

Clean Mobility Frameworks for Asia and Cascadia

Cornie Huizenga

Executive Director
CAI-Asia Center

Beyond Oil:
Transforming Transportation
4 September, 2008
Redmond, WA



Who are we?

“The Clean Air Initiative for Asian Cities promotes and demonstrates innovative ways to improve the air quality of Asian cities through sharing experiences and building partnerships”



CAI-Asia began as a multi-stakeholder initiative by ADB, WB and the United States – Asia Environmental Partnership (a project of USAID)

The CAI-Asia Center was incorporated in June 20, 2007 as a non-stock, non-profit corporation in the Philippines

Part 1

Quick introduction to Transport in Asia

The Asian transport context..... Dhaka, Bangladesh



Source : Karl Fjellstrom, ITDP



Source: Cornie Huizenga, CAI-Asia



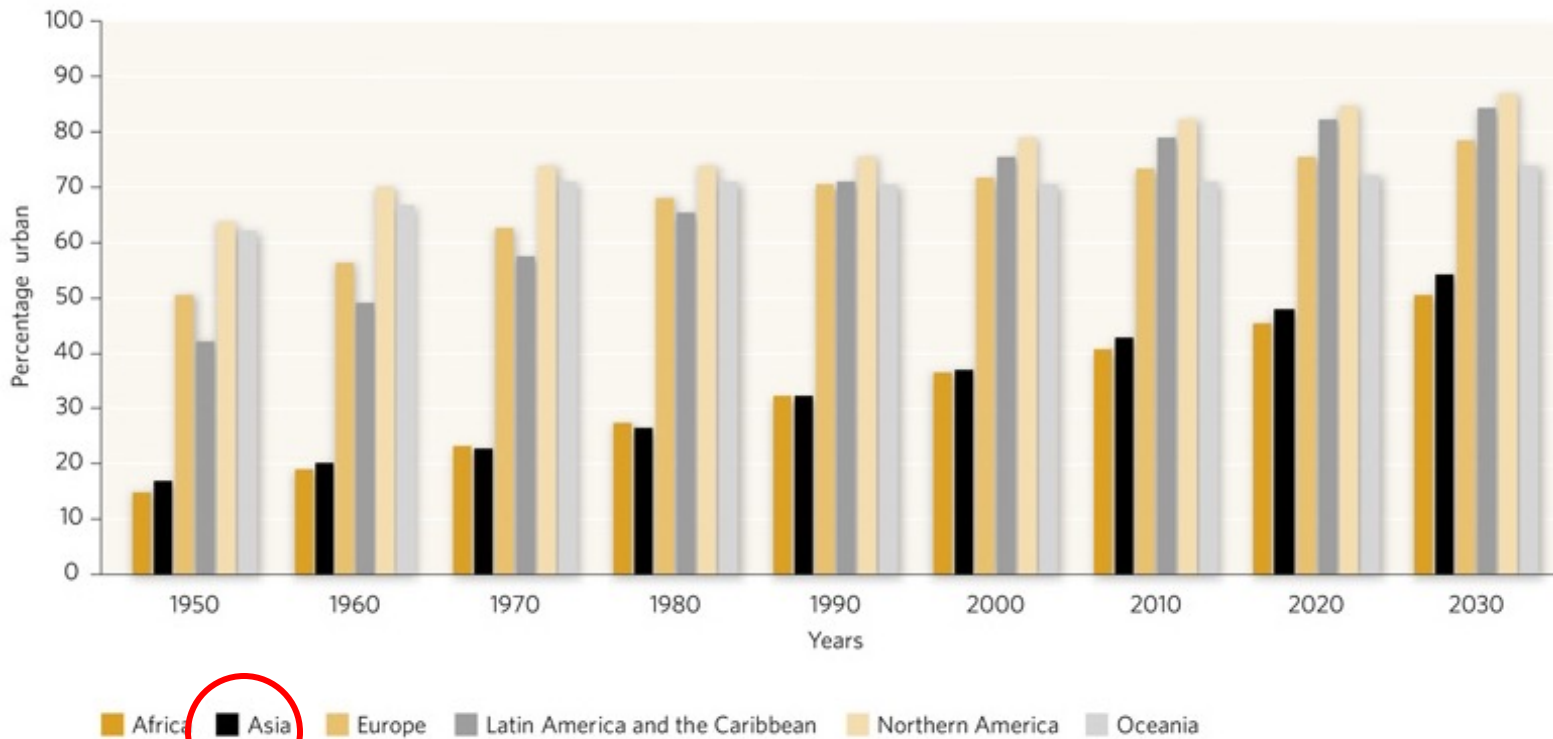
Source: Cornie Huizenga, CAI-Asia



Source: Cornie Huizenga, CAI-Asia

www.cleanairnet.org/caiasia

Percentage of population residing in urban areas (by region), 1950-2030



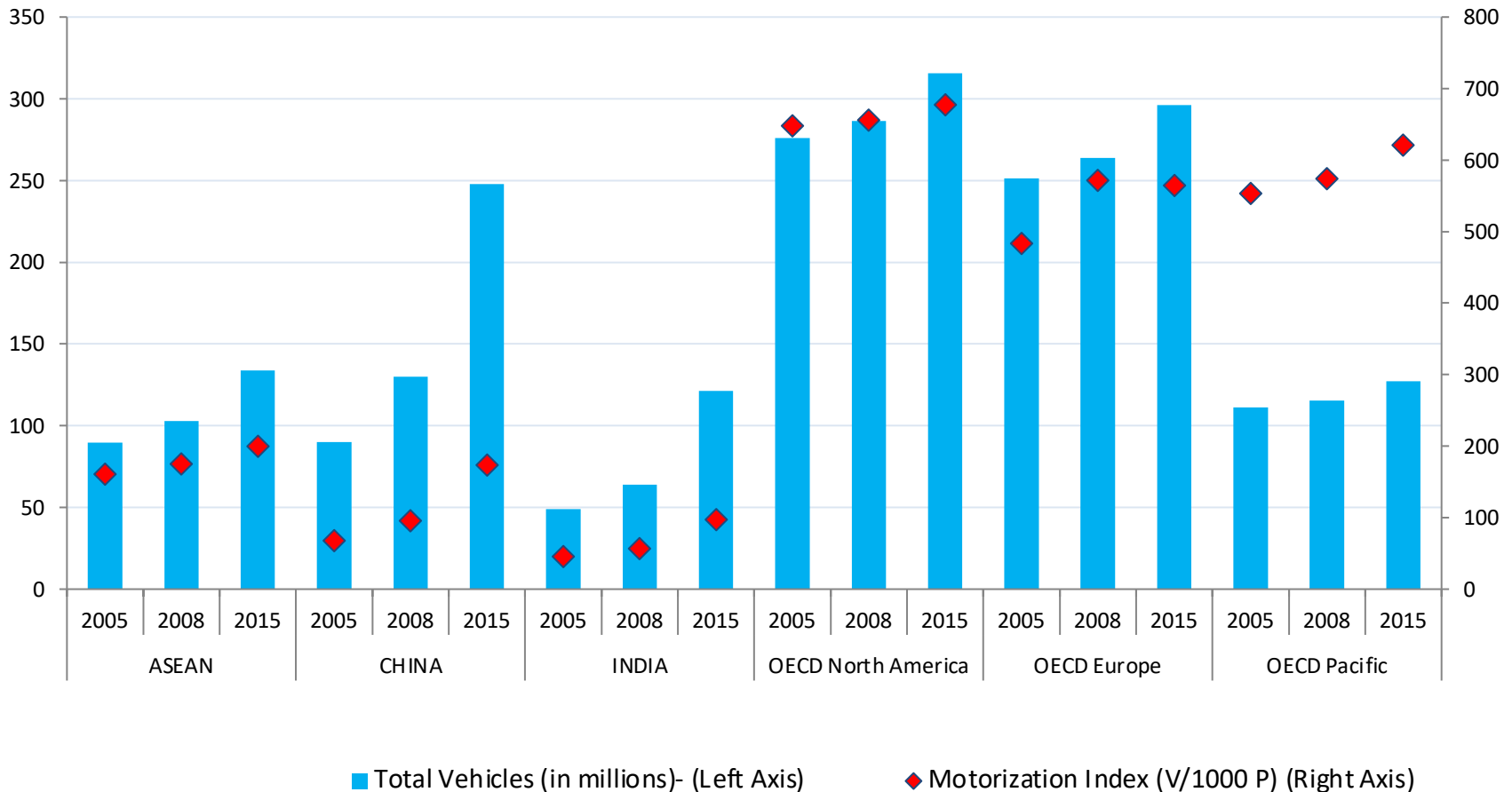
China: 2008 – 2030: 300 million persons will be added to urban population

