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2006 CITA CONFERENCE

'The future of Vehicle Inspection – Contributing to Sustainable Road Transport'
'Developments in Inspection of 2 & 3 Wheeled Vehicles'



2 & 3 WHEELERS

KEYNOTE SPEECH 2

In-service Vehicle Inspection



Road Transport





Road Transport

2006 CITA CONFERENCE

'The future of Vehicle Inspection – Contributing to Sustainable Road Transport'

'Developments in Inspection of 2 & 3 Wheeled Vehicles'

Emission Control for In-Use Motorcycles in Asia

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Organization : Vietnam Register
Country : Vietnam

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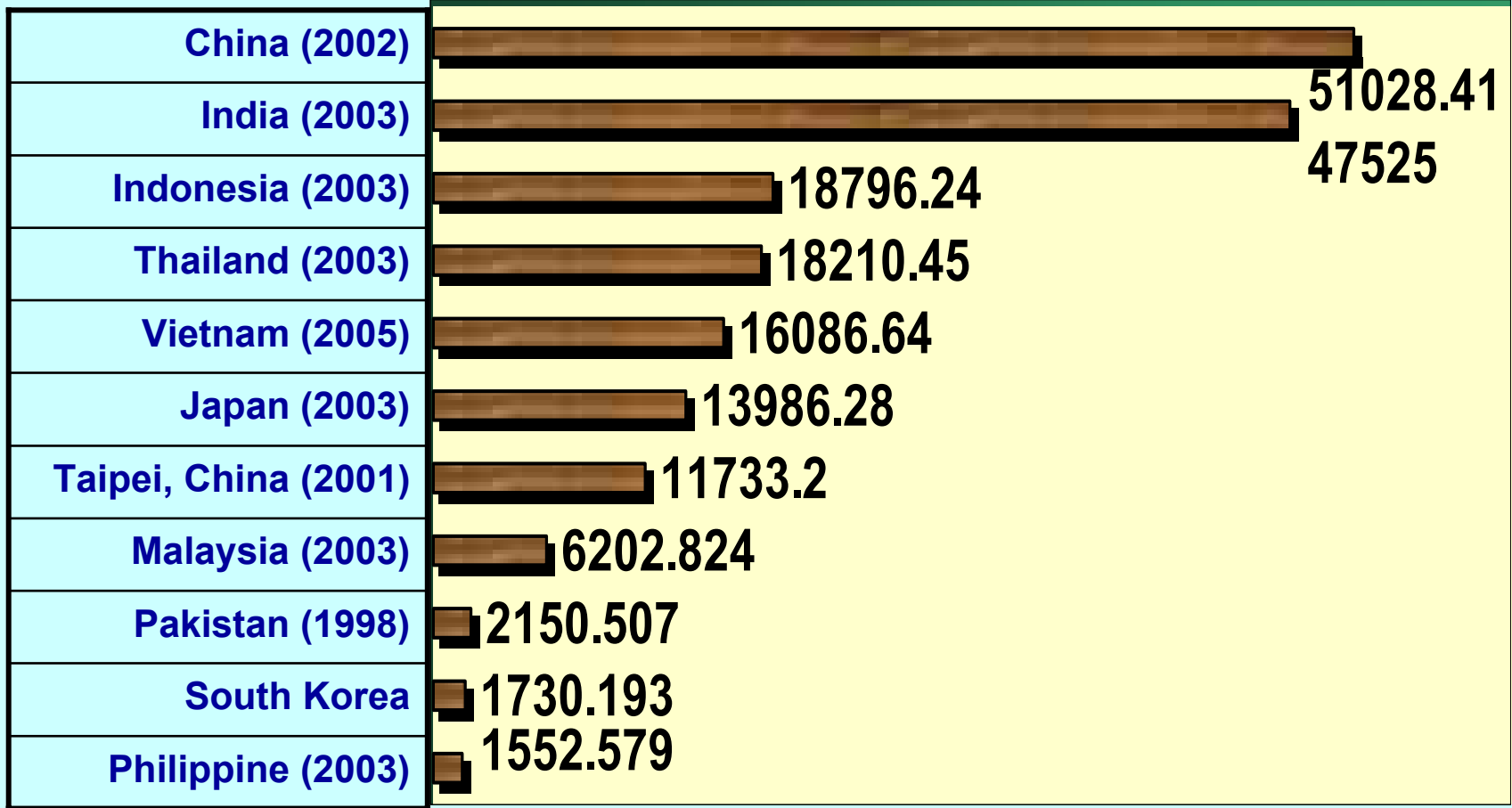
1. Motorcycles Emissions in Asia

1.1 - GENERAL SITUATION

- Nowadays, there are about 200 million motorcycles in Asia. As triple number of motorcycles as in OECD, while the Asian automobile number is only 12%.
- Vehicle emissions in emerging Asian countries account for 31% PM, 13% NO_x, 30% VOC, 24% CO of the world. In which, motorcycle emissions contributed 29% PM, 7% NO_x, 69% VOC and 61% CO.
- Asian motorcycles contributes a considerable amount of PM, CO and VOC emissions.

