules and Regulations implementing P.D. 984, as amended by NPCC Memorandum Circular No. 002 dated 12 May 1980, the Environmental Quality Standards for Noise in General Areas according to time of day and land use were promulgated.

2.4 Vehicle Emission Control, Standards, and Inspection and Maintenance

The Philippine Clean Air Act (CAA) of 1999 is the main program of the government in reducing emissions from transportation. The CAA covers mobile sources or pollution from motor vehicles. It has specific provisions on:

- 1) Emission Control for New Motor Vehicles
- 2) Emission Control for In-Use Vehicles
- 3) National Motor Vehicle Inspection and Maintenance Program
- 4) Roadside Inspection of Motor Vehicles
- 5) Fuels, Additives, Substances and Pollutants
- 6) Regulation of Fuels and Additives
- 7) Ozone-Depleting Substances
- 8) Greenhouse Gases

In-use, new, rebuilt and imported second-hand motor vehicles were required to comply with the emission standards as a requirement for registration effective January 1, 2003. Motor vehicles introduced in the market beginning January 2003 were required to comply with the exhaust emission standards equivalent to Euro 1, which was upgraded to Euro 2 beginning 2008. For new vehicles, a Certificate of Conformity (COC) is issued by the DENR through the Environmental Management Bureau to a vehicle manufacturer, assembler, or importer certifying that a vehicle type complies with the emission standards.

All in-use vehicles are allowed to renew their registration upon submission of certificate of compliance to emission standards (CCES). The Department of Transportation and Communications and the Land Transportation Office require

testing of vehicles at the Motor Vehicle Inspection Station (MVIS) or at authorized private emission testing centers (PETC).

On July 31, 2007, the DENR Department Administrative Order No. 2007-27 was signed that revised the emission standards enforced in 2003 (DENR DAO No. 2000-81 and DENR DAO No. 2003-51) from Euro 1 to Euro 2. The DENR has already issued an EO for the implementation of Euro 4 by end 2015.

Prior to registration, in-use vehicles are tested for safety (roadworthiness) and emissions at the motor vehicle inspection system (MVIS) stations of the Land Transportation Office (DOTC-LTO).

The government allowed the private sector to establish private emission testing centers (PETC) starting January 2003 in order to implement the emission test requirement prior to registration. Emission testing at the PETCs is an interim program prior to the full operation of the MVIS. PETCs are authorized by the DOTC and accredited by the Department of Trade and Industry (DTI). The DENR-DTI-DOTC Joint Administrative Order No. 1 Series of 2003 was issued to monitor the PETCs.

The upgrading and expansion of the Motor Vehicle Inspection System (MVIS) of the DOTC-LTO is currently underway. Being implemented in phases, the acquisition of new equipment and refurbishing of old MVIS sites as well as construction of new sites are being funded by the Motor Vehicle User's Charge Special Vehicle Pollution Control Fund (MVUC-SVPCF). The current MVIS program of the DOTC is guided by the end goal of establishing at least one (1) state-of-the-art MVIS in each region of the country.

The Committee on the Harmonization of Vehicle Standards and Regulations (CHVSR) was created with the objectives of improving vehicle safety, promoting energy efficiency, increasing anti-theft performance, protecting the environment, and formulating a legislative agenda pertaining to vehicle standards and regulations. It was also created to provide inputs and guidance leading to the Philippine government's membership to the World Forum for Harmonization of Vehicle Regulations, more commonly known as WP 29, and accession to the provisions of the 1958, 1997 and 1998 agreements that now serve as the foundations of vehicle standards and regulations among member nations that have acceded to some or all these agreements.

Four Sub-Committees were created in support of the CHVSR. These are the following:

- Sub-Committee on Standards Development;
- Sub-Committee on Certifications and Regulations;
- Sub-Committee on Participation to Regional and International Agreements;
- Sub-Committee on Legislative Agenda

These sub-committees have been instrumental in taking up issues pertaining to their assigned areas of concern and consolidating inputs from stakeholder members.

2.5 Cleaner Fuels

The mandate of setting of fuel quality standards by the Department of Energy (DOE) are provided for by the Philippine Standardization Law (Republic Act No. 4109), Philippine Clean Air Act of 1999 (Republic Act No. 8749) and the Biofuels Act of 2006 (Republic Act No. 9367). The Philippine Standardization Law provides for the development of Philippine National Standards (PNS) on fuels and related products, implementation and coordination of standardization activities. The Philippine Clean Air Act sets the specifications for all types of fuels and fuel-related

products for every 2 years or as the need arises. The Biofuels Act provides for the establishment of fuel quality standards for biofuels. In the 1990s, lead content in gasoline has been significantly lowered.

Specifications on aromatics and benzene in gasoline have started as early as 1994 while specification on sulfur content in diesel has started as early as 1989. For the gasoline fuel, the Philippine Clean Air Act required that lead be phased out nationwide starting 1 January 2001, and set the aromatics and benzene content at 45% and 4% maximum, respectively, starting 1 January 2000. The aromatics and benzene contents, had been further lowered to 35% and 2% maximum, respectively, in 1 January 2003. For automotive diesel, sulfur content had been lowered to 0.2% maximum (1 January 2001) and 0.05% maximum (1 January 2004).

As part of its energy independence agenda, the DOE has been promoting and increasing the utilization of alternative transport fuels such as compressed natural gas (CNG), coco-methyl ester (CME) biodiesel, bioethanol and other fuels/ technologies such as liquefied petroleum gas (LPG), fuel cell, hydrogen and electric vehicles. The DOE started the Natural Gas Vehicle Program for Public Transport (NGVPPT) in 2002. In 2004, several executive orders (E.O. 290 – Implementing the Natural Gas Vehicle Program for Public Transport and E.O. 396 - Reducing the Rates of Import Duty on Compressed Natural Gas Motor Vehicles and Natural Gas Vehicle Industry) have been issued by the President in 2004.

Programs on alternative transport fuels such as biofuels were institutionalized with the effectivity of the Biofuels Act of 2006 in February 2007. The Act designated DOE as the lead implementing agency on the use of biofuels and provided for the establishment of the Biofuels Program. Within 3 months of the Act's effectivity, a minimum of 1% biodiesel conforming to Philippine National Standards has been mandated to be blended in all diesel engine fuel sold and distributed in the country. Within two (2) years, the National Biofuels Board is expected to determine feasibility to increase the blend to 2% and recommend to DOE to mandate the said blend. Within the same period, at least 5% bioethanol conforming to Philippine National Standards shall comprise the annual total volume of gasoline sold and distributed in the country. Within 4 years, the National Biofuels Board is expected to determine feasibility to increase the blend to 10% by volume and recommend to DOE to mandate the said blend.

After the passage of the Clean Air Act, the DOE created the Technical Committee on Petroleum Products and Additives (TCPPA) which reviewed and formulated standards for petroleum products. It has developed PNS for coconut methyl ester (CME), FAME-blended diesel oils (B1), bioethanol fuel and E-gasoline (E10), 2-stroke engine motor oil. In addition, quality standards for LPG as motor vehicle fuel have also been developed and endorsed to the Bureau of Product Standards (DTI-BPS). In addition to fuel quality standard setting and monitoring, the DOE through the Oil Industry Management Bureau (OIMB) is in charge of registration of additives, petroleum facilities standards setting. The DOE through the Energy Utilization Management Bureau (EUMB) is in charge of accreditation of manufacturers of biofuels and monitoring of manufacturing and marketing of biofuels.

The laws on standardization, clean air and recently the biofuels have been the basis for the improvement of quality of petroleum-based and alternative transport fuels but still there is absence of a long-term national plan on when to phase in stricter fuel standards which are also tied up with vehicle standards.

2.6 Public Transport Planning and Travel Demand Management

Philippine cities and towns enjoy a significant majority of mode share for public transportation. The mode share for person trips in Metro Manila has been estimated at about 70% (MMUTIS, 1999 and Tiglao, 2007) and similar statistics

in other cities and towns might reach 80% to 85%. Public transport, however, is dominated by paratransit or informal modes including the popular jeepneys and tricycles.

The need for rationalizing public transportation services in the Philippines is underscored by the problems currently experienced by many Philippine cities. These cities are mostly progressive and further development is impeded by traffic congestion caused in large part by paratransit modes especially the tricycle (i.e., a three wheeler composed of a motorcycle and a sidecar). Shortcomings stemming from the lack of guidance in public transport planning for Philippine cities and towns have led to the proliferation of tricycles and the rise of informal transport modes including motorcycle taxis and pedicabs.

Most organized and adequately funded studies have been made for Metro Manila where the challenges in public transport are very serious and most noticeable if not most critical. Studies such as the Metro Manila Urban Transportation Integration Study (JICA, 1999) proposed a master plan for transport that included expansion and rationalization of road-based and rail-based public transport networks. The Study on the Standardization for Integrated Railway Network in Metro Manila (JICA, 2001) proposed standards for stations and rail vehicles for the proposed rail network for Metro Manila.

Among the more recent studies include the Metro Manila Public Transport Study or the MMPTS (JICA, 2007) and the Pre-Feasibility Study for a Bus Rapid Transit System in the Greater Metro Manila Area (USAID-ECAP, 2007). Both emphasized the need for rationalization that should be applied not only in Metro Manila but in other cities as well. Such rationalization includes the establishment and implementation of a proper hierarchy of public transport services that is based on more suitable criteria that considers supply, demand and network characteristics. The MMPTS, for example, has strongly advocated for drastically reducing the number of buses along EDSA while the National Land Transport Policy Framework (NTPF, 2010) has pointed to the need to formulate a replacement for the Route Measured Capacity (RMC) that is the basis for establishing the number of public transport units along specific routes.

The BRT pre-feasibility study for the Greater Metro Manila Area identified potential corridors for BRT as part of a bigger urban transport system for the metropolis. This is in recognition of the considerable cost effectiveness, comparable passenger capacity, and potential economic and environmental benefits of BRT systems vis-à-vis rail-based mass transit systems. The recognition of BRT as a potentially viable mass transit option for Metro Manila and other major Philippine cities is steadily growing and gaining momentum, as it has been proven feasible in many foreign cities in both the developed and developing world as in Curitiba, Bogota, San Paolo, Quito, Mexico City, Seoul, Guangzhou, Jakarta, and others.

Few studies on public transportation planning have been undertaken in other Philippine cities and these are mostly in the context of master planning (i.e., land use plans, transport and traffic management plans). The burden of coordinating with the relevant agencies (i.e., LTFRB and LTO) for rationalizing public transport services as a result or recommendation of such studies is often with the local government. Guidance from the national agencies, especially the DOTC, is an area of growth and opportunities.

Of note is the Pre-feasibility Study for a BRT Demonstration Corridor for Cebu City (The World Bank, 2010), which assessed the options and prospects for an initial pilot BRT corridor in Cebu City. Based on the identification of local user needs. The study determined the feasibility of a BRT system in responding to the city's mobility needs focusing on a specific corridor. At the same time, the study identifies a possible BRT network that can evolve from the pilot corridor. It also

determines the potential role that existing public transport operators have either as participant in the provision of BRT services or in the provision of feeder services. Being a pre-feasibility study, it is expected to be followed by a full feasibility study and detailed design.

Various TDM schemes have been implemented in Philippine cities from the most simple to the more complex programs. Vehicle restraint remains the most popular type of measures and “odd-even,” “number coding,” and “color coding” have become common household terms. The Unified Vehicular Volume Reduction Program (UVVRP) has been modified several times since its inception and application in Metro Manila in 1995. Truck bans are still enforced with one scheme being implemented in Metro Manila since way back 1978. In other cities, variations of the coding schemes are usually applied to public transport modes like jeepneys and tricycles in response to the apparent over-supply of these public transport modes. The popularity of such schemes is due in part to the perception that these have immediate impacts on traffic. However, their prolonged or extended use like in the case of the UVVRP has spawned more challenges as vehicle ownership continues to increase, not to mention the rise in multiple vehicle ownerships of some households.

In the case of truck bans implemented in various cities, there are generally two types – temporal (i.e., travel restrictions during certain periods of the day) and spatial (i.e., travel restrictions along certain roads). Such policies restricting freight movement are implemented due to the perceived impacts of trucks on traffic flow (i.e., congestion), and road and bridge maintenance. However, with the impending implementation of an updated anti-truck overloading law (Republic Act 8794), truck bans would have to be revisited in order ensure that the flow of goods would not be impeded further thereby affecting the markets including the prices of commodities.

Congestion pricing is still a sensitive issue in the Philippines. Toll fee levels and increases along established facilities like the expressways are often criticized and met with much opposition. Yet, the experiences with private sector participation in expressways have pointed to the general improvement of operation and maintenance of such facilities and should be an encouragement towards the formulation of congestion pricing policies for other roads.

Private sector initiatives have included flexible times for office employees and adjusted class schedules for schools. These have, however, resulted in undesirable outcomes such as the lengthening of peak periods that have translated into lengthier times when congestion is experienced. Public transport has also been exposed as insufficient where there is significant demand during late night or early morning periods that are associated with business process outsourcing (BPO) firms that are now established in metropolitan areas most especially in Metro Manila, Cebu, and Davao.

2.7 Non-Motorized Transport

Non-motorized transport (NMT) can provide economical and environment-friendly means of meeting travel demand. The popular use of human-propelled vehicles (bicycles, rickshaws, *pejak*, etc.) in many of our neighboring Asian countries demonstrates that NMT can serve utilitarian trip purposes other than recreational use. In a number of more advanced countries, the paradigm for planning traveled ways had shifted from the traditional highway planning to accommodate motorized vehicle traffic to EST planning for a more people- and community-friendly transport. Transport planning is not planning for vehicles after all but planning for people.

Reserving and reclaiming space for pedestrian traffic is as important as providing lanes for cars. In high-density areas like CBD and residential communes,

sidewalk improvement is a must. Makati City's pedestrian underpasses and covered walkways are good examples that many other local governments can adopt to enhance traffic management and encourage walking. Manila City's pedestrianization project in Avenida a couple of years back improved that part of the city's landscape from a decaying CBD to a more pleasant, and community-friendly space. The carless oval scheme during Sundays in the University of the Philippines Diliman campus transforms a four-lane oval roadway into a space conducive to weekend family promenades, and provides safe and pleasant abode for cyclists and joggers. On weekdays, this oval is a 3-lane corridor, with the innermost lane reserved for the exclusive use of pedestrians and cyclists, and the two other lanes for one-way vehicular use.

In many rural areas, traveling by foot is still the main (and only) means of performing the daily social and economic activities. The government should very well consider the provision of paved footpaths in such areas. Such will address both the needs of people and commodities for efficient transportation even at the most basic level.

Traveling by bicycles is low-cost and can be shown to be an acceptable alternative means of traveling around the city for moderate distances. The 35-km bikeways network in Marikina City demonstrated that bicycle travel could be promoted in medium-scale growing cities. There was an increase in bicycle-based traffic volume from the baseline 4 percent (1999) to about 9 to 10 percent (WB-GEF, 2008) upon the provision of the bicycle network. The city also showed an increase in revenues from local bicycle industry while providing a means to go to work for poor factory workers. The exclusive bike lanes provided in the academic oval in U.P. Diliman campus as part of its traffic model zone project had encouraged biking for a number of students and benefited them with savings on transport costs of riding the jeepney to go elsewhere inside the campus. Prominent bicycle advocacies that ride high on the environmental and health benefits of bicycle use such as those pushed forth by organizations such as the Firefly Brigade and U.P. Padyak have contributed to awareness-building and acceptance and popularity of the bicycle not only as a recreational mode but as a viable utilitarian transport option. The Firefly Brigade currently implements an initiative distributing bike racks to government agencies and other offices as part of their advocacy.

Everywhere around the country, cities has long taken advantage and enjoyed the service of pedicabs as a convenient means of public transport. In itself, the pedicab as a non-motorized public transport mode is clearly environment-friendly. But its interaction with the other elements of the transport system resulting in traffic flow efficiency and road safety is an important issue that planners and implementers should always be mindful of.

Retrofitting of bicycle lanes in existing highways; conscious planning for bicycle and pedestrian facilities and routes; targeted behavior-change programs; publicity campaigns; and policy support for bicycle transport are some efforts needed to attain EST targets through NMT.

2.8 Environment and People Friendly Infrastructure Development

Erroneous transport planning and engineering could be focused on the vehicle rather than the people who use the infrastructure and avail of the services. Environment- and people-friendly infrastructure development must place people at the center of the planning and design process, and several aspects need to be considered in the design including safety, geometry and accessibility.

There are a few good examples of people friendly transport projects. These are mostly initiatives at the local level. Examples include pedestrianization of the UN World Heritage Site in Vigan City, pedestrian facilities in the Makati City CBD, the Bikeways Program in Marikina, and the University of the Philippines Road

Traffic Safety Model Zone in Quezon City. Such programs need to be encouraged and reinforced through appropriate incentives as well as aggressive information and education campaigns to increase awareness regarding such developments or designs.

The design of people-friendly infrastructure extends to vehicle design as well. It should be noted that most road-based public transport vehicles are not designed for easy and safe access by the elderly, children, and persons with disabilities. Buses plying Metro Manila routes, for example, have designs that are more appropriate for provincial, long distance travel. Seating layouts or configurations have no provisions for wheel-chair users and high-floors are unfriendly to children and the elderly. Jeepneys meanwhile have minimal safety features and are not configured for convenient boarding and alighting by passengers regardless of age, gender and physical ability.

2.9 Social Equity and Gender Perspectives

Inclusive transportation is qualified as being gender sensitive and accessible to persons with disabilities (or, to use the politically correct term, the physically challenged). This definition is extended to include the elderly and children, as well as people who are regarded as vulnerable. Another term that is commonly used to refer to the latter is “transportation poor,” and this generally includes those with low-income, the elderly, children and persons with disabilities.

A number of legislations offers guidance in the provision of socially equitable and gender sensitive transport infrastructure and services:

- Republic Act No. 9442, which is known as the Magna Carta for Disabled Persons, provides the legal basis for the formulation of programs and projects that seek to enhance the mobility of the disabled.
- Republic Act No. 9257, known as the Expanded Senior Citizens Act of 2003 grants privileges to the elderly that includes a 20% discount on transport fares. Such enable and encourage senior citizens to travel.
- Republic Act No. 7277, known as the Anti Sexual Harassment Act of 1995, provides the legal basis through which various initiatives have been developed and implemented to establish gender equity in public transport and other facilities.

Government agencies like the National Council for Disability Affairs (NCDA) serves as a focal point for disability-related concerns and issues. Similarly, the National Commission on the Role of Filipino Women (NCRFW) has advocated policies and programs for the advancement of women including the removal of barriers that are often manifested in the form of discrimination and harassment.

The private sector, including the academe, is also very much involved in the social equity and gender perspective area where the ultimate objective is to have barrier-free communities. Examples include the initiatives of the United Architects of the Philippines (UAP) in designing facilities for accessibility and efforts to disaggregate data according to gender and age.

2.10 Road Safety and Maintenance

The Philippines, like many countries around the world, is faced with the problem of road crashes. Every year in the Philippines, approximately 9 thousand fatalities are attributed to road traffic accidents. The annual cost of accidents is estimated at over 100 billion pesos that constitute about 2.6% of the GDP.

The ADB had launched initiatives to curb this alarming global problem. In 2004, ASEAN countries exerted collective effort to have a regional national road safety action plan, which meant that member countries have their own national plans. The National Road Safety Action Plan (NRSAP) of the Philippines (signed by the

President in 2004, revised in 2007) consists of road safety programs until 2015 addressing the three E's (engineering, enforcement, and education), frameworks for administrative and legislative support, and public-private sector partnership. The target is to reduce to ~2% by 2015 the annual road accident fatality growth rate, from the baseline ~4% in 2004. The plan was drafted and is being implemented jointly by government, academe, industry, and other private sectors.

Needless to say, an environmentally sustainable transport is fundamentally a safe transport. The EST strategy must complement and support the realization of the NRSAP. Immediate concern, still, is the establishment of a road accident database system that will provide objective information for all sectors of the road safety initiative. Publicity campaigns and education on road safety, especially for the vulnerable road users like children, pedestrians, and motorcyclists must be persistent. Filipino road user must imbibe a road safety culture. Road and other traffic facilities must be planned, designed, constructed, and maintained, always, with road safety as a primary concern.

Private sector participation must be considered for the long term even more. Currently, financial support for NRSAP programs under the DOTC comes from a portion of the MVUC. It is encouraging to see that several private organizations are quite enthusiastic in supporting road safety initiatives in an effort to demonstrate their corporate social responsibility.

2.11 Strengthening Knowledge Base, Awareness and Public Participation

Various studies especially those commissioned by the DOTC, DPWH and DENR, and supported by donor and technical cooperation institutions like the UNCRD, the World Bank (WB), the Asian Development Bank (ADB), the Japan International Cooperation Agency (JICA), the United States Agency for International Development (USAID), and others, have yielded a wealth of information. However, such information are currently and commonly with the respective agencies and there is an absence of a central clearinghouse for knowledge. As such, knowledge in the form of various data, processed or raw, may be inaccessible if not difficult to procure despite the existence of agreements on data sharing as well as a general rule for certain data like traffic counts and accident frequencies as public property (i.e., for public consumption). There are current efforts to establish an integrated database with DOTC that will serve as the repository of transport related data that can be easily accessible to government agencies, local governments and the general public. Yet, there is also a need to establish a knowledge management system for such information that would include the regular data collection, updating and processing, as well as its presentation in the form of graphs, charts and tables that would show data trends or behavior.