India: 2008 – 2030: 265 million persons will be added to urban population

Source: United Nations, 2006. World Urbanization Prospects: The 2005 Revision. Table A.2. New York: Population Division, Department of Economic and Social Affairs, United Nations

Total Vehicle Growth Forecast

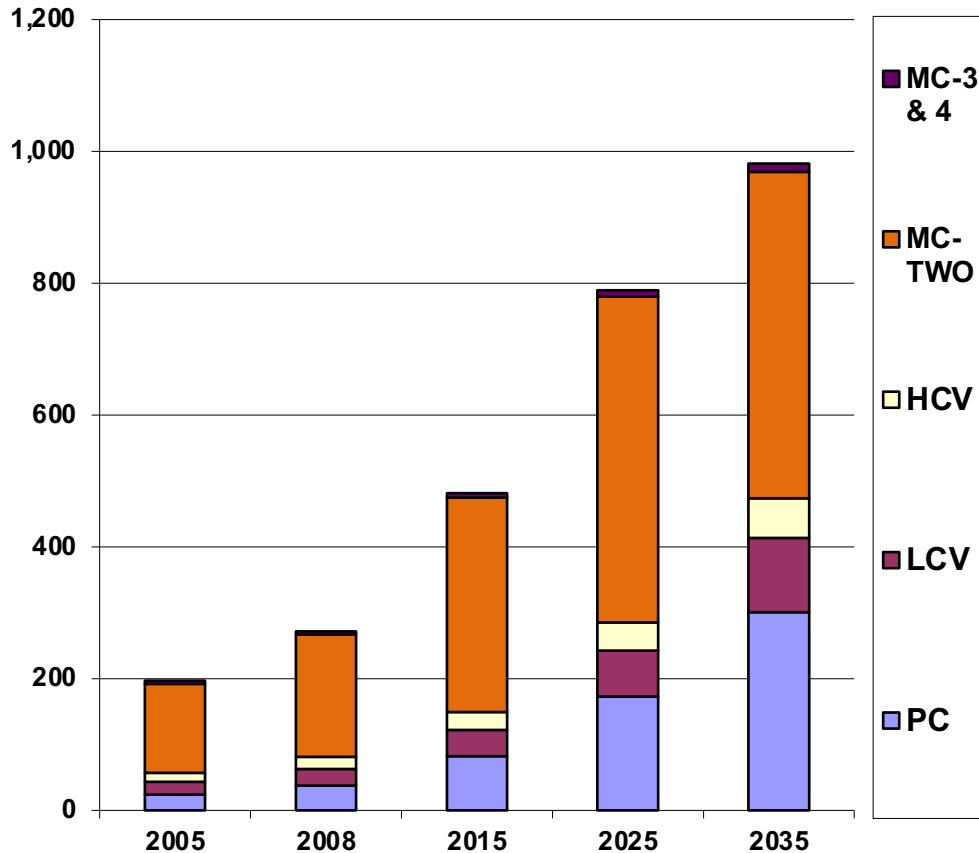
Total Vehicles and Motorization Index



Source: CAI-Asia, Segment Y Ltd., and OECD

Vehicle Growth Forecast in Asian Countries (China, India, Thailand, Indonesia, Philippines and Vietnam)