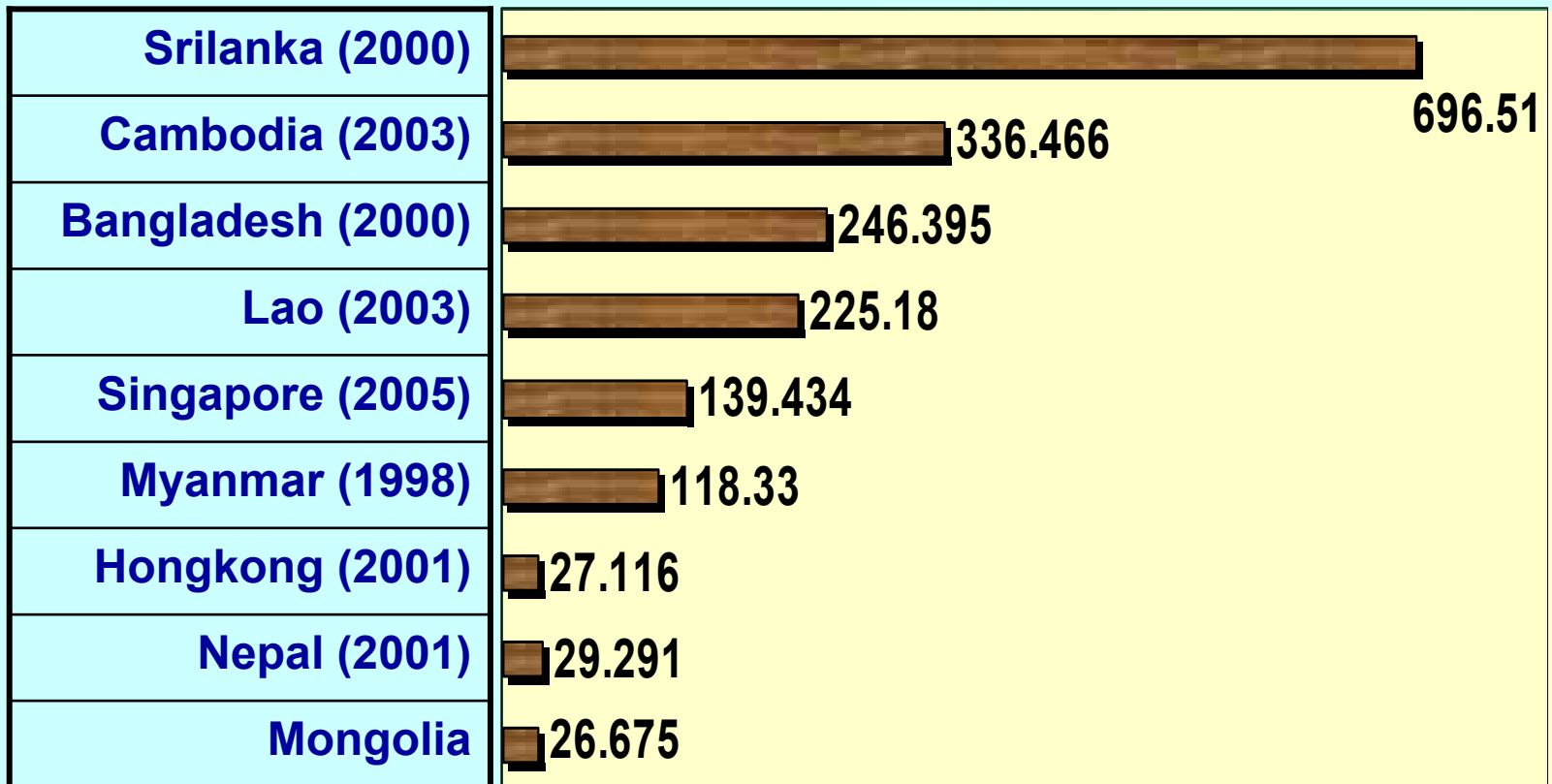
Source: IEA-SMP transport model reference case projection
(see http://library.iea.org/textbase/subjectqueries/keyresult.asp?KEYWORD_ID=4121)

1.2 - MOTORCYCLE POPULATION IN ASIAN EMERGING COUNTRIES (in 1000)



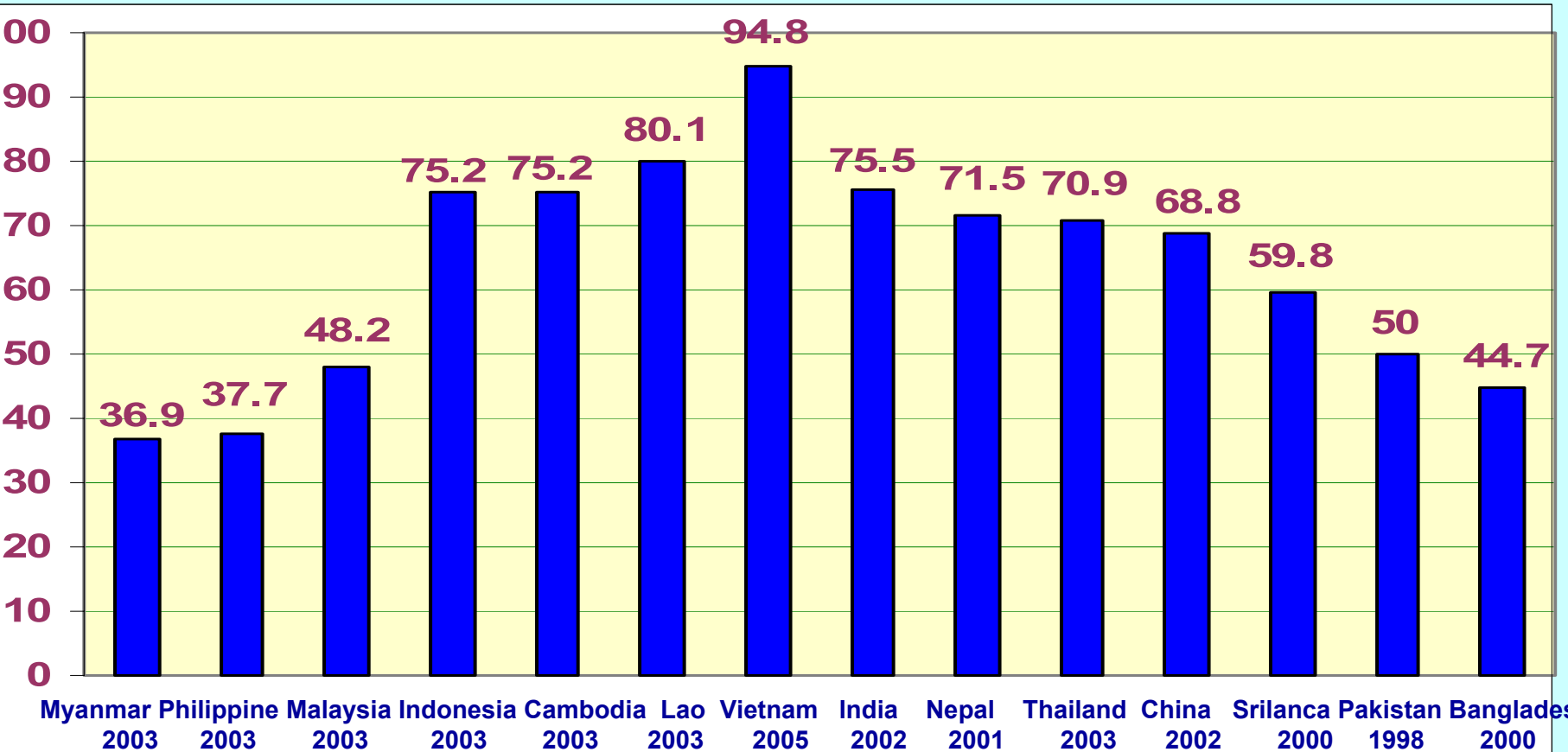
Sources: ADB (See <http://www.adb.org/vehicle-emissions>); International Road Federation, Asean-Japan center (see [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html)), MOT of Singapore, Taiwan-China, Malaysia India: Korea (see: <http://www.entek-international.com/Publications/MotorcycleBatteriesinAsia.pdf>)

1.3 - MOTORCYCLE POPULATION IN OTHER ASIAN COUNTRIES (in 1000)