Awareness on EST related initiatives, plans, and programs rests with the agencies but is gradually being provided by tri-media (i.e., TV, radio, print) with the current interest in the environment. The internet provides a tremendous amount of information about EST including data culled from various sources including government agencies and the private sector. These include technical reports, data sets as well as position papers and commentaries pertaining to EST. The net enables such information to be readily available to the public and therefore ready for use for various purposes especially and particularly in the context of EST.

Public participation and consultation have already been institutionalized by way of the Environmental Impact Assessment (EIA) process of the Philippines. The provision to derive social acceptability of projects may be extended to transportation and traffic via traffic impact assessment (TIA) that should incorporate EST principles.

2.12 Land-Use Planning

Transportation and land use have an interactive relationship. Transportation is what provides the links between different land use activities like residential, employment, industrial, institutional, and others. In view of the interactive relationship between transport and land use, a change in one can engender a change in the other. Ideally, a land use plan should be prepared in conjunction with a transportation plan. Put in another way, any land use plan should therefore be accompanied by the corresponding transportation plan.

Local land use planning in the Philippines is undertaken by provinces, cities, and municipalities by virtue of the R.A. 7960 or the Local Government Code. Local government units (LGUs) are mandated to prepare their comprehensive land use plans (CLUP), zoning ordinance (ZO), sectoral plans that are embodied in comprehensive development plans (CDPs), and annual investment program (AIPs) which schedules the LGU's planned expenditures and available and expected financial resources. The prepared land use plans are subject to conformity to plans of higher echelons of governance to ensure that there will be harmonization of plans among adjacent local government units and there will be conformity with national plans.

National, regional, and provincial physical framework plans are policy oriented and indicative and general in nature. These are treated in detail in the preparation of the CLUP. Provincial plans promote the goals and objectives provided for in the national and regional plan and provide the guidelines for the preparation of the CLUPs. CLUPs shall be consistent with and supportive of the goals and objectives in the provincial plan and shall guide the development of plans for parts of the city or municipality such as barangays (HLURB, 2006).

Executive Order No. 72 prescribes the following to ensure compliance of CLUPs with national standards and guidelines:

- Review and approval of CLUPs of component cities and municipalities by the province
- Review and approval of CLUPs of provinces, highly-urbanized cities, independent component cities, and Metro Manila cities and municipalities by the HLURB

At present, the treatment of transportation in the preparation of CLUP and CDP is as a component of the "Infrastructure and Utilities Sectors" which includes transportation, power, water, communication, and solid waste management. A change in the positive direction is to more clearly establish the causal relationship between land use and transportation, and to plan them in a comprehensive and integrated manner. The case of Singapore is a very good model, where the Land Transport Authority is responsible for both land use and transport planning.

An effective plan for a city will provide accessibility of destinations and mobility of its residents. An efficient city is one that will not require considerable time and energy for people to get to their destinations. This can be done if there is efficient public transport system, traffic congestion management, and good matching of employment and residential locations. With a judicious location of employment and corresponding housing locations, it will be possible to reduce travel distances and make the use of non-motorized modes including walking for certain trips as a more viable option.

A transport system is traditionally considered as a support infrastructure for the various land use activities in an area. However, the potential of a transport system as a catalyst for change, even preceding land use developments should not be underestimated. Transportation, after all, can also be transformational. A transport intervention does not have to always be a reaction to land use change; it can be a proactive intervention to effect and shape a land use change.

3. STRATEGY FORMULATION

3.1 Methodology

The EST approach adopts the pro-active integration of environmental consideration in the planning process itself. Thus, negative impacts are minimized and environmental sustainability is achieved. On the other hand, the traditional planning framework considers the environmental impacts after planning and thus mitigation measures are formulated after the implementation of the project.

The formulation of the national EST strategy employed a feedback mechanism for contextual factors, policy environment factors and system attributes. This mechanism also involves extensive consultations with various stakeholders including government agencies and the private sector. Stakeholders were grouped into five clusters in order to facilitate the consultation process:

- Public Health and Social Equity;
- Roadside Pollution;
- Transport Planning;
- Road Safety; and
- Advocacy and Awareness

The participatory process employed yielded the outcomes shown in the following sections where descriptors, strategies and indicators were identified through a series of workshops and focus group discussions (FGDs). Discussions made reference to immediate, short, medium, and long-term horizons. Eventually, priority strategies were selected from a long list generated by stakeholders. These are shown in the succeeding sections.

As discussed in Chapter 1, the challenge for EST in the Philippines as far as formulation of strategies is concerned is to take into consideration the need for fiscal survival of major players in the transport sector. Thus, strategies identified for the short and medium terms must work within the existing modes and operations of the transport sector. Strategies must emanate from the objectives of the program. In this section, results from the consultation meetings and workshops on acceptable objectives, herein termed as descriptors, and priority strategies for each thematic area are discussed. These strategies recognize the pillars of sustainable development that includes environmental, social and economic elements, as well as the co-benefits that can be derived from these.

3.2 Strategies for Public Health

Based on the discussion with the partners, reduction of the negative impacts impact of transport must result to healthy road users. Strategies for achieving such should include public information drive, strengthening of public health services, formulation of the necessary department administrative orders, and required regular general and audio-logical check-up for PUV drivers and affected communities. Other strategies identified are found to be common with other thematic areas such as increase green areas, implementation of TSM/TDM programs for smoother traffic flow, and strict enforcement of the anti-smoke belching law. The public information campaign must be designed to enhance awareness of the benefits of an environmentally sustainable transport system. Special attention must be given to the local government units for enhanced success of the effort.

Table 3.1: Descriptors and priority strategies for public health

| Descriptors | Strategies |
|---|---|
| Healthy road users through: (1) Reduced respiratory diseases (2) Good hearing/visual (3) Enhanced IQ of children (4) Stress free travel (5) Healthy pregnant women | a) Formulate and promulgate Department (DOH) Administrative Orders on public health b) Establish linkage/partnership with concerned agencies/ groups/stakeholders including information and communication dissemination on public health hazards c) Fully implement EST program on public health d) Evaluate and monitor the EST Program |

3.3 Strategies for Strengthening Road Side Air Quality Monitoring and Assessment

With the vision of improving roadside air quality, it is also equally important to enhance the monitoring capacity as well as the knowledge on assessment and evaluation.

First of the strategies is that TSP concentration, which has been decreasing in recent years, will be monitored and evaluated. Since TSP is the only air pollutant which has extensive monitoring in Metro Manila and the regions, another strategy for the short-term to medium-term is the acquisition and commissioning of ambient air quality monitoring equipment for other criteria pollutants such as PM, HC, CO, NO₂, SO₂ that will be installed at roadside areas. A mid-term to long-term strategy is to also develop and fabricate monitoring instruments for TSP, PM, NO₂ and CO that would be locally harnessing the experience and capability of academe and government. This strategy was proposed since the equipments are usually imported and expensive in initial purchase cost and maintenance due to parts and calibration gases and reliance on foreign technical support.

With local governments of cities and highly urbanizing towns becoming aware and proactive on the need for baseline air quality data for the assessment of environmental quality, it has been proposed to capacitate local government units and other sectors on air quality monitoring and assessment as well as to enhance developmental and enforcement capacity to implement air quality standards set by the respective Airshed Governing Board. All of these will contribute to enhancing their technical and institutional capacity in carrying out their mandate in sharing responsibility in air quality management within their respective territorial jurisdictions.

A medium-term to long-term strategy is to have monitoring equipment commissioned and installed in strategic areas in cities and highly urbanized towns nationwide to establish the national network and support air quality management in local government units through enhanced monitoring capacity and increased knowledge in assessment and evaluation.

Similar to other countries, air quality indices from air quality data from the established monitoring stations would be reported to public through a web site which will be frequently updated. By this time, the public, especially at the local government level, would have some appreciation on monitoring, assessment and evaluation.

Table 3.2: Descriptors and priority strategies for strengthening roadside air quality monitoring and assessment

| Descriptors | Strategies |
|--|--|
| (1) Air quality improved (2) Monitoring capacity enhanced (3) Knowledge on assessment and evaluation increased | a) Monitor reduction of concentration of TSP and other criteria pollutants b) Purchase/Install PM10, PM2.5, HC, CO, NO2, SO2 (road side) equipment c) Capacitate local government units and other sectors on monitoring and assessment |

3.4 Strategies for Traffic Noise Management

Noise levels at sensitive areas such as schools, hospitals, etc., must be kept to tolerable levels. Along very busy roads, passengers on public transport (jeepneys and non-air-conditioned buses) and pedestrians are constantly being subjected to high noise levels. Strategies must be focused on lowering engine noise and loud stereo music of public transport vehicles. The installation of noise barriers should be considered as a standard road accessory for noise abatement along elevated sections of highways passing through residential and other noise sensitive areas.

Table 3.3: Descriptors and priority strategies for traffic noise management

| Descriptors | Strategies |
|------------------------------------|---|
| (1) Reduced road side noise levels | a) Amend/update of noise standards and compliance b) Strictly enforce motor vehicle noise regulations c) Enhance vLGU capability/enact local ordinances on noise [including ambient and source] |

3.5 Strategies for Vehicle Emission Control, Standards, and Inspection and Maintenance

Well maintained vehicles could solve most of our woes as regards pollution, frequent breakdowns on the road which contribute to congestion, and road crashes/accidents. Descriptors that could possibly express improvements in this sector are listed in the table below. Corresponding strategies focusing on how to keep the vehicles always in tiptop condition are given on the second column of the table. A number of these strategies are currently being implemented albeit limited in coverage. There is a need to expand the MVIS program covering all regions and all types of vehicles. The PETCs are expected to play a major role in the inspection of vehicles but they must be strictly regulated and monitored. For most of our indigenous vehicles – jeepneys, tricycles, etc., there is a need to establish motor vehicle standards.

Table 3.4: Descriptors and priority strategies for vehicle emission control, standards, and inspection and maintenance

| Descriptors | Strategies |
|---|--|
| (1) Fully operational national vehicle inspection and management systems (2) MV compliance with standards increased (3) Maintenance culture developed (4) Public participation in enforcement/ advocacy strengthened | a) Establish motor vehicle standards on fuel economy and roadworthiness (in-use) b) Strengthen road side apprehension on {smoke-belchers and} polluting and non-roadworthy vehicles including organization of Anti Smoke Belching Units (ASBU) under CENRO office c) Mandatory vehicle inspection of public utility vehicles [2x a year] |

3.6 Strategies for Cleaner Fuels

With the vision of increased use of clean alternative fuels and vehicles and improved fuel quality, a strategy proposed is for the intensification of the promotion of alternative fuels/vehicles such as CNG, biofuels, Auto-LPG, hybrid vehicles and electric vehicles. As raised in several transport-related summits in 2008, there is need for provision of fiscal and non-fiscal incentives for both producers and users of alternative fuels/vehicles as well as access to financial assistance. Although the government has already provided various incentives and funds for alternative fuels and vehicles, there is still need for a longer term plan for the introduction and phasing in of these technologies with the corresponding financial incentives. These strategies would require continuous research and development of these technologies to include finding sources of cleaner fuels as well as the conduct of master plans including accessibility to green fuels with cost-benefit analysis.

Another major strategy that would improve fuel quality would be the adoption of fuel quality standards aligned with international standards such as UN-ECE regulations. This strategy is linked closely to the long-term strategy for motor vehicle standards and regulations.

Table 3.5: Descriptors and priority strategies for cleaner fuels

| Descriptors | Strategies |
|--|--|
| (1) Use of clean alternative fuels/vehicles increased (2) Fuel quality improved | a) Increase use of cleaner fuels for all vehicles (reduction of use of conventional fuels; improvement of specs) b) Adoption of harmonized fuel quality standards (Euro regulations) c) Improve distribution system of CNG |

3.7 Strategies for Public Transport Planning and Travel Demand Management

Strategies developed for public transport planning and travel demand management are interlinked as the promotion of public transport, particularly mass transport, underlines TDM inclination against private car usage. In the Philippines, most people use public transport (i.e., as high as 90% in rural areas and 80% in urban areas). Therefore, there is a need to maintain this share while moving towards more efficient and rationalized systems. This is reflected in the descriptors and strategies in Table 3.6 that also includes the promotion of high occupancy for vehicles.

While rail transit and conventional buses are viewed as the basic mass transit options, paratransit like jeepneys and tricycles continue to be the dominant forms of transport in most areas. The emergence of BRT as a viable option that is suitable for many Philippine cities has provided more opportunities for rationalizing public transport services as well as the provision of appropriate infrastructure or facilities (e.g., park-and-ride facilities, inter-modal stations, etc.) to complement these services. The strategies also include the promotion of the appropriate public transport options to policymakers and the general public. This takes into account the limited resources available for public transport infrastructure development (that is the major consideration) and yet is often set aside due to the perception that capital intensive mass transit options are perfect remedies to traffic woes.

However, transport is not limited to people as goods or freight movement is also essential. Truck bans and similar policies and regulations were considered in the development of strategies albeit with respect to temporal and spatial aspects of truck flows and their potential impacts (e.g., emission and noise) considering overloading practice.

Table 3.6: Descriptors and priority strategies for public transport planning and travel demand management

| Descriptors | Strategies |
|--|--|
| (1) Fast and reliable transport services (2) Developed mass transport network (3) Higher PT mode share (4) Formalized/improved PT terminals (5) Rationalized PT routes (6) Operational BRT in urban areas (7) Converted transport organizations to cooperatives (8) Rationalized truck routes (9) Reduced number of low-occupancy vehicles | a) Integrate public transport system network (including efficient PT) b) Develop and enhance appropriate freight transport policies c) Develop and implement appropriate TSM/TDM measures (e.g., synchronization of traffic lights, road widening and paving, alternate routes) d) Develop mass transit systems especially BRT e) Rationalize public transport systems and services according to public transport and road network hierarchies |

3.8 Strategies for Non-Motorized Transport

The realization of walkable and cycling friendly cities is an overall vision for non-motorized transport. Again, this is interlinked with the descriptors for other thematic areas especially where social equity is concerned. As such, strategies include the promotion of walking and cycling as utilitarian modes, a departure from traditional perceptions in the Philippines that motor vehicle ownership corresponds to status symbols where walking and cycling are modes associated with the less fortunate. Complementary to this promotion are the provision of facilities for walking and cycling.

The strategies also address the need for rationalized non-motorized public transport services. The latter recognizes the reality that while walking and the bicycle may be effectively integrated with designs presently favoring motor vehicles, services of three-wheelers such as pedicabs need to be qualified with respect to their suitability since current operations are also detrimental to high capacity corridors. It is important to note that NMTs have low passenger capacities and should not be favored along corridors like national roads where travel demand is high and priority is rightfully given to motor vehicles.

Table 3.7: Descriptors and priority strategies for non-motorized transport

| Descriptors | Strategies |
|---|---|
| (1) Walkable cities (2) Dedicated routes for NMTs (3) Available parking spaces for NMVs in public places (4) Rationalized NMT PT | a) Develop policies and guidelines for pedestrian- and cycling-inclusive land use planning b) Provide non-motorized transport (NMT) facilities |

3.9 Strategies for Environment and People Friendly Infrastructure Development

Perhaps the overall vision for this thematic area can be expressed by the first descriptor. That is, the primary objective is to have environment and people friendly cities or communities. This also requires a paradigm shift in the sense that current practices are perceived to center on planning and design of infrastructure for vehicles rather than for people. This is particularly the norm for road transport infrastructure in the Philippines where, too often, the needs of people are set aside in favor of vehicles. Such realities are clear, for example, from the failure to provide for pedestrian facilities and public transport rationalization while resources are allocated to road widening and capacity increase for the sake of private car traffic.

It is in the above context that strategies were formulated towards a future of environment and people friendly infrastructure. These are shown in Table 3.8 where it is evident that certain strategies are actually linked with strategies of practically all thematic areas especially public health, social equity, non-motorized transport and road safety.

Table 3.8: Descriptors and priority strategies for environment and people friendly infrastructure development

| Descriptors | Strategies |
|---|---|
| 1) People friendly cities (2) Inclusive transport services and facilities (3) Green transport infrastructure and vehicles (4) Safe streets and roads | a) Incorporate green architecture principles in the design of transportation infrastructure b) Incorporate “inclusive transport” principles in transportation infrastructure and vehicle design c) Provide seamless and secure transport systems (e.g., seamless transfers) |

3.10 Strategies for Social Equity and Gender Perspective

To achieve ‘inclusive transport service’ as discussed in Section 1, equal access to public transportation must be achieved through the use of technology such as traffic and transport assistive device and use of cheaper alternative energy for more affordable fares, infrastructure such as the provision of bikeways for work and recreational trips, and legislation such as the mandatory adoption of the EST planning paradigm by the LGUs.

Table 3.9: Descriptors and priority strategies for social equity and gender perspective

| Descriptors | Strategies |
|---|---|
| Equal access to public land transport thru: (1) NMT friendly roads (2) Gender sensitive public transport (3) Senior citizens' friendly transport (4) PWD friendly transport (5) Affordable transport | a) Monitor and reinforce existing laws, rules, and regulations on gender, age, and PWD concerns b) Install traffic and transport assistive devices including manpower components |

3.11 Strategies for Road Safety and Maintenance

The strategy for achieving accident-free road transport in the country is already formulated in the country’s National Road Safety Action Plan (NRSAP). With a target of reducing the accident rate to approximately 2% in 2015 from the baseline 4% in 2004, the underlying strategies documented in NRSAP can be divided into 5 main areas namely: safer vehicles, safer roads, safer road users, effective road safety management, and effective road safety support system. It can be observed that the strategy imply multi-sector and inter-agency cooperation among government agencies, NGO, and private sector. Education of road users, enforcement (and enactment) of regulations, as well as proper road/vehicle design and engineering are among the key elements in these strategies. This paves the way for the Philippines active participation in activities focused on a Decade of Action for Road Safety: 2011-2020.

Table 3.10: Descriptors and priority strategies for road safety and maintenance

| Descriptors | Strategies |
|---|--|
| SAFER VEHICLES (1) Vehicles conforming to safety standards SAFER ROADS 2) Planning and design of roads with high regard for road safety (3) Improvement of hazardous locations (no black spots) (4) Nation aware of costs due to accidents EFFECTIVE ROAD SAFETY MANAGEMENT (5) Existence of a road safety coordinating body (6) Existence of accurate road accident database (7) Budget allocated for road safety enhancement (8) Research support (9) Involvement of private sector and community EFFECTIVE ROAD SAFETY SUPPORT SYSTEM (10) Promulgation of laws that enhance road safety (11) Strict enforcement for road safety (12) Presence of quick and reliable emergency road accident victim assistance SAFER ROAD USERS (13) Citizens free from road accidents (14) "Road safety" culture among citizens | a) Road safety audit b) Valuation of accident costs c) Establish road traffic safety zones or TSZs (e.g. UP, Ayala-Alabang Village, Subic TDZ, The Fort TDZ, EAST Ave TDZ, etc.) |

3.12 Strategies for Land Use Planning

As mentioned earlier, transportation and land use have an interactive relationship. Transportation is what provides the links between different land use activities like residential, employment, industrial, institutional, and others. In view of the interactive relationship between transport and land use, a change in effect a change in the other. Ideally, a land use plan should be prepared in conjunction with a transportation plan. Put in another way, any land use plan should therefore be accompanied by the corresponding transportation plan.

An effective plan for a city is one that aims to achieve accessibility of destinations and mobility of its residents. By achieving these ends, cities can become more efficient. An efficient city is one that will not require considerable time and energy for people to get to their destinations. This can be done if there is efficient public transport system, traffic congestion management, and good work-home location matching. With a judicious location of employment and corresponding housing locations, it will be possible to reduce travel distances and make the use of non-motorized modes including walking for certain trips as an option. In addition, a good matching or compatibility between land use activities and the supporting transportation infrastructure will help make for efficient movement of people and goods. This can be achieved through clear and proactive land use policies and planning guidelines that aim to marry land use and transport planning.

Several strategies have so far been identified to attain EST through land use and transport interventions. One is by designation of vehicle-free zones. Another is by promoting efficient use of idle lands. Both these strategies can help achieve the desired states as articulated in descriptors 1, 2, and 5.

Implementation of traffic calming strategies can help promote safety and order in communities. The promotion of mixed-use development can pave the way for compact cities. Proactive land use policies and planning guidelines can be nurtured through the integration of EST in CLUP/CDP preparation and other planning guidelines. This presupposes that there exists local capability for planners of integrated land use and transportation. Lastly, this is achievable through the public involvement so that citizens, on whom real power rests, will have a meaningful voice in the planning and implementation of land use and transport interventions.