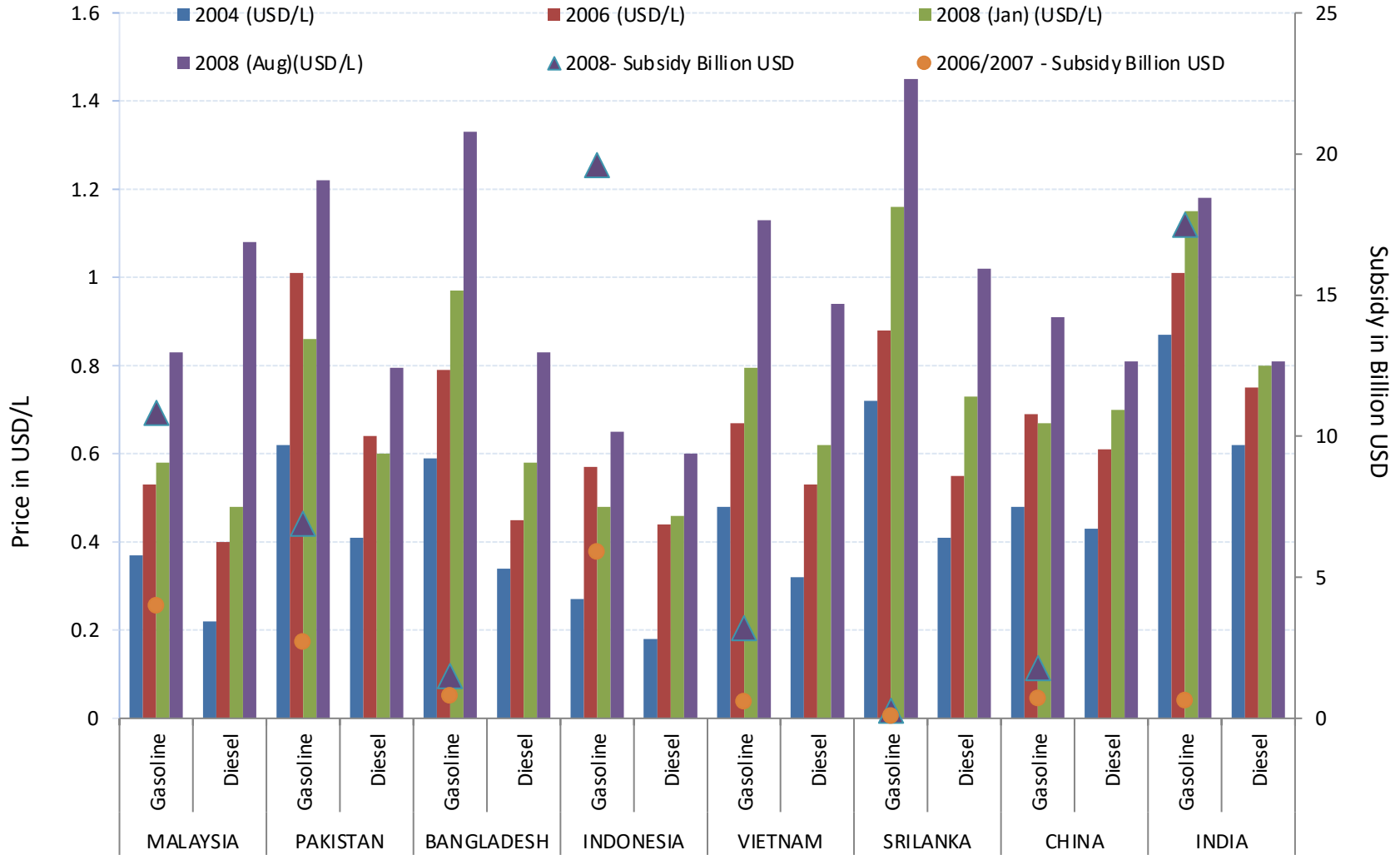
Million Vehicles



<http://www.economistblog.com>

Source: Vehicle Population Projection from Segment Y Ltd

Fuel Prices and Subsidies in Asia



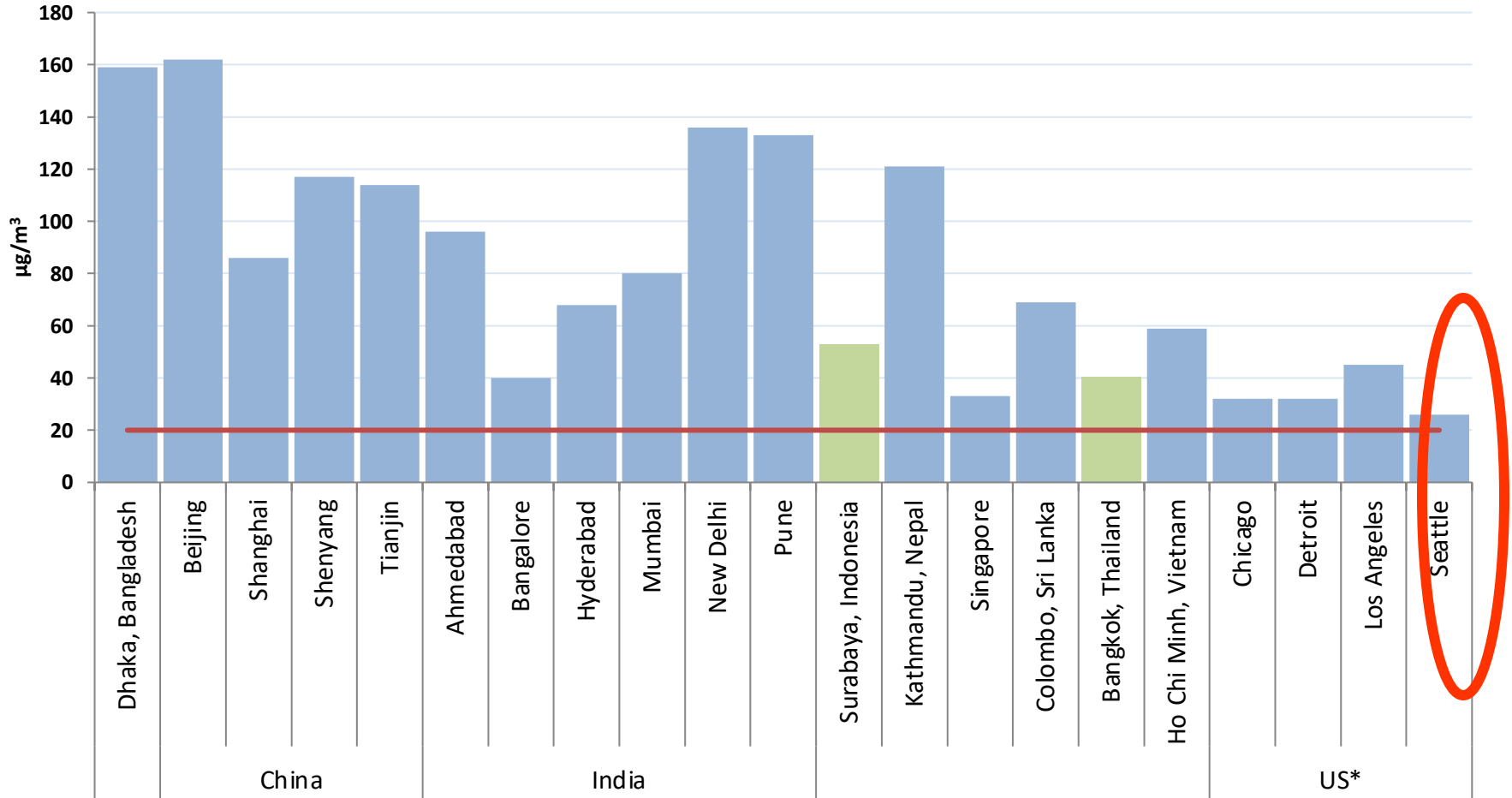
Source: CAI-Asia research

Part 2

Co-benefits:
Air Quality Management + Climate Change Mitigation

PM levels in Cities -WHO guideline values

PM₁₀ Annual Ambient Concentrations in Selected Asian and US Cities vs WHO



* Source: USEPA.