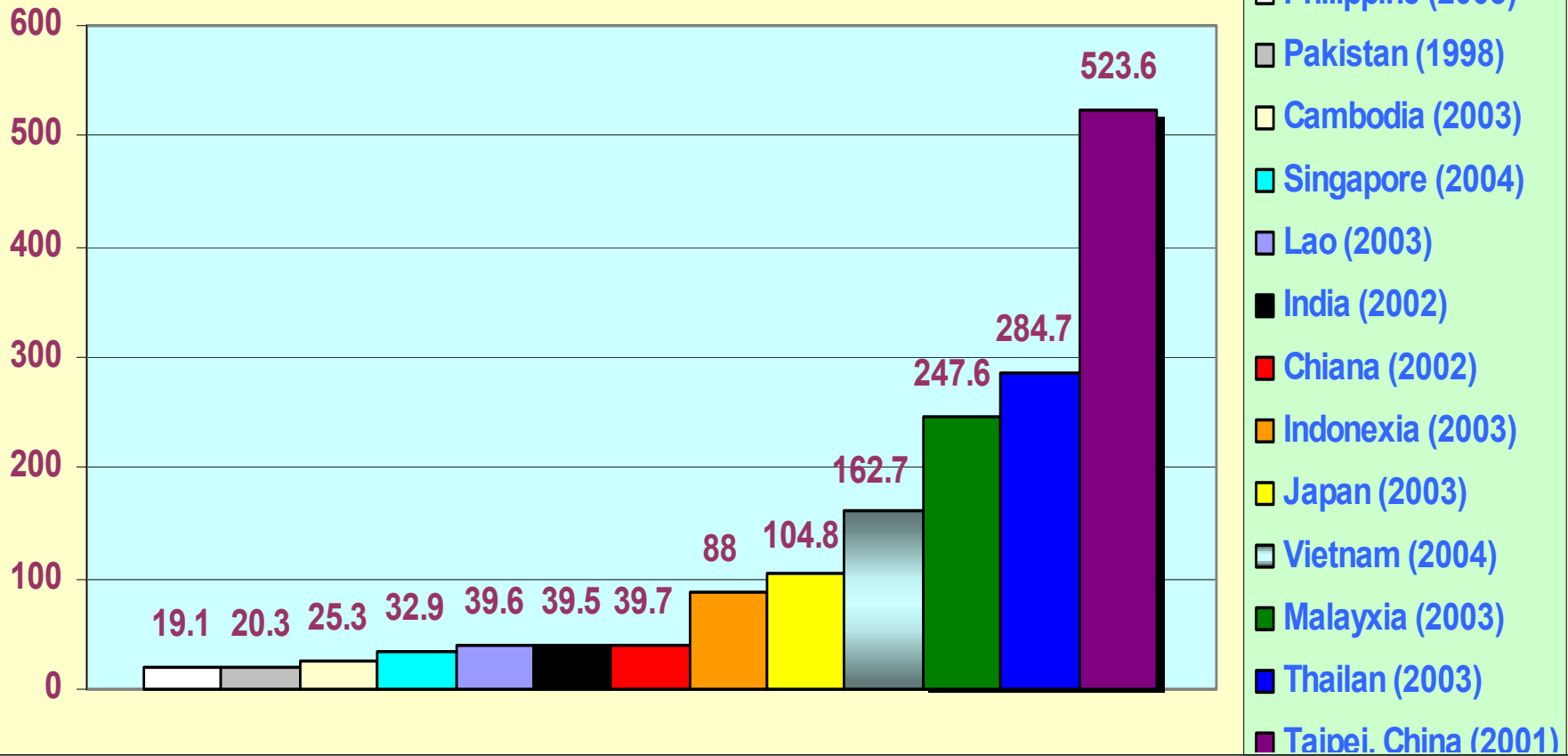


Sources: ADB (See <http://www.adb.org/vehicle-emissions>; <http://www.adb.org/Documents/Reports/Arrive-Alive/Action-Plans/>); International Road Federation, Asean-Japan center (see [http://www.asean.or.jp/eng/general/statistics/index\(05\).html](http://www.asean.or.jp/eng/general/statistics/index(05).html)), MOT of Singapore; <http://www.entek-international.com/Publications/MotorcycleBatteriesinAsia.pdf>)

1.4 - MOTORCYCLE PROPORTION IN MOTOR VEHICLE FLEET (%)

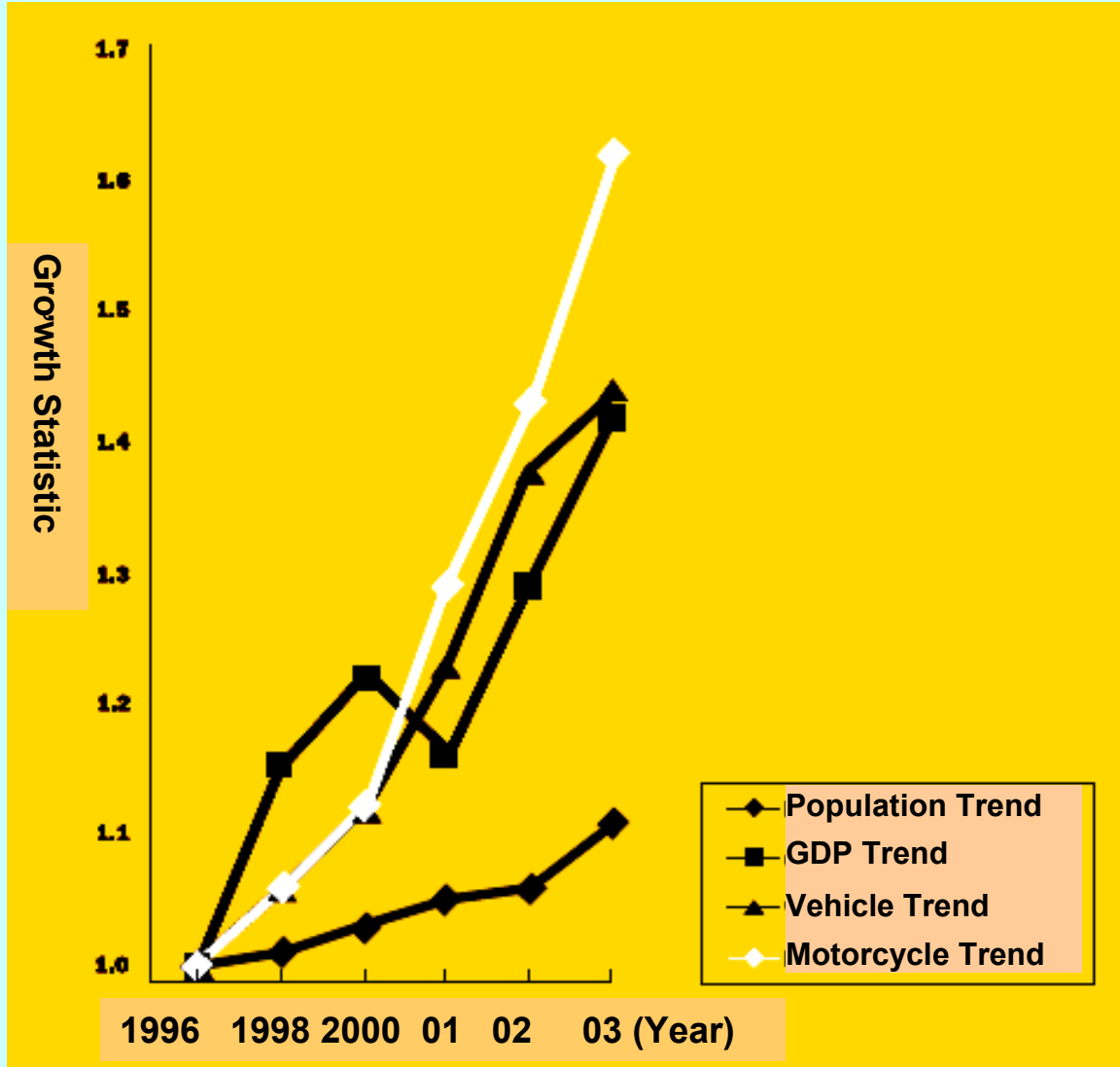


1.5 - USAGE RATE OF MOTORCYCLE (Number per 1000 habitants)