Table 3.11: Descriptors and priority strategies for land use planning

| Descriptors | Strategies |
|---|--|
| (1) Compatible land uses/compatibility of land uses and transport for safe & orderly communities (2) Compact urban development (3) Adequate access to services (4) Sufficient transport infrastructure facilities/support (5) Proactive land use policies and planning guidelines | a) Capability building on integration of land use and transport policies b) Promote mixed use development (compact, shorter trip distances) |

3.13 Strategies for Knowledge Base, Awareness and Public Participation

Cross cutting strategies that were generally geared towards knowledge base, awareness and public participation were derived from the eleven other thematic areas. These address the same sets of descriptors for each of the themes.

Table 3.12: Descriptors and priority strategies for knowledge base, awareness and public participation

| Descriptors | Strategies |
|--|---|
| Same as those for the 11 previous thematic areas | <ul style="list-style-type: none"> a) Establish Center for Research in EST (CREST) b) Establish "Building for EST" (BEST) Award c) Information build up on public health relatives d) Reporting of air quality indices to the public (website) e) Public awareness on hazards of noise f) Intensify promotion of alternative fuels and vehicles such as CNG, biofuels, AutoLPG, hybrid vehicles and EVs g) Road accident database system h) Establish road safety research center i) Capability building on road safety at the LGU level |

4. THE WAY FORWARD

4.1 Background

To enable the policy makers to determine the efficacy of the recommended strategies, these must have set indicators. The actual viable quantifiable indicators have been identified, discussed and finalized for each thematic area during the Partnership Meetings. Meanwhile, action plans for the priority strategies were formulated in the Action Planning workshop. It should be emphasized that while strategies, indicators and actions plans are discussed separately in the succeeding sections, most of these are actually cross-cutting and there are and will be programs and activities where many if not all thematic areas are involved. The summary of the outcomes of meetings and workshops are related in the following sections and action plans are referred to as key result activities.

4.2 Indicators and Action Plans for Public Health

To increase public awareness of the benefits of an environmentally sustainable transport, a two-prong approach is recommended to be undertaken: multi-media information campaign and presentation of technical papers on researches conducted. Efficacy of such efforts is measured by the number of publications published and public campaigns conducted. To facilitate public health monitoring activities, a database of health professionals must be developed. The primary responsible agency identified here is the Department of Health (DOH). At the local level, LGUs are to be encouraged to develop and implement initiatives on public health in relation to transport.

Table 4.1: Priority strategies, indicators and action plans for public health

| Strategies | Indicators | Key Result Activities |
|---|---|--|
| a) Formulate and promulgate Department (DOH) Administrative Orders (AO) on public health | a) Action and communications plan developed b) AO issued c) Guidelines and policies developed and circulated d) IRR issued/ circulated/ published e) Road map with time line formulated and mainstreamed | a) Create/ formulate of action and communication plan b) Issue/sign AO c) Prepare and formulate guidelines d) Prepare and formulate IRR e) Prepare/ formulate and mainstream road map and time line |
| b) Establish linkage/ partnership with concerned agencies/ groups/stakeholders including information and communication dissemination on public health hazards | a) Inter-agency links established b) Working group/s created c) Issuances of MOA with concerned agencies, including LGU's and NGO's d) Setting of incentives scheme e) Media support/ solicited/ tapped for information campaign | a) Create/ establish of steering committee and TWG b) Create working groups/ committee c) Issue/sign MOA d) Establish/set incentives scheme e) enter into MOA with media |
| a) Fully implement EST program on public health | a) Number of community based organizations/ NGO's involved b) Number of LGU's capacitated and involved c) Medical package for PUV drivers and families integrated in the National Health Program d) No. of community based health facilities including health work force, strengthened and capacitated | a) Establish tie ups with NGO's and community based org b) Assess capacity and train identified LGU's. c) Conceptualize and incorporate medical package in the national health program d) Strengthen and capacities community based health facilities |

| | | |
|---|-------------------------------------|---|
| d) Evaluate and monitor the EST Program | Evaluation and monitoring conducted | Convene participants to evaluate EST programs and come up with monitoring scheme, and identify additional researches necessary to update data |
|---|-------------------------------------|---|

4.3 Indicators and Action Plans for Strengthening Road Side Air Quality Monitoring and Assessment

The objectively verifiable indicators for the strategies not only in this thematic area but for the overall effectiveness of the environmentally sustainable transport strategy would be the ambient air concentration of criteria air pollutants such as TSP, PM, HC, CO, NO₂ and SO₂. As a gauge in enhancing the monitoring and assessment capacity for air quality management, indicators would be the number of operational road side air quality monitors, the number of personnel of local governments trained in air quality management and the number of air quality indices reported to the public. The number of locally fabricated monitoring instruments would indicate the level of the development of the local technology for air quality monitoring. The main agency responsible would be the DENR through its Environmental Management Bureau (EMB). At the local level, LGUs are encouraged to take an active part through its CENRO and, if already established and functional, its Anti-Smoke Belching Unit (ASBU).

Table 4.2: Priority strategies, indicators and action plans for strengthening roadside air quality monitoring and assessment

| Strategies | Indicators | Key Result Activities |
|--|--|--|
| a) Monitor reduction of concentration of TSP and other criteria pollutants | Reduction in concentration of criteria pollutants (%) | Establish baseline data for other criteria pollutants; determine contribution of transport to emissions (inventory)-- emission factor development and AAQ modeling; source apportionment/ speciation |
| b) Purchase/Install PM ₁₀ , PM _{2.5} , HC, CO, NO ₂ , SO ₂ (road side) equipment | Number of operational roadside air quality monitoring stations | Identify potential hotspots and prioritize establishment of stations |
| c) Capacitate local government units and other sectors on monitoring and assessment | a) Number of trained LGU personnel in basic air quality management b) Number of LGU AQM plans developed and implemented | a) Identify potential staff to be trained in the HUCs; b) Conduct trainings (e.g. use DENR mobile AQ monitoring van); conduct of action planning workshops on AQM |

4.4 Indicators and Action Plans for Traffic Noise Management

A number of indicators must be monitored regularly (possibly on a yearly basis) to gauge the improvement achieved in this sector. The DENR or the DOTC may be tasked to develop noise monitoring program for Metro Manila and other cities in the country. The DPWH should be the main source of data for the length of noise barriers installed along highways. Local governments may also develop and enforce ordinances intended for noise management but these should be guided and consistent with national standards.

Table 4.3: Priority strategies, indicators and action plans for traffic noise management

| Strategies | Indicators | Key Result Activities |
|--|-----------------------------|---|
| a) Amend/update of noise standards and compliance | Revised noise standards | Update of baseline roadside noise level data by 2010; set up IATWG |
| b) Strictly enforce motor vehicle noise regulations | Roadside noise level | Purchase of noise level meters; training on use of equipment and procedure of LTO and LGU personnel; issuance of MC/AO on noise regulations for inspection of in-use MVs; roadside apprehension procedures for LGUs |
| c) Enhance LGU capability/enact local ordinances on noise [including ambient and source] | Enacted ordinances on noise | Disseminate template of ordinance (samples, ex. QC) |

4.5 Indicators and Action Plans for Vehicle Emission Control, Standards, and Inspection and Maintenance

The progress or improvement in this sector may be assessed by the indicators shown on the table. Most of the data for estimating the values of the indicators can be obtained from the DOTC-LTO, DTI and/or LGUs. Public transport vehicles' roadworthiness may also be assessed by the LTFRB as a prerequisite to franchising. At present, there is also the Committee on the Harmonization of Vehicle Standards and Regulations (CHVSR) comprised of various frontline government agencies including the DTI, LTO, EUMB, and others, that is tasked to evaluate and recommend for standards concerning motor vehicles including compliance with international standards.

Table 4.4: Priority strategies, indicators and action plans for vehicle emission control, standards, and inspection and maintenance

| Strategies | Indicators | Key Result Activities |
|--|--|--|
| a) Establish motor vehicle standards on fuel economy and roadworthiness (in-use) | a) Percentage (%) compliance of MVs to emission standards b) Developed fuel efficiency standards for public transport c) Developed vehicle roadworthiness standards for all vehicles | a) Develop fuel efficiency standards for PT vehicles/ fuel efficiency ratings for private modes (for PT, to aid in LTFRB fare setting) b) Develop vehicle scrappage program |
| b) Strengthen road side apprehension on {smoke-belchers and} polluting and non-roadworthy vehicles including organization of Anti Smoke Belching Units (ASBU) under CENRO office | a) Percentage (%) compliance of MVs b) No. of operational LGU ASBUs; | a) Encourage enactment of local ordinances to impose fees and set aside collection as a local clean air fund; b) Encourage creation of LGU ASBUs with training; facilitate deputation of LGU personnel by LTO |
| c) Mandatory vehicle inspection of public utility vehicles [2x a year] | Percentage (%) compliance to vehicle inspections | Issuance of policy directive requiring of mandatory twice a year inspection of PUVs; |

4.6 Indicators and Action Plans for Cleaner Fuels

The main indicator for the promotion and diffusion of alternative fuels/vehicles would be the number of vehicles using alternative fuels. Although the Department of Energy (DOE) has started to gather statistics on Auto-LPG taxis and CNG

buses, a more comprehensive monitoring of the number of CNG buses, Auto-LPG taxis, electric vehicles, other alternative fuel-vehicles and conventional vehicles using alternative fuels would be better implemented by the Department of Transportation and Communications (DOTC) through the Land Transportation Office (LTO). This can be done through its vehicle classification and registration process and vehicle database. As for the number of conventional vehicles that use alternative fuels, the DOE can implement monitoring of refueling stations with alternative fuels such as biodiesel and bioethanol which is already doing not only by volume but also by the count of vehicles refueling.

The DOE has already started to gather statistics on infrastructure on alternative fuels/vehicles such as the number of Auto-LPG refueling stations and it is recommended to be expanded to cover more types of alternative fuel/vehicles. With respect to fuel quality standards, a major indicator is the adoption of Euro 4 standard for fuels which has been set at 2012.

Table 4.5: Priority strategies, indicators and action plans for cleaner fuels

| Strategies | Indicators | Key Result Activities |
|--|---|---|
| a) Increase use of cleaner fuels for all vehicles (reduction of use of conventional fuels; improvement of specs) | a) Percentage (%) of vehicles using alternative fuels b) Number of distribution stations for alternative fuels | a) Provide of fiscal and non-fiscal incentives for producers and users of cleaner fuels; b) Provide incentives for assemblers of cleaner fuel vehicles; incentives for clean fuel conversion/retrofit companies); c) Develop standards for LPG conversion of tricycles Negotiate for sources of natural gas supply (e.g. Malampaya or imported); |
| b) Adoption of harmonized fuel quality standards (Euro regulations) | Euro 4 adoption | a) Harmonization of biofuel blends with Euro 4 standards; b) Study on appropriate fuels for motorcycles/ tricycles (e.g. conversion of 2-stroke to LPG); c) Suitability of E10 to carbureted vehicles |
| c) Improve distribution system of CNG | Number of daughter stations | Conduct of FS for additional CNG refueling stations; encourage investors for LNG terminals and pipeline distribution system |

4.7 Indicators and Action Plans for Public Transport Planning and Travel Demand Management

The main indicators for this thematic area corresponds to improvements in public transportation and the rationalization of travel demand management measures pertaining to both passenger and goods movement. From the planning perspective, an important indicator would be the mainstreaming of public transport planning in local government process, ideally in the context of land use and development plans of cities. Improvements in public transportation also include upgrades of vehicle fleets and decrease in travel times when utilizing public transport. The main responsible agency for public transport planning would be the DOTC through its planning divisions as well as the LTFRB, the LRTA, the PNR and the OTC. The formulation of TDM schemes is partly the responsibility of the DOTC but should

be undertaken in close cooperation with local government units at the local level. For example, TDM for Metro Manila should be a joint activity with the MMDA while TDM for Cebu City may be in cooperation with CITOM. The ideal set-up is for the DOTC to provide technical and institutional guidance to LGUs in public transport planning and TDM measure formulation. In addition, capability should be harnessed and developed at the level of the LGU, so that local staff may be equipped to identify the appropriate interventions that will address their specific problems. This may be achieved through assistance from the academia, which is mandated to conduct transport research as well as extend services for human resource development.

Table 4.6: Priority strategies, indicators and action plans for public transport planning and travel demand management

| Strategies | Indicators | Key Result Activities |
|--|--|--|
| a) Integrate public transport system network (including efficient PT) | <ul style="list-style-type: none"> a) Inclusion in national plan b) Number of LGUs having PT planning integrated in local plans c) Number of LGUs with intermodal stations d) Presence of integrated ticketing system for Metro Manila's rail system | <ul style="list-style-type: none"> a) Integrate EST in NTPP2; b) DOTC to endorse NTPP2 to NEDA b) Develop of HLURB policy guidelines to integrate PT plan to LGU plan - mandatory to HUCs c) Develop policy guidelines |
| b) Develop and enhance appropriate freight transport policies | Number of development studies (e.g., logistics improvement plan) | Push studies for rationalized truck routes |
| c) Develop and implement appropriate TSM/ TDM measures (e.g., synchronization of traffic lights, road widening and paving, alternate routes) | <ul style="list-style-type: none"> a) Travel time reduction for public and private transport users b) Number of rationalized truck routes | <ul style="list-style-type: none"> a) Conduct studies to assess travel speeds along critical corridors/sections b) Assess truck routes in Metro Manila and other Highly Urbanized Cities (HUCs) |
| d) Develop mass transit systems especially BRT | <ul style="list-style-type: none"> a) Number of cities with appropriate mass transport b) Number of mass transport lines (e.g., BRT lines in Cebu and Davao by 2013) | <ul style="list-style-type: none"> a) Assess existing public transport system b) Push studies for mass transport including BRT and rail |
| e) Rationalize public transport systems and services according to public transport and road network hierarchies | Public transport mode and supply suitable to major corridor based on network demand estimates (to replace current RMC) | <ul style="list-style-type: none"> a) Assess existing public transport system b) Push studies for mass transport including BRT and rail |

The share of public transport in the Philippines is around 80-90% and paratransit such as jeepneys and tricycles are the dominant forms of public transport. There are current efforts to rationalize public transport systems but these are concentrated mainly in Metro Manila, Cebu City and Davao City. Other cities are experiencing rapid growth and yet have jeepneys and tricycles as the main mode of transport. Therefore, it is very important to assist cities in developing their transport and traffic management plans, which include the determination of the appropriate public transport system that can optimally serve the city. They may still involve the same jeepneys and tricycles but their numbers should be kept commensurate with prevailing and expected passenger demand and their operations organized.

Paratransit systems should be integrated with mass transport systems to serve feeder routes. This is essential from the planning stage of future mass transit system development such as BRT. As has been observed in cities which have decided to implement higher-capacity and higher-quality mass transit systems, a reasonable number of the existing paratransit or informal public transport modes

have been kept but given new roles to play in the hierarchy of transport modes. The planning of the new mass transit system includes the integration of the existing paratransit modes to complement and support the new system as feeder modes. This achieves the much-needed hierarchy of transport modes as well as eases the social acceptability of inevitable change. The examples of Bangkok, Ahmedabad, and Jaipur are noteworthy.

4.8 Indicators and Action Plans for Non-Motorized Transport

Indicators for NMT include general measures such as the number of NMT friendly cities (i.e., walkable and bicycle friendly cities) to more specific gauges like the lengths of pedestrian walkways and bicycle paths constructed or designated by cities and municipalities. Another indicator pertains to fiscal instruments or resources such as budget allocations and incentives for NMT. While much responsibility may be in the hands of local governments, again there is a need to provide guidance from national agencies such as the DOTC and DPWH for the planning, design and construction of NMT facilities. Guidance is also required for the formulation of appropriate policies and local ordinances to promote NMT, particularly walking, in cities and municipalities.

Table 4.7: Priority strategies, indicators and action plans for non-motorized transport

| Strategies | Indicators | Key Result Activities |
|--|---|--|
| a) Develop policies and guidelines for pedestrian- and cycling-inclusive land use planning | a) Number of NMT-friendly cities b) Number and length of bike lanes constructed | a) Develop local indices b) Push for bicycle and walkway plans implementation by 2012 |
| b) Provide non-motorized transport (NMT) facilities | c) Number and length of pedestrian walkways constructed d) Percentage (%) or amount of budget provision or incentives on the use of NMTs (national and local government) | |

Tools are already available for assessing walkability. Literature on walking and assessment tools developed for cities can be accessed through the Clean Air Initiative for Asia (CAI-Asia) knowledgebase that is available through their Clean Air Portal (<http://cleanairinitiative.org/portal/knowledgebase>). Meanwhile, Marikina City is mulling the reactivation of its Bikeways Office that used to be the only one of its kind in the country, which can serve as an example of institutional commitment to promoting and implementing NMT programs.

4.9 Indicators and Action Plans for Environment and People Friendly Infrastructure Development

It was mentioned in the previous section that the thematic area on environment and people friendly infrastructure development essentially incorporates the elements of all other thematic areas as it deals with both environmental and social aspects of EST. Thus, most indicators are actually replications of indicators corresponding strategies that are also mentioned for other thematic areas. For example, indicators shown in Table 4.8 include those that are obviously applicable for road traffic safety, social equity, and non-motorized transport, among other indicators. As such, it is important for agencies such as the DOTC, DPWH and local governments to closely coordinate with agencies such as the NCDA, NCRFW and possibly senior citizens organizations in order to address issues pertaining to this thematic area.

Table 4.8: Priority strategies, indicators and action plans for environment and people friendly infrastructure development

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Incorporate green architecture principles in the design of transportation infrastructure | a) Number of cities adopting or implementing environmentally sustainable transport infrastructure including green designs b) Increase in number/length of pedestrian walkways and other people friendly facilities | a) Develop local indices b) Prepare plans by 2011, implementation by 2013 |
| b) Incorporate “inclusive transport” principles in transportation infrastructure and vehicle design | a) % Reduction in accidents involving elderly, children, women and persons with disabilities b) % Increase in the number of public transport vehicles incorporating “inclusive” design c) # of cities adopting or implementing environmentally sustainable transport infrastructure including green designs d) Increase in #/Length of pedestrian walkways and other people friendly facilities | Strict implementation of provisions for PWD, senior citizens, pregnant women, etc. as stipulate in Philippine laws and design codes |
| c) Provide seamless and secure transport systems (e.g., seamless transfers) | a) Number of inter-modal terminals; b) Number of incidents concerning security in public transport systems | a) Develop indices b) Prepare inter-modal terminal plans c) Conduct diagnostic assessment |

4.10 Indicators and Action Plans for Social Equity and Gender Perspective

An important indicator discussed by the partners to determine whether an ‘inclusive’ transport system is already in place is the development of satisfaction rating for the public transport services. The total number of passengers with special transport needs served by the public transportation services and infrastructure in place has been identified as a key indicator. Activities under this theme are also mainly the responsibility of local governments but should again receive guidance from national agencies like the DOTC and DPWH. In addition, the NCDA, NAPC, NCRFW and perhaps the DSWD would be relevant partners in discussions and cooperation to implement activities for this thematic area.

Table 4.9: Priority strategies, indicators and action plans for social equity and gender perspective

| Strategies | Indicators | Key Result Activities |
|---|---|---|
| a) Monitoring and reinforcement of existing laws, rules, and regulations on gender, age, and PWD concerns | Level of compliance of concerned agencies, LGUs, and transport infrastructure and service providers | Convene concerned agencies to evaluate compliance |
| b) Installation of traffic and transport assistive devices including manpower components | Number of traffic and transport assistive devices installed, and manpower component assigned in key areas | a) Determine areas for installation and manpower requirements b) Installation of needed devices and assignment of personnel in these areas |

4.11 Indicators and Action Plans for Road Safety and Maintenance

Road users need to be skilled, disciplined, and aware of road hazard. Road facility and vehicles must be designed, constructed, and operated judiciously to eliminate or minimize harm that can be inflicted by and upon road users. Road rules and regulations must be promulgated and enforced to instill discipline.

Safe road environment, road-worthy vehicles, and well-educated road users backed by effective road safety management and support system ideally add up to zero road crashes. In this theme, responsible agencies are led by the DOTC and the DPWH and initiatives are coordinated through the Road Safety Steering Committee (RSSC) whose members include private sector partners. The private sector is also active through the Philippine Global Road Safety Partnership (PGRSP) led by the Automobile Association Philippines (AAP).

Table 4.10: Priority strategies, indicators and action plans for road safety and maintenance

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Road safety audit (RSA) | a) Number of road projects audited for road safety b) Percentage (%) of road-kilometers audited c) Number of RS auditors | a) Develop or RSA training module b) Conduct RSA training for national agency (DPWH) and local government units |
| b) Valuation of accident costs | Itemized accident cost components | Update costs of accidents (research) |
| c) Establish road traffic safety zones (TSZs) or traffic discipline zones (TDZs) (e.g. UP Model Safety Zone, Ayala-Alabang Village, Subic TDZ, The Fort TDZ, East Avenue TDZ, etc.) | Number of road traffic safety zones | a) Develop/Identify criteria for selecting candidate areas/corridors TSZ b) Conduct traffic management studies c) Provide legal support like issuance of LGU ordinances, or aids of legislation |

The Philippines has formulated an updated Road Safety Action Plan (RSAP) for the period 2011-2020 to coincide with the U.N. Decade of Action for Road Safety and consistent with the UNESCAP objectives. The items in the RSAP are categorized according to the “Pillars” for road traffic safety: road safety management, safer road, safer vehicles, safer road users, and post-crash response.