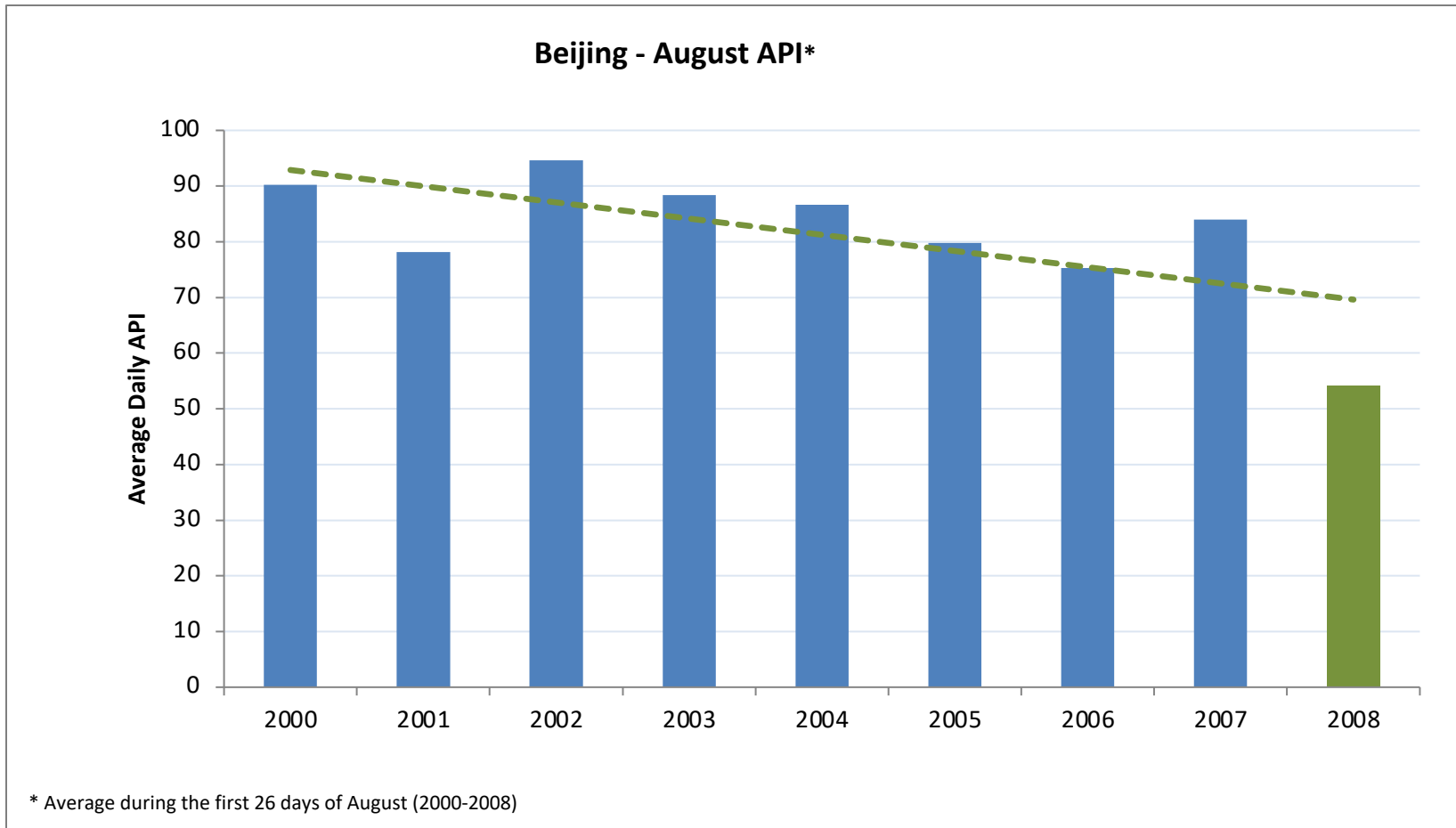
Note: County information was used

■ PM10 (2005)

■ PM10 (2006)

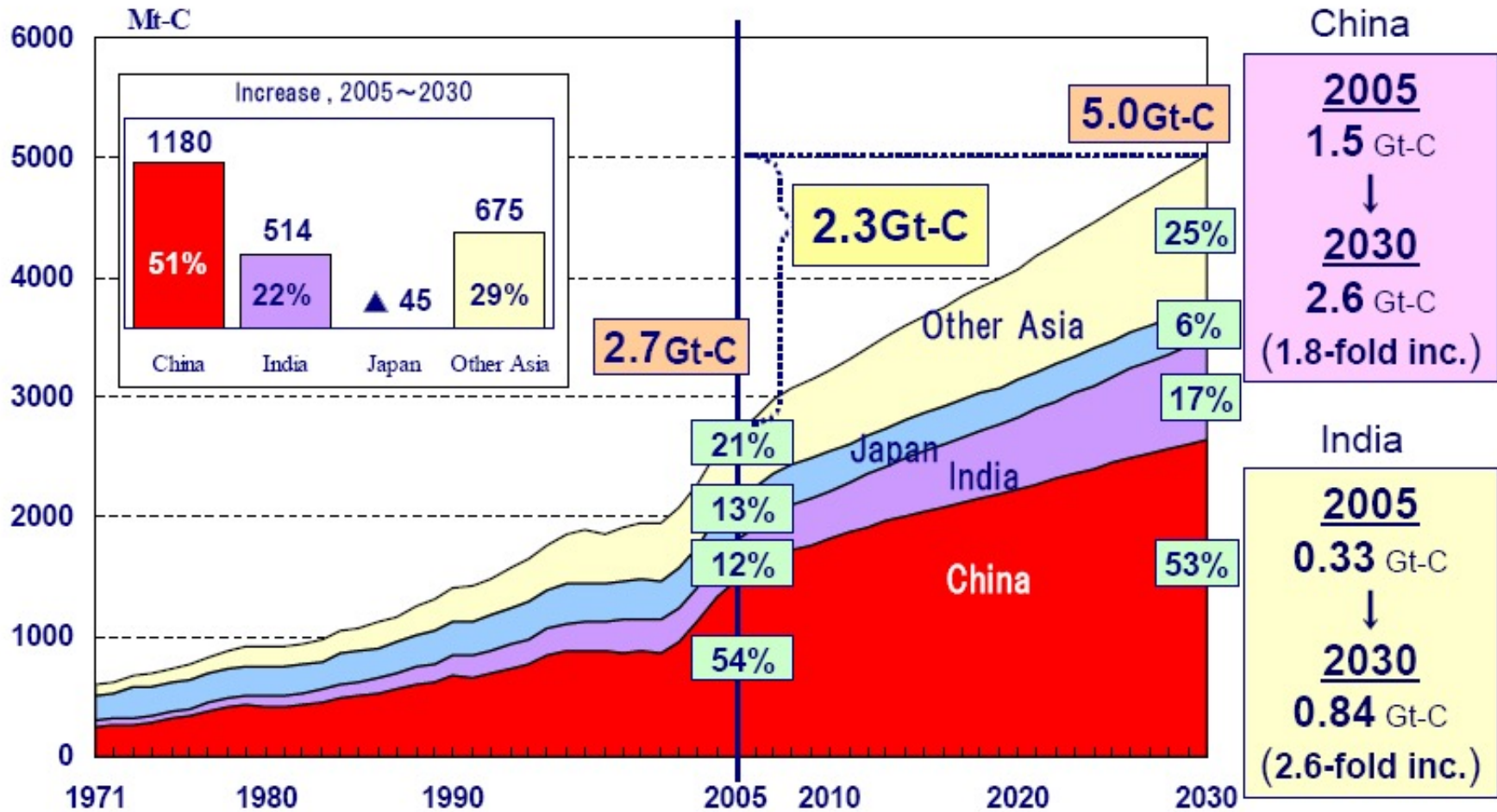
— WHO 2005 Guideline Value for Annual Average of PM10 = 20 µg/m³

