

Air and Noise Pollution Reduction from Tricycles

A Strategic Plan for
Quezon City and Puerto Princesa City,
Philippines

Asian Development Bank

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ADB analysis of technical and social aspects of the environmental
issues of tricycles, a popular mode of transportation in the
Philippines

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ABBREVIATIONS

ADB	–	Asian Development Bank
AQMS	–	Air Quality Management Section
AUV	–	Asian utility vehicle
BIMP-EAGA	–	Brunei-Darussalam, Indonesia, Malaysia and the Philippines-East Asian Growth Area
CAA	–	Clean Air Act
CBD	–	central business district
CENRO	–	City Environment and Natural Resources Office
CKD	–	complete knocked-down
CLUP	–	Comprehensive Land Use Plan
CO	–	carbon monoxide
CPDO	–	City Planning Development Office
C-3	–	Circumferential Road No. 3
C-4	–	Circumferential Road No. 4
C-5	–	Circumferential Road No. 5
C-6	–	Circumferential Road No. 6
DENR	–	Department of Environment and Natural Resources
DOTC	–	Department of Transportation and Communication
DTI	–	Department of Trade and Industry
DOST	–	Department of Science and Technology
DOLE	–	Department of Labor and Employment
ECE	–	Economic Commission for Europe
EDSA	–	Epifanio De Los Santos Avenue
FTODA	–	Federation of Tricycle Operators' and Drivers' Associations
HC	–	hydrocarbon
HOV	–	high-occupancy vehicle
LGU	–	local government unit
LOS	–	level of service
LRT	–	Light Rail Transit
LTFRB	–	Land Transportation Franchising and Regulatory Board
LTO	–	Land Transportation Office
MDPPA	–	Motorcycle Development Program Participants Association
MMDA	–	Metro Manila Development Authority
MRT	–	Metro Rail Transit
MMUTIS	–	Metro Manila Urban Transportation Integration Study
NLEX	–	North Luzon Expressway
NMT	–	nonmotorized transport
NO _x	–	nitrogen oxide
NO ₂	–	nitrogen dioxide

NSCB	–	National Statistical Coordination Board
O ₃	–	ozone
PCIERD	–	Philippine Council for Industry and Energy Research Development
PETC	–	Private Emission Testing Center
PM	–	particulate matter
PPC	–	Puerto Princesa City
PPNR	–	Puerto Princesa North Road
PPSR	–	Puerto Princesa South Road
RMC	–	route-measured capacity
SP	–	Sanguniang Panglungsod
SUV	–	sports utility vehicle
TEC	–	Traffic Engineering Center
TESDA	–	Technical Education and Skills Development Authority
TFB	–	Tricycle Franchising Board
TODA	–	Tricycle Operators and Drivers Association
TRU	–	Tricycle Regulatory Unit
TSP	–	total suspended particulates
TVRP	–	tricycle volume reduction program
UP-NCTS	–	University of the Philippines-National Center for Transportation Studies
VOC	–	volatile organic compounds
VPD	–	vehicles per day
WB	–	World Bank
WHO	–	World Health Organization

WEIGHTS AND MEASURES

Cc	–	cubic centimeter
Db	–	decibel
Mm	–	millimeter
MI	–	milliliter
PM ₁₀	–	particulate matter with diameter of less than 10 microns
Ppb	–	parts per billion
Ppm	–	parts per million
Rpm	–	revolution per minute

CURRENCY EQUIVALENTS

(as of December 2004)

Currency Unit – Philippine peso (P)

P1 – \$0.0178

\$1 – P56.04

NOTES

In this report, “\$” refers to US dollars.

PREFACE

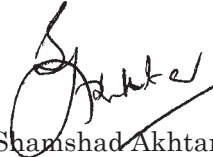
Vehicular emission is among the major concerns of air pollution in the Asia-Pacific region, as it threatens both people's health and their daily activities. According to the World Health Organization (WHO), 12 of the 15 cities with the highest levels of particulate matters, and 6 of the 15 cities with the highest levels of sulfur dioxide are located in Asia. While it is seemingly common in the light of rapid urbanization, vehicular emissions are predominantly severe in the Philippines where one third of vehicular population is composed of two- and three-wheeled (tricycles) vehicles. These two- and three-wheeled vehicles are major contributors to air emissions as they usually are equipped with old model engines and are poorly maintained.

