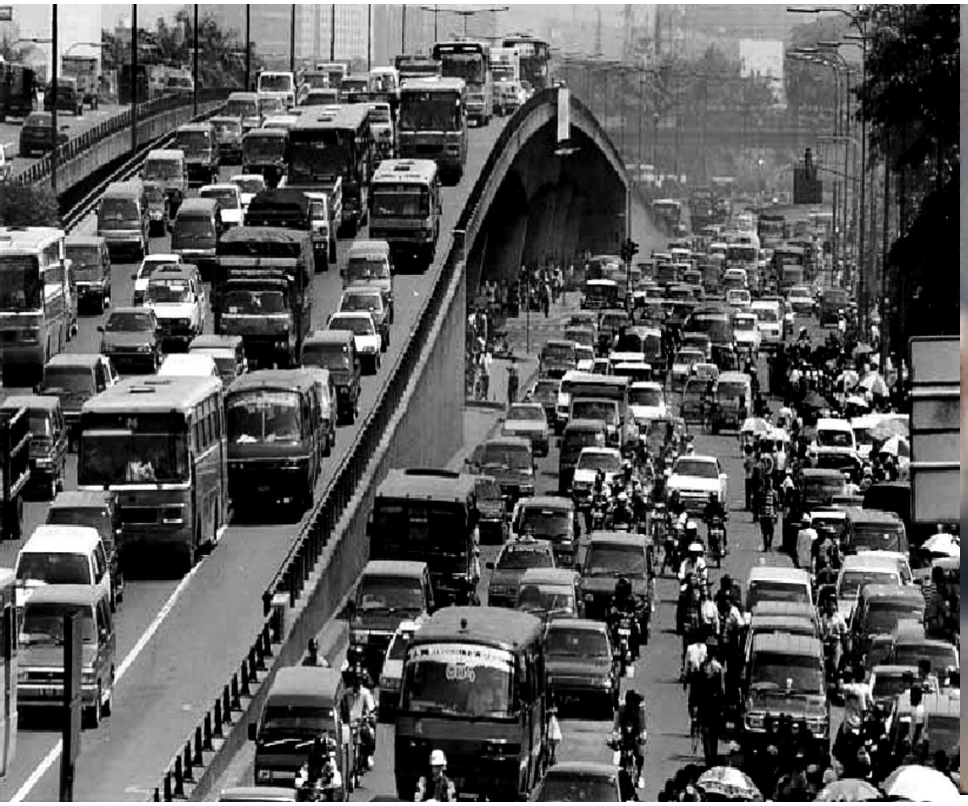
Air Quality, Mobility and Our Health



Conclave of Champion Cities from Africa and Asia on Clean Air and Sustainable Mobility

Centre for Science and Environment, New Delhi April 9, 2015

Today Newspapers have started their air pollution campaigns in Delhi…

City enveloped in smog, back to pre-CNG

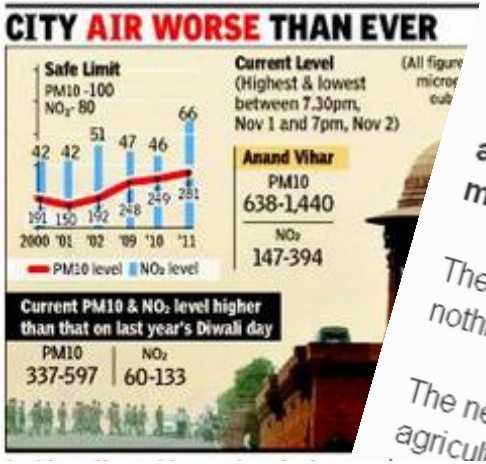
Gains Of Switch To Cleaner Fuel Frittered Away

Neha Lalchandani | TNN

New Delhi: Delhi's air pollution has reached alarming levels. For proof, just look out of the window. The grey-white 'haze' that has been covering the city since October 28, say experts, is actually smog that is linked to the rapid rise in

▶High pollution, P 6

CITY AIR WORSE THAN EVER



Delhi winter smog is not an act of God

Nov 22, 2012

During the first week of November, Delhi went under a thick blanket of smog. The breeze nearly stopped, and the skies turned grey and calm weather led to fumes settling close to the ground. Many people wore masks, scarves or handkerchiefs to cover their faces.

