Sustainable Transport Indicators – "Map the Gap"

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Essential Transport indicators and their practical applications

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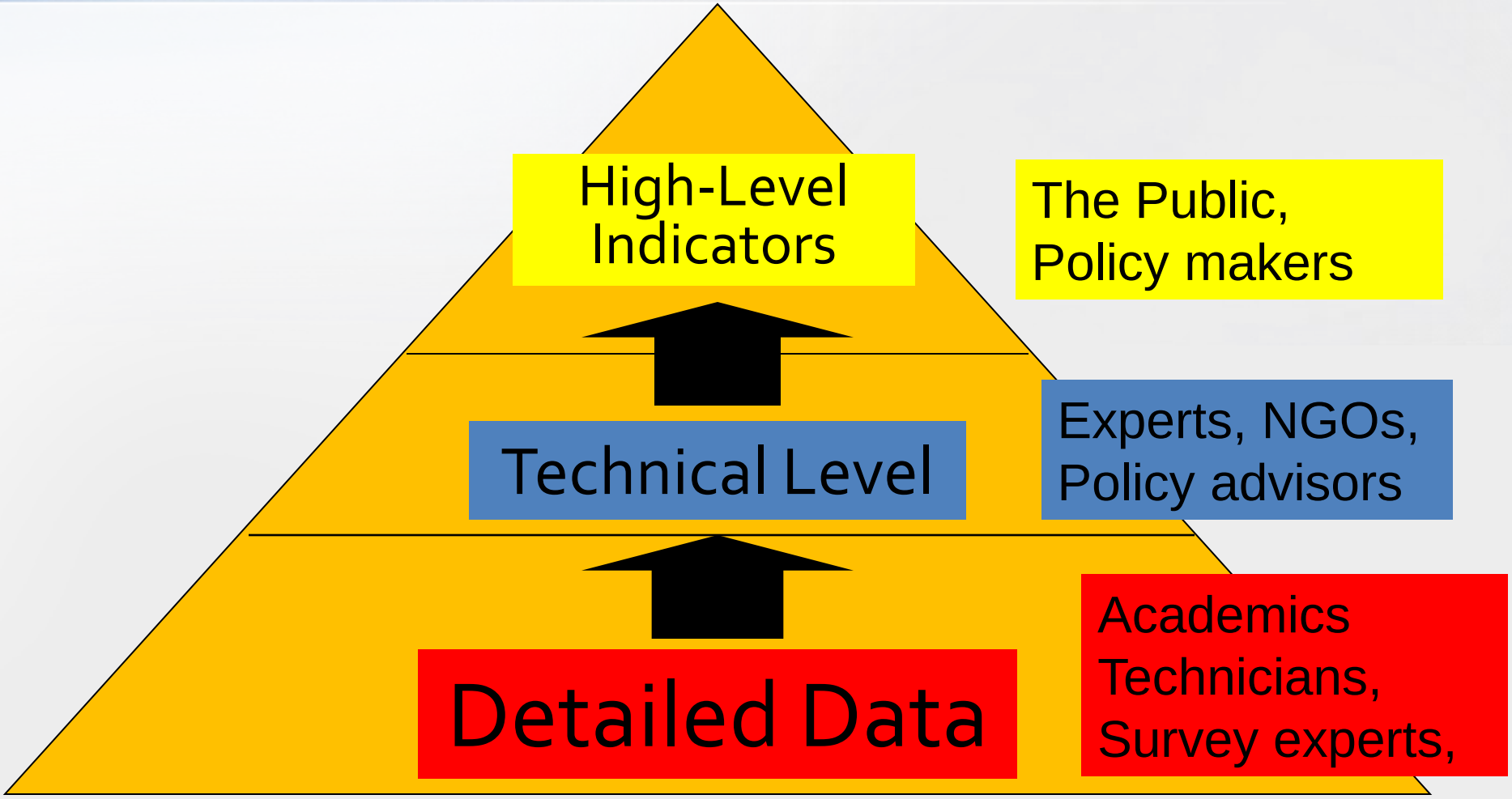
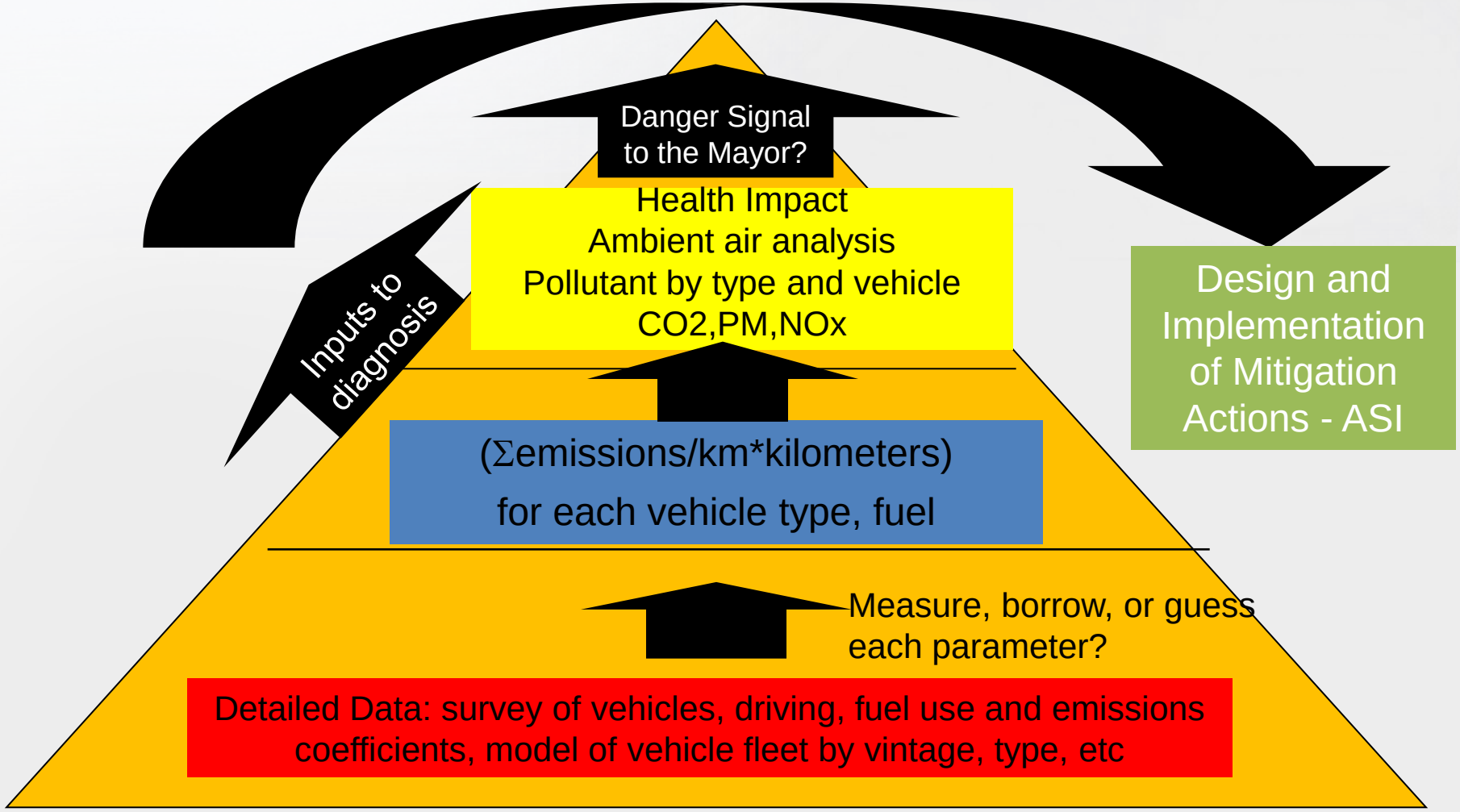
Bangkok