Source: Asean regional road safety strategy and action plan 2005-2010 Book see:
<http://www.adb.org/Documents/Reports/Arrive-Alive/Action-Plans/>
 ADB (see http://www.adb.org/Documents/Books/Key_Indicators/2005)

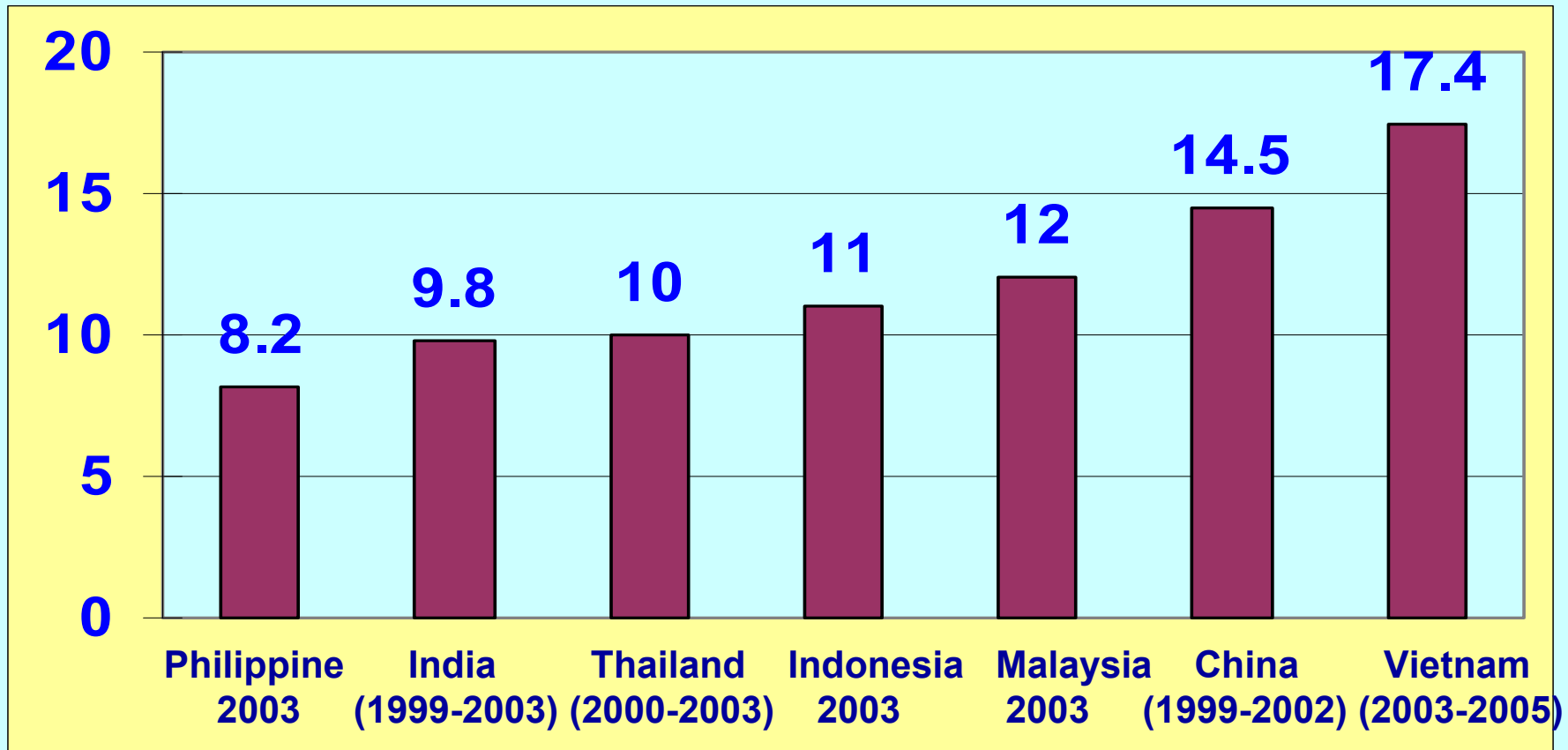
1.6 - MOTORCYCLE GROWTH



South East Asian Trends in Population and Gross Domestic Products and Vehicle Registration (1998 – 2003)

Source: ADB – Asean (see <http://www.adb.org/Documents/Reports/Arrive-Alive/Action-Plans/>)

1.7 - ANNUAL GROWTH RATE (%)



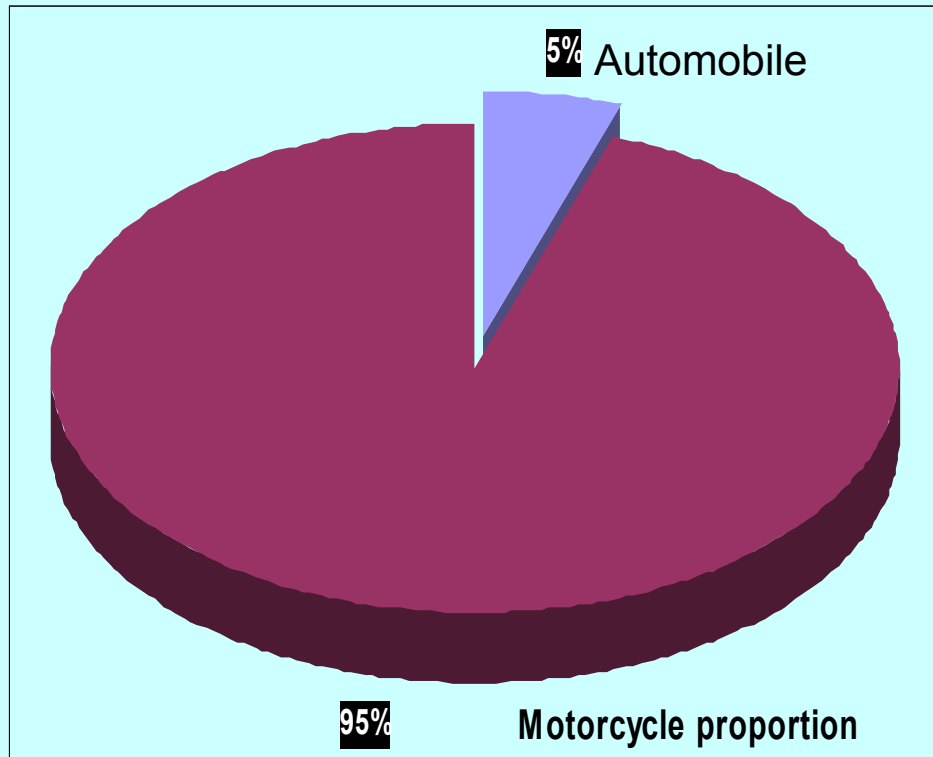
Source: Philippine, Indonesia, Malaysia see ADB – Asean (see <http://www.adb.org/Documents/Reports/Arrive-Alive/Action-Plans/>); The other calculated from population