The resultant outcry in the smog-hit city is nothing new and that it happened earlier in the year.

The new twist came from agricultural

'सांसों' पर स्मॉग की 'स्याह' परतें

Updated on: Thu, 15 Nov 2012 02:00 AM (IST)

Smog leaves Delhi gasping for breath

TNN | Nov 3, 2012, 01.33 AM IST

poisonous gases . Not co- air quality, the judiciary (see graphic) — that exists

insisting that this was

billowing in

Smog delays Sheila Dikshit's flight to Punjab

02.44AM IST

| Punjab | NASA | flight | Flashpoint | Apex

Ludhiana trip by Delhi chief minister Sheila Dikshit in a chartered telecom industrialist family became the flashpoint of the ongoing Delhi and Punjab when the plane was delayed by nearly three hours

Disadvantage Delhi: Smog here to stay

Darpan Singh, Hindustan Times
New Delhi, November 08, 2012

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email print 0 Comments Like 3 Tweet 0

The Centre for Science and Environment (CSE), in its latest report, has delivere
The smog is here to stay. It has also warned that Delhi is in the grip of a multi-p
matter is not the only thing choking us. Nitrog

Media reportage on air pollution in cities of Africa…

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PREMIUM Times

Friday, February 20, 2015 | Abuja ☀ 32

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Air, air, everywhere, nor a place to breathe in Lagos! By Ogaga Ifowodo

August 21, 2013 Premium Times

NEWS

Aerial measurements shed light on pollution from Lagos

11 December 2009, by Tom Marshall

UK scientists have quantified for the first ... emission of air pollutants including carbon monoxide and ... (VOCs) around the African megacity of Lagos in

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Nairobi traffic jam should be marketed as a tourist attraction

Updated Monday, February 17th 2014 at 15:32 GMT +3

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By Editorial

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POLLUTION

London, L.A., Beijing, Delhi, Nairobi… Is Smog an Inevitable Urban Growing Pain?

By ANDREW C. REVKIN FEBRUARY 15, 2015 9:46 AM 36 Comments

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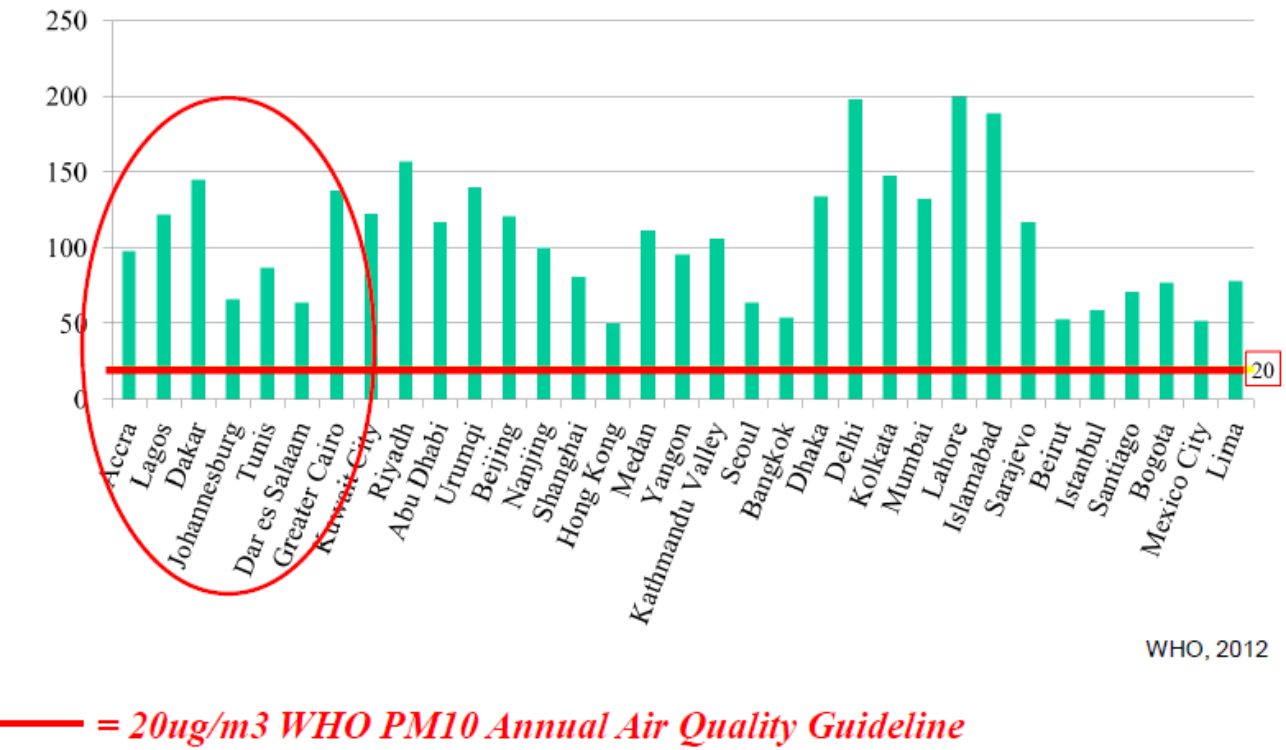
Nigeria smog: October, 2005