How do we know that the transport of a city is becoming sustainable or unsustainable?

Indicator Pyramids



Indicator Pyramids : ASIF Example



Source : PSUTA

Principles for Indicator Development

“Gold Standard” of Indicators

A good indicator should meet the following five standards:

1. The indicator is needed and useful.
2. The indicator has technical merit.
3. The indicator is fully defined.
4. It is feasible to measure the indicator.
5. The indicator has been field-tested or used operationally.

There is no silver bullet “indicator”

Vision Indicators

Example of Vision /Objective

Philippines development plan-2011-2016 uses 4 targets for Urban transport in Metro Manila

1. Decreased travel time from 2.17 min/km to 1.57 min/kr
2. Increase in travel speed from 27.79Km/hour to 38.2 km
3. Increased occupancy due to reduction of city buses - a
   conditioned from 37 to 45.
4. Decrease in pedestrian vehicle conflict (302 in 2010 to 10 in 2016)

Travel Time, Travel Speed, Occupancy and Traffic fatalities

Singapore Land Transport Master Plan – Main vision objectives for 2030 are

8 in10
households living within a 10-minute walk from a train station

85%
of public transport journeys (less than 20km) completed within 60 minutes

75 %
of all journeys in peak hours undertaken on public transport

Density/Train stations, Travel time, Average Trip length, Mode share

Evaluation Indicators

India Urban Transport - All cities covered by the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) have been advised to benchmark their level of services annually.

Urban Transport evaluation (37 Indicators)

1. Public Transport facilities (6 Indicators)
2. Pedestrian Infrastructure facilities (3 Indicators)
3. NMT facilities (3 Indicators) (Cycling)
4. Level of Usage of Intelligent Transport System (ITS) facilities (5 indicators)
5. Travel speed (motorized and mass transit)along major corridors (2 indicators)
6. Availability of Parking spaces (2 indicators)
7. Road Safety (2 indicators)
8. Pollution levels (4 indicators)
9. Integrated Land Use Transport System (7 indicators)
10. Financial Sustainability of Public Transport by bus (3 indicators)

Measure of reliability on the basis of which the indicator data has been collected

Standard Definition of Indicator

India – Walkability assessment

Ministry of Urban Development – Service level Benchmarks on Walkability

1. Signalized intersections delay (%)
2. Street lighting
3. Percentage of city covered with footpath

MOUD-Study on Traffic and Transportation policies & strategies - Walkability Index