1.8 - MOTORCYCLE GROWTH IN VIETNAM



Source:
National
Traffic Safety
Administration

1.9- MOTORVEHICLE FLEET COMPOSITION IN VIETNAM (2005)



Type	Number
Automobiles	891,104
Motorcycle	16,086,644

Source: Vietnam Register

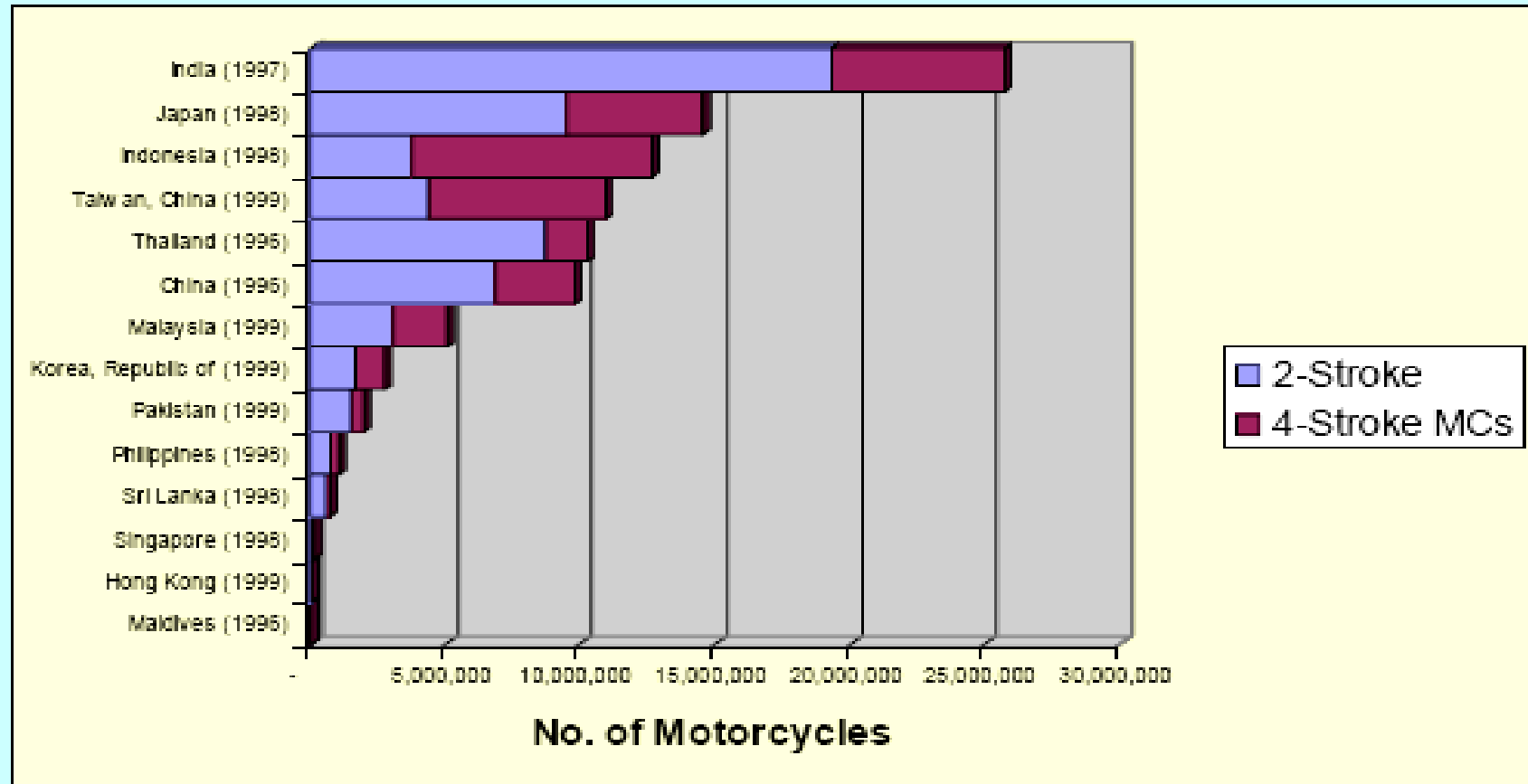
1.10 - MOTORCYCLE POPULATION AND USAGE RATE

- The Asian countries have largest number of motorcycles.
- Motorcycles are the most popular type of transport means in some countries.
- Motorcycles play a special important role in Vietnam.
- In some countries, motorcycle population is booming in the recent years and still increasing in the coming years.

1.11- MOTORCYCLE CHARACTERISTICS IN ASIA

- ***Small displacement***: from 70 cm³ to 150 cm³, popularly from 80 cm³ to 125 cm³
- ***Simple design engines*** without emissions control system So, fuel efficiency far less than auto.
- Although existing a change to 4 stroke, but ***2 stroke still a significant pollution*** in some countries in the region.
- ***2 wheelers – 90%*** , and 3 wheelers – 10%.