Road safety audit will be bolstered by the implementation of the International Road Assessment Program (iRAP) in the Philippines. The program will cover more than 3,000 kilometers of roads including Asian Highway 26 and major roads where there are significant crash experiences.

4.12 Indicators and Action Plans for Land Use Planning

Performance indicators that can measure the level of success (or failure) of the chosen strategies have been selected as shown in the table below. These are usually quantifiable parameters that are indicative of the level of implementation of the chosen strategies. The intervention in the form of capability-building on integrated land use and transport planning can be gauged by the number of trainings or seminars on this topic. The number of local comprehensive land use plans and comprehensive development plans that treats transportation and land use in an integrated approach can be monitored through the HLURB. The other indicators mentioned are likewise measurable and reflective of the different strategies presented in the left column.

Further to the identification of the appropriate indicators, it is also necessary to clearly identify the data sources. These should include government agencies like

DOTC, DENR, DOH, DOE and DPWH. Others with pertinent databases are the HLURB, LGUs, Senate, House of Representatives, local and international NGOs, the private sector and academic institutions like UP, Ateneo and Miriam College. Ultimately, their willingness and support to provide the needed data should be solicited, ensured, and institutionalized.

Table 4.11: Priority strategies, indicators and action plans for land use planning

| Strategies | Indicators | Key Result Activities |
|--|---|---|
| a) Capability building on integration of land use and transport policies | a) Case studies on EST and develop toolkits b) Number of trainings/ seminars on land use and transport integration conducted c) Number of CLUPs/CDPs integrating EST d) Recognition of good practices of LGUs on EST | a) Detailed case study on the Marikina Bikeways in 2009 and search for EST leading practices of HUCs b) Development of EST training program and modules c) Develop and conduct advocacy activities for LGUs d) Develop and implement recognition mechanics |
| b) Promote mixed use development (compact, shorter trip distances) | a) Urban density (number of persons/area); b) Diversity of land uses in a given space; c) Trip lengths (unit distance) | a) Conduct transport surveys; b) Advocate diversification of land use by responsible agencies especially HLURB; c) Recognize local best practices in compact, mixed use development |

4.13 Indicators and Action Plans for Knowledge Base, Awareness and Public Participation

Priority strategies for knowledge base, awareness and public participation were derived from strategies identified for the other eleven thematic areas. Many of these were cross-cutting among themes and were primarily classified into the knowledge base theme as they were mainly concerned with research, building awareness, and participatory activities. Indicators and action plans were discussed and defined during the action planning workshop.

Table 4.12: Priority strategies, indicators and action plans for knowledge base, awareness and public participation

| Strategies | Indicators | Key Result Activities |
|---|--|---|
| a) Establish Center for Research in EST (CREST) | Established research center | Establish research center and allocate resources for multi-disciplinary studies |
| b) Establish "Building for EST" (BEST) Award | Annual awards for LGUs promoting and implementing EST good practices | Formulate guidelines and invite nominees from HUCs |
| c) Information build up on public health relatives | a) Number of IEC materials produced and disseminated; b) Number/name of tri-media tapped for information campaign | a) Conduct research on alcohol, and drug related accidents; b) Enter into MOA with media |
| d) Reporting of air quality indices to the public (website) | Air Quality Indices - TSP, HC, CO, NO ₂ , SO ₂ , PM ₁₀ , PM _{2.5} | Development of web portal for reporting of air quality indices |
| e) Public awareness on hazards of noise | No. of advocacy materials used in quad-media | Develop IEC materials |

| | | |
|--|--|---|
| f) Intensify promotion of alternative fuels and vehicles such as CNG, biofuels, AutoLPG, hybrid vehicles and EVs | No. of advocacy materials used in quad-media | Develop IEC materials |
| g) Road accident database system | Number of computerized database systems | <ul style="list-style-type: none"> a) Develop RADSys, b) Establish about 30 computerized accident database systems for tertiary hospitals c) Enhance TARAS to include accident data on local roads |
| h) Establish road safety research center | <ul style="list-style-type: none"> a) Established research center b) Number of researches conducted / disseminated | <ul style="list-style-type: none"> a) Formulate and submit proposal for a road safety research center b) Identify and conduct road safety research c) Disseminate activities like annual conferences, annual reports, and publications |
| i) Capability building on road safety at the LGU level | <ul style="list-style-type: none"> a) Number of training programs conducted b) number of LGU personnel trained | <ul style="list-style-type: none"> a) Develop RS training modules b) Trainors' training in MM c) regional RS training program/seminar |

5. IMPLEMENTATION AND FINANCIAL MECHANISM

5.1 Opportunities and Barriers

It is important to recognize ongoing efforts related to EST. These efforts include facilities and resources that enable the formulation and implementation of EST plans, programs and projects. Meanwhile, there are also barriers that can be manifested in various forms including hindrances or obstacles. Initial resistance is expected considering the issues and challenges pertaining to the formulation and implementation of EST initiatives. EST touches on many sensitive issues particularly concerning the transport groups (e.g., compliance with EST principles concerning emission control, vehicle standards, inspection and maintenance, etc.).

Local governments are also more concerned with their development and EST, much like traffic impact assessment can be viewed as an additional requirement which, if the results or recommendations point towards additional measure, can be regarded as a hindrance to development. This is very much related to the concepts of survival and sustainability discussed in Section 1 of this draft and it should be understood that social marketing of EST must target these issues and concerns to overcome barriers at the local level.

At the national government level, there will be a need for the DOTC and DENR to step up and lead the way for national government agencies to adopt EST. This co-leadership would require stronger linkages and a reconsideration of functions and responsibilities consistent with the mandates of these agencies. Only, since EST focuses on the transport sector, it is recommended that DOTC be the lead agency in mainstreaming EST in government processes as well as advocating EST to the private sector and the general public. In fact, the agency is now formulating the National Implementation Plan on Environment Improvement in the Transport Sector with assistance from JICA. The National Implementation Plan incorporates the essential elements of the National EST Strategy.

5.2 Special Vehicle Pollution Control Fund

Republic Act No. 8794, entitled, “AN ACT IMPOSING A MOTOR VEHICLE USER’S CHARGE ON OWNERS OF ALL TYPES OF MOTOR VEHICLES.” All monies collected under MVUC Law are earmarked and used exclusively for road maintenance and improvements of road drainage, installation of adequate and efficient traffic lights and road safety devices, and air pollution control. These funds are deposited in four (4) Special Trust Accounts, wherein a Road Board was created to manage the said funds in a prudent and efficient manner:

- a. Special Road Support Fund
- b. Special Local Road Fund
- c. Special Road Safety Fund
- d. Special Vehicle Pollution Control Fund

The Special Road Support Fund, Special Local Road, Special Road Safety Fund are under the DPWH while the Special Vehicle Pollution Control Fund (SVPCF) is under the DOTC. It is through the SVPCF that EST initiatives are mainly supported. Road safety plans and programs can be supported by the Special Road Safety Fund. Figure 5.1 show the road transport sub-sector logical framework with the SVPCF interlinked with the EST clusters incorporating the thematic areas.

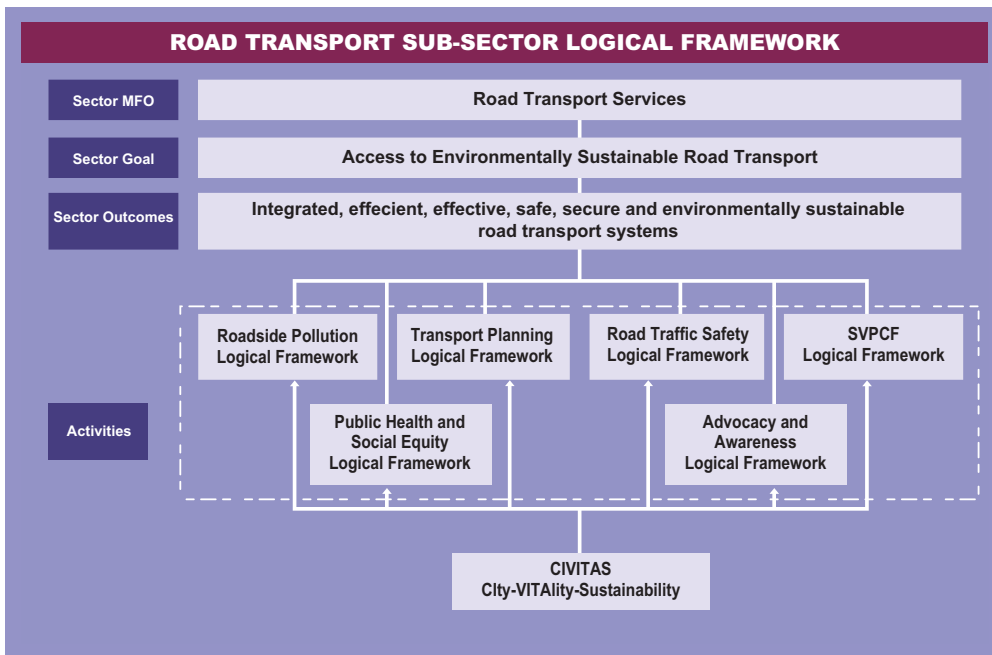


Figure 5.1: Road transport logical framework showing five EST clusters and the SVPCF logical framework

5.3 Linkages

It is imperative to touch base with a broad range of stakeholders with the aim of establishing linkages or building partnerships. These partnerships, in as far as government is concerned, should be at all levels as represented by national government agencies and local government units. Communities need to be involved and empowered in the formulation and implementation of EST plans and programs. The participatory process involving all sectors would ensure that ownership is established, which in turn is a requirement to increase the chances of success for EST initiatives.

The roles of non-government organizations and the private sector are also recognized. In fact, NGOs and the private sector can also initiate EST programs and projects. However, these should be in close coordination with pertinent agencies that should provide the framework and guidance for the involvement of NGOs and the private sector in various EST initiatives. Such an approach in cooperative work will also diminish the potential for wastage of resources allocated for EST.

These linkages will form the foundation for mainstreaming EST in national and local processes and systems. Establishing partnerships will employ social marketing concepts that would introduce EST and help current and potential partners appreciate its co-benefits concerning environmental, social and economic elements.

International linkages would include those in relation to the Clean Air Initiative for Asian Cities (CAI-Asia) and the Partnership for Sustainable Low Carbon Transport (SLoCaT). This partnership has initiated several activities and programs that encourage discussions and dialogue towards attaining objectives that have blended transport and climate change. These include identification of country specific targets and the sharing of knowledge at expertise in as far as dealing with the challenges posed by climate is concerned.

It is important to mention at this stage that partnerships between the academe and government (i.e., both at the national and local levels) should be pursued, established and nurtured. This is perhaps a general strategy that should be considered that includes capacity building for LGUs by cooperating with local universities. Such a strategy has been explored by the NCTS in cooperation with the Mindanao State University – Iligan Institute of Technology in Iligan City, Northern Mindanao together with the local government of that city.

5.4 Other Opportunities

Opportunities for financial support were presented in the Regional EST Forums held in Seoul in 2009 and Bangkok in 2010. Among those presented was the Japan International Cooperation Agency's (JICA) new scheme for addressing climate change. This is illustrated in Figure 5.2.

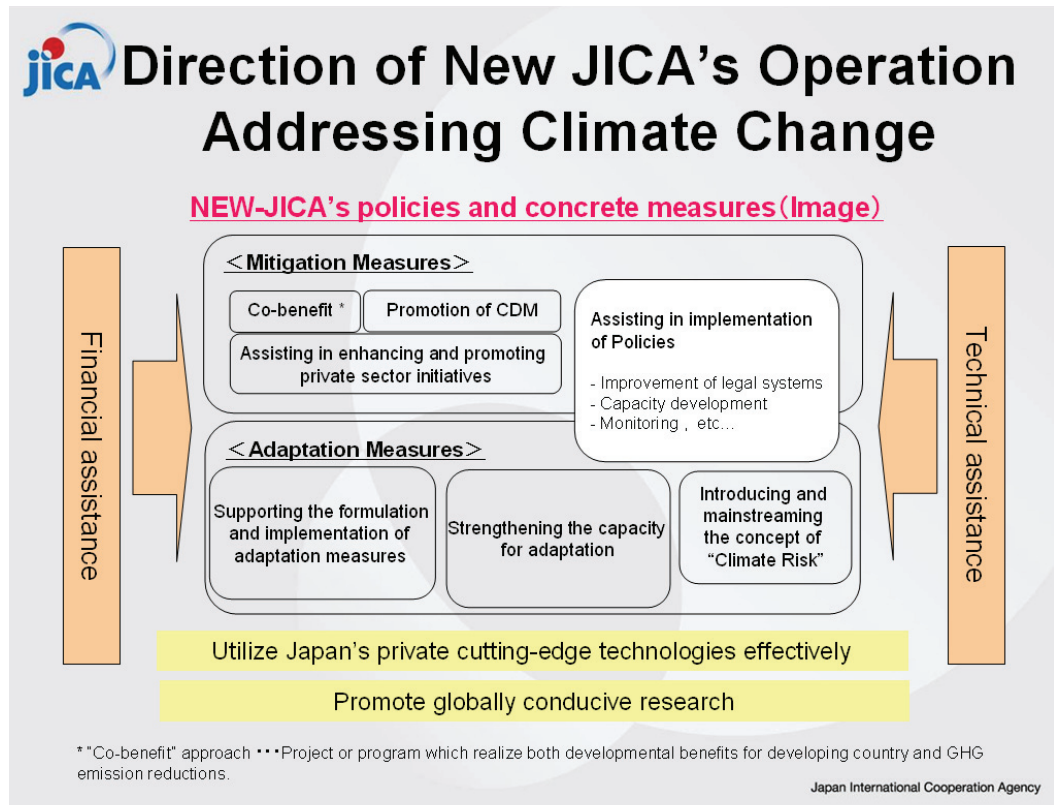


Figure 5.2: JICA scheme for addressing climate change

It is clear from the JICA presentation that EST initiatives must be contextualized from the perspective of climate change. Such task is already underway for the Philippines and its national EST strategy formulation as the DOTC is mandated by Presidential Administrative Order No. 254 to formulate the national strategy and currently chairs the Task Group on Fossil Fuels under the Presidential Task Force on Climate Change that was reorganized under Presidential Executive Order No. 774. In the latter capacity, the DOTC is able to mainstream EST in climate change discussions at the decision-makers level.

In 2006, the GEF implemented the Resources Allocation Framework (RAF) as a mechanism to effectively provide funds for beneficiary countries. The RAF is based on a system that prioritizes the country's potential to generate global environmental benefits as well as the level of their capacity, policies and approaches to successfully implement GEF projects. The RAF ended in June 2010 and the newly replenished GEF trust fund, known as GEF 5, is now open for utilization based on the newly developed System for Transparent Allocation of Resources (STAR). The GEF 5 funds will be available from July 1, 2010 to June 30, 2014.

The GEF 5 funds will be accessed and provided based on its consistency and relevance with the STAR's strategic objectives. The GEF 5 will also use the GEF Benefit Index (GBI) and GEF Performance Index (GPI) as parameters for determining specific country allocations. The GBI measures the potential of each country to generate global benefits in a particular focal area while the GPI measures a country's technical capacity, policies and practices considered relevant to GEF projects. The GEF 5 has four Strategic Goals, namely.

- Strategic Goal 1: Conserve, sustainably use and manage biodiversity, ecosystems and natural resources globally taking into account the anticipated impacts of Climate Change;
- Strategic Goal 2: Reduce global climate change risks by: i) stabilizing atmospheric GHG concentration through emission reduction actions; ii) assisting countries to adapt to climate change, including variability;
- Strategic Goal 3: Promote the sound management of chemicals throughout their life cycle to minimize adverse effects on human health and the global environment;
- Strategic Goal 4: Build national and regional capacities and enabling conditions for global environmental protection and sustainable development.

The main features of the GEF 5 STAR are the following.

- It is a new system for allocating resources to countries in a transparent and consistent manner based on global environmental priorities and country capacity, policies and practices relevant to successful implementation of GEF projects
- Reduces the need for upward or downward adjustments to the national allocation
- In case of funding shortfall, no changes will be made to the current country allocations
- Cancellation of any project prior to the last six months of the replenishment (12/31/2013) will lead to those resources becoming available again to that same country (or focal set aside) and focal area
- Re-allocation of additional or unused resources within focal areas and across focal areas
- Allocation for “flexible countries” up to flexibility threshold (US\$7M)
- Marginal adjustment can be applied from 1 or 2 focal areas, to 1 or more other focal areas.

The GEF 5 STAR will mainly support three focal areas: Biodiversity, Climate Change, and Land Degradation. The GEF 5 Philippine Portfolio states that the overall goal of the climate change focal area is to mitigate climate change and support developing countries and economies in transition toward a low-carbon development path. Five objectives are mentioned that is relevant to EST:

- Promote the demonstration, deployment and transfer of advanced low carbon technologies through enabling policy environment and mechanisms, and by avoiding GHG emissions;
- Promote market transformation for energy efficiency in industry and the building sector through appropriate policy, legal and regulatory frameworks, sustainable financing and delivery mechanisms, and avoiding GHG emissions;
- Promote investment in renewable energy technologies (RETs) through favorable policy and regulatory environment for RE investments, and avoiding GHG emissions;
- Promote energy efficient, low-carbon transport and urban systems through sustainable transport and urban policy and regulatory frameworks, investments in less-GHG intensive systems, and avoiding GHG emissions; and,
- Conserve and enhance carbon stocks through sustainable management of land use, land use change, and forestry, good management practices, restoration, and avoiding emissions and sequestering carbon.

The Clean Technology Fund (CTF) Investment Plan for the Philippines is another possible source for supporting EST programs and projects. It is actually being tapped for the development of Bus Rapid Transit (BRT) systems in Metro Manila, Metro Cebu and Metro Davao.

The ADB has also set aside funds to support initiatives that are linked with Climate Change Mitigation and Adaptation. These include funding for electric

vehicle initiatives like support for the delivery and deployment of electric tricycles intended to replace conventional tricycles that are currently the dominant mode of transport in many rapidly developing Philippine cities. The ADB published the Operational Plan for its Sustainable Transport Initiative in 2010 that should serve as a guide for formulation and implementation of EST plans and programs as well as the engagement of donor agencies such as the ADB to support these endeavors.

Meanwhile, guidance may also be derived from publications most notably from the GTZ including:

- **Accessing Climate Finance for Sustainable Transport:** A Practical Overview, Sustainable Urban Transport Technical Document #5 (November 2010); and
- **Financing Sustainable Urban Transport,** Module 1f, Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities (July 2010).

Such documents are available from the GTZ homepage and may be referred to by national agencies and local governments when seeking possible funding from international sources.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Overall Strategy

Given the detailed strategies (i.e., per thematic area) identified in the previous sections it is clear that it is possible to develop so many strategies and their corresponding indicators that will realize the descriptors for EST in the Philippines.

However, it also becomes clear that an overall strategy must be identified, synthesizing the essence of the detailed strategies.

The DOTC articulated its green transport strategy using an acronym that appears conspicuous enough. This is shown in the Figure 6.1 below and highlights the current programs and projects of the Department that are related to EST. These include initiatives pertaining to motor vehicle inspection and maintenance, emission reduction, mass transport, road traffic safety, alternative fuels, carbon reduction and EST advocacy. The green transport strategy is incorporated in the Department’s strategic planning and is particularly evident in the logical framework of the road transport sub-sector logical framework. The logical framework takes into account the cluster categories of the EST thematic areas.

| DOTC's Green Transport Strategy | |
|---------------------------------|--|
| V | Vehicle Inspection and Maintenance Program |
| E | Emission reduction |
| H | High capacity vehicles |
| I | Improved road safety |
| C | Cleaner fuels |
| L | Low pollution, low carbon transportation systems |
| E | EST advocacy and mainstreaming in the LGUs |

Figure 6.1: DOTC's green transport strategy

Another way of reformulating the strategies into an overall strategy is presented in this draft is presented in Figure 6.2. In the overall strategy proposed, the essential components for mainstreaming EST are emphasized. These include capacity building for all levels of government, institutional measures, infrastructure, mobility and accessibility, partnerships, technologies, and the empowerment of communities. The last element recognizes the need to involve a broad spectrum of stakeholders from different sectors. Their contribution to the formulation and implementation of EST initiatives are critical especially as ownership of plans and programs is a necessary ingredient for success.


| PROPOSED OVERALL EST STRATEGY | |
|-------------------------------|--|
| C | Capability Building – including institutional strengthening for mainstreaming EST at local and national levels |
| L | Legal Instruments – including institutional and financial mechanisms |
| I | Infrastructure – including both environment and people friendly facilities and vehicle design |
| M | Mobility Management – including TDM and TSM strategies covering both private & public transport as well as logistics |
| A | Alliances – linkages among organizations/entities/agencies to promote/advocate/ implement EST at local and national levels |
| T | Technology – including development of tools and innovations to enable EST like Intelligent Transport Systems (ITS) |
| E | Empowerment of Communities – including public involvement/ participation for ownership of EST initiatives |

Figure 6.2: Proposed overall EST strategy

Given the long list of strategies and corresponding indicators in the previous sections of this draft, it is evident that there is a need to come up with a primary strategy for each thematic area. These strategies would be those that are ascertained to have the most significant impacts in as far as EST implementation is concerned and its success is measured. Along with the identification of the primary strategies would be the determination of suitable indicators. These indicators will be selected based on criteria that includes the requirement that such parameters can be measured or monitored regularly, aside from their being practical and easily understood from both technical and layman perspectives.