1. Availability of footpath
2. Pedestrian Facility Rating

National Mission on Sustainable Habitat Indicators on Walkability

1. Adoption of urban street design standards
2. Total length of 12+ m streets with unobstructed footpaths as a percentage of the total length of streets in the city.
3. % of length of streets smaller 12m ROW with at least 125 trees per km.
4. % of length of streets wider than 12m ROW with at least 125 trees per km per footpath for which they provide continuous shade.
5. % of streets with total carriageway >10m which have 5 or more traffic calmed or signalized crossings per km.
6. % of intersections that have pedestrian

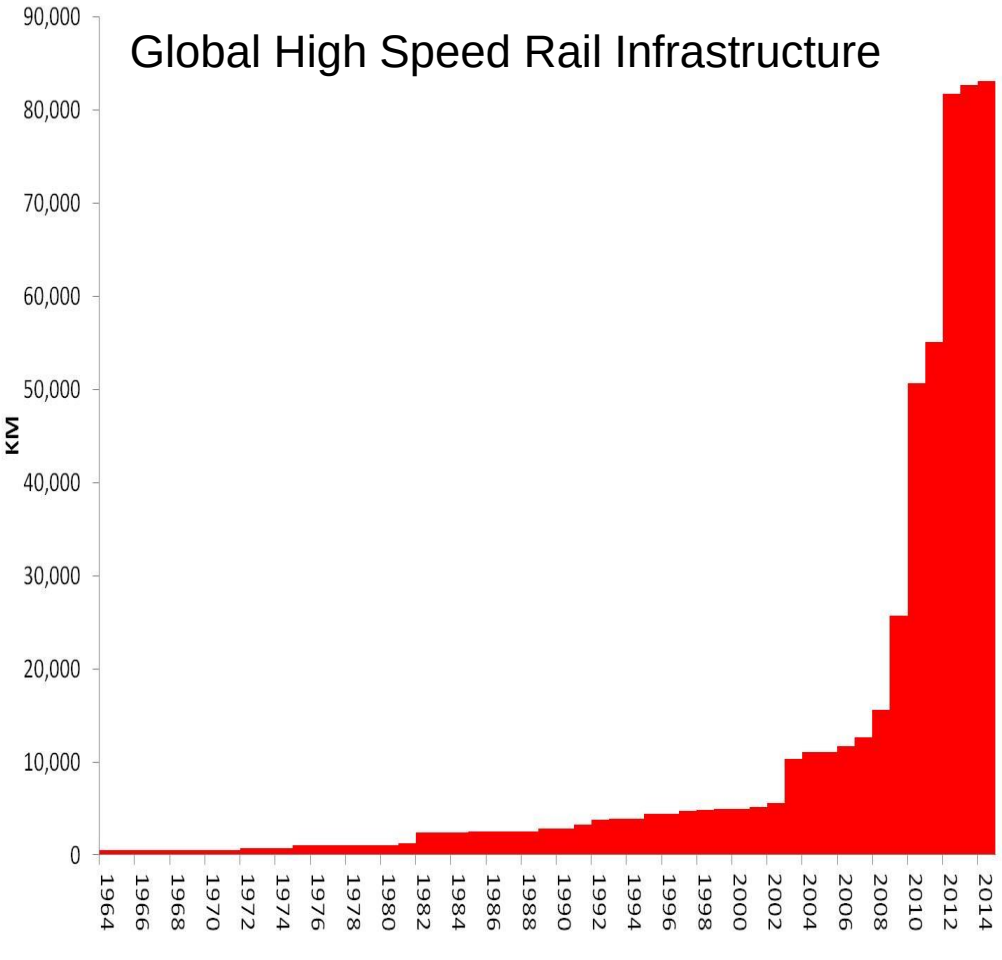
Frequency of Collecting Indicators

As a rule of thumb the "frequency at which indicators must be measured depends both on the rate of change of what is being measured and the accuracy required"

In India, urban transport data at national level was collected in 1994 and again in 2008