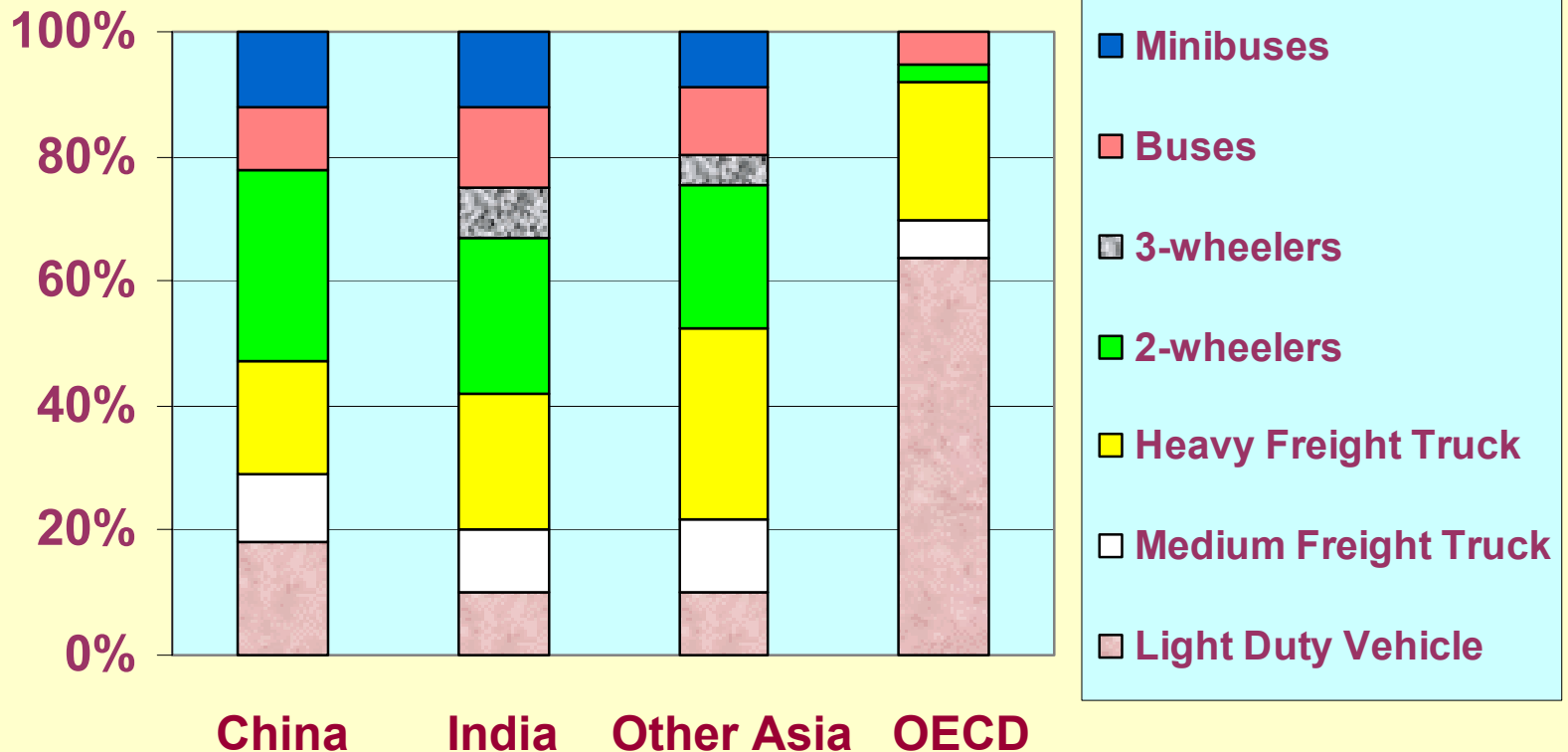
1.12 – 2 STROKE VERSUS 4 STROKE



Source: ADB (See <http://www.adb.org/vehicle-emissions>)

1.13-MOTORCYCLE EMISSIONS

PM emission by type of vehicle in 2005

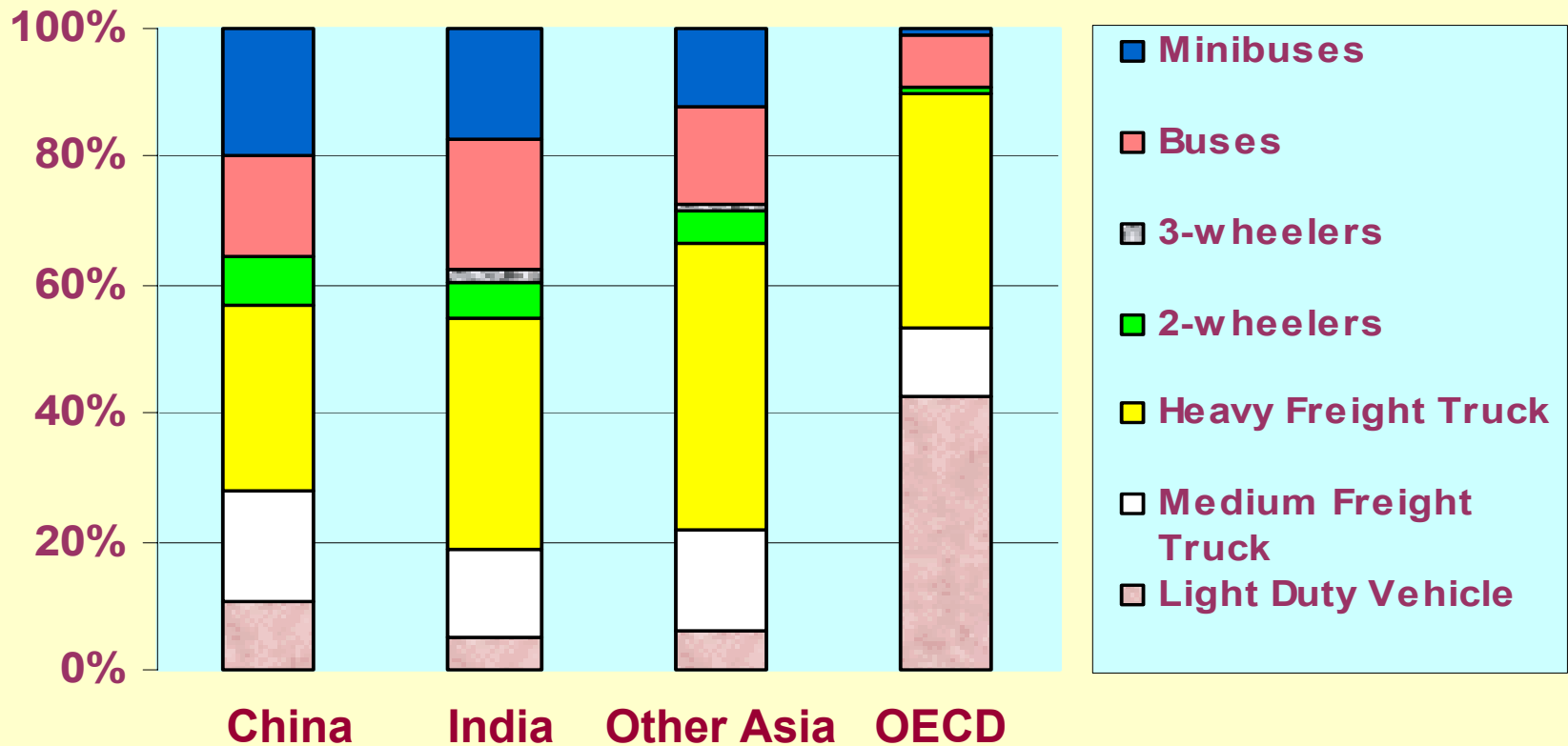


Source: IEA-SMP transport model reference case projections

See http://library.iaea.org/Textbase/subjectqueries/keyresults.asp?KEYWORD_ID=4121