•**Wednesday, October 12, 2005: The first-ever smog in Lagos Nigeria, which lasted for more than six hours.**

This led LAMATA to facilitate the Lagos Air (vehicular emission) Quality Monitoring Study (LAQMS) in February 2007

Annual average particulate levels of select African cities are well above WHO guideline



WHO, 2012

= 20ug/m3 WHO PM10 Annual Air Quality Guideline

Reported pollution levels in African cities are lower than some of the worst hit cities in India.

But they are still much higher than the stringent WHO guidelines.

PM10 levels are 7.5 times the WHO standards in Dakar, 5 times higher in Accra, 6 times higher in Lagos, and more than 3 times higher in Jo berg and Tunis.

In Delhi levels are 10 times higher.

The beginning in African nations….

•The WHO database on outdoor air pollution of 2013 has listed African countries that monitor particulate:

- Algeria, Botswana, Ghana, Madagascar, Mauritius, Nigeria, Senegal, South Africa, and Tanzania, Ethiopia and Zimbabwe.

•Also Egypt, Madagascar, Tunisia, and Morocco have published reports of PM monitoring data.

•Nairobi: National Environmental Management Authority (NEMA) has drafted the air quality regulations in 2008. To be notified. Monitoring to begin…

Air quality monitoring: Senegal takes a step forward

The Senegalese Ministry of Environment and Sanitation has set up a Centre for Management of Air Quality. There are 5 fixed monitoring stations in Dakar. Also a portable air quality monitoring van.

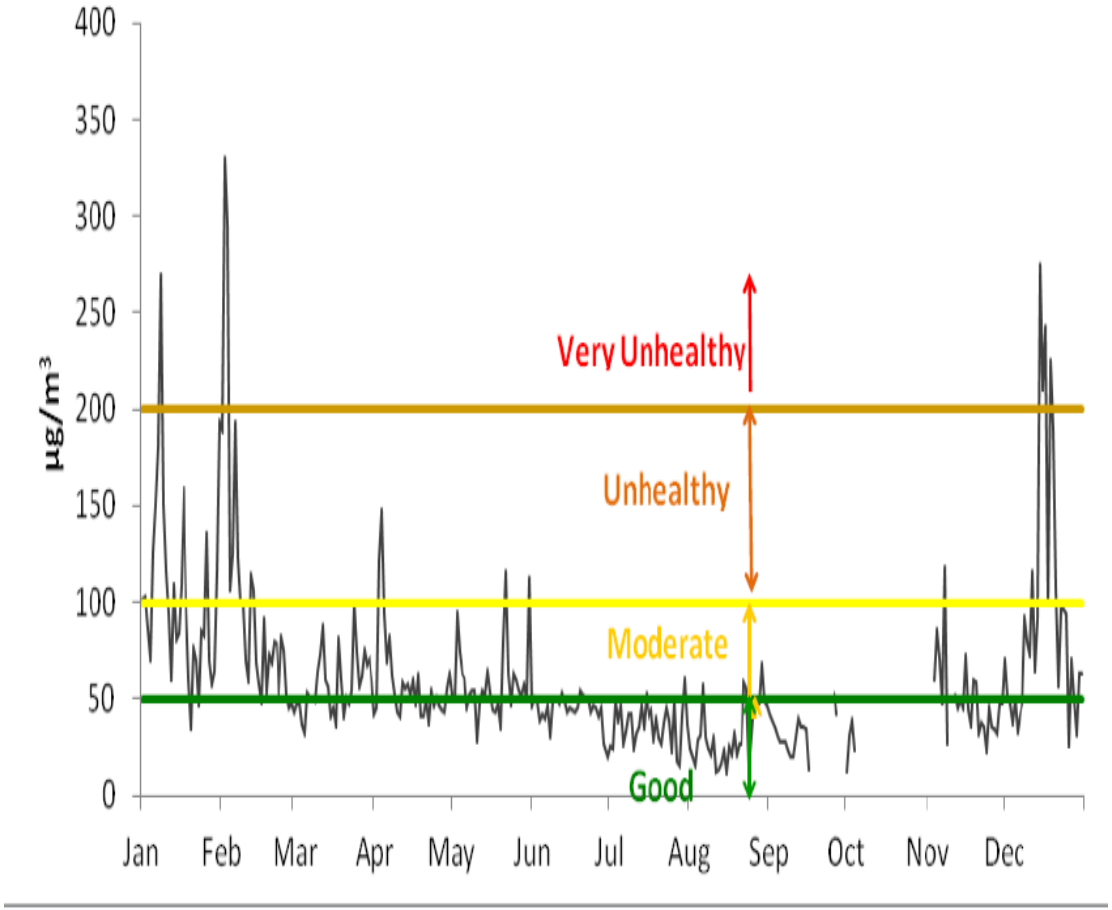
The air quality measurements are characterized and communicated to the public through a simple air quality index.