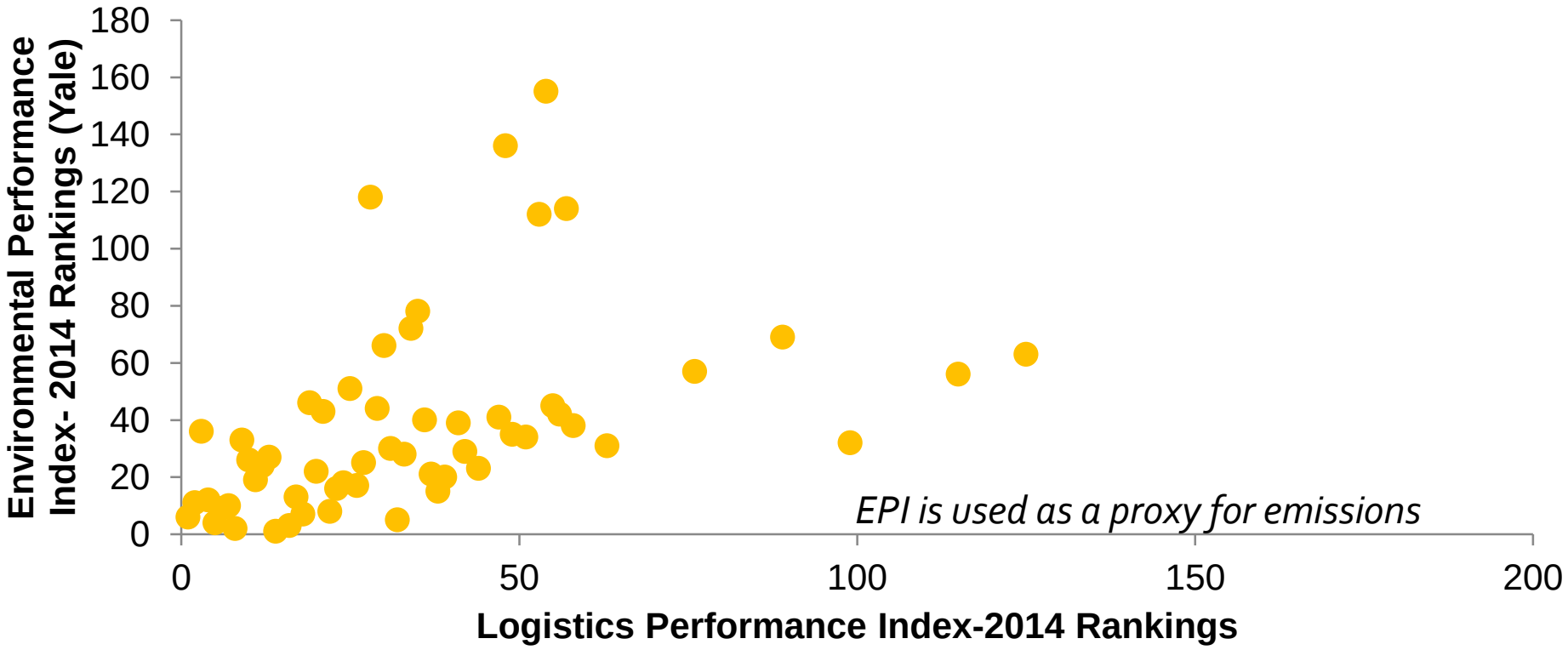
Between 2000 to 2012,

1. Global High Speed Rail infrastructure increased by **30** times
2. Global Bike share programs increased by nearly **90** times
3. Number of Cities with BRT has increased by **4** times



Use Comprehensive Indicators (Example – LPI)

LPI is an interactive benchmarking tool created to help countries identify the challenges and opportunities they face in their performance on logistics.
Indicators included are - Infrastructure, customs, service quality, timeliness, tracking-tracing & international shipments



Source : World Bank – LPI and Yale - EPI

Use Comprehensive Indicators (Example – ADB projects)

Carbon Footprint	Output indicator	Demand Indicator		Investment indicator
	CO2 tons/ km infrastructure improved	CO2 g/pkm	CO2 g/ tkm	CO2 tons/$milion invested
Expressways	88000	**47**	61	58667
Rural roads	10000	**74**	61	20000
Rehabilitated roads	600	55	68	5000
BRTS	44000	28	-	14667
Railways	42000	20	23	31111
Metros	48000	38	-	**1371**
Bikeways	24	-	-	**960**

Metro vs BRT - Metro is more efficient in terms of footprint investment indicator, but not in terms of output/demand.

Expressways vs Rural Roads – Expressways are more efficient in terms of demand indicators but not in terms of investment or output.

Instead of Footprint, if you use Savings, you would get different results.

Source : ADB – Reducing emissions from Transport Projects

Communicating Indicators

Clean Air Scorecard

Air Pollution & Health Index

Clean Air Policies and Actions Index

Clean Air Management Capacity Index

Breathe easy, Jakarta's air is fine: Survey

The Jakarta Post, Jakarta | Headlines | Mon, December 20 2010, 9:53 AM

Headlines News

Fresh doubt cast on Prabowo's suitability to rule

Customs investigate perpetrators of crude oil smuggling

Commentary: Prabowo: The (unwanted) hope for military power revival

Contrary to what you may think about Jakarta's air getting worse, a survey has determined the overall air quality in the city is "good".

A survey of Asian cities by the Clean Air Initiative (CAI) found that in terms of air quality, Jakarta is in the same league with other Asian cities notorious for their air pollution: Bangkok, Hanoi, Manila and Jinan in China.

Jakarta got a score of 61.9 for overall air quality, barely entering the "good" category — comprising scores between 61 and 80.

For the survey, the CAI analyzed the air quality of eight cities in seven Asian countries, Bangkok in Thailand, Manila in the Philippines, Colombo in Sri Lanka, Jinan and Hangzhou in China, Kathmandu in Nepal and Hanoi in Vietnam.

Philippine News
Asian Journal San Diego
The original and first Asian Journal in America

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Manila among top Asian cities with good air quality

Reprinted from Good News Philippines | MANILA, 12/04/2010 -- Five Asian cities, including Manila, obtained "good" clean air assessment in a pilot test of the Clean Air Scorecard developed by the Asian Development Bank (ADB) and Clean Air Initiative for Asian Cities (CAI-Asia).

The scorecard gives an overall clean air score from zero, the lowest grade, to a maximum of 100.

Overall score has three indices: air pollution and health, clean air management capacity, and clean air policies and actions.

Results presented at the three-day Better Air Quality conference in Singapore which ends today showed the five pilot cities with "good" clean air score were Bangkok (Thailand), Hanoi (Vietnam), Jakarta (Indonesia), Jinan (China) and Manila.