1.14- MOTORCYCLE EMISSIONS

NOx emission by type of vehicle in 2005

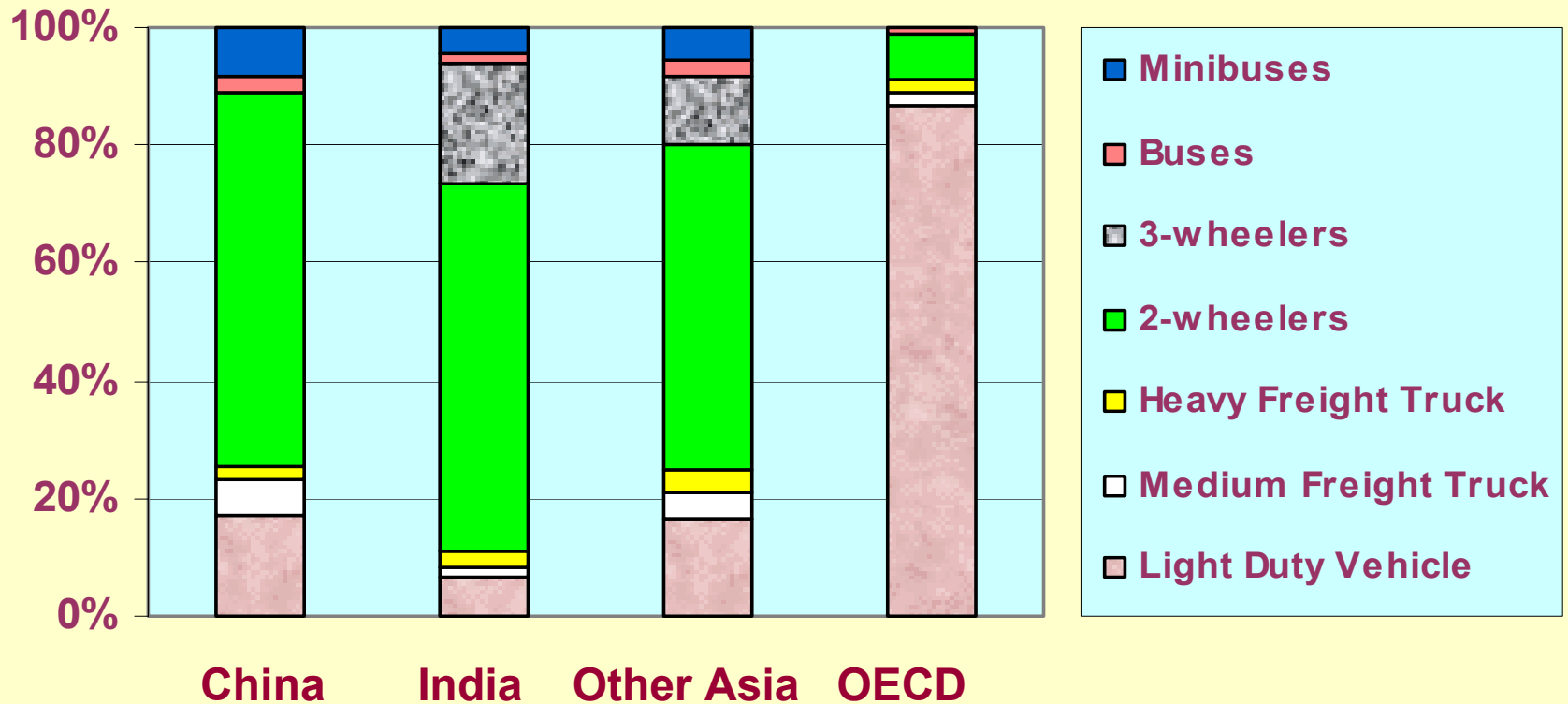


Source: IEA-SMP transport model reference case projections

See http://library.iaea.org/Textbase/subjectqueries/keyresults.asp?KEYWORD_ID=4121

1.15- MOTORCYCLE EMISSIONS

VOC emission by type of vehicle in 2005

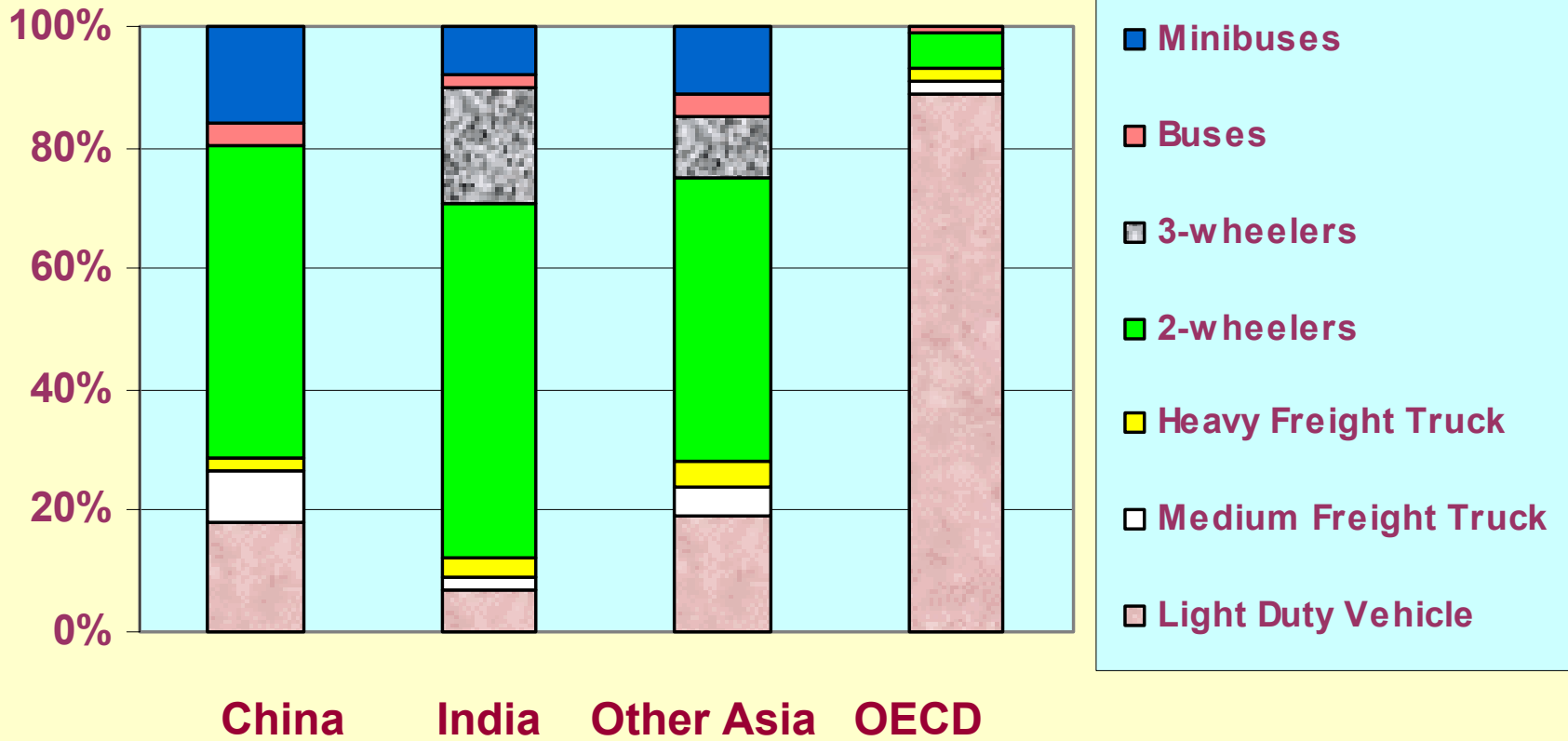


Source: IEA-SMP transport model reference case projections

See http://library.iaea.org/Textbase/subjectqueries/keyresults.asp?KEYWORD_ID=4121