Pollutant	Averaging time	Maximum Limit Value	
		WHO	Senegal
Sulphur Dioxide (SO_2)	1 hour 24 hours Year	500 (10 min) 125 50	- 125 50
Nitrogen Dioxide (NO_2)	1 hour Year	200 40-50	200 40
Ozone (O_3)	1 hour 8 hours	150-200 120	- 120
Carbon Monoxide (CO)	1 hour 8 hours	30 000 10 000	- 30 000 (24h)
Particles <10 µm (PM10)	24 hours Year	50 * 20 *	260 80
Lead (Pb)	Year	0.5-1,0	2

*) EU limit values

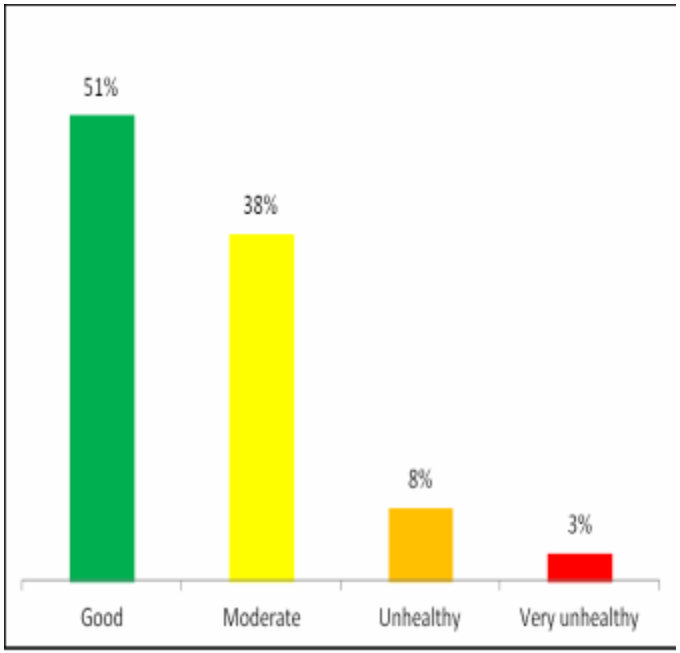
Air Quality Index (AQI) values…	Levels of Health Concern	Colors
When the AQI is in this range…	… air quality conditions are:	… as symbolized by this color:
0 – 50	Good	Green
51 - 100	Moderate	yellow
101 - 200	Unhealthy	Orange
> 200	Very Unhealthy	Red