Beijing Olympics – It is possible to have cleaner air



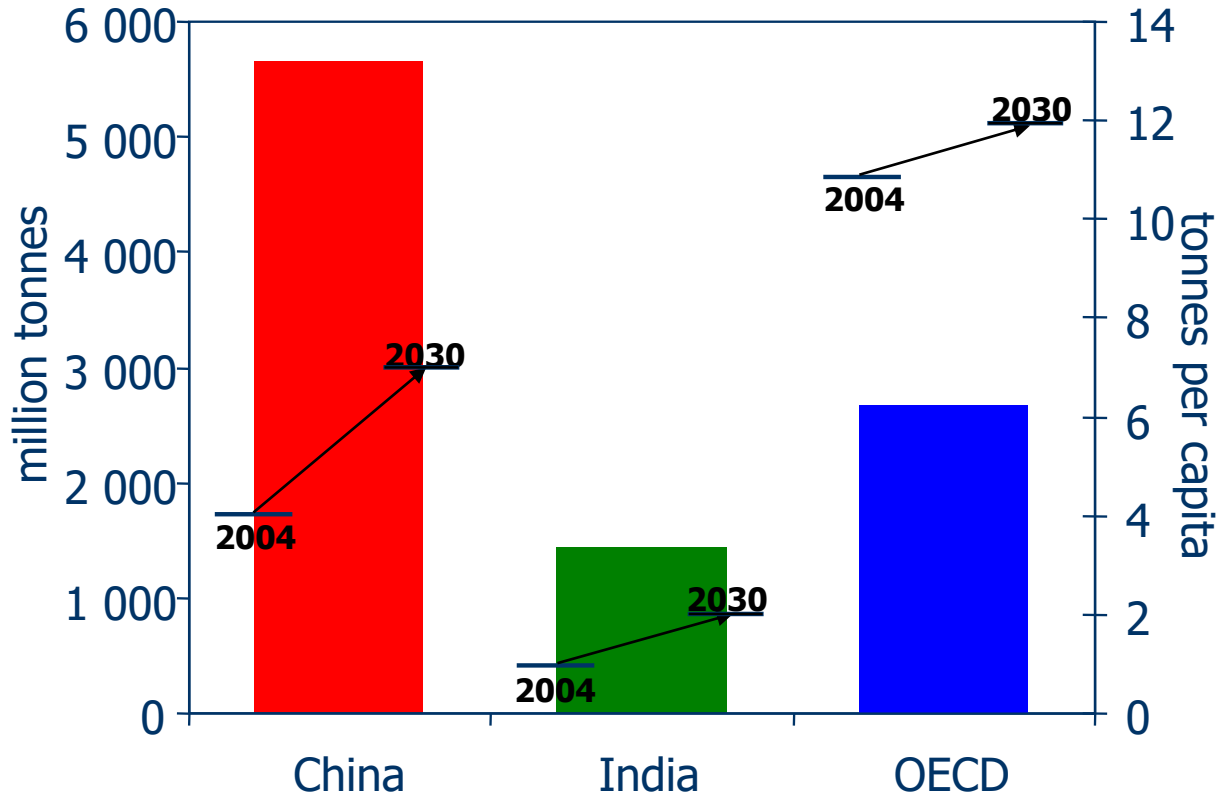
The average daily API in Beijing during the first 26 days of August 2008 was 36% lower than the average during the same period in the preceding eight years.

CO₂ Projections in Asia



Source: Institute of Energy Economics, Japan. 2007. Asia/World Energy Outlook 2007.