6.2 Official Endorsements

The National EST Strategy and Action Plan was finalized and endorsed by the DOTC to NEDA and the Office of the President of the Republic of the Philippines in November 2009. The memoranda endorsing the priority strategies and action plans for each of the 12 thematic areas are shown in the following Figures 6.3 to 6.6.



Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

OFFICE OF THE SECRETARY
RECEIVED
NOV 25 2009
BY: *[Signature]*

MEMORANDUM FOR THE SECRETARY

From : Undersecretary for Road Transport

SUBJECT : **THE NATIONAL ENVIRONMENTALLY SUSTAINABLE TRANSPORT (EST) STRATEGIES AND ACTION PLAN**

Date : 24 November 2009

The current transport planning paradigm of 'forecasting and providing' has brought about negative externalities such as traffic congestion and traffic-related health issues to the community. Emissions from mobile sources were estimated by the DENR-EMB to have contributed 65% to the air pollution load nationwide. In addition, the increase in road traffic accidents is another clear indicator of an unsustainable transport system with the national cost of traffic accidents estimated to constitute 2.6% of the GDP of the country. Transport likewise consumes more energy than any other sector with the sector accounting for 41.6% of the total energy demand according to estimates by the DOE, where road transport consumed about 80% of this share of the demand.

To mitigate these negative externalities of the transport sector, several initiatives have been taking place. These initiatives fall under environmentally sustainable transport (EST), and refers to the Aichi Statement of 2005 that defined twelve thematic areas including 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; non-motorized transport, 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 initiatives were consolidated into a national EST strategy that employed a participatory approach in strategy development according to the 12 thematic areas. The approach included seminars and workshops involving national government agencies, local government units, non-government organizations, the private sector and the academe. National and regional consultations on draft descriptors, strategies and indicators led to a set of priority strategies for which action plans were formulated including the identification of financial mechanisms to support the strategies.

If the Secretary approves, we will be submitting this to NEDA for eventual presentation to the Inter-Agency Technical Committee on Transport Planning (IATCTP) and the NEDA Infrastructure Committee, and subsequently integrate LST in the formulation of the Medium Term Philippine Development Plan.

For your information and further instructions

[Signature]
ANNELI R. LONTOG

THE COLUMBIA TOWER
89GY WACK WACK, ORIGAS AVENUE
1555 MANDA-UYONG CITY, PHILIPPINES

TELEFAX (632) 723-49-25
TRUNKLINE 777-79-60 to 79
DOTC ACTION CENTER HOTLINE 7890

Figure 6.3:
Memo of
Undersecretary
for Road
Transport to
the DOTC
Secretary



Republic of the Philippines

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
OFFICE OF THE SECRETARY

25 November 2009

Honorable Augusto B. Santos
 Acting Director General
 National Economic and Development Authority
 NEDA sa Pasig Building,
 Ortigas Center, Pasig City

Dear DG Santos,

Per Presidential Administrative Order 254, the Department of Transportation and Communications has formulated the National Environmentally Sustainable Transport (EST) Strategy for the Philippines in consultation with the various stakeholders through a participatory approach including seminars and workshops involving national government agencies, local government units, non-government organizations, the private sector and the academe. National and regional consultations on draft descriptors, strategies and indicators led to a set of priority strategies for which action plans were formulated including the identification of financial mechanisms to support the strategies.

We all know that the current transport planning paradigm of 'forecasting and providing' has brought about negative externalities such as traffic congestion and traffic-related health issues to the community. Emissions from mobile sources were estimated by the DENR-EMB to have contributed 65% to the air pollution load nationwide. In addition, the increase in road traffic accidents is another clear indicator of an unsustainable transport system with the national cost of traffic accidents estimated to constitute 2.6% of the GDP of the country. Transport likewise consumes more energy than any other sector with the sector accounting for 41.6% of the total energy demand according to estimates by the DOE, where road transport consumed about 80% of this share of the demand.

The strategies formulated aim to reduce the annual growth rate of energy consumption and associated green house gas (GHG) emissions from the transport sector in urban areas in the country, and mainstream EST, which involves, among others, the promotion of transportation systems of low carbon intensity and shift towards the use of more sustainable transport modes. These strategies refers also to the Aichi Statement of 2005 that defined twelve thematic areas including 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; non-motorized transport; 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.

We are submitting a copy of the National EST Strategy and Action Plan for evaluation by the Inter-Agency Technical Committee on Transport Planning (IATCTP) and the NEDA Infrastructure Committee, and eventual integration of the EST in the formulation of the Medium Term Philippine Development Plan.

Thank you very much,

Very truly yours,

LEANDRO R. MENDOZA

17/F THE COLUMBIA TOWER, BRGY. WACK-WACK, ORTIGAS AVENUE, 1555 MANDALUYONG CITY, PHILIPPINES
 DIRECT LINES 728 7125 • 726 7109 • 723 4098 • 723 1500 • 724 6465
 TRUNK LINES 727 7960 TO 79 LOCAL 307 • 309 • 289 • 277 • FACSIMILE LINE 726 7104
 E-MAIL ADDRESS: sec1.ra@dotc.gov.ph

Figure 6.4: Memo of DOTC Secretary endorsing National EST Strategy and Action Plan to the National Economic Development Authority



Republic of the Philippines

**DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS
OFFICE OF THE SECRETARY**

MEMORANDUM FOR THE PRESIDENT

From : Secretary LEANDRO R. MENDOZA
Department of Transportation and Communications

SUBJECT : **THE NATIONAL ENVIRONMENTALLY SUSTAINABLE
TRANSPORT (EST) STRATEGIES AND ACTION PLAN**

Date : 25 November 2009

As instructed, through Administrative Order 254, the Department of Transportation and Communications has formulated the National Environmentally Sustainable Transport (EST) Strategy for the Philippines in consultation with the various stakeholders through a participatory approach including seminars and workshops involving national government agencies, local government units, non-government organizations, the private sector and the academe. National and regional consultations on draft descriptors, strategies and indicators led to a set of priority strategies for which action plans were formulated including the identification of financial mechanisms to support the strategies.

We all know that the current transport planning paradigm of 'forecasting and providing' has brought about negative externalities such as traffic congestion and traffic-related health issues to the community. Emissions from mobile sources were estimated by the DENR-EMB to have contributed 65% to the air pollution load nationwide. In addition, the increase in road traffic accidents is another clear indicator of an unsustainable transport system with the national cost of traffic accidents estimated to constitute 2.6% of the GDP of the country. Transport likewise consumes more energy than any other sector with the sector accounting for 41.6% of the total energy demand according to estimates by the DOE, where road transport consumed about 80% of this share of the demand.

The strategies formulated aim to reduce the annual growth rate of energy consumption and associated green house gas (GHG) emissions from the transport sector in urban areas in the country, and mainstream EST, which involves, among others, the promotion of transportation systems of low carbon intensity and shift towards the use of more sustainable transport modes. These strategies refers also to the Aichi Statement of 2005 that defined twelve thematic areas including 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; non-motorized transport; 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.

Attached is the National Environmentally Sustainable Transport Strategy and Action Plan for your perusal.

17/F THE COLUMBIA TOWER, DRGG WACK-WACK, ORTIGAS AVENUE, 1555 MANDALUYONG CITY, PHILIPPINES
DIRECT LINES 726 7125 • 726 7109 • 723 4698 • 723 1500 • 724 6465
TRUNK LINES 727 7960 TO 79 LOCAL 307 • 309 • 269 • 277 • FACSIMILE LINE 726 7104
EMAIL ADDRESS: sec1@dotc.gov.ph

Figure 6.5: First page of the Memorandum of the DOTC Secretary to the Office of the President of the Republic of the Philippines

We are submitting another copy to NEDA for evaluation by the Inter-Agency Technical Committee on Transport Planning (IATCTP) and the NEDA Infrastructure Committee, and eventual integration of the EST in the formulation of the Medium Term Philippine Development Plan.

For your information and further instructions.

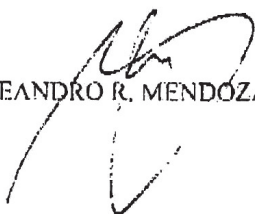

LEANDRO R. MENDOZA

Figure 6.6: Second page of the Memorandum of the DOTC Secretary to the Office of the President of the Republic of the Philippines

Since then, the various provisions of the National EST Strategy and Action Plan has been used as inputs to the formulation or crafting of various policy documents including the following:

- 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); and
- Medium Term Philippine Development Plan (MTPDP) for 2011-2016.
- National Implementation Plan on Environment Improvement in the Transport Sector

6.3 Climate Change Discussions

A major challenge for most countries is how to include EST in climate change discussions. Too often, decision-makers are not generally aware of the impacts or contribution of transport as mobile sources of pollution. In the Philippines, Executive Order 774 was issued, reorganizing the Presidential Task Force on Climate Change with the DOTC identified to head the Task Group on Fossil Fuels. In subsequent meetings of this Task Group as well as the Presidential Task Force, the DOTC made presentations on the formulation of the National EST Strategy. It is in this manner that EST has been included in climate change discussions in the national level.

At the local level, there have been a variety of efforts in mainstreaming EST particularly in the area of air pollution as an implication of the implementation of the provisions of the Clean Air Act. There is still a need to inculcate the basic elements for all other thematic areas, recognizing that there is still the struggle at the local level for reconcile between survival and sustainability in as far as transportation is concerned.

The regional consultations will provide the appropriate venue to thresh out issues and concerns at the local level – both from the perspective of local governments and the regional offices of the national agencies. Experiences from past and recent initiatives on mainstreaming and social marketing of EST at the local levels would be very useful in engaging local governments, especially as EST is explained in the context of climate change.

The National EST Strategy and Action Plan was included as input to the Philippine National Report for CSD 18, particularly on the Transport sector. The Climate Change Commission of the Philippines has submitted the National

Framework Strategy for Climate Change in early 2010, and the 12-year plan (2010-2022) was approved by the previous administration. Transport is mentioned for mitigation and EST is explicitly mentioned including the strategic priority of having a National EST Strategy. It is expected that such and other similar initiatives and actions will pave the way for the efficient mainstreaming of EST in climate change discussions and programs in the country. More recently, there is the report on policy options and actions to facilitate the implementation of projects and programs that was developed for presentation in the 19th Session of the Commission on Sustainable Development. The document discusses, among others, the need for an enabling environment for implementing programs and projects and the policies necessary for sustainable transport to be realized.

6.4 Harmonizing the National Strategy with the Bangkok Declaration

The elements of the National EST Strategy are consistent with the provisions of the Bangkok Declaration for 2020. In fact, the priority strategies discussed in Chapter 3 that were the basis for the development of action plans presented in Chapter 4 could be reclassified according to the goals listed in the Bangkok Declaration.

This report recognizes the importance of Information and Communications Technology (ICT), considering that these can be used as tools for leverage against the challenges posed on transportation and traffic systems. The case of Singapore, for example, can be used as a model for the deployment of Intelligent Transport Systems (ITS) for a wide range of applications. Current applications in the Philippines as well as in other countries in Asia are still limited and should be aggressively pursued, perhaps in partnership with the private sector. The latter initiative would be consistent with the Philippine government's current policy to pursue Public Private Partnerships (PPP) to develop its infrastructure and capabilities, and this can be applied as well to EST.

Goals pertaining to freight are also very relevant considering the issues on logistics like TDM schemes that tend to restrain logistics services (e.g., truck bans) and concerns pertaining to truck overloading and their impacts on road pavements and bridges. Intermodal transport is also well noted despite this report focusing mainly on road transport. All of the above concerns are already covered by the National Implementation Plan on Environment Improvement in the Transport Sector that is being formulated by the DOTC, which includes all modes of transportation, and would be implemented by air, maritime, rail and road agencies attached to the DOTC, in close cooperation with other agencies and stakeholders.



Photo courtesy of Institute for Climate and Sustainable Cities



Photo courtesy of Institute for Climate and Sustainable Cities



Photo courtesy of NCTS



Photo courtesy of NCTS



Photo by Regin Regidor



Photo by Regin Regidor



Appendix I

STATEMENTS

Aichi Statement

~ Towards establishment of the Regional Forum for the promotion of environmentally sustainable transport (EST) in Asia ~

The participants, having met in Nagoya City, Aichi Prefecture, Japan from 1-2 August 2005, for the International Conference on Environment and Transport, to draw up and adopt a statement on the establishment of a Regional EST Forum for the promotion of environmentally sustainable transport in Asia,

Reaffirming and building upon the 'Manila Statement' agreed upon by the participants at the intergovernmental Manila Policy Dialogue on Environment and Transport in the Asian Region, held in Manila, the Philippines, from 16-17 January 2004,

Reaffirming and building upon the 'Framework for Environmentally Sustainable Cities in ASEAN', agreed upon by the ASEAN Working Group on Environmentally Sustainable Cities (AWGESC) and officially endorsed by the ASEAN Environment Ministers in December 2003,

Reaffirming and building upon the Johannesburg Plan of Implementation (JPOI) adopted in the 2002 World Summit on Sustainable Development (WSSD) which underlines the importance of environmentally sustainable transport and the required actions to be taken at national and international level,

Noting the important contribution sustainable transport systems can make towards realizing the Millennium Development Goals (MDG) set by the United Nations, through improving access to education, employment opportunities, and health care,

Noting the importance of achieving greater synergies among the various efforts to promote environmentally sustainable transport in Asia, at the regional, national and local level,

Acknowledging that continued economic growth in Asian countries will result in significant further growth in transport demand, which will require a wide range of effective measures at the national and local level to prevent or minimize negative environmental and social impacts associated with the rapid growth in motorization,

Considering that efforts to promote environmentally sustainable transport will result not only in the improvement of human health through the reduction of urban air pollution but will also have important complimentary benefits, including the reduction of greenhouse gas (GHG) emissions, the reduction of deaths and injuries from road accidents, the reduction of harmful noise levels, and the reduction of traffic congestion levels,

Recognizing the need for both national and local level governments to develop and adopt integrated policies, strategies, and programmes incorporating key elements of environmentally sustainable transport such as:

a. Public health

- Promoting integrated transport policies that mitigate the negative human health impacts of motorized transport
- Recognizing the high costs incurred to the national health system due to non-sustainable transport modes
- Strengthening the coordination and cooperation among health and transport agencies

b. Land-use planning

- Accepting a vision of cities for people rather than for cars, with a focus on the movement of people and goods rather than vehicles
- Supporting urban planning with a particular emphasis on public transport, non-motorized transport, traffic safety and environmental control
- Encouraging the integration of both land-use and transport planning to reduce the unplanned, low-density expansion of urban areas
- Promoting urban revitalization through mixed-use development, favouring

concentrated development around public transport nodes

c. Environment and people friendly urban transport infrastructures

- *Providing affordable and socially acceptable transport infrastructure and facilities in urban areas*
- *Recognizing that overprovision of infrastructure can induce additional travel by private motorized vehicles and result in increased pollution and congestion, unless appropriate consideration is made*
- *Acknowledging the importance of mass transit systems in meeting the needs for increased mobility in an environment friendly manner*

d. Public transport planning and transport demand management (TDM)

- *Maintaining or increasing the share of public transport by improving the quality of such services*
- *Controlling the demand for private motorized travel through a combination of policies, such as regulatory measures (manage demand for road space), fiscal policies (such as parking fees, vehicle taxes, road or congestion charging, and fuel taxes, etc.), and infrastructure design measures*
- *Recognizing Bus Rapid Transit (BRT) as a low-cost mass transit option which can be implemented quickly to meet the growing demand for mobility*
- *Recognizing Mass Rapid Transit (MRT) as a mass transit option which can be implemented to meet the growing demand for mobility, where appropriate*

e. Non-motorized transport (NMT)

- *Acknowledging the dependence of all-income groups on non-motorized transport and its importance as an environmentally sustainable mode of transport*
- *Aiming to maintain or enhance the existing role of non-motorized transport, especially in dense urban areas, especially for short trips*
- *Encouraging the provision of higher-quality infrastructure and the development of city-level master plans for footpaths and cycle ways*
- *Increasing safety for non-motorized transport*

f. Social equity and gender perspectives

- *Acknowledging the need for, and contribution of, safe and affordable urban transport systems to the alleviation of poverty and the promotion of social development*
- *Recognizing that public transport has to address the conditions of women and the need to build the institutional capacity to better include gender aspects in urban transport planning*
- *Providing infrastructure that particularly caters to the needs of the most vulnerable users, including children, the elderly, and the physically disabled*

g. Road safety and maintenance

- *Creating appropriate inter-agency coordination and management mechanism to address the road safety in transport policies and programmes*
- *Acknowledging road safety as a primary guiding principle for transport planning*
- *Mobilizing resources for formulation and implementation of multi-stakeholder integrated road safety action plans*

h. Strengthening road side air quality monitoring and assessment

- *Improving road side air quality monitoring in urban city centres to better understand the impacts of road side pollution on people travelling on the roads and people working or living close to the roads*
- *Improving and harmonizing road side monitoring methodologies in line with the internationally standardized methodologies for ambient air quality monitoring*

i. Traffic noise management

- *Improving traffic noise monitoring in urban city centres to better understand the impacts of road side noise on people travelling on the roads and people working or living close to the roads*

- *Acknowledging the need for standards on noise levels and the enforcement of such standards by establishing management mechanisms • Promoting the prevention of excessive noise through the promotion of non-motorized modes and high-quality public transport*

j. Cleaner fuel

- *Phasing out leaded gasoline as rapidly as possible, and phasing down sulphur levels in gasoline and diesel as required to achieve advanced vehicle emission standards*
- *Acknowledging the contribution of alternative fuels such as Compressed Natural Gas (CNG) and biomass-derived ethanol and biodiesel as a means to reduce vehicle emissions • Planning for an eventual transition to renewable fuels*

k. Vehicle emission control, standards, and inspection and maintenance (I/M)

- *Rapidly phasing-in strict emission standards for new vehicles, with due regard to manufacturing lead times and to the provision of compatible fuels*
- *Adopting and enforcing vehicle inspection and maintenance programmes for vehicle emissions and safety, based on high-volume, test-only inspection centres with stringent quality control*
- *Reducing emissions from in-use vehicles by retro-fitting of emission control devices and/or the conversion to lower-emitting fuels*

l. Strengthening knowledge base, awareness, and public participation

- *Promoting coordination and cooperation among groups collecting or managing information on EST through a decentralized network of knowledge providers*
- *Developing and disseminating best practice on EST*
- *Increasing the understanding and awareness of the civil society and decision-makers on the beneficial aspects of EST with the aim to accomplish changes in policies, investment decisions, and personal behaviour*

Noting the best practice principles presented in this document, the participants are thus called upon to:

1. unanimously endorse the Regional EST Forum and welcome the contribution by its expert members to conduct periodic high-level policy dialogues and expert consultations to share opinions, ideas, and information on best practices and effective policy instruments among the participating countries on environment and transport related issues in the Asian Region;
2. welcome the initiatives of UNCRD in extending assistance to the countries of the region, especially the developing countries, in preparing national EST strategies, and request the expert members of the Forum to play a catalytic role by providing substantial input and strategic feedback towards the formulation of such strategies;
3. welcome the involvement of all groups including international organizations, bilateral organizations, nongovernmental organizations and civil society, academic institutions, foundations, private enterprises, and others, in developing and promoting a decentralized cooperation network to contribute to activities undertaken in support of the Forum such as knowledge management, capacity-building, and the formulation of integrated action plans;
4. request UNCRD to cooperate with other related organizations and initiatives both at the national and international levels in identifying and exploring sources of potential assistance and collaboration for capacity-building activities, including demonstration and pilot projects, as well as for the implementation of policies, strategies, and action plans developed by the participants of the Forum; such efforts may include providing assistance to the Forum participants in utilizing the Global Environment Facility (GEF), the Clean Development Mechanism (CDM), and financing from the bilateral and international organizations to implement EST measures.