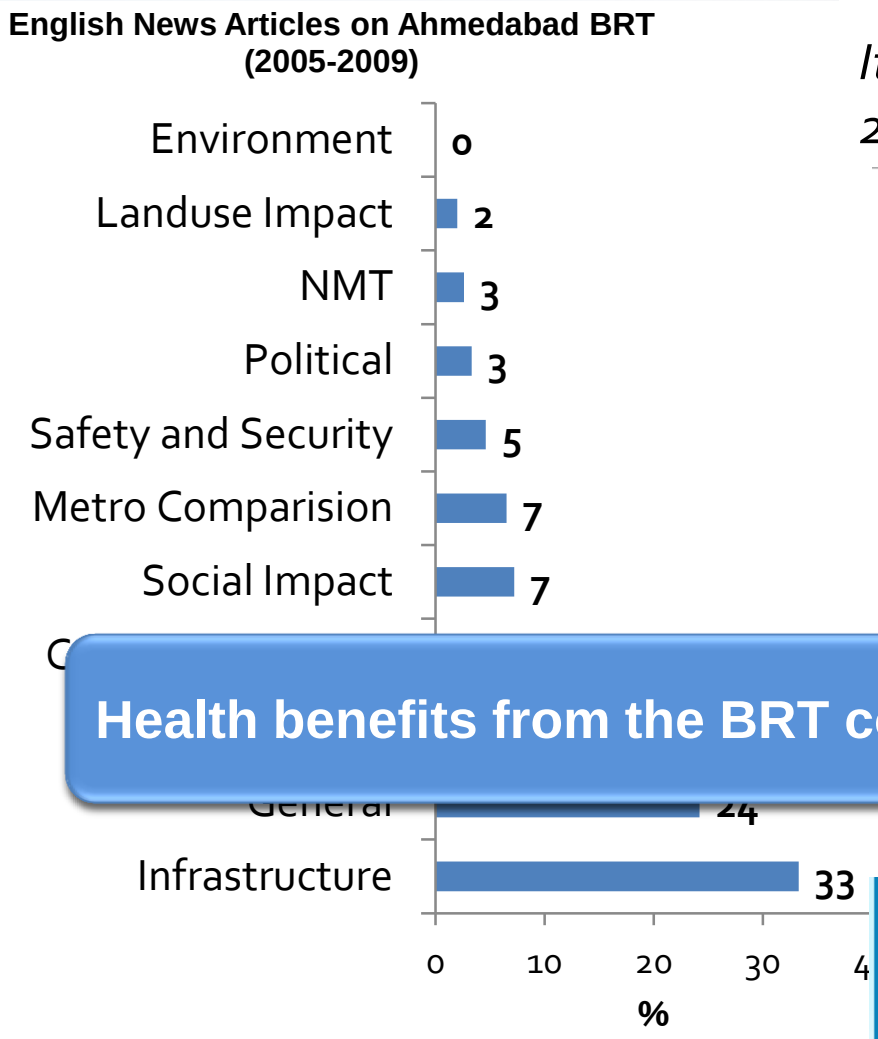
Details of the report have yet to be released.

ADB said it implemented the project with CAI-Asia Center in Manila last July. It added in a separate statement CAI-Asia Center is planning to implement the project in China.

CAI-Asia was established in 2001 by ADB, World Bank and United States Agency for International Development. CAI-Asia Center is the secretariat.

Other three pilot cities — Colombo (Sri Lanka), Hangzhou

Building Partnerships with Stakeholders



"We have to be sure of what we're spending for. It must be beneficial" - President Aquino (*April 2013) on Cebu BRT*

Bayanihan

Filipino news about people, events and the environment

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Proposed BRT system to reduce air pollution in Cebu City

AUGUST 29, 2012

in ENVIRONMENT

Health benefits from the BRT could be US$100 to US$140 million

At the presentation of study results by the Clean Air Initiatives for Asian Cities (CAI-Asia), some officials in favor