1.16- MOTORCYCLE EMISSIONS

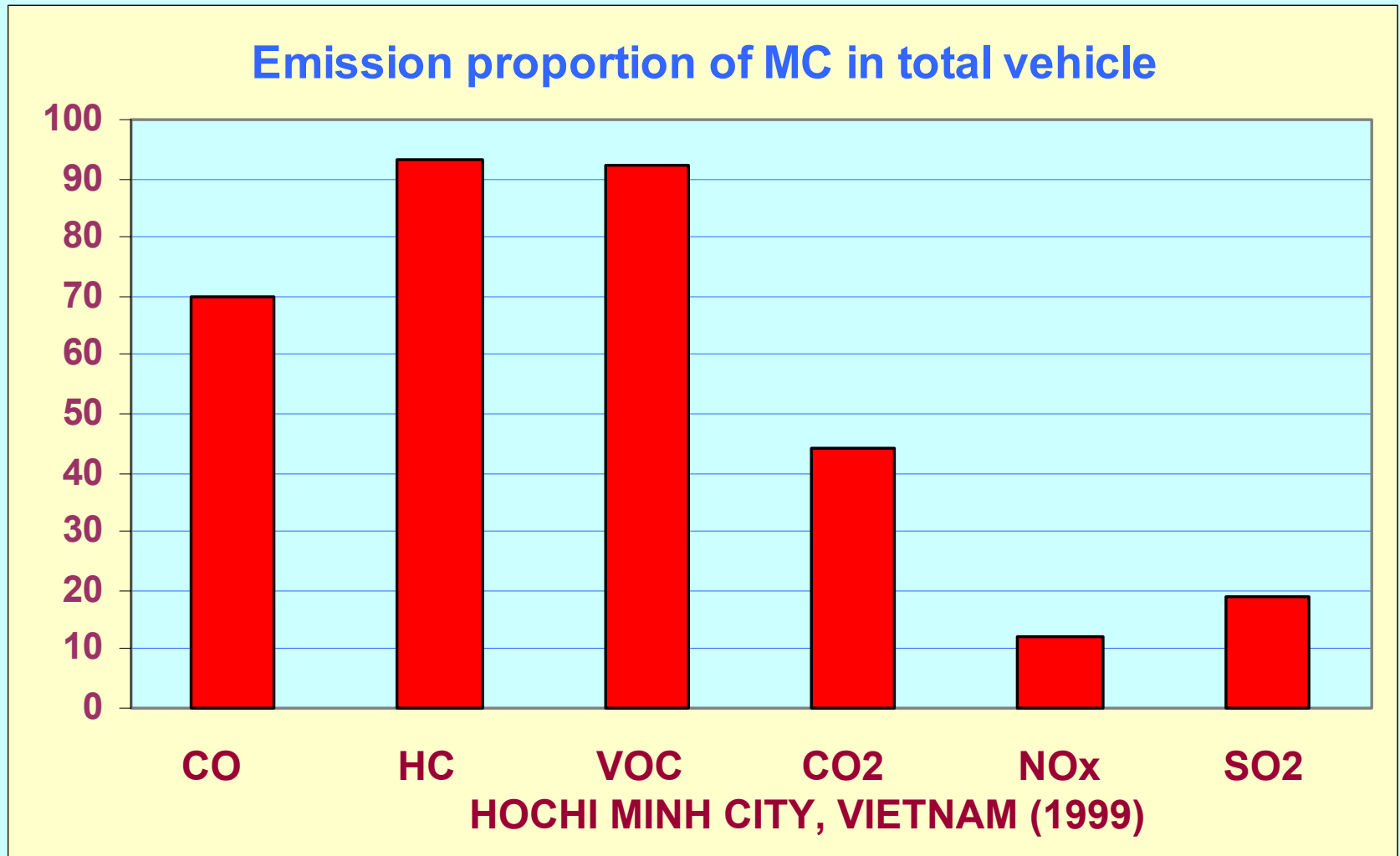
CO emission by type of vehicle in 2005



Source: IEA-SMP transport model reference case projections

See http://library.iaea.org/Textbase/subjectqueries/keyresults.asp?KEYWORD_ID=4121

1.17- MOTORCYCLE EMISSIONS



1.18- MOTORCYCLE EMISSIONS

- Other than developed countries, motorcycles are the most pollution source in Asia.
- Without controlling measures, the situation will go worse, dangerous health effect for Asian people.

2. Emissions control for in-use motorcycles in Asia

2.1- CONTROL MEASURES



Measures	Countries
Mandatory emissions inspection for in-use motorcycles	Some countries
Strengthen Inspection & Maintenance	Taiwan, China
Limited registration and regulated vehicle lifetime	China
Alternative fuel program	India, Thailand
Encourage using 2T oil less smoke	India, Thailand
Prohibit using 2T gasoline-mixed oil	India
Lead-free gasoline program	Almost all countries

2.2- PERIODICAL INSPECTION & ROAD SIDE TEST

- **Periodical emissions test for motorcycles.**
- **Normal inspection frequency is 01 year, and tend to be more stringent.**
- **Roadside test also involved in parallel.**

2.3 - EMISSION STANDARD FOR NEW AND IN-USE MOTORCYCLES

Country	Type	New Motorcycles			In-use Motorcycles		
		CO	HC	HC+NO x	CO (%)	HC (ppm)	PM
Philippines		4,5 %	-	-	6		
India	2-Stroke	1,5 g/km	-	-	3.5	6000	
	4-Stroke	1,5 g/km	-	-	3,5	4.500	
Taipei, China	All	4 %	6000 ppm	-	3,5	2.000	30%
Sri Lanka	All	6 g/km	-	-	6		
Thailand	All	3,5 g/km		1,8 g/km	4,5	10.000	30%
China	2-Stroke	3 %	2000 ppm	-	4,5	8.000	
	4-Stroke			-	4,5	2.200	
Indonesia	2-Stroke	8 g/km	-	-	4,5	3000	
	4-Stroke				4,5	3000	

2.4- CLEANER FUEL USE & OTHERS



- Cleaner fuels program.
- Regulated age limits on vehicles.

2.5-REDUCING MOTORCYCLE EMISSION IN VIETNAM



- Lead Phased out in 2001
- Developed Action Plan on Vehicles Emissions Reduction in 2002 with TA from ADB.
- Successful research to convert MC for using LPG. Catalytic converter for MC is being studying.
- Motorcycle Clinic is being developed for Hanoi City with funding from Worldbank.
- Issued Roadmap to adopt emissions standards for new and in-use vehicles.
- Vietnam Register is developing a Proposal for Prime Minister's approval on Controlling emissions for in-use MC in the large cities.

3. CONCLUSIONS



MC population is most density in Asia, especially in South-East Asia and East Asia, a major transport means in some countries in the region.

MC is a significant source of pollution for the cities in South-East Asia and East Asia. Especially for 2 stroke MC used in some countries in the region.

MC population is still increasing and will be dangerous to the environment if no action to be taken.

Cleaner fuels program is an encouraging measure.

Catalytics is being researched, tested to speed up its application in some countries in the region.

Many countries have type approval test for motorcycles.

Mandatory emissions test and Roadside test are the main measures to control MC emissions.