Bangkok Declaration for 2020

– Sustainable Transport Goals for 2010-2020

We, the participants, who are representatives of Asian countries (Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People's Republic of China, Indonesia, India, Japan, Republic of Korea, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, and Viet Nam), international organizations, bilateral and multilateral agencies, nongovernmental organizations (NGOs), research organizations, and expert sustainable transport professionals, having met at the Fifth Regional Environmentally Sustainable Transport (EST) Forum in Asia, held in Bangkok, Kingdom of Thailand, from 23 to 25 August 2010, to draft and adopt a declaration, the *Bangkok 2020 Declaration*, in order to demonstrate our renewed interest in, and commitment to, realizing a promising decade (2010-2020) of sustainable actions and measures for achieving safe, secure, quick, reliable, affordable, efficient and people-centric and environment friendly transport in rapidly urbanizing Asia,

Noting the identification of transport as a theme under Agenda 21 on sustainable development and the outcome of the high-level meeting of the 9th session of the Commission on Sustainable Development (CSD-9) in 2001 which reached important decisions on transport sector issues concluding that improving transport systems to promote sustainable development, including improving accessibility, can foster economic and social development, help integrate developing countries into the world economy, and contribute to the eradication of poverty,

Reaffirming and building upon the Aichi Statement agreed upon by the participants at the First Regional EST Forum, held in Nagoya, Aichi Prefecture, Japan, on 1-2 August 2005, and its integrated approach to promoting environmentally sustainable transport will result not only in the improvement of human health through the reduction of urban air pollution, but also the reduction of greenhouse gas (GHG) emissions, deaths and injuries from road accidents, harmful noise levels, and traffic congestion,

Reaffirming and building upon the *Seoul Statement*, agreed upon by the participants at the Fourth Regional EST Forum, held in Seoul, Republic of Korea, from 24 to 26 February 2009, that urged the need to address transport issues within the context of the broader environmental aims of Green Growth to encompass the transport-energy-carbon emission nexus, to develop strategies for low-carbon transport that include a shift to energy-efficient and low carbon modes to enhance energy security, and mitigate the effects of transport on climate as well as of climate change on transport services and other socioeconomic sectors Noting the findings of the 18th Session of the Commission on Sustainable Development (CSD-18) held in May 2010, that basic transport infrastructure and services are still lacking or inadequate in many developing countries (both in urban and rural areas), making it difficult for the poor, including women, youth, and children, to access basic services, including those related to health and education, and for workers to have access to jobs, and that in the case of rural areas lack of adequate rural transport infrastructure perpetuates poverty, poses constraints on the marketing of agricultural produce and other income-generating opportunities, and thus hampers efforts to achieve the internationally agreed Millennium Development Goals (MDGs),

Noting that transport-related carbon dioxide emissions are projected by international bodies to increase approximately 57 per cent worldwide in the period 2005-2030, whereby the largest part of this increase would come from the increase in private motorized vehicles in Asia,

Noting the UN General Assembly Resolution (64/255) of 2 March 2010 on improving global road safety, proclaimed 2011-2020 as a decade of action for road safety, and **deeply concerned** that about half of all road traffic fatalities and injuries occur in the Asian and Pacific region, most of which are related to vulnerable road users such as pedestrians, children, and cyclists, due to streets that lack the necessary safety infrastructure such as exclusive pedestrian and bicycle lanes, safe street crossings, kerb ramps for the disabled, and lack of post-accident care,

Recognizing the specific mobility needs of low-income groups, as well as women, children, the elderly, and persons with disabilities which must be addressed to achieve socially-equitable communities and a better quality of life for all,

Acknowledging the importance of an EST strategy based upon the concept of Avoiding unnecessary motorised transport - Shifting to more sustainable transport modes and - Improving transport practices and technologies,

We, the participants of the Fifth Regional Environmentally Sustainable Transport (EST) Forum in Asia express our intent to voluntarily develop and realize integrated and sustainable transport policy options, programmes, and projects that will help realize the following EST goals and objectives by the year 2020 in the Asian region (EST 20):

I. Strategies to Avoid unnecessary travel and reduce trip distances

Goal 1: Formally integrate **land-use and transport planning** processes and related institutional arrangements at the local, regional, and national levels

Goal 2: Achieve **mixed-use development** and medium-to-high densities along key corridors within cities through appropriate land-use policies and provide people-oriented local access, and actively promote transit-oriented development (TOD) when introducing new public transport infrastructure

Goal 3: Institute policies, programmes, and projects supporting **Information and Communications Technologies** (ICT), such as internet access, teleconferencing, and telecommuting, as a means to reduce unneeded travel

II. Strategies to Shift towards more sustainable modes

Goal 4: Require **Non-Motorized Transport** (NMT) components in transport master plans in all major cities and prioritize transport infrastructure investments to NMT, including wide-scale improvements to pedestrian and bicycle facilities, development of facilities for intermodal connectivity, and adoption of complete street design standards, wherever feasible

Goal 5: Improve **public transport** services including high quality and affordable services on dedicated infrastructure along major arterial corridors in the city and connect with feeder services into residential communities

Goal 6: Reduce the urban transport mode share of private motorized vehicles through **Transportation Demand Management** (TDM) measures, including pricing measures that integrate congestion, safety, and pollution costs, aimed at gradually reducing price distortions that directly or indirectly encourage driving, motorization, and sprawl

Goal 7: Achieve significant shifts to more sustainable modes of **inter-city passenger and goods transport**, including priority for high-quality long distance bus, inland water transport, high-speed rail over car and air passenger travel, and priority for train and barge freight over truck and air freight by building supporting infrastructure such as dry inland ports

III. Strategies to Improve transport practices and technologies

Goal 8: Diversify towards more sustainable **transport fuels and technologies**, including greater market penetration of options such as vehicles operating on electricity generated from renewable sources, hybrid technology, and natural gas

Goal 9: Set progressive, appropriate, and affordable **standards** for fuel quality, fuel efficiency, and tailpipe emissions for all vehicle types, including new and in-use vehicles

Goal 10: Establish effective vehicle testing and compliance regimes, including formal vehicle

registration systems and appropriate periodic vehicle **inspection and maintenance** (I/M) requirements, with particular emphasis on commercial vehicles, to enforce progressive emission and safety standards, resulting in older polluting commercial vehicles being gradually phased-out from the vehicle fleet, as well as testing and compliance regimes for vessels

Goal 11: Adopt **Intelligent Transportation Systems** (ITS), such as electronic fare and road user charging systems, transport control centres, and real-time user information, when applicable

Goal 12: Achieve improved **freight transport** efficiency, including road, rail, air, and water, through policies, programmes, and projects that modernize the freight vehicle technology, implement fleet control and management systems, and support better logistics and supply chain management

IV. Cross-cutting strategies

Goal 13: Adopt a zero-fatality policy with respect to road, rail, and waterway **safety** and implement appropriate speed control, traffic calming strategies, strict driver licensing, motor vehicle registration, insurance requirements, and better post-accident care oriented to significant reductions in accidents and injuries

Goal 14: Promote monitoring of the **health** impacts from transport emissions and noise, especially with regard to incidences of asthma, other pulmonary diseases, and heart disease in major cities, assess the economic impacts of air pollution and noise, and devise mitigation strategies, especially aiding sensitive populations near high traffic concentrations

Goal 15: Establish country-specific, progressive, health-based, cost-effective, and enforceable **air quality and noise** standards, also taking into account the WHO guidelines, and mandate monitoring and reporting in order to reduce the occurrence of days in which pollutant levels of particulate matter, nitrogen oxides, sulphur oxides, carbon monoxide, and ground-level ozone exceed the national standards or zones where noise levels exceed the national standards, especially with regard to environments near high traffic concentrations Goal

16: Implement sustainable low-carbon transport initiatives to mitigate the causes of **global climate change** and to fortify national **energy security**, and to report the inventory of all greenhouse gases emitted from the transport sector in the National Communication to the UNFCCC

Goal 17: Adopt **social equity** as a planning and design criteria in the development and implementation of transport initiatives, leading to improved quality, safety and security for all and especially for women, universal accessibility of streets and public transport systems for persons with disabilities and elderly, affordability of transport systems for low-income groups, and up-gradation, modernization and integration of intermediate public transport

Goal 18: Encourage innovative **financing** mechanisms for sustainable transport infrastructure and operations through measures, such as parking levies, fuel pricing, time-of-day automated road user charging, and public-private partnerships such as land value capture, including consideration of carbon markets, wherever feasible

Goal 19: Encourage widespread distribution of **information and awareness** on sustainable transport to all levels of government and to the public through outreach, promotional campaigns, timely reporting of monitored indicators, and participatory processes

Goal 20: Develop dedicated and funded **institutions** that address sustainable transport-land use policies and implementation, including research and development on environmentally-sustainable transport, and promote good **governance** through implementation of environmental impact assessments for major transport projects

Inviting countries to voluntarily report progress by utilizing the EST Forum-

Annex 1

Measuring Progress on the Bangkok Declaration for 2020

This annex outlines the type of performance indicators that countries may consider in achieving a successful EST strategy. The Bangkok Declaration for 2020 is a voluntary document, and thus countries may opt for developing a number of additional / alternative indicators and measures to monitor progress domestically.

The objective of such comprehensive list of indicators is to provide guidelines for objective measurement of the efficiency and effectiveness of the transport system to achieve the desired goals.

| Strategy | Indicator |
|--|---|
| “Avoid” Strategies | Meta Indicator: Change in vehicle kilometres travel per person overtime at the metropolitan and national levels |
| Integrated Land Use-Transport Planning | Number of cities in the country having formally developed integrated land use-transport plans Requirements for local compliance with regional integrated land use-transport plans |
| Mixed-Use Development | Reduction in average passenger trip length in the city Reduction in average freight trip distance regionally and nationally Number of units developed in purpose-built mixed-use projects Number of public transport projects achieving transit-oriented development (TOD) around stations Population and employment per square kilometre along major public transport corridors Number of public transport corridors achieving an increase in development and population density Amount of increase in property value along corridors of quality public transport projects |
| Information and Communications Technologies (ICT) | Number of policies developed encouraging ICT as a substitute for travel Average broadband speed of internet services Penetration of broadband among different income groups Penetration rate of mobile telephones in the country Increase in the amount of teleconferencing over business travel Number of policies and/or programs that promote telecommuting Estimated number of trips avoided through telecommuting |
| “Shift” Strategies | Meta Measure: Mode share of all major transport modes at the metropolitan and national levels, including passenger transport (walking, bicycles, car driver, car passenger, motorcycle driver, motorcycle passenger, motorized three-wheelers, non-motorized three-wheelers, buses, minibuses, and urban rail), inter-city transport (private motorized vehicles, bus, rail, and boat), and freight transport (truck, rail, barge, minivan, and non-motorized) |

| | |
|--|---|
| <p>Non-Motorized Transport</p> | <p>Number of cities with NMT specifically highlighted in the city's integrated transport master plans</p> <p>Note the existence of national and local policies requiring drop curbs at interface between footpaths and intersections</p> <p>Note the existence of national and local policies mandating minimum footpath widths, and note the minimum width</p> <p>Note the existence of national and local policies mandating dedicated pedestrian signals at major intersections</p> <p>Promote the monitoring and measurement of the quality of pedestrian facilities and the number of cities surveyed or audited for a "walkability" score</p> <p>Number of cities with dedicated cycleways</p> <p>Number of kilometres of cycleways</p> <p>Number of secure bicycle parking spaces</p> <p>Number of cities with shared bicycle programmes and number of shared bikes per programme</p> <p>Number of cities with pedicabs(cycle rickshaw) improvement programmes</p> <p>Number of public transport systems with formal integration of pedicabs (cycle rickshaws)</p> <p>Number of cities participating in a Car-Free Day programme</p> |
| <p>Public Transport</p> | <p>Number of cities with trunk bus corridors operating on dedicated busway lanes in the median of the roadway (Bus Rapid Transit)</p> <p>Number of kilometres of dedicated, median busways (Bus Rapid Transit)</p> <p>Number of cities with bus systems using pre-board fare verification and stations designed for at-level fast boarding</p> <p>Number of cities utilizing electronic fare cards on their public transport system</p> <p>Number of cities with a fully integrated fare structure across public transport modes</p> <p>Number of cities with elevated or underground metro systems (MRT)</p> <p>Number of kilometres of MRT</p> |
| <p>Transportation Demand Management</p> | <p>Number of cities or areas utilising congestion charging</p> <p>Number of cities or areas utilizing road tolls</p> <p>Number of cities employing a formal parking levy system, in which a parking levy is defined as a set land tax charged to each non-residential parking space, and is assessed regardless of whether or not the parking space is utilized</p> <p>Number of cities with active parking management programmes</p> <p>Amount of any increase in fuel levies</p> <p>Number of cities or regions which have adopted measures to discourage ownership and/or operations of private vehicles</p> <p>Amount of vehicle duties or taxes</p> <p>Increase of mode share of inter-city coach services</p> |

| | |
|---|--|
| Inter-City Passenger and Goods Transport | <p>Increase of mode share of high-quality inter-city bus services</p> <p>Increase of mode share of inter-city conventional rail services</p> <p>Increase of mode share of high-speed inter-city rail</p> <p>Number of kilometres of high-speed inter-city rail</p> <p>Number of kilometres of freight rail lines</p> <p>Number of inland dry ports</p> |
| “Improve” Strategies | Meta Measure: fuel efficiency levels of passenger and freight fleets |
| Cleaner Fuels and Technologies | <p>Market share of alternative fuels for road transport, including renewably-generated electricity, natural gas, and sustainably managed and cultivated biofuels that do not compete with food crops</p> <p>Market share of electric vehicles, hybrid vehicles, and fuel cell vehicles</p> |
| Standards | <p>Note current fuel quality standards and the time line for attainment of EURO IV (or equivalent) fuel quality standard</p> <p>Note current vehicle emission standards for each vehicle class</p> <p>Note current fuel economy standards for each vehicle class</p> |
| Inspection and Maintenance | <p>Note the nature of commercial vehicle testing requirements, including frequency of tests, emission levels required, safety features examined, and number of vehicles retired</p> <p>Number of cities that conduct roadway spot checks on vehicle emissions</p> <p>Note the type of vehicle insurance mandated by national and local laws</p> <p>Number of persons taking driver licensing testing and provision of the pass/fail rate</p> |
| Intelligent Transportation Systems | <p>Number of public transport vehicles per city with Automatic Vehicle Location tracking technology</p> <p>Number of public transport stations and vehicles using real-time information displays</p> <p>Number of cities with a control centre to manage traffic incidents and manage public transport fleets</p> |
| Freight Transport | <p>Quantify improvements in freight vehicle fuel efficiency</p> <p>Quantify changes in freight vehicle types</p> <p>Quantify network efficiency gains</p> |
| “Cross-Cutting” Strategies | |
| Safety | <p>Reductions in number of traffic accidents</p> <p>Reductions in number of transport-related injuries and deaths</p> <p>Adoption of a zero-accident policy framework</p> |

| | |
|--|--|
| <p>Health</p> | <p>Incidence levels of disease and illnesses related to transport emissions including asthma, other pulmonary diseases, heart disease, stroke, and flu</p> <p>Reduction in number of days with restricted outdoor activity due to health concerns of air quality</p> <p>Number of cities with policies in place to prohibit smoking in public places, including public transport systems</p> |
| <p>Air Pollution and Noise</p> | <p>Number of cities with ambient air quality monitoring, including monitors for particulate matter (PM10 and PM2.5, nitrogen oxides (NOx), sulphur oxides (SOx), carbon monoxide (CO), and ground-level ozone, especially with monitors in high traffic areas and ports</p> <p>Air quality levels for particulate matter (PM10 and PM2.5), nitrogen oxides (NOx), sulphur oxides (SOx), carbon monoxide (CO), and ground-level ozone for each major city</p> <p>Number of days air quality is within local standards and WHO guidelines for all major pollutants in each major city</p> <p>Number of cities with formal noise monitoring programme Number of cities that spot check noise levels on vehicles</p> <p>Number of cities with time-of-day noise restrictions and noise reduction programmes</p> |
| <p>Climate Change and Energy Security</p> | <p>Note whether the transport sector is included as part of the Nationally Appropriate Mitigation Actions (NAMA), and note the specific transport sub-sectors in the NAMA</p> <p>Note the number of transport GEF projects approved for the country</p> <p>Amount of oil imported by the country</p> |
| <p>Social Equity</p> | <p>Amount and type of security measures provided on public transport systems</p> <p>Off-peak frequency of public transport systems</p> <p>Number of public transport vehicles and stations permitting full universal access for users in wheelchairs and parents with prams</p> <p>Number of public transport stations and kilometres of footpaths with tactile paving tiles for the sight impaired</p> <p>Number of kilometres of footpaths that have been upgraded to be fully accessible to persons in wheelchairs</p> <p>Relative affordability levels of public transport services for low-income groups</p> <p>Employment generated from EST projects and availability of related job training opportunities</p> |
| <p>Finance and Economics</p> | <p>Number of applications for greenhouse gas emission reduction credits</p> <p>Total amount of revenues generated from greenhouse gas emission reduction credits</p> <p>Total amount of revenues generated from congestion charging schemes</p> <p>Total amount of revenues generated from roadway tolls</p> <p>Total amount of revenues generated from parking levies</p> <p>Number of Public-Private Partnerships (PPPs) implemented</p> <p>Total amount of revenues generated from land value capture initiatives</p> <p>Number of Benefit-Cost analyses conducted on transport projects, considering, direct, indirect, and cumulative impacts</p> <p>Note the results of Benefit-Cost analyses conducted on transport projects</p> |

| | |
|------------------------------------|---|
| Information and Awareness | <p>Number of EST-related publications</p> <p>Number of outreach and promotional efforts on EST</p> |
| Institutions and Governance | <p>Number of staff at Transport, Environment, and Health Ministries dedicated to EST</p> <p>Amount of financial resources of the national government dedicated to EST</p> <p>Human and financial resources devoted to EST at the regional and local levels</p> <p>Existence of unit at National Government level dedicated to non-motorized transport and number of cities with local government units dedicated to non-motorized transport to promote walking</p> <p>Structure and relationship of national, regional, and local actors involved in EST, including engagement with civic and business sectors</p> <p>Note environmental impact assessments (EIAs) for evaluating the impact of transport infrastructure initiatives prior to environmental clearance</p> |

Fifth Regional EST Forum, 23-25 August 2010, Bangkok, Thailand

Seoul Statement

~ Towards the Promotion of Environmentally Sustainable Transport (EST) for a Low-Carbon Society and Green Growth in Asia ~

The participants, having met in Seoul, the Republic of Korea from 24 to 26 February 2009, for the Fourth Regional EST Forum, to draw up and adopt a statement for the promotion of environmentally sustainable transport in Asia,

Noting that Asia is experiencing the fastest economic growth and by mid of this century, and at the current growth rate there might be more motorized vehicles in Asia than there would be in Europe and North America combined, and that the profound impact of this trend on quality of human life and environment can not be underestimated,

Reaffirming and building upon the integrated EST measures defined under the *Aichi Statement* adopted at the First Regional EST Forum in Asia, held in Nagoya, Japan, on 1-2 August 2005, and considering that efforts to promote environmentally sustainable transport will not only result in the improvement of human health through the reduction of urban air pollution, but will also have important complementary (co-)benefits, including the reduction of greenhouse gas (GHG) emissions,

Recognizing the outcome of the Fifth Ministerial Conference on Environment and Development in Asia and the Pacific held in Seoul in 2005, which endorsed environmentally sustainable economic growth, *Green Growth*, as a policy focus and important strategy for achieving the Millennium Development Goals (MDGs) as well as decoupling environmental degradation from development,

Noting the commitment made by the Ministries of Health in Member States in the resolution of the WHO Regional Committee for the Western Pacific in September 2008 to assess the health implications of the decisions made on climate change by the transport sector and advocate for the decision that provide opportunities for improving health,

Realizing that transport services affect all aspects of sustainability - social, economic, and environmental - and that there is a need for safe, clean, and energy-efficient transport in order to achieve green growth through low-carbon transport in Asia, the participants are thus called upon to:

1. address transport issues with the broader environmental aims of green growth to encompass the transport-energy-carbon emission nexus, from energy consumption to the emissions and climate change perspectives;
2. develop strategies for low-carbon transport including the increasing shift to energy-efficient and low carbon modes to mitigate the effects of transport on climate, and the effects of climate change on transport services and other socioeconomic sectors;
3. focus on sustainable mobility and transport demand management (TDM) tools and measures [such as – parking controls (including parking charges and pricing), road pricing and congestion charging, fuel and vehicle taxation, low and zero emission zones, car-free day, city centre pedestrianization, public transport priority and improvement measures, transit oriented development, appropriate road- space allocation to high-occupancy vehicles, efficient and affordable mass transit systems (such as BRT), and measures to help and develop non-motorized transport (walking and cycling)], etc. with stakeholder consultation and participation rather than relying only on end-of-pipe solutions, so that local air pollutants and GHG emissions from transport sector can be addressed concurrently and effectively, thereby contributing to materializing a Low Carbon Asian Society;
4. as far as possible exploit benefits of adopting intelligent transport system (ITS), and of utilizing market mechanisms such as tax credits for environmentally friendly technologies,

to make the transport services environment and people friendly, cost effective as well as energy efficient;

5. develop city partnerships and collaboration across national boundaries within Asia and between Asian cities and cities from other regions for mutual technical assistance and cooperation on implementing environmentally sound practices in transport sector, including recognition of the special needs of the post conflict countries;
6. strengthen regional cooperation, in particular among the international organizations and donors active in the region and member countries, to further improve and deepen the transport agenda at energy efficiency and climate change-related fora, including the Conference of Parties (COP), for achieving low-carbon society and green growth bearing in mind the ultimate objective of reducing global emissions under the UN Framework Convention on Climate Change (UNFCCC); and
7. request international organizations and donor communities to mobilize necessary capacity building services and financial support to the developing member countries to enable them to overcome the complex technical barriers involved in developing transport projects for taking full benefit of the GHG market under the Clean Development Mechanism (CDM) stipulated by Kyoto Protocol.