EMB-7: BRT to lessen air pollution

By Liv G. Campo/FPL (The Philippine Star) | Updated August 29, 2012 - 12:00am

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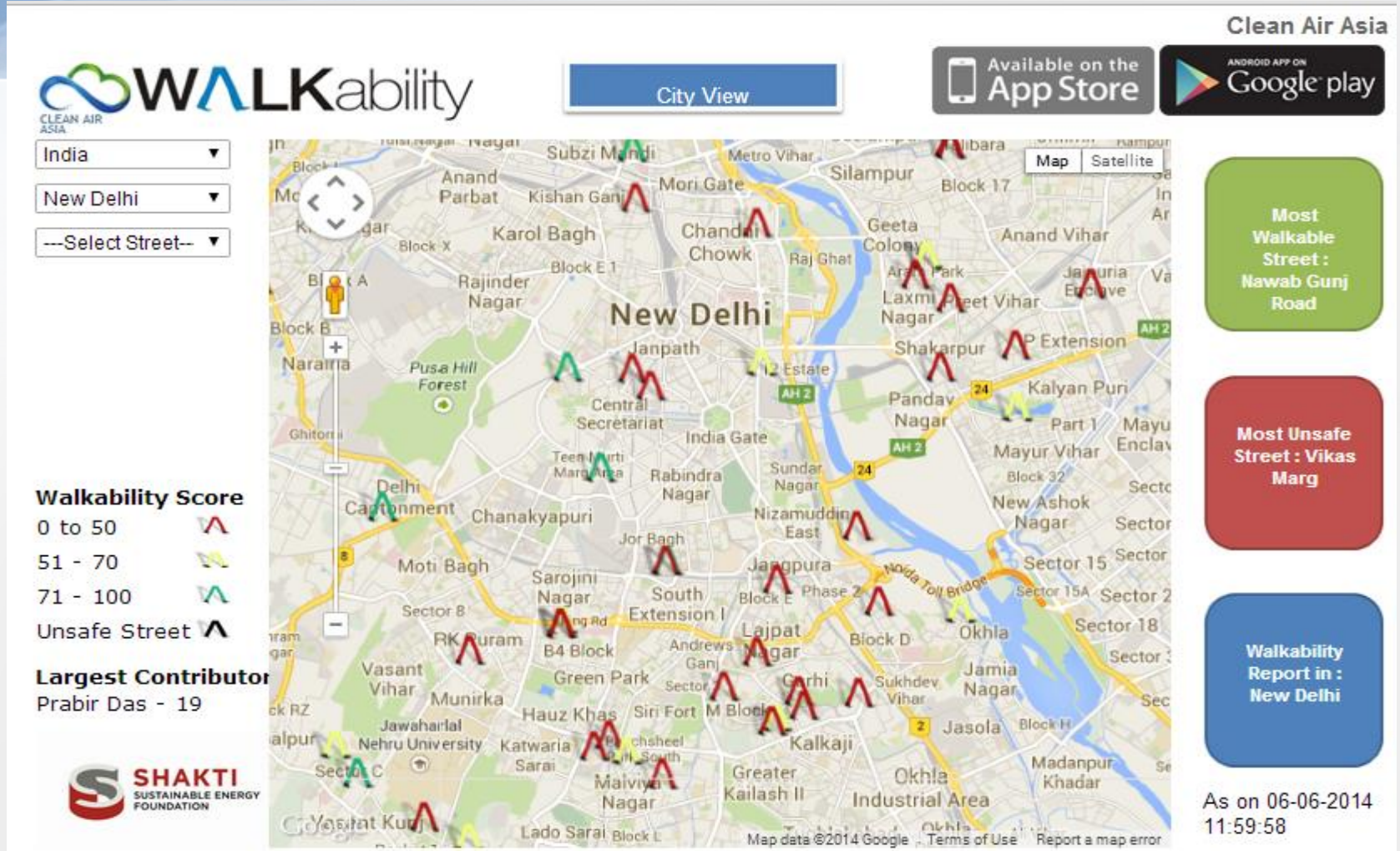
CEBU, Philippines - An official of the Environmental Management Bureau 7 believes that the proposed Bus Rapid Transit System will lessen the air pollution problem in Cebu

Crowd sourcing Indicators



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Disclaimer:

The data is representative of situation on ground. While it is based on the contribution of the "Walkability App" users, it may not be completely

Recent Developments

Move towards Standardization?

"Cities, on average, are each collecting in excess of 100 indicators, and in some cases, annually collect 1,000 indicators. The eight pilot cities were collecting over 1,000 various indicators, ***only three of which were common to all cities****"*
-Global City Indicators Program Report (2008)

ISO 37120:2014 - Sustainable development of communities — Indicators for city services and quality of life