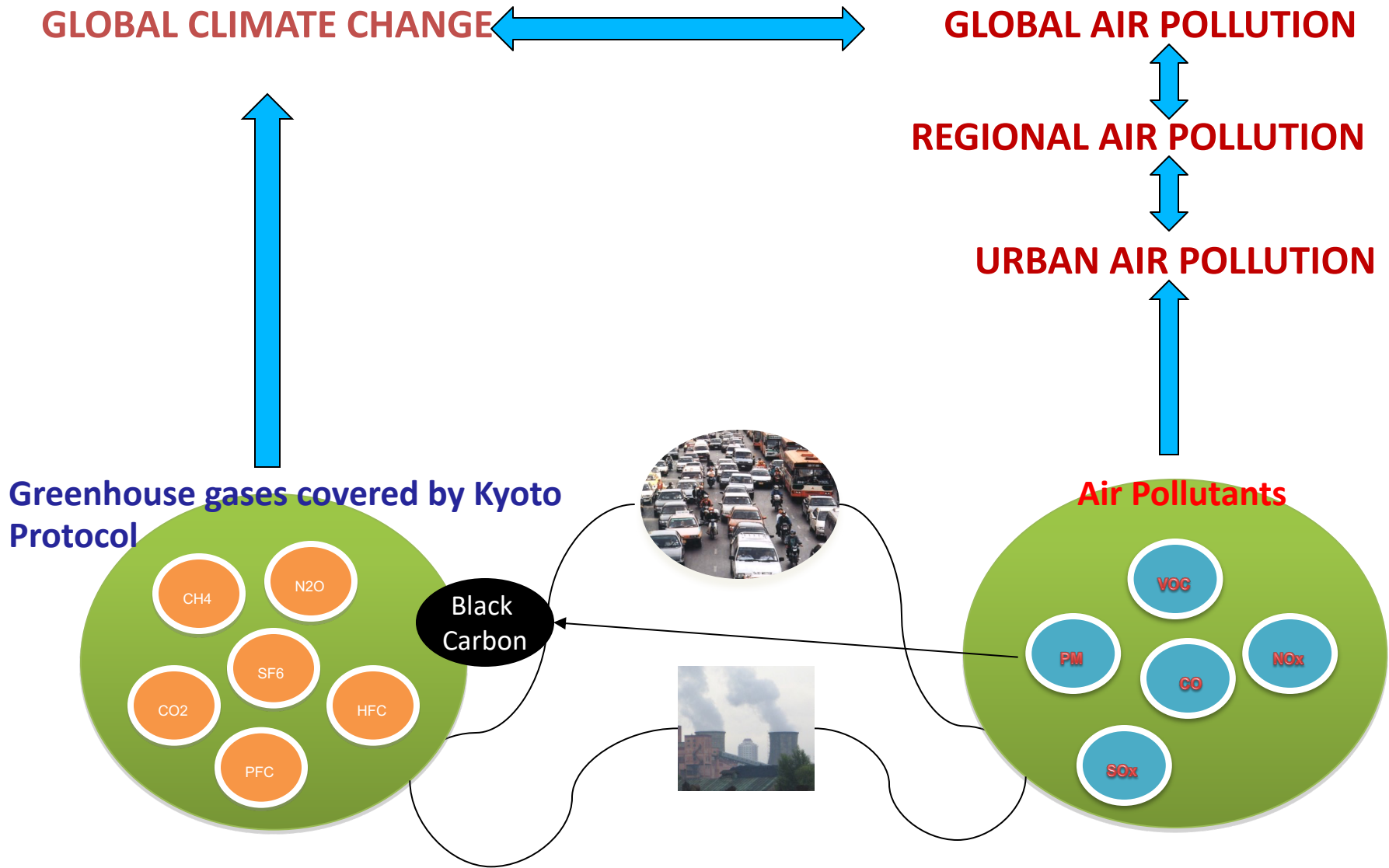
CO₂ Emissions Growth 2004–2030



Source: IEA, 2007 - World Energy Outlook 2006

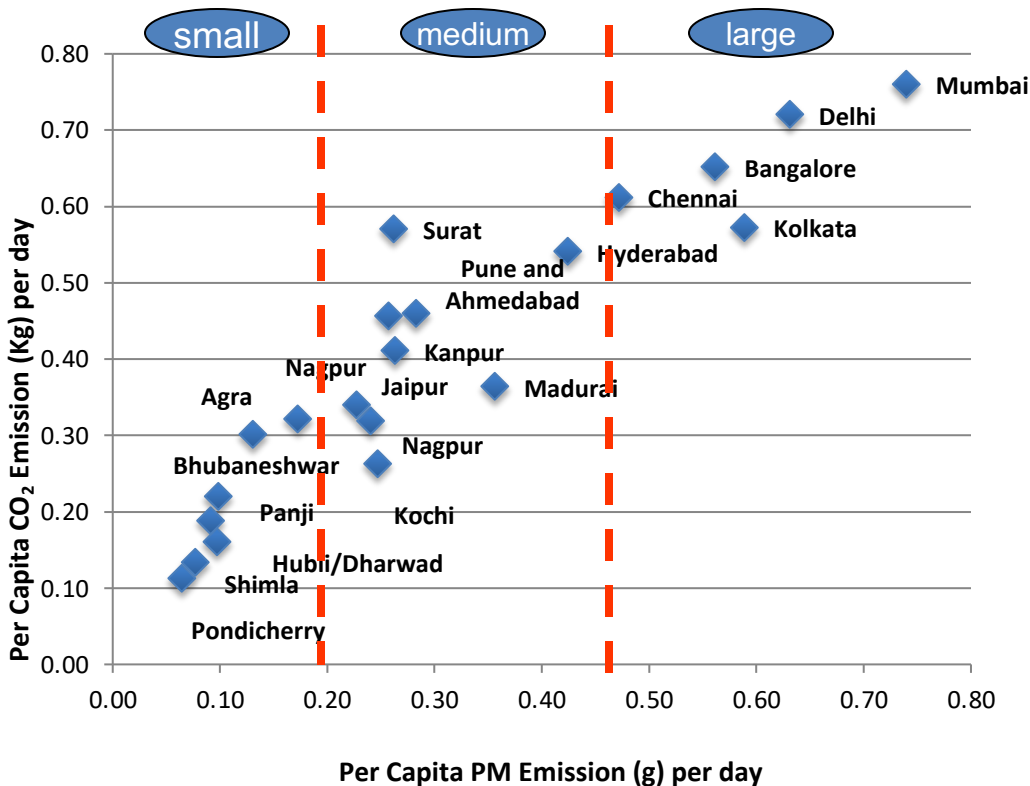
Emissions growth in China will be twice as large as in the OECD, but in 2030 Chinese per capita emissions will still be lower than 2004 OECD per capita emissions

Air Pollution and Climate Change Link



Air pollution and Emissions in India (Transport)

Per Capita CO₂ and Per Capita PM Emissions



- Indian cities show strong correlation between emissions of air pollutants and GHGs
- As cities grow in size, transport emissions increase
- Importance of catching cities early before they start to grow.

Source : Analysis of MOUD- Study on Traffic and Transportation Policies and Strategies in Urban Area By CAI-Asia

PM₁₀ and CO₂ Forecast for China and India (Transport)

Thousand Tons of PM₁₀

Million Tons of CO₂



-  China, P.R.
-  India

*** Projected PM₁₀ and CO₂ are based on current plans for emission (Euro) standards and fuel efficiency targets in China and India.**