While policy makers can deal with some aspects of tricycle pollution by setting technical standards and imposing tricycle operational practices, it is important to understand the unique social, economic and technical environment in which the tricycles operate to ensure the sustainability of any tricycle management strategies.

Asian Development Bank (ADB) supported this study through a technical assistance on Promoting Cleaner Production for the Philippines. The study also supplemented the Metro Manila Air Quality Improvement Sector Development Program (MMAQISDP), in order to cover every aspect of urban air quality management. The study looked into the issues of and introduced cleaner technology to the often-ignored tricycle industry and transport ecology in two local government units (LGUs), i.e., Quezon City in Metro Manila and Puerto Princesa in Palawan. Owing to the support granted by the Department of Science and Technology (DOST), the executing agency, and the two LGUs, the implementing agencies, we now have a better understanding of the tricycle subsector issues from a holistic view of political, economic, social and technological aspects.

Despite the health and environmental hazards that tricycles bring, the study found that the two cities continue to experience increase in tricycle population due to: (i) high unemployment and absence of alternative livelihood; (ii) limited road network; and (iii) increase in commuting population. The first two are especially true for Puerto Princesa. The study also discovered that a majority (70%) of the drivers earned a daily net income of P100-P150 (\$1.80-\$2.70). This leaves the tricycle drivers little interest to maintain their vehicles to reduce air or noise emissions. Therefore, while the tricycle subsector is counted as a major contributor to pollution, its vulnerability to haphazard solutions should be noted and prudent considerations should be observed.

Given the insights and valuable information on the tricycle subsector gathered during the study and the commitment of DOST and Puerto Princesa City government, ADB is able to further finance pilot testing of the recommended strategies in Puerto Princesa City through the Poverty and Environment Fund. The pilot test was commenced in September 2005 and will help tricycle owners and operators solve the environmental problems caused by tricycle operation without jeopardizing their livelihood. This is a good example of ADB working together with an LGU to look after the environment and poverty issues. We expect to see more replication of the approach in other LGUs in the Philippines.



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FOREWORD

This report provides valuable information on the various options and strategies for the reduction of air and noise pollution from tricycles in Quezon City and Puerto Princesa City. This is a jumpstart in our initiatives to clean the air by providing a sound basis for implementing technical and policy strategies to effectively address the issues facing the tricycle subsector.

The tricycle industry grew rapidly over the last 14 years despite the absence of formal policies from the Government. The demand for this mode of transportation will continue to grow with the increase in tricycle-riding population. As such, the tricycles' effects on the environment are threatening and the noise level is beyond the maximum standard. These have provided the context for the Asian Development Bank-initiated study under the Cleaner Production Program, which the Philippine Council for Industry and Energy Research and Development (PCIERD) fully supported.

We would like to underscore the importance of the Local Government Units' support through the passage of local ordinances that would regulate the tricycle subsector in terms of the acceptable and locally-applicable strategies stated herein. We all have taken the most important step in solving this environmental problem. We have identified where the problem is and what causes it, and came up with a strategic plan of action that hopefully will lead us to a safe and sound environment.



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The preparation of this report was impossible without the support of Mayor Edward Hagedorn of Puerto Princesa City and Mayor Feliciano Belmonte, Jr. of Quezon City. The Study Team also received significant assistance and suggestions from Jovenee Sagun, Angel Padon and the staff of Puerto Princesa City Planning and Development Office, Traffic Management Bureau and City Environment and Natural Resources Office, as well as Marge Toledo of Quezon City Tricycle Regulatory Unit. The Tricycle Operators' and Drivers' Associations of Quezon City and Puerto Princesa City and their members contributed their time and ideas, which enabled a large amount of work on consultation, survey, interview, and data analysis to be completed in a timely manner and rendered a better understanding of the social, economic, and environmental aspects of the three-wheeler (tricycle) subsector in the two cities.