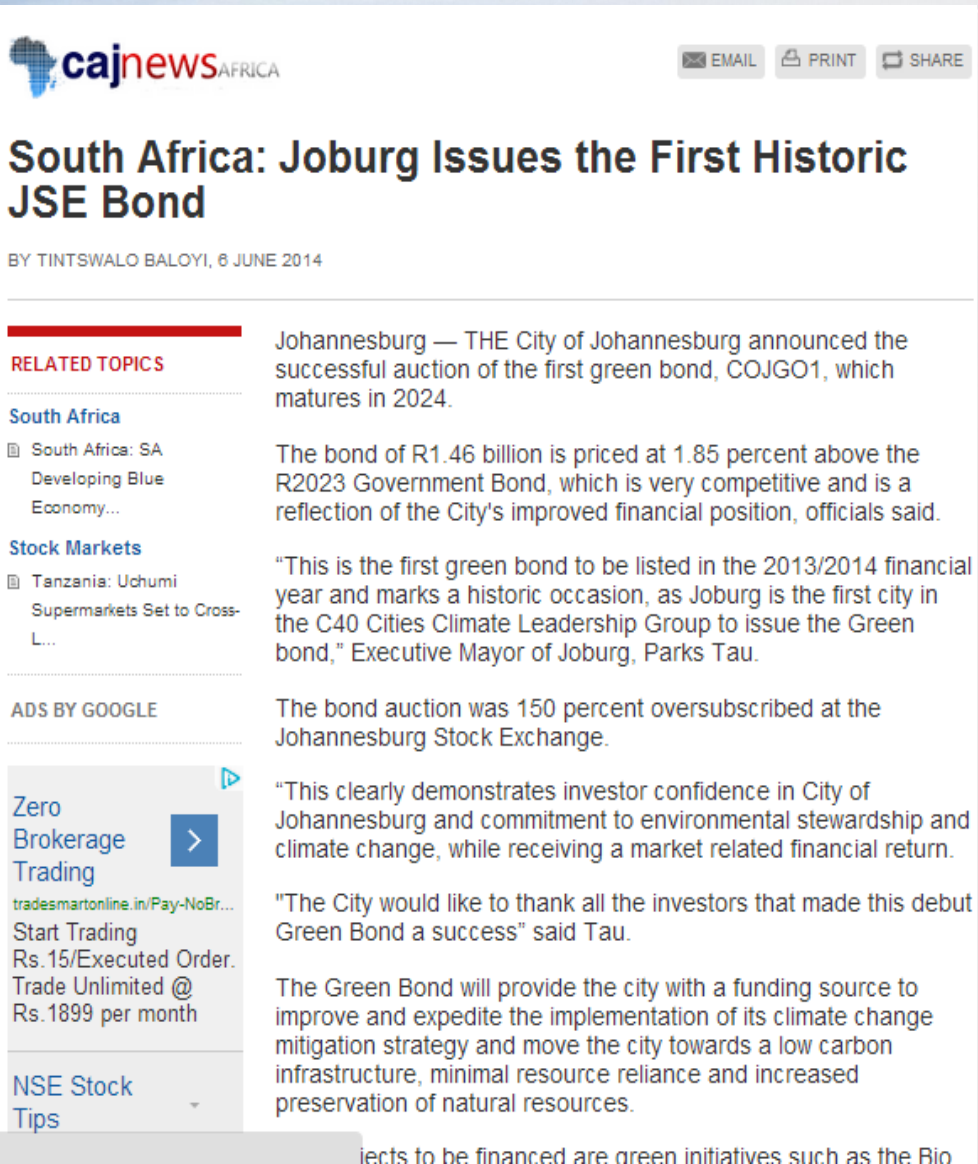
Core Indicators (requirement)

1. Kilometres of high capacity public transport system per 100 000 population
2. Kilometres of light passenger public transport system per 100 000
3. Annual number of public transport trips per capita
4. Number of personal automobiles per capita

Supporting Indicators (recommended)

1. Percentage of commuters using a travel mode to work other than a personal vehicle
2. Number of two-wheel motorized vehicles per capita
3. Kilometres of bicycle paths and lanes per 100 000 population
4. Transportation fatalities per 100 000 population
5. Commercial air connectivity (number of non-stop commercial air destinations)

Indicators will drive Future Finance



cajnews AFRICA

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South Africa: Joburg Issues the First Historic JSE Bond

BY TINTSWALO BALOYI, 6 JUNE 2014

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NSE Stock Tips

Johannesburg — THE City of Johannesburg announced the successful auction of the first green bond, COJGO1, which matures in 2024.

The bond of R1.46 billion is priced at 1.85 percent above the R2023 Government Bond, which is very competitive and is a reflection of the City's improved financial position, officials said.

"This is the first green bond to be listed in the 2013/2014 financial year and marks a historic occasion, as Joburg is the first city in the C40 Cities Climate Leadership Group to issue the Green bond," Executive Mayor of Joburg, Parks Tau.

The bond auction was 150 percent oversubscribed at the Johannesburg Stock Exchange.

"This clearly demonstrates investor confidence in City of Johannesburg and commitment to environmental stewardship and climate change, while receiving a market related financial return.

"The City would like to thank all the investors that made this debut Green Bond a success" said Tau.

The Green Bond will provide the city with a funding source to improve and expedite the implementation of its climate change mitigation strategy and move the city towards a low carbon infrastructure, minimal resource reliance and increased preservation of natural resources.

...jects to be financed are green initiatives such as the Bio

"Need for providing transparency and confidence about the environmental benefits of specific projects/city actions"

"The Green Bond will provide the City with a funding source to improve and expedite the implementation of its **climate change mitigation strategy** and move the City towards a low carbon infrastructure, minimal resource reliance and increased preservation of natural resources."

Indicators will drive domestic finance

Bangkok 2020 Declaration

20 Goals with 105 Indicators Proposed

1. Avoid – 3 Goals, 17 Indicators
2. Shift – 4 Goals, 33 Indicators
3. Improve – 5 Goals, 16 Indicators
4. Cross cutting – 8 Goals, 39 Indicators

Meta Indicators Proposed

1. Change in vehicle kilometres travel per person over time at the metropolitan and national levels
2. Mode share of all major transport modes at the metropolitan and national levels,
3. Fuel efficiency levels of passenger and freight fleets