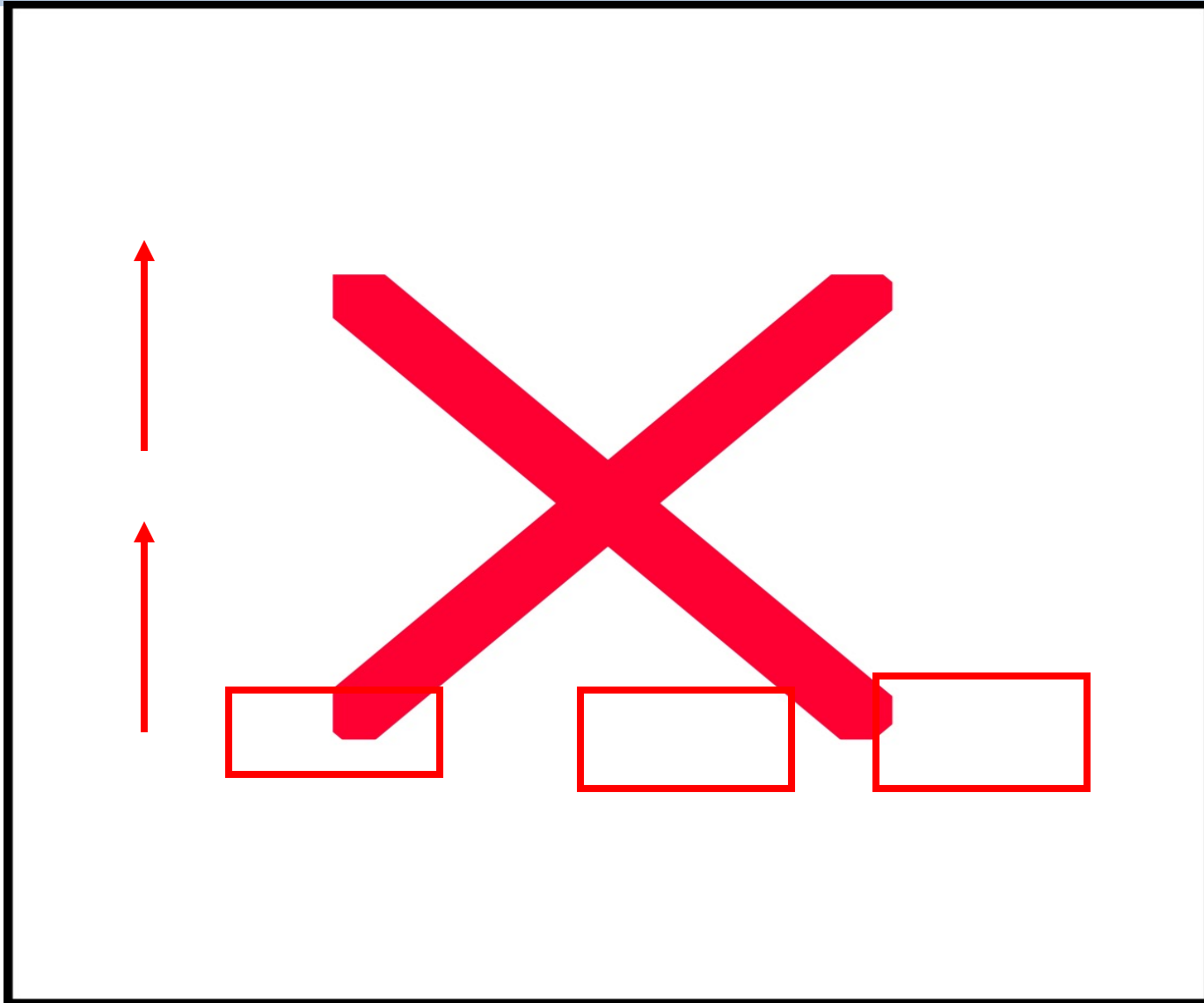
Source: ADB, 2006

Transport options to reduce air pollution and CO₂

	AP ↓	CO ₂ ↓	\$ Costs
Reduce emissions per kilometer			
Technology/ vehicle change	+++	+	low
Behavioral change (e.g. Fleet mgm't, driver's training)	++	+	low
Fuel-switch (e.g. gas to CNG/LPG, to biofuels)	++	?	?
Reduce emissions per unit transported			
Passenger transport:			
Mode switch	+++	++	low-med
Usage of larger units	+	+	low
Improved occupation rates	++	++	low
Freight transport	++	++	low-med
Reduce number of trips			
Land-use – Behavioral change	+++	+++	? - high
TDM	++	+++	? - med

Source: Authors, adapted from GTZ, 2007

The importance of scale: think integrated and big



Part 3

Case study: E-bikes China

Source: Preliminary results: Environmental Impacts of E-Bikes in Chinese Market, Christopher Cherry-University of Tennessee
Jonathan Weinert-Univ. of CA-Davis & Chevron, Yang Xinmiao-Tsinghua University

Emergence of Electric 2 wheelers in large Chinese Cities

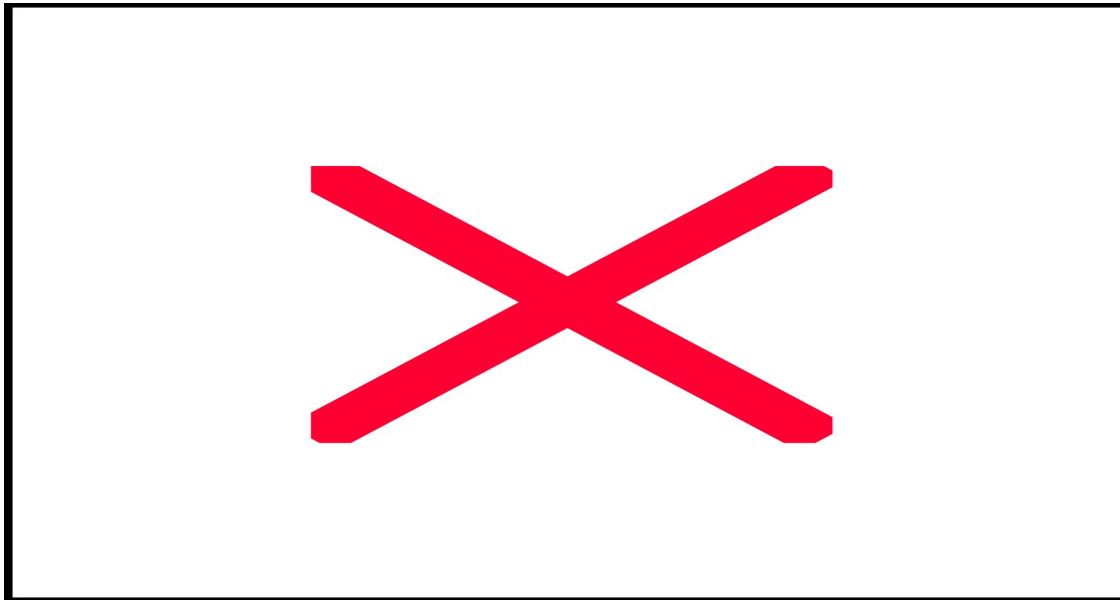
- From 48,000 in 1998 to 16 million in 2006
- Range: 40-50 km
- Actual max speed: 20-30 km/hr
- Cost: US \$200-500



Scooter style electric bike (SSEB)