Air quality monitoring in Senegal



Daily Air Quality Index (AQI) in Dakar for 2013

www.air-dakar.org



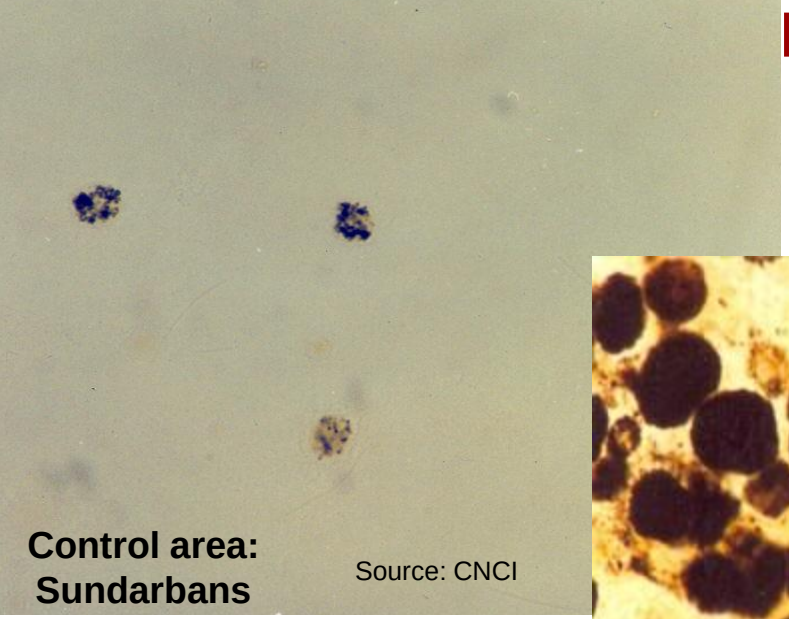
Air Quality status in Dakar for 2013

www.air-dakar.org

Our health matters……

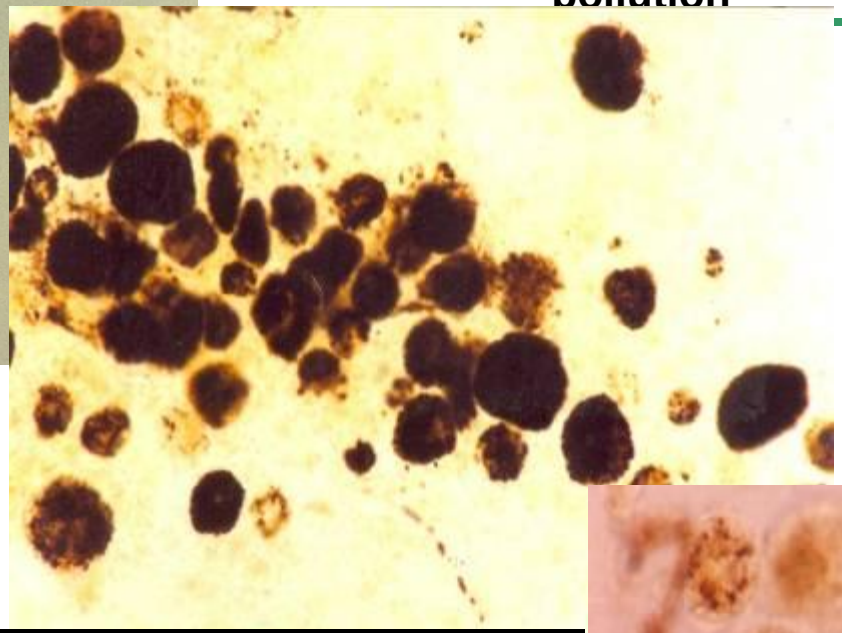
Emerging evidences of health impacts in India……