*Fourth Regional EST Forum, 24-26 February 2009,
Seoul, Republic of Korea*

-Kyoto Declaration-

(Extended -16 March 2010)

Subsequently ten Asian cities (Ahmedabad, Banjarmasin, Chiang Mai, Chuncheon, Donghae, Islamabad, Kandy, Penang, Surakarta, and Tangerang) having met in the Special Event of Asian Mayors on the Signing of the Kyoto Declaration for the Promotion of Environmentally Sustainable Transport in Cities during the United Nations Forum on Climate Change Mitigation, Fuel Efficiency and Sustainable Development of Urban Transport in Seoul, Republic of Korea on 16 March 2010, unanimously endorsed and signed the Kyoto Declaration for the promotion of environmentally sustainable transport (EST) in Asia.

-Kyoto Declaration-

(Extended -12 November 2008)

Subsequently twelve Asian cities (Baguio, Bangkok, Batam, Cebu, Colombo, Guwahati, Karachi, Kathmandu, Makassar, Makati, Palembang, and Surat) having met in the Special Event of Asian Mayors on Environmentally Sustainable Transport during Better Air Quality (BAQ) 2008 Workshop in Bangkok, Thailand on 12 November 2008, unanimously endorsed and signed the Kyoto Declaration for the promotion of environmentally sustainable transport (EST) in Asia.

-Kyoto Declaration-

(24 April 2007)

for the Promotion of Environmentally Sustainable Transport in Cities

We, the Mayors and governmental representatives of Asian cities, having met in Kyoto, Japan on 23-24 April 2007 at the Asian Mayors' Policy Dialogue for Promotion of Environmentally Sustainable Transport (EST) in Cities, to discuss and address key policy issues on environment and transport from city perspectives under the overall framework of the Regional EST Forum,

Recognizing that cities in the region are faced with a number of critical environment and transport related issues, their implications for human health, economic well-being, and social equity, and the emerging need to define and implement clear goals at the city level in line with the Millennium Development Goals (MDGs) and the Johannesburg Plan of Implementation (JPOI) adopted at the 2002 World Summit on Sustainable Development (WSSD),

Reaffirming and building upon the Aichi Statement agreed upon at the First Meeting of the Regional Environmentally Sustainable Transport Forum in Asia, held in Nagoya, Japan, from 1-2 August 2005,

Noting the objectives of the Regional EST Forum, an initiative of the United Nations Centre for Regional Development (UNCRD) in cooperation with Asian countries, which is comprised of high-level government representatives and experts in various thematic areas related to EST, and which provides a strategic and knowledge platform for sharing experiences and disseminating best practices, policy instruments, tools, and technologies,

Emphasizing that the Regional EST Forum has identified in the Aichi Statement the need for both national and local governments to develop and adopt integrated policies, strategies, and programmes incorporating key elements of environmentally sustainable transport,

Realizing the importance of strengthening regional cooperation for sustainable cities through the framework of the ASEAN Working Group on Environmentally Sustainable Cities (AWGESC) and other initiatives, such as the International Council for Local Environment Initiatives (ICLEI) and the Kitakyushu Initiative for a Clean Environment,

Acknowledging the important role that Mayors could play in implementing local-level actions to make cities healthy, green, and environment- and people-friendly in cooperation with key stakeholders, and also addressing local issues which have regional and global implications, such as climate change,

Recognizing the importance of achieving greater synergy between local actions and national strategies and programmes to realize EST,

We, the Mayors, thus hereby declare our intention to:

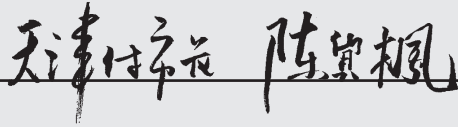
1. resolve to demonstrate leadership and ownership in promoting EST and setting the vision in Asian cities in motion in close collaboration with the national government, the private sector, civil society, and regional and international communities,
2. commit to implementing integrated policies, strategies, and programmes addressing key elements of EST such as public health; land-use planning; environment- and people-friendly urban transport infrastructure; public transport planning and transport demand management (TDM); non-motorized transport (NMT); social equity and gender perspectives; road safety and maintenance; strengthening road side air quality monitoring and assessment; traffic noise management; reduction of pollutants and greenhouse gas emission; and strengthening the knowledge base, awareness, and public participation,
3. dedicate ourselves to specifically addressing priorities that are often under-emphasized but are nevertheless vital and central to EST, such as the provision of exclusive pedestrian and bicycle lanes, and ensuring safe and comfortable movement of women, children, the elderly, and the physically impaired,
4. dedicate ourselves to specifically address the adverse impact of the growing number of motorcycles in most Asian cities,
5. ensure sustainable financing and equitable pricing structures for implementing EST,
6. resolve to actively collaborate and cooperate through the Regional EST Forum in order to share information and promote the incorporation of EST elements in city master plans and programmes,
7. urge the international and donor community to acknowledge the importance of city-based actions and programmes concerning EST, and strongly appeal to them to actively support the implementation of these actions and programmes by providing financial assistance, and facilitating technology transfer and capacity-building through pilot and demonstration projects,
8. call for city-to-city cooperation to address issues of common concern and to bridge knowledge, policy, and technology gaps in the environment and transport sector, and
9. explore possible opportunities for organizing similar policy dialogues on a regular basis in collaboration with the international and donor community.

We are thus convinced that the concerted efforts of national governments, city authorities, the private sector, civil society, and the donor and international community will contribute to a more profound vision of EST for Asian cities in the 21st century.

We express our sincere appreciation to the organizers, experts, and participants for contributing their ideas, opinions, and experiences which will greatly help us in achieving this milestone.


Mayor of Kyoto


Kyoto Japan

天津市長 陳崇楓


Tianjin China

MAYOR (ADMINISTRATOR) OF BANGALORE



Bangalore,
India

MAYOR (BHUBANESWAR)



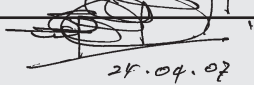
Bhubaneswar,
India

MAYOR OF SURABAYA



Surabaya,
Indonesia

Minister Urban development
SRI Lanka


25.04.07

Matale, Sri Lanka

Mayor of Jeju

조영준

Jeju S. Korea

 24/4/07.

MAYOR. OF. SEMARANG

Semarang,
Indonesia

MAYOR OF NAGOYA City

T. Matsumura.

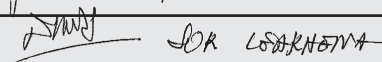
Nagoya Japan

VICE MAYOR OF PHNOM PENH

 MANN CHHOURN

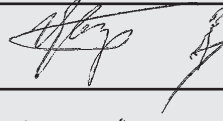
Phnom Penh,
Cambodia

Vice mayor of Siem Reap Province

 SOK LOSAKHOMA

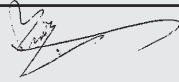
Siem Reap,
Cambodia

Mayor Ulaanbaatar



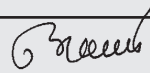
Ulaanbaatar,
Mongolia

Deputy Mayor, Nakhonatchasima city Municipality



Korat, Thailand

Deputy Mayor of VIENTIANE CAPITAL (LAO PDR)



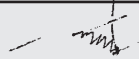
Vientiane, Lao PDR

The Governor of Luang Prabang (Lao PDR)



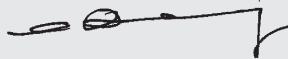
Luang Prabang,
Lao PDR

CEO S.C.C. (Sylhet City Corporation)



Sylhet, Bangladesh

MAYOR, COUNCIL OF KUCHING CITY SOUTH,
SARAWAK, MALAYSIA



Kuching, Malaysia

Assistant Mayor for Air Quality,
Seoul Metropolitan Government



Seoul, S. Korea

MAYOR OF YOGYAKARTA



~~KYOTO, 24 APRIL - 2017~~

HERRY ZURANTO.

Yogyakarta,
Indonesia

Suzhou city center for disease and prevention



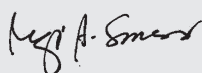
Suzhou,
China

LAND TRANSPORT AUTHORITY, SINGAPORE




Singapore

QUEZON CITY GOVERNMENT



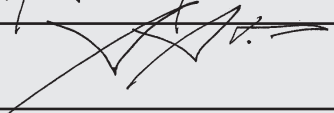

Quezon,
Philippines

PERMANENT SECRETARY FOR B.M.A. THAILAND.


DR. PONGSAK SEMSON.

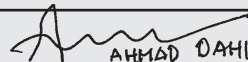
Bangkok, Thailand

MAYOR - CITY OF BAGUIO



REINALDO BAUTISTA JR
EXECUTIVE ASSISTANT BAGUIO CITY

Baguio, Philippines

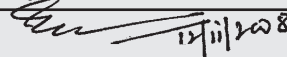
MAYOR OF BATAM (INDONESIA)


AHMAD DAHLAN.

Batam, Indonesia

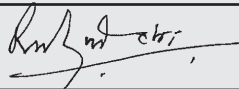

Philippines Mike Rama
Vice Mayor, Cebu City

Cebu, Philippines

COMMISSIONER COLOMBO MUNICIPAL
EDUNCEL, SRILANKA  12/11/2008

Colombo,
Sri Lanka

CHIEF ADMINISTRATOR. GUWAHATI CITY



Guwahati, India

ADVISOR TO CNTY NAZIM (MAYOR)
CITY DISTRICT GOVERNMENT KARACHI



Karachi, Pakistan

CHIEF AND EXECUTIVE OFFICER
KATHMANDU METROPOLITAN CITY
KATHMANDU, NEPAL



Kathmandu, Nepal

AN. MALIKOTA MAKASSAR
Assistant For Economic and Social
Development

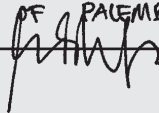
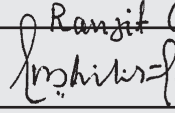


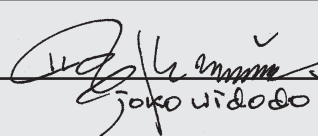

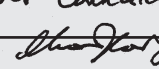
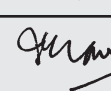
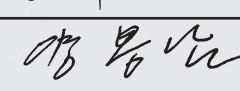
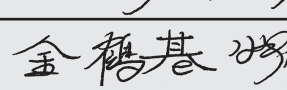



Burhanuddin

Makassar,
Indonesia

Councillor Makati City Phil.



Makati, Philippines

| | | | |
|---|--|---------------------------------|------------------------------|
| MAYOR OF PALEMBANG - INDONESIA |  | EDDY SANTANA | Palembang, Indonesia |
| MAYOR OF SURAT (Gujarat) India |  | Ranjit G. Gadhani | Surat, India |
| MAYOR AHMEDABAD |  | KANAJI THAKOR 16-8-2020 | Ahmedabad, India |
| MAYOR OF BANJARANSIN CITY Indonesia |  | 16/2-2020 AGUS YUSTI HARTONO | Banjaramsin, Indonesia |
| Mayor of Surakarta Indonesia |  | Joko Widodo | Surakarta, Indonesia |
| DEPUTY MAYOR OF TANGERANG CITY, INDONESIA |  | H. ARIEF R. WISMANIYAH. | Tangerang, Indonesia |
| Executive Councilor, Penang, MALAYSIA |  | (CHOW KON YEOW) | Penang, Malaysia |
| Mayor of Islamabad |  | Iftikhar | Islamabad, Pakistan |
| |  | 박병민 | Chuncheon, Republic of Korea |
| Dong Hae City of Mayor |  | 김기원호 | Dong Hae, Republic of Korea |
| MAYOR KANDY CITY |  | | Kandy, Sri Lanka |
| Mayor of Chiangmai City. |  | | Chiang Mai, Thailand |

Manila Statement

~ Towards the realization of environmentally sustainable transport in Asia ~

The participants, having met in Manila, the Philippines from 16-17 January 2004, for the Manila Policy Dialogue on Environment and Transport in the Asian Region, to gain insight into the regional situation on transport and environment, to discuss specific priority topics with regard to environmentally sustainable transport, and to adopt a statement on environmentally sustainable transport in the Asian region,

Recalling the outcomes of the World Summit on Sustainable Development, held in Johannesburg in 2002, and in particular, the commitments reflected in the Johannesburg Plan of Implementation (JPOI),

Building upon the Nagoya Statement agreed at the International Conference on Environmentally Sustainable Transport in the Asian Region, held in Nagoya, Japan, in March 2003,

Noting that there have been efforts by the United Nations Centre for Regional Development (UNCRD), as well as other international organizations such as the Asian Development Bank, the World Bank, the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP), Association of Southeast Asian Nations (ASEAN), and the United Nations Environment Programme (UNEP) in carrying out initiatives toward the promotion of environmental sustainability in the transport sector,

Considering that rapid economic growth and urbanization in Asia has brought about significant transport related socio-economic and environmental issues such as air pollution and health related problems,

Respecting the natural, social, cultural diversity, and economic differences among Asian countries, and the need to establish environmental goals and timetables that are appropriate to local circumstances, and to identify ways of meeting these goals while ensuring social and economic development,

Acknowledging that the Asian countries should work together towards a roadmap for concrete actions to realize environmentally sustainable transport in Asia,

Recognizing the need for strategic planning on environmentally sustainable transport with both long-term vision and short to long-term actions at the regional, national, and local levels,

1. unanimously agree to the need for establishing a regional forum and subsidiary expert groups, where appropriate, to facilitate further exchange of opinions, ideas, and information among participating countries on environment and transport related issues in the Asian region;
2. also agree that such a regional forum should facilitate annual high-level policy dialogues, including sharing of experiences and views on regional, national, and local strategies, and detailed discussions on specific issues of common concerns through expert group meetings;
3. appreciate the on-going activities in relation to some elements of environmentally sustainable transport, such as Clean Air Initiative for Asian Cities (CAI Asia), Policy Initiative in Transport (POINT), Air Pollution in the Megacities of Asia (APMA), Kitakyushu Initiative, the Sustainable Mobility Project of World Business Council of Sustainable Development (WBCSD), ASEAN Working Group on Environmentally Sustainable Cities, and various projects carried out by bilateral and multilateral agencies;

4. particularly welcome the initiatives of UNCRD in extending assistance to the countries of the region, especially the developing countries, in preparing national strategies and action plans to promote environmentally sustainable transport, and to facilitate annual high-level meetings and expert group meetings;
5. request UNCRD to cooperate with other relevant organizations and initiatives, in identifying and exploring sources of possible assistance to realize national strategies and action plans, and in establishing the regional forum and its subsidiary expert groups to promote environmentally sustainable transport;
6. also request UNCRD, in cooperation with other relevant organizations and initiatives, to follow-up overall progress on transport and environment related issues in Asia, including formulation as well as implementation of the national strategies and action plans on environmentally sustainable transport, and to report on achievements and progress at the first regional forum. The First Regional Forum is expected to be held in the year 2005 in Nagoya, Japan.



Photos courtesy of Marikina City Bikeways Office



Appendix 2

LIST OF PARTICIPANTS

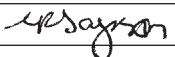
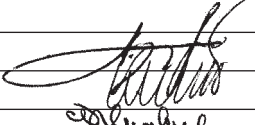
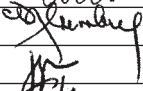

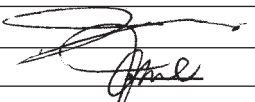
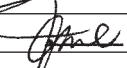
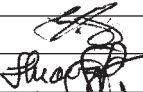
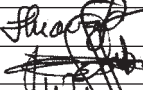
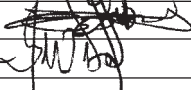
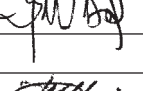

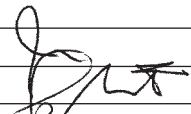
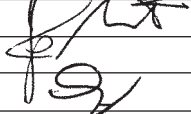
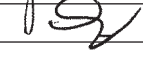
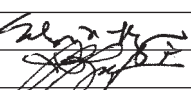
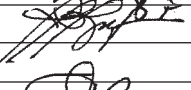
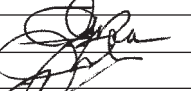
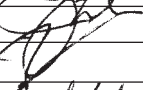
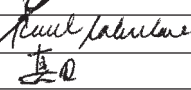


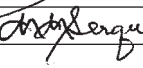
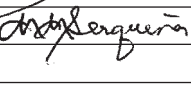

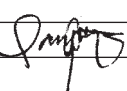


Formulation of a National EST Strategy for the Philippines

National Stakeholders Conference
Sapphire AB, Crowne Plaza Galleria Manila
Ortigas Center, Mandaluyong City
22 April 2009 (Wednesday)
8:00 AM to 12:00 NN

ATTENDANCE SHEET

| NAME | | | AFFILIATION | SIGNATURE |
|------|---------------|-------------------|--|-----------|
| 1 | Aquino | Valiente | Bases Conversion Development Authority (BCDA) | |
| 2 | Arquiza | Allan | LRTA | |
| 3 | Bagtas | Rodante | Valenzuela City | |
| 4 | Bathan | Glynda | CAI-Asia | |
| 5 | Bato | Ma. Jerusa | Department of Finance / avilaspain@yahoo.com | |
| 6 | Bautista-Cruz | Corazon | Metro Manila Development Authority (MMDA) | |
| 7 | Bellen | Arnel | LRTA | |
| 8 | Bontia | Robert | Tollways Management Corporation (TMC) | |
| 9 | Bustamante | John Jess Anthony | LRTA | |
| 10 | Cabrido | Candido Jr. | School of Urban and Regional Planning | |
| 11 | Cariño | Allan M. | Manila North Tollways Corporation/amcariño@yahoo.com | |
| 12 | Capricho | Lourdes Maria | DOE-EUMB | |
| 13 | Catibayan | Luis | Department of Trade And Industry (DTI) | |
| 14 | Contreras | Carlota | Marikina Settlement's Office (MSO) | |
| 15 | Corpuz | Susan | BOI | |
| 16 | Creus | Florencia | LTO | |
| 17 | David | Glenda | DOTC | |
| 18 | David | Rene | DOTC | |
| 19 | De Veza | Elias | DTI-BIS | |
| 20 | Dela Fuente | Claire | IMBOA | |
| 21 | Delfin | Robert | DOTC | |
| 22 | Dispo | Evan | ECAP | |
| 23 | Domdom | Jaime | Office of Transport Cooperatives (OTC) | |
| 24 | Domingo | Eleonor | LRTA | |
| 25 | Elpedes | Abel | TESDA | |
| 26 | Esguerra | George | Transport and Traffic Planners (TTPI), Inc. | |
| 27 | Fabian | Herbert | CAI-Asia | |
| 28 | Felipe | Rommel | Marikina City | |
| 29 | Garsuta | Rebecca | Department of Public Works and Highways (DPWH) | |
| 30 | Gatcahlian | Evelyn | HLURB | |
| 31 | Gaviola | Nabor | TTPI | |
| 32 | Gota | Sudhir | CAI-Asia | |
| 33 | Guanzon | Annabelle | HLURB | |
| 34 | Gust | Dulce | Occupational Safety and Health Center | |

| | | | | |
|----|-------------|------------|---|---|
| 35 | Inoturan | Dante | TESDA | |
| 36 | Japson | Corazon | DOTC |  |
| 37 | Karunungan | Elma | DOE-EUMB | |
| 38 | Lastimoso | Roberto | MRT3 | |
| 39 | *Legaspi | Villamor | Marikina City |  |
| 40 | *Lontoc | Anneli | DOTC | |
| 41 | Lumbres | Carellina | LRTA |  |
| 42 | Maala | JenniferL | RTA/ jxnzi@yahoo.com |  |
| 43 | Magnayon | Gerrix | Marikina City | |
| 44 | Magturo | Cecille | Department of Health | |
| 45 | Maranan | Zenaida | FEJODAP | |
| 46 | Marcos | Wency | Valenzuela City |  |
| 47 | Miralles | Kathreen | NEDA |  |
| 48 | Monsada | Zenaida D | OE | |
| 49 | Nacianceno | Robert | Metro Manila Deve;opment Authority (MMDA) | |
| 50 | Narca | Misael | MRT3 |  |
| 51 | *Naval | Leonora | Association of Taxi Operators |  |
| 52 | Fabregas | Edgar | DPWH |  |
| 53 | Nierva | Estelito | PNR |  |
| 54 | Olaguer | Edna | DOTC | |
| 55 | *Olivia | Tessa | Miriam College |  |
| 56 | Ong | Elena | INTERBOA | |
| 57 | Pabroa | Preciosa | PNRI | |
| 58 | Pagulayan | Antonio | MMDA |  |
| 59 | Panem | Agnes | TESDA /apanem@yahoo.com |  |
| 60 | Pantaleon | Serafin | Automobile Association of the Philippines | |
| 61 | Patdu, Jr. | Ildefoso | DOTC |  |
| 62 | Punte | Sophie | CAI-Asia | |
| 63 | Quibic | Nida | LTFRB | |
| 64 | Quiros | Edwin | Mechanical Engineering Dept, UPD | |
| 65 | Reyes | Cynthia | AAP | |
| 66 | Reyes | Evelyn | DOE-EUMB |  |
| 67 | Ricafranca | Ricardo | PNR |  |
| 68 | Roque | Drexel | League of Cities of the Philippines | |
| 69 | Rosales | Darwin | PCIERD-DOST |  |
| 70 | Rosete | Jean | EMB-DENR |  |
| 71 | *Salbasa | Manuel | Quezon City Hall | |
| 72 | Sabularse | Raul | PCIERD-DOST /raul@dost.gov.ph |  |
| 73 | Sanada | Hitoshi | DOTC |  |
| 74 | Santos | Joaquin | MMDA /sirjates@yahoo.com |  |
| 75 | Segovia | Vicky | CAI-Asia |  |
| 76 | Serqueña | Minda | Department of Finance /piscanms@yahoo.com |  |
| 77 | Simpas | James | Manila Observatory (MO) | |
| 78 | Tayag | Jean | CHED | |
| 79 | Umali | Amelito | BOI | |
| 80 | Uson | Jasmin | DOTC | |
| 81 | Valera, Jr. | Deogracias | Valenzuela City |  |
| 82 | Yao v | Myrna | NCRFW | |
| 83 | Yap | David | SURP |  |
| 84 | Zambales | Rolyn | DILG | |



Formulation of a National EST Strategy for the Philippines

National Stakeholders Conference
Sapphire AB, Crowne Plaza Galleria Manila
Ortigas Center, Mandaluyong City
22 April 2009 (Wednesday)
8:00 AM to 12:00 NN

ATTENDANCE SHEET

| | NAME | AFFILIATION / OFFICE | SIGNATURE |
|----|--------------------------|----------------------|-----------|
| 1 | Kenneth De la Cruz | MNTC | |
| 2 | Com. Elsie De Veyra | NCRFW | |
| 3 | Miguel Panal | MMDA | |
| 4 | Palaza Charlito M. | MMDA | |
| 5 | Ma. Teresita Del Rosario | BPS | |
| 6 | Roberto Tolentino | CEDO/MAND | |
| 7 | EC Galvante Jr. | DOTC | |
| 8 | Enrico Ferre | DOTC | |
| 9 | Ares Baron | OVCS/DENR | |
| 10 | Samuel C. Custodio | TTPI | |
| 11 | Ric Sigua | UP NCTS | |
| 12 | Atty. Sol Arboladura | Mayor A. Lim | |
| 13 | Cecile Magturo | DOH | |
| 14 | Celino Y. Geronimo | OTE | |
| 15 | Z. G. Lazan | DOE | |
| 16 | N.B. Anitao | -do- | |

NESTS Regional Consultation Seminar

Baguio City, June 11, 2009

The 3rd Regional Consultation Seminar on the Formulation of the National EST Strategy was held in Baguio City last June 11, 2009. The seminar was well attended by participants from the Baguio City Government, LTO-CAR, LTO Region I, LTFRB-CAR, DENR-CAR, HLURB-CAR, NGOs and Transport Groups. The venue was the Hotel Elizabeth and the seminar was organized in cooperation with the City Government of Baguio and Energy and Clean Air Project (ECAP) of USAID.