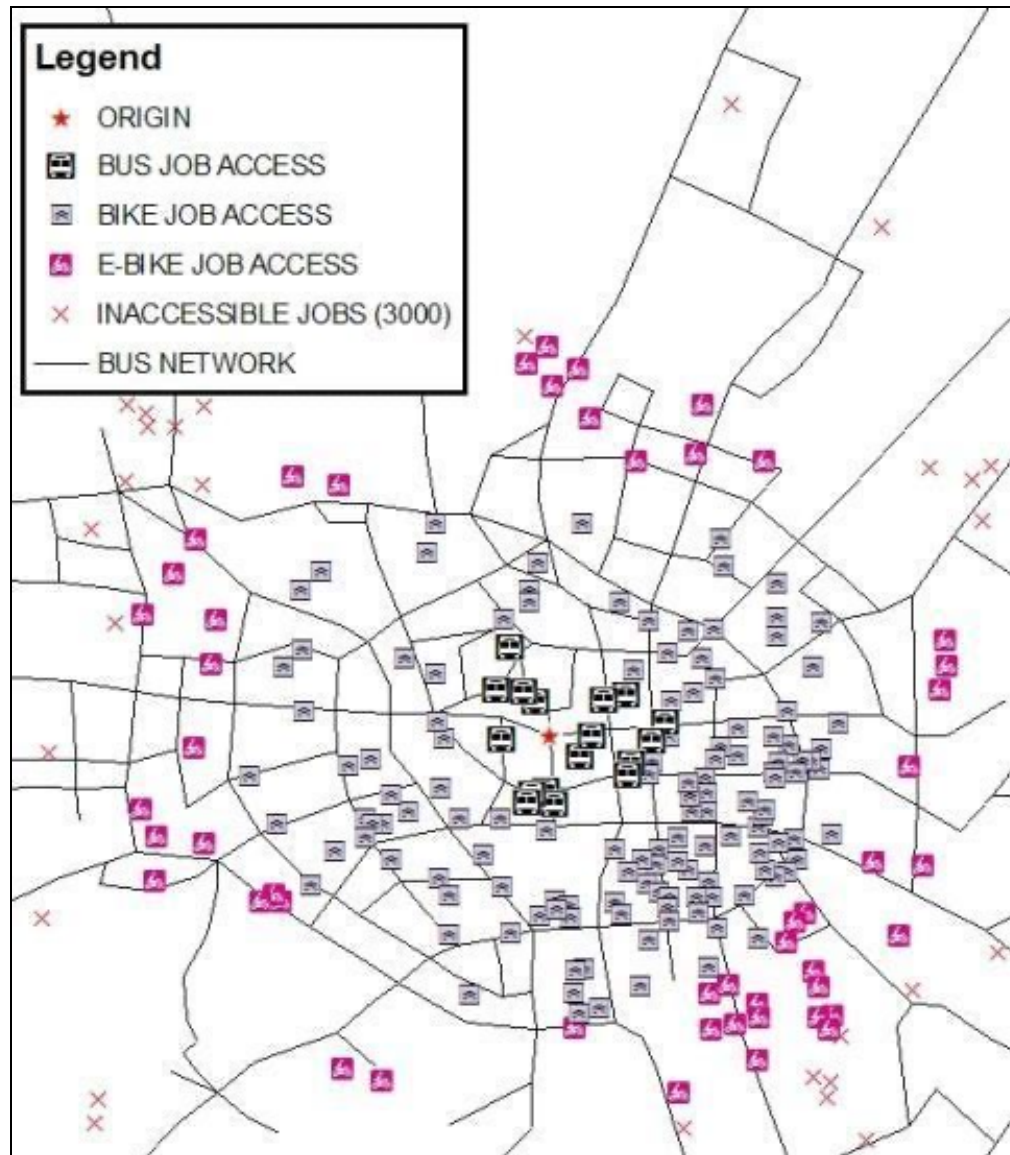


Bicycle style electric bike (BSEB)

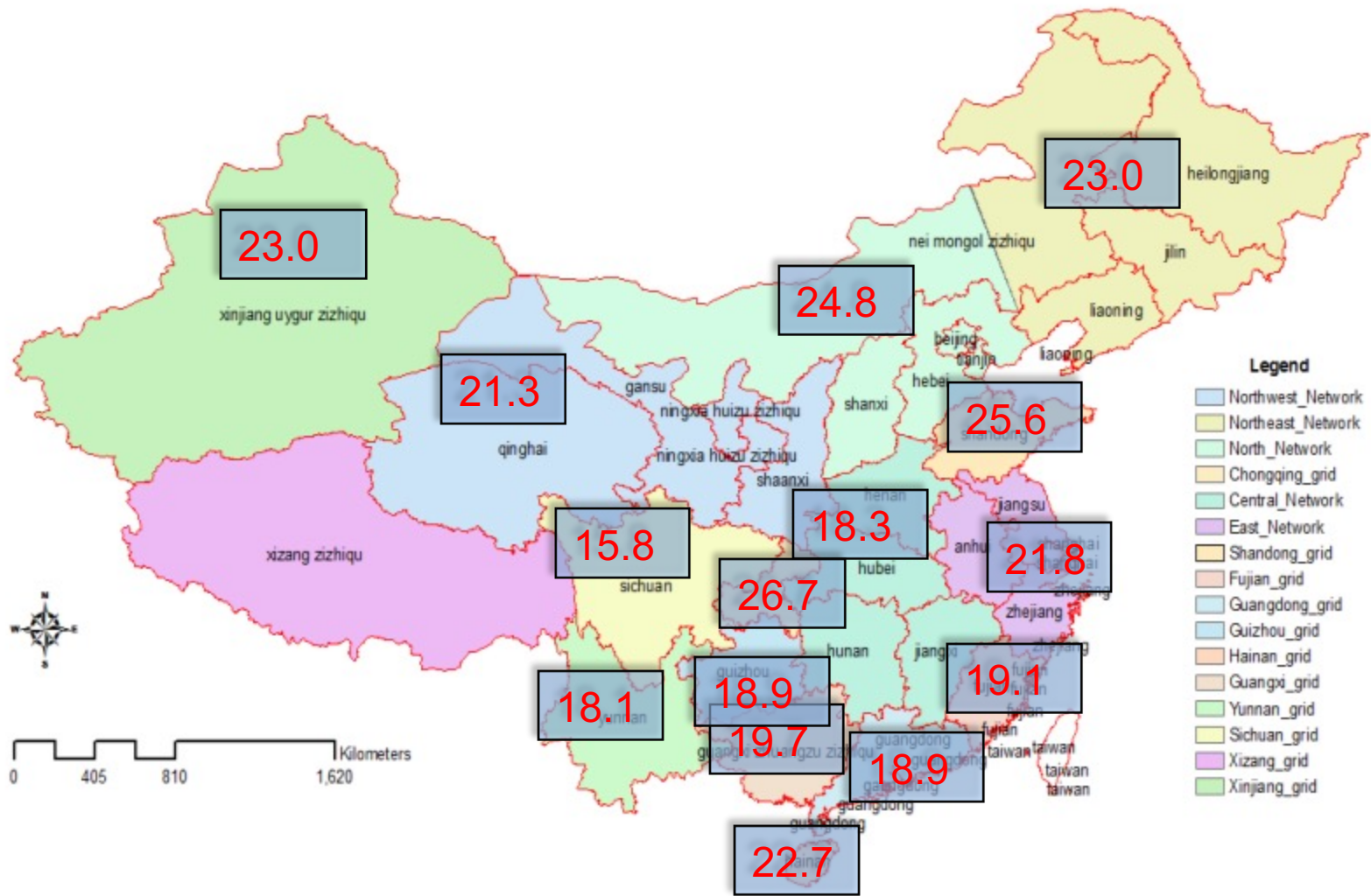


Sources: Jamerson (2007) LuYuan Electric Bike Company (2006), Yu (2004), China Statistical Yearbook (2007)

Mode Specific Jobs Access Within 20 minutes of Kunming City Center



E-bike emission rates gCO₂/km



Emission Impacts E-bikes in China



- E-bikes have an advantage in air pollutants over traditional motor cycles, and cars
- E-bikes have an advantage in GHG over cars, traditional motor cycles and busses
- E- bikes can result in increased lead emissions –lead acid batteries, however lithium ion battery technology can prevent this

What's Next: Light Electric Vehicles?



整车尺寸: 3050mm × 1580mm × 1530mm (长 × 宽 × 高)	
整车重量: 650kg	轴距: 2020mm
轮距: 1150mm	电机功率: 3kw
电池规格: 铅酸蓄电池 48V / 180Ah, 48V / 220Ah	
续航里程: 85km (180Ah), 120km (220Ah)	
最高车速: 45km/h	充电时间: 6-12h
最小转弯半径: 4.5m	爬坡度: 30%
调速形式: 无级调速	座位数: 4
制动距离: (车速 30km/h) < 4m	

For more information, please contact



CAI-Asia Center

www.cleanairnet.org/caiasia

Cornie Huizenga, Executive Director

cornie.huizenga@cai-asia.org

Sophie Punte, Deputy Executive Director

sophie.punte@cai-asia.org

Unit 3510, 35th Floor, Robinsons-Equitable Tower, ADB Avenue, Pasig City, Metro Manila, 1550 Philippines

www.cleanairnet.org/caiasia