Alveolar macrophage - biomarker of air pollution



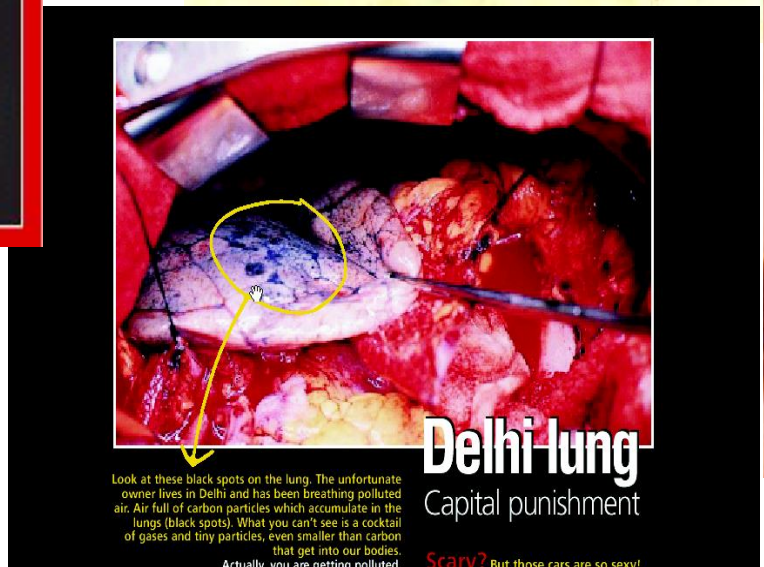
Control area: Sundarbans

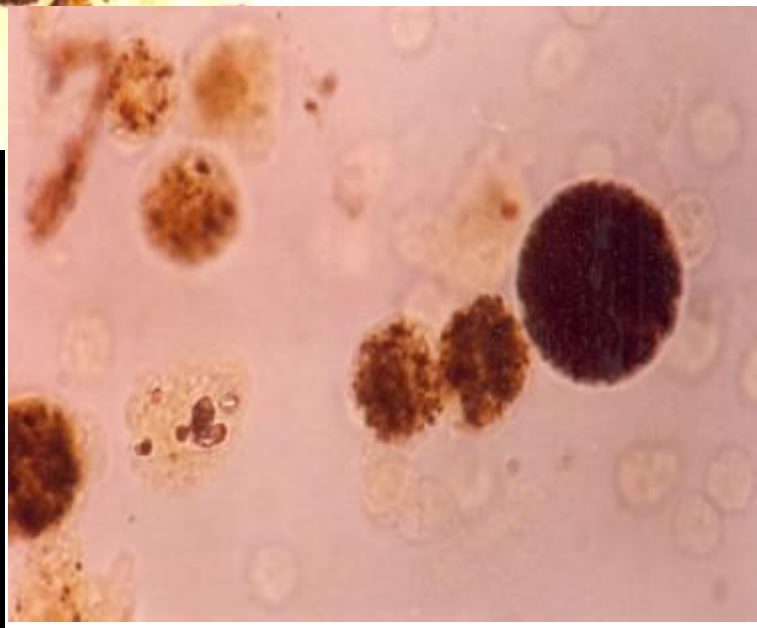
Source: CNCI



Exposed group; Kolkata taxi driver

Increase in AM number





Source: CSE

Cities in African region: Health cost of air pollution

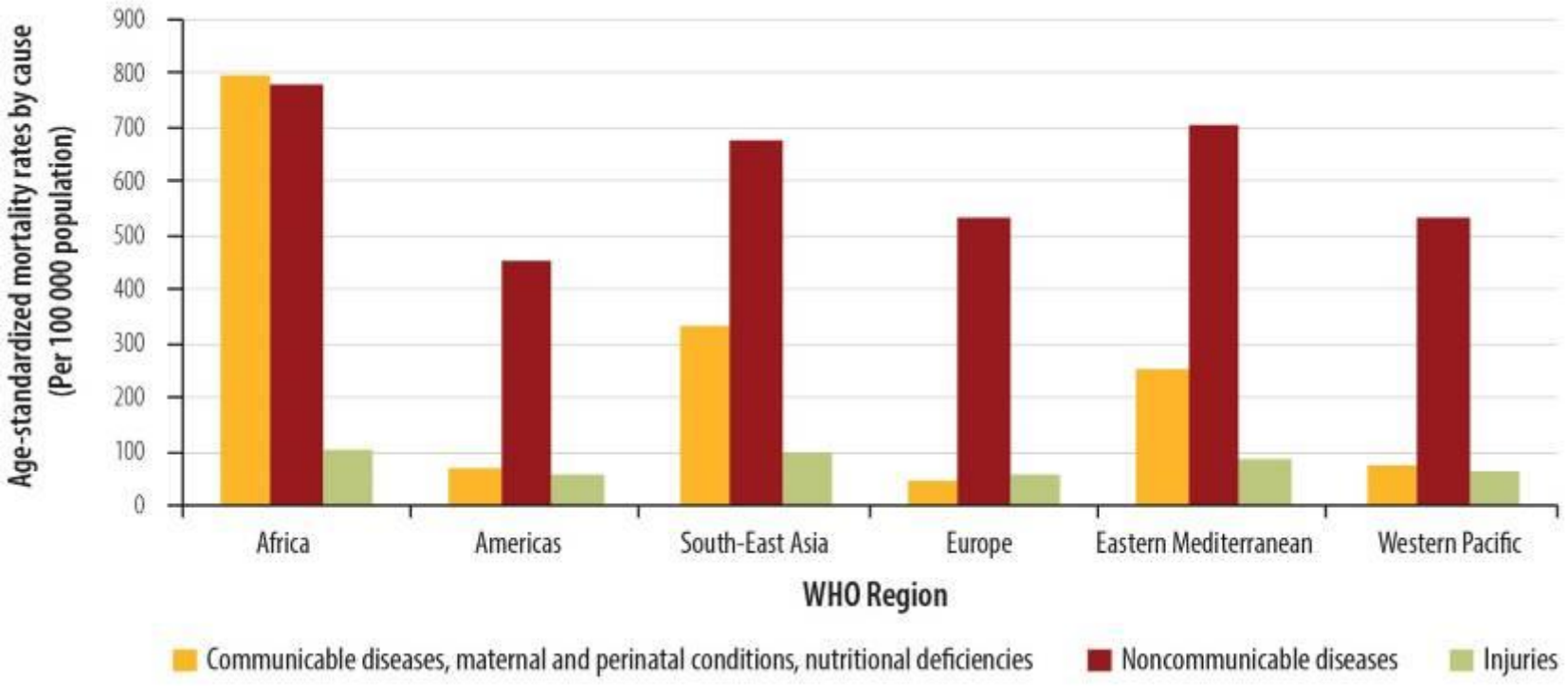
The UN Economic Commission of Africa has estimated that **the cost of air pollution in a number of African cities can be as high as 2.7 per cent of GDP**.