The Welcome Remarks were delivered by **Atty. Federico J. Mandapat, Jr., Regional Director of LTO and LTFRB for the Cordillera Autonomous Region**. The Opening Remarks were delivered by the **Hon. Reinaldo Bautista, City Mayor of Baguio City**. The Message from DOTC was delivered by **Hon. Anneli R. Lontoc, Undersecretary for Road Transport**. The Message from DENR was delivered by **Hon. Primitivo C. Galinato, Jr., Regional Executive Director of the DENR**. Mayor Bautista related the story of Baguio City and emphasized the urgency to come up with solutions to Baguio's traffic and air pollution woes and also mentioned other environmental concerns such as the problem with solid waste management. He expressed his optimism that with close cooperation among stakeholders including support and guidance from the national government, Baguio City and other LGUs as well could successfully confront the challenges they face.

The following presentations were made in the seminar:

- 1) **Defining EST in the Philippine Context** – *Dr. Hilario Sean O. Palmiano, NCTS*
- 2) **Draft National EST Strategy** – *Dr. Jose Regin F. Regidor, UP College of Engineering/NCTS*
- 3) **Eco-efficient City** – *Ms. Cordelia C. Lacsamana, OIC, Department Head, City Environment and Parks Management Office (CEPMO), Baguio City*

- 4) **EST Initiatives in San Fernando City, La Union** – *Mr. Valmar Valdez, CENRO, City of San Fernando, La Union*
- 5) **Examples of Good Practices of EST in the Philippines** – *Dr. Karl N. Vergel, UP College of Engineering/NCTS*
- 6) **Bus Rapid Transit** – *Dr. Ricardo G. Sigua, Jr., UP College of Engineering/NCTS*

An Open Forum was held in the morning after the Draft EST Strategy was presented and participants lauded the efforts of the DOTC and DENR in formulating the national EST strategy. Comments were more about the current problems experienced by Baguio City concerning traffic and air pollution, including inter-boundary issues with adjacent LGUs like La Trinidad. In the afternoon, participants took interest in the concept of BRT and how it can be applied or adapted to a city like Baguio. The concept of pedestrianization was also discussed as the city's climate is apt for walking.

Other ideas on EST practices and possibilities particularly for the City of Baguio were captured in the workshop conducted in the afternoon to gauge the extent of EST practices as well as the hindrances and possible solutions to these at the local level. The workshop was facilitated by **Dr. Sean Palmiano** of the UP College of Engineering.

The Concluding Remarks were delivered by **Dir. Mandapat** of the LTO-LTFRB-CAR.

Speakers to the EST Regional Consultations held at the Ateneo De Davao University [From left to right: Engr. Mario Luis J. Jacinto (Davao CPDC), Chairman Alberto H. Suansing (LTFRB), Hon. Nilo Abellera (Davao City Councilor), Atty. Gomer J. Dy (Regional Director, LTO Region XI), Ms. Sophie Punte (CAI-Asia), Mr. Mohanty (Coordinator, UNCRD), Mr. Jamie Leather (ADB), Dr. Regin Regidor (UP-NCTS)]



NESTS Regional Consultation Seminar

Davao City, May 22, 2009

The 2nd Regional Consultation Seminar on the Formulation of the National EST Strategy was held in Davao City last May 22, 2009. The seminar was well attended by participants from the Davao City Government, LTO Region XI, LTFRB Region 11, DENR Region 11, DPWH Region 11, HLURB Region 11, NGOs and Transport Groups. The venue was the Ateneo De Davao University and the seminar was organized in cooperation with the City Government of Davao and the Energy and Clean Air Project (ECAP) of USAID.

The Welcome Remarks were delivered by **Atty. Gomer J. Dy**, Regional Director of LTO Region XI. The Opening Remarks were delivered on behalf of Mayor Rodrigo Duterte by the Hon. Nilo G. Abellera, Davao City Councilor. A Message on behalf of the DOTC and DENR (national focal agencies) was delivered by Assistant Secretary Alberto Suansing, Chair of the Land Transport Franchising and Regulatory Board (LTFRB).

The following presentations were made in the seminar:

- 1) **Defining EST in the Philippine Context** – *Dr. Ma. Sheilah G. Napalang*, NCTS (morning)
- 2) **Draft National EST Strategy** – *Dr. Jose Regín F. Regidor*, UP College of Engineering/NCTS (morning)
- 3) **Examples of Good Practices of EST in the Philippines** – *Dr. Karl N. Vergel*, UP College of Engineering/NCTS (afternoon)
- 4) **Bus Rapid Transit** – *Dr. Cresencio M. Montalbo, Jr.*, UP School of Urban and Regional Planning/NCTS (afternoon)
- 5) **Public Transport Strategic Plan for Metro Cebu** – *Engr. Nigel Paul Villarete*, Cebu City Planning and Development Coordinator (afternoon)

An Open Forum was held in the morning after the Draft EST Strategy was presented and participants lauded the efforts of the DOTC and DENR in formulating the national EST strategy. Also, questions and comments were accommodated after each presentation in the afternoon. Comments were more about the current efforts in Davao City in implementing solutions to transport and traffic problems. Davao CPDC Jacinto mentioned that Davao City is practically self-sufficient and is able to fund its projects through loans provided by the Land Bank. Davao City is currently considering mass transport options for the city and is seriously looking at the possibility of having a BRT system.

The various efforts and ideas by the participants were also captured in the workshop conducted in the afternoon to gauge the extent of EST practices as well as the hindrances and possible solutions to these at the local level. The workshop was facilitated by **Dr. Noriel Christopher C. Tiglao** of the UP National College of Public Administration and Governance. Participants were divided into groups representing the different sectors in Davao City.

The **Concluding Remarks** were delivered by **Dir. Patdu**. He reiterated the commitment of the national government, particularly the DOTC, in connecting with LGUs and providing the necessary guidance for LGUs to develop sustainable solutions to transport and traffic problems.

Participants to the EST Regional Consultations held at the Hotel Elizabeth
[At Center are DENR Regional Executive Director Primitivo C. Galinato, Jr., DOTC Undersecretary for Road Transport Anneli R. Lontoc, and LTO-LTFRB-CAR Regional Director Federico J. Mandapat, Jr.]





NESTS Regional Consultation Seminar

Iloilo Grand Hotel, Iloilo City, May 15, 2009

The 1st Regional Consultation Seminar on the Formulation of the National EST Strategy was held in Iloilo City last May 15, 2009. The seminar was well attended by participants from the LTO Region 6, LTFRB Region 6, DENR Region 6, DPWH Region 6, HLURB Region 6 and 12 LGUs (including 10 cities/municipalities and 2 provinces). Also participating were members of the Transport and Traffic Committee of the TWG of the Metro Iloilo Guimaras Economic Development Council (MIGEDC) that included faculty from the University of the Philippines Visayas (UPV). The venue was the Iloilo Grand Hotel along Iznart Street in Iloilo City and the seminar was organized in cooperation with LTO Region 6 and the MIGEDC.

The Welcome Remarks were delivered by Mr. Eric Lenard Tabaldo, Assistant Regional Director of LTO Region 6 and the Opening Remarks were delivered on behalf of Iloilo City Mayor Jerry Trenas by Engr. Renan Escoto, Iloilo City CENRO. A Message on behalf of the DOTC and DENR (national focal agencies) was delivered by Dir. Ildefonso Patdu, Jr., Project Development Service, DOTC.

The following presentations were made in the seminar:

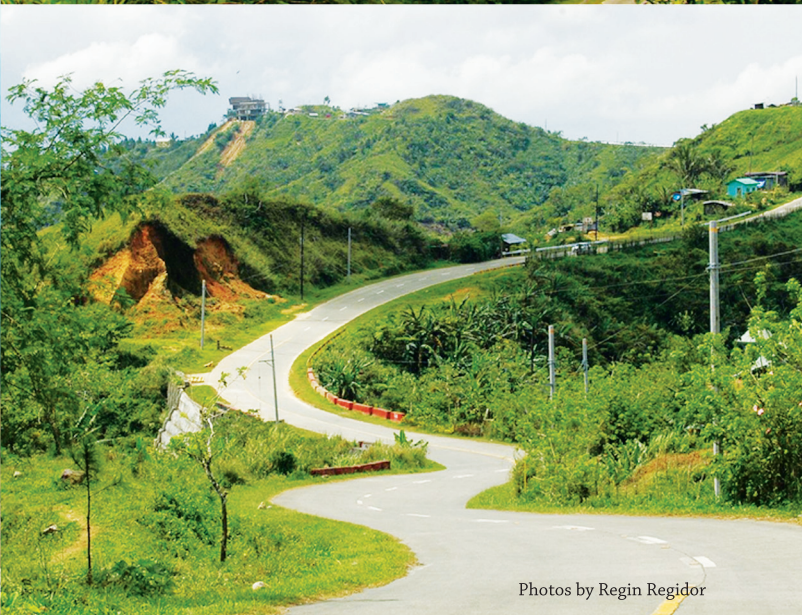
- 1) **Defining EST in the Philippine Context** – *Dr. Hilario Sean O. Palmiano*, UP College of Engineering/NCTS (morning)

- 2) **Draft National EST Strategy** – *Dr. Jose Regin F. Regidor*, UP College of Engineering/NCTS (morning)
- 3) **Transport and Traffic in Metro Iloilo** – *Engr. Jose Tengco*, Alternate Action Officer, MIGEDC Transport and Traffic Committee (afternoon)
- 4) **Examples of Good Practices of EST in the Philippines** – *Dr. Karl N. Vergel*, UP College of Engineering/NCTS (afternoon)
- 5) **Bus Rapid Transit** – *Dr. Ricardo G. Sigua*, UP College of Engineering/NCTS (afternoon)
- 6) **Public Transport Strategic Plan for Metro Cebu** – *Dir. Ildefonso T. Patdu*, DOTC (afternoon)

Participants to the EST Regional Consultations held at the Iloilo Grand Hotel

An Open Forum was held in the morning after the Draft EST Strategy was presented and participants lauded the efforts of the DOTC and DENR in formulating the national EST strategy. Comments were more about the current efforts by LGUs present in implementing sustainable transport solutions. These were captured more effectively in the workshop conducted in the afternoon to gauge the extent of EST practices as well as the hindrances and possible solutions to these at the local level. The workshop was facilitated by **Dr. Sean Palmiano** and the participants were grouped according to LGU or agency represented.

The Concluding Remarks were delivered by **Dir. Patdu**. He reiterated the commitment of the national government, particularly the DOTC, in connecting with LGUs and providing the necessary guidance for LGUs to develop sustainable solutions to transport and traffic problems.



Photos by Regin Regidor



Appendix 3

CONTRIBUTORS AND REVIEWERS

Contributors

| Contributor | Organization |
|------------------------------|--|
| Cresencio M. Montalbo, Jr. | Professor, School of Urban and Regional Planning, University of the Philippines Diliman |
| Ma. Sheilah G. Napalang | Assistant Professor, School of Urban and Regional Planning, University of the Philippines Diliman |
| Hilario Sean O. Palmiano | Assistant Professor, Institute of Civil Engineering, University of the Philippines Diliman |
| Jose Regin F. Regidor | Director, National Center for Transportation Studies, University of the Philippines Diliman |
| Ricardo G. Sigua | Professor, Institute of Civil Engineering, University of the Philippines Diliman |
| Noriel Christopher C. Tiglao | Associate Professor, National College of Public Administration and Governance, University of the Philippines Diliman |
| Karl N. Vergel | Associate Professor, Institute of Civil Engineering, University of the Philippines Diliman |

Reviewers

| Reviewer | Organization |
|--|--|
| Glynda Bathan | Clean Air Initiative for Asia (CAI-Asia) |
| Teresita Castillo (Undersecretary) | Department of Environment and Natural Resources (DENR) |
| George D. Esguerra (Assistant Secretary) | Department of Transportation and Communications (DOTC) |
| Herbert Fabian | Clean Air Initiative for Asia (CAI-Asia) |
| Sudhir Gota | Clean Air Initiative for Asian Cities (CAI-Asia) |
| Elisea Gozun | Presidential Assistant on Climate Change |
| Thomas Hamlin | UN-Department of Economic and Social Affairs (DESA) |
| Jaehyun Jang | United Nations Centre for Regional Development (UNCRD) |
| Jamie Leather | Asian Development Bank |
| Anneli R. Lontoc (Undersecretary for Road Transport) | Department of Transportation and Communications (DOTC) |
| Choudhury Rudra Charan Mohanty | United Nations Centre for Regional Development (UNCRD) |

| | |
|--|---|
| Zenaida Monsada | Oil Industry Management Bureau (OIMB) under the DOE |
| Ildfonso T. Patdu (Assistant Secretary) | Department of Transportation and Communications (DOTC) |
| Sophie Punte | Clean Air Initiative for Asian Cities (CAI-Asia) |
| Jane Romero | Institute for Global Environmental Strategies (IGES) |
| Jean Rosete | Environmental Management Bureau |
| Alberto Suansing (Assistant Secretary) | Land Transportation Office (LTO) and Land Transportation Franchising and Regulatory Board (LTFRB) |

The National EST Strategy and Action Plan have been presented at various venues including:

- 4th Regional EST Forum, Seoul, Korea (February 2009)
- Regional Conference on Global Environment: "Global Environmental Management Practices in the ASEAN Region," Makati City (February 2009)
- Cebu City BRT Studies Coordination Conference, Cebu (May 2009)
- 2nd World Roads Conference, Singapore (October 2009)
- 47th Meeting of the Philippine Economic Society, Manila (November 2009)
- Forum on Greening the Transport Sector, Manila (November 2009)
- Shared Growth Seminar Series #12, "Shared Growth and the Environment: The Case of Urban Land Transportation," Pasig City (April 2010)
- 5th Regional EST Forum, Bangkok, Thailand (August 2010)



Photo by Raul Vibal



Photo by Raul Vibal



Photo by Raul Vibal



Photo by Raul Vibal



Photo by Regin Regidor



Photo by Regin Regidor



Appendix 4

LIST OF NATIONAL GOVERNMENT AGENCIES

Bureau of Investments (BOI) under the Department of Trade and Industry (DTI)

Bureau of Product Standards (BPS) under the DTI

Climate Change Commission (CCC)

Commission on Higher Education (CHED)

Department of Energy (DOE)

Department of Environment and Natural Resources (DENR)

Department of Finance (DOF)

Department of Health (DOH)

Department of Interior and Local Government (DILG)

Department of Public Works and Highways (DPWH)

Department of Science and Technology (DOST)

Department of Trade And Industry (DTI)

Department of Transportation and Communications (DOTC)

Environmental Management Bureau (EMB) under the DENR

Housing and Land Use Regulatory Board (HLURB)

League of Cities of the Philippines (LCP)

Light Rail Transit Authority (LRTA) under the DOTC

Land Transport Franchising and Regulatory Board (LTFRB)

Land Transportation Office (LTO)

Metropolitan Manila Development Authority (MMDA)

National Commission on the Role of Filipino Women (NCRFW)

National Economic Development Authority (NEDA)

Office of Transport Cooperatives (OTC) under the DOTC

Philippine Council for Industry and Energy Research and Development (PCIERD) under
the DOST

Philippine National Railways (PNR) under the DOTC

Philippine Nuclear Research Institute (PNRI) under DOST



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Appendix 5

LIST OF ABBREVIATIONS

| | |
|-----------------|--|
| AAP | Automobile Association Philippines |
| AFETD | Alternative Fuels and Energy Technology Division |
| BIS | Bureau of Import Services (of the DTI) |
| BPS | Bureau of Product Standards (of the DTI) |
| BOI | Board of Investments (of the DOF) |
| CAI-Asia | Clean Air Initiative for Asia |
| CCC | Climate Change Commission |
| CDS | City Development Strategies |
| CHED | Commission on Higher Education |
| DENR | Department of Environment and Natural Resources |
| DepEd | Department of Education |
| DILG | Department of Interior and Local Government |
| DOE | Department of Energy |
| DOF | Department of Finance |
| DOH | Department of Health |
| DOST | Department of Science and Technology |
| DOTC | Department of Transportation and Communications |
| DPWH | Department of Public Works and Highways |
| DSWD | Department Social Welfare and Development |
| DTI | Department of Trade and Industry |
| ECAP | Energy and Clean Air Project (of the USAID) |
| EMB | Environmental Management Bureau (of the DENR) |
| EST | Environmentally Sustainable Transport |
| ESSO | Environmental Safety and Security Office (of the DPWH) |
| EUMB | Energy Utilization Management Bureau (of the DOE) |
| HLURB | Housing and Land Use Regulatory Board |
| HUDCC | Housing and Urban Development Coordinating Council |
| JICA | Japan International Cooperation Agency |
| LCP | League of Cities of the Philippines |

| | |
|-----------------|--|
| LGU | Local government unit |
| LRTA | Light Rail Transit Authority |
| LTFRB | Land Transport Franchising and Regulatory Board |
| LTO | Land Transport Office |
| MMAQISDP | MM Air Quality Improvement Sector Development Program |
| MMDA | Metropolitan Manila Development Authority |
| MMPTS | Metro Manila Public Transport Study |
| MMURTRIP | Metro Manila Urban Transport Improvement Project |
| MMUTIS | Metro Manila Urban Transport Integration Study |
| MO | Manila Observatory |
| NAPC | National Anti-Poverty Commission |
| NCDA | National Council on Disability Affairs |
| NCPAG | National College of Public Administration and Governance (of UP) |
| NCRFW | National Commission on the Role of Filipino Women |
| NCTS | National Center for Transportation Studies (of the UP) |
| NEDA | National Economic and Development Authority |
| NTPP | National Transport Policy and Planning |
| OIMB | Oil Industry Management Bureau (of the DOE) |
| OTC | Office of Transport Cooperatives (of the DOTC) |
| PCA | Partnership for Clean Air |
| PIA | Philippine Information Agency |
| PNP | Philippine National Police |
| PNR | Philippine National Railways |
| PNRI | Philippine Nuclear Research Institute (of the DOST) |
| SIRPAFF | Survey on Inter-Regional Passenger and Freight Flow |
| SURP | School of Urban and Regional Planning (of the UP) |
| UNCRD | United Nations Centre for Regional Development |
| UNDP | United Nations Development Programme |
| UP | University of the Philippines |
| USAID | United States Agency for International Development |
| WHO | World Health Organization |