TRB Indicators Subcommittee Recommendations

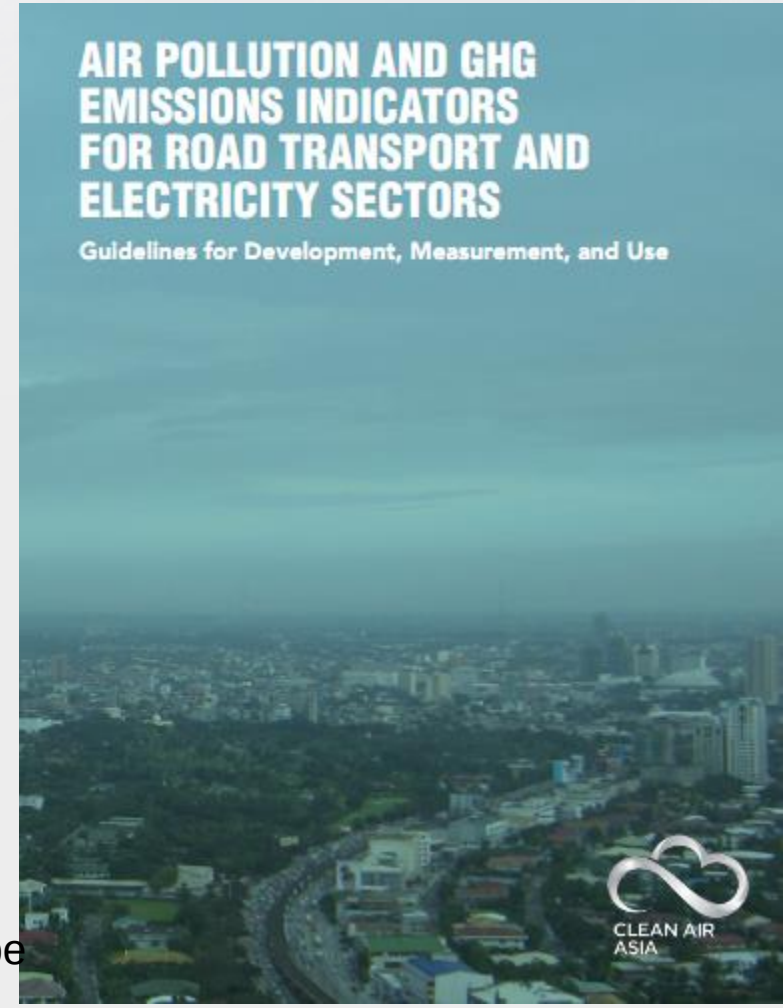
Universal Indicators (application in virtually every situations and jurisdictions)

1. Motor Vehicle Ownership
2. Motor vehicle Travel
3. % Of Trips by different modes
4. Total vehicle emissions
5. Number of days of air pollution exposure per year
6. Climate change emissions
7. Emissions from vehicle and facility construction
8. Crash deaths and injuries
9. Police-reported crashes
10. Consumer expenditures on transport
11. Access to employment
12. Expenditures on roads, public transit, parking, ports, etc.
13. Quality of walking, cycling, public transit, driving, taxi, etc.
14. Portion of household budgets needed to provide adequate transport.

Clean Air Asia Indicator Guidelines

- AP/GHG Indicators and input parameters selection
  - 24 transport indicators
- Guidelines for Generation, interpretation and analysis of indicators
- **“Collected data are often not easily accessible, or are incomplete”**
- Defaults for missing data
- CO_2 emissions from road transport

1. Road transport CO2 emissions per GDP
2. Road transport CO2 emissions per capita
3. Road transport CO2 emissions per passenger- km
4. Road transport CO2 emissions per freight ton-km
5. Road transport CO2 emissions per vehicle type
6. Road transport CO2 emissions per vehicle-fuel type



Proposed Indicators for Post-2015 Development Agenda (MDG)

6 targets and 12 Indicators

Process Indicators (2030 compared to 2010 baseline) and improvements

1. % of the rural population living within 2 km of of an infrastructure providing all-year access
2. % of rural population living within 30 min walk of formal or informal transport
3. Mean daily travel time for individuals to reach employment, education, health etc.
4. Proportion of income spent by urban families on transport to reach employment, education, health
5. Logistics Performance Index
6. Long distance passenger modeshares by public transport
7. Fatalities due to road crashes
8. Serious injuries due to road crashes
9. PM10 and/or PM2.5 emissions from passenger & freight vehicles
10. Transport related fossil fuel subsidies
11. fuel economy in all new LDV
12. Travel share of public transport, cycling & walking

Source : Slocat

NAMA's and MRV Gaining Prominence

Output Indicators (efficiency)

1. g CO2/pkm and g/CO2/tonkm
2. g CO2/ km
3. g CO2/GDP (USD)
4. g PM/pkm and g PM/tonkm
5. g NOx/pkm and g NOx/tonkm
6. g CO2/VKM (mode wise)
7. KTOE/capita
8. Fatality/VKM
9. ton CO2/$ investment

Activity Indicators (Avoid-Shift)

1. PKM/capita
2. TKM/capita
3. VKM/capita (mode wise)
4. PKM mode share/Trips mode share, TKM mode share
5. Average Speed
6. Load factor

Investment Indicators (infrastructure/investment)

1. Km of infrastructure built/Year
2. USD of Transport Investment/Year

Technology Indicators

1. MJ/VKm (different modes)

The Final Word

- **Local political will and money**
  - Collection and maintenance costs – assure continuity
  - Ability to overcome data ownership feuds
  - Willingness to harmonize with efforts elsewhere

- **“How To” - the actual methodology**
  - Develop local expertise
  - Survey available data
  - Develop standards

- **Why and what matters – Couple to policy-making**
  - Introduce indicators and their message to policy makers
  - Diagnose, choose, prognose, implement evaluate, rebalance, market

“greatest barrier to using indicators is the lack of cooperation among stakeholders “ *- Lee Schipper*

Thank you

Lee Schipper 1947-2011

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