In Africa **about 176,000 deaths permature deaths due to air pollution**. The WHO assessment of pre-mature deaths in Africa is below world average. But data is also a barrier

A study by University of Nairobi: **The economic loss per year in Kenya of vehicle emissions and associated air pollution is 115 million KSh from related illnesses and deaths.**

Africa: One of the highest death rate from non-communicable diseases

Age-standardized Mortality Rates by Cause, WHO Regions, 2008



Source: World Health Statistics 2013, World Health Organization

Jigsaw of health evidences from cities of Africa

Addis Ababa: A study of patients and their exposure to the pollution level -- **Out of the top 20 leading causes of out patient visit by region in all health centers and hospitals of Addis Ababa, acute respiratory infections is of prime concern**.

- This is due to noxious emissions from vehicles. Cases of acute respiratory infection were about **148,000 in 2006-2007**, which reached up to **207,000 in 2007-2008**.

- Study has identified more than 18 air pollutant elements in the biomonitor samples (lichen) in highly polluted area affected mainly by traffic air pollution.

In Ghana **acute respiratory illness is among the top 10 causes of out patient hospital visit**. The Africa is also reporting one of the highest death rates form non-communicable disease. Air pollution can exacerbate this.

Nigeria: Study by Delta State University on ambient particulate pollution and health impact in Nigerian cities (2001-2006) show significant prevalence of **cough, catarrh, eye infection, asthma, chronic bronchitis etc.**

http://www.epostersonline.com/rcog2014/?q=node/2038&posterview=true

Vehicles are a special problem

Vehicular emissions contribute to significant human exposure. Pollution concentration in our breathe is 3-4 times higher than the ambient air concentration.

In densely-populated cities more than 50 – 60% of the population lives or works near roadside where levels are much higher. This is very serious in low income neighborhoods located close to roads.

Some of the deadliest air toxics, also carcinogens, are related to vehicular emissions. Blamed even for killing foetus.

About 55% -- more than half of Delhi's population live within 500 meters from arterial roads in Delhi that is the direct influence zone.

About 60% of health studies in India have focused on exposure to traffic pollution…

Vehicle numbers expected to explode in African cities..

Vehicle numbers in cities of Africa are comparatively less than Indian metro cities… but poised for rapid growth…

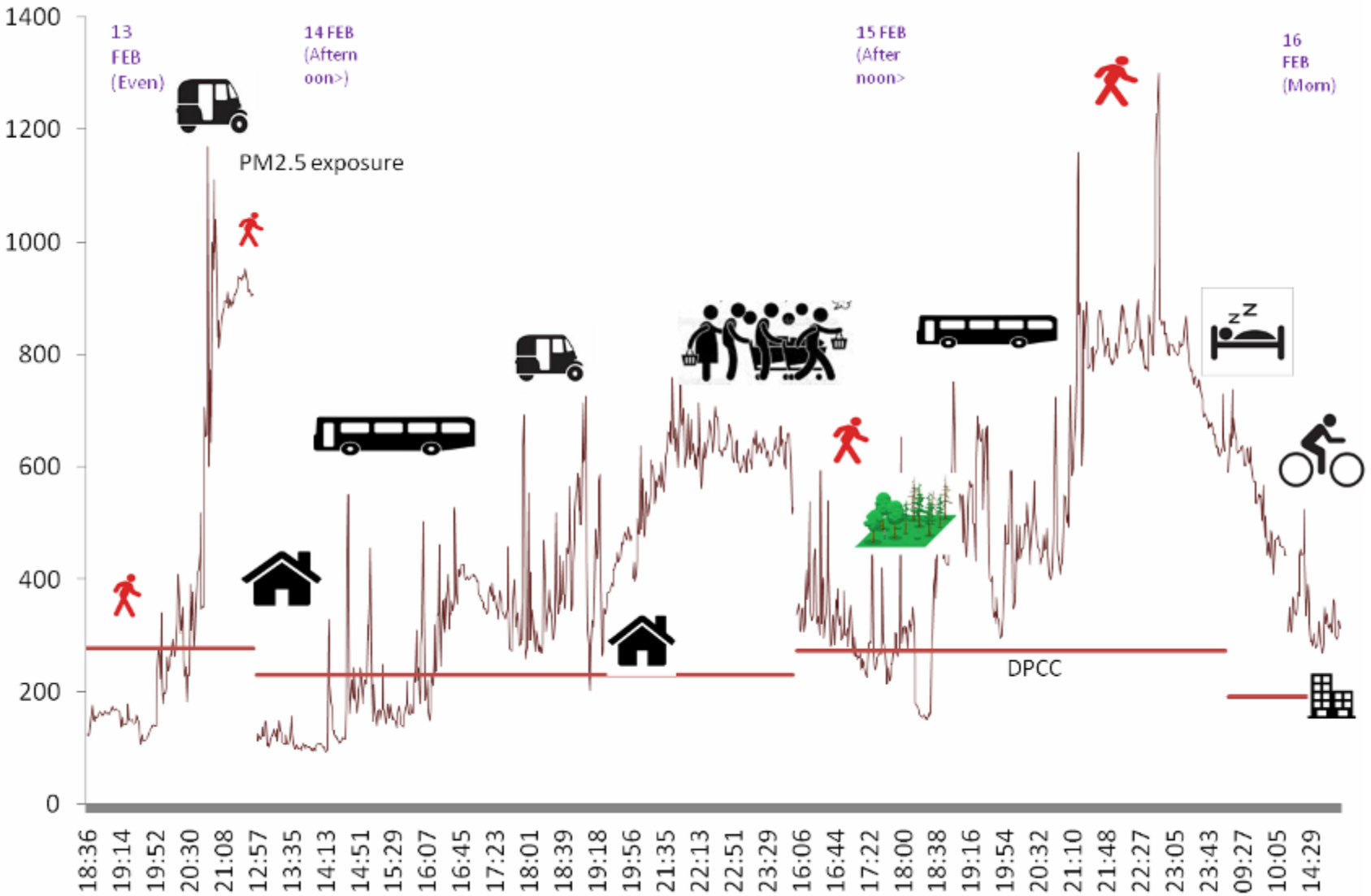
Kenya: 2013, Kenya has a registered vehicle fleet of 2.25 million. Of these nearly 30% per cent are in Nairobi. Kenya imports around 200,000 every year. As much as 85.5% registered vehicles in the country are personal – motorcycles and cars. Motorcycles. **Nairobi's car fleet to double in just six years**.

Lagos: If ownership rates grow from 0.05 per capita to 0.06 over the period from **2010 to 2025 there will be an 80% increase in the numbers of vehicles** -- to around 850,000.

Addis Ababa: **Base numbers are still small. But growth rate to increase**… Last year, a total of 30,128 cars were imported, -- an increment of more than 7,000 cars than the previous year. In June 2014 the total stock of registered cars in the nation was 519,816.

CSE assessment of exposure to pollution while traveling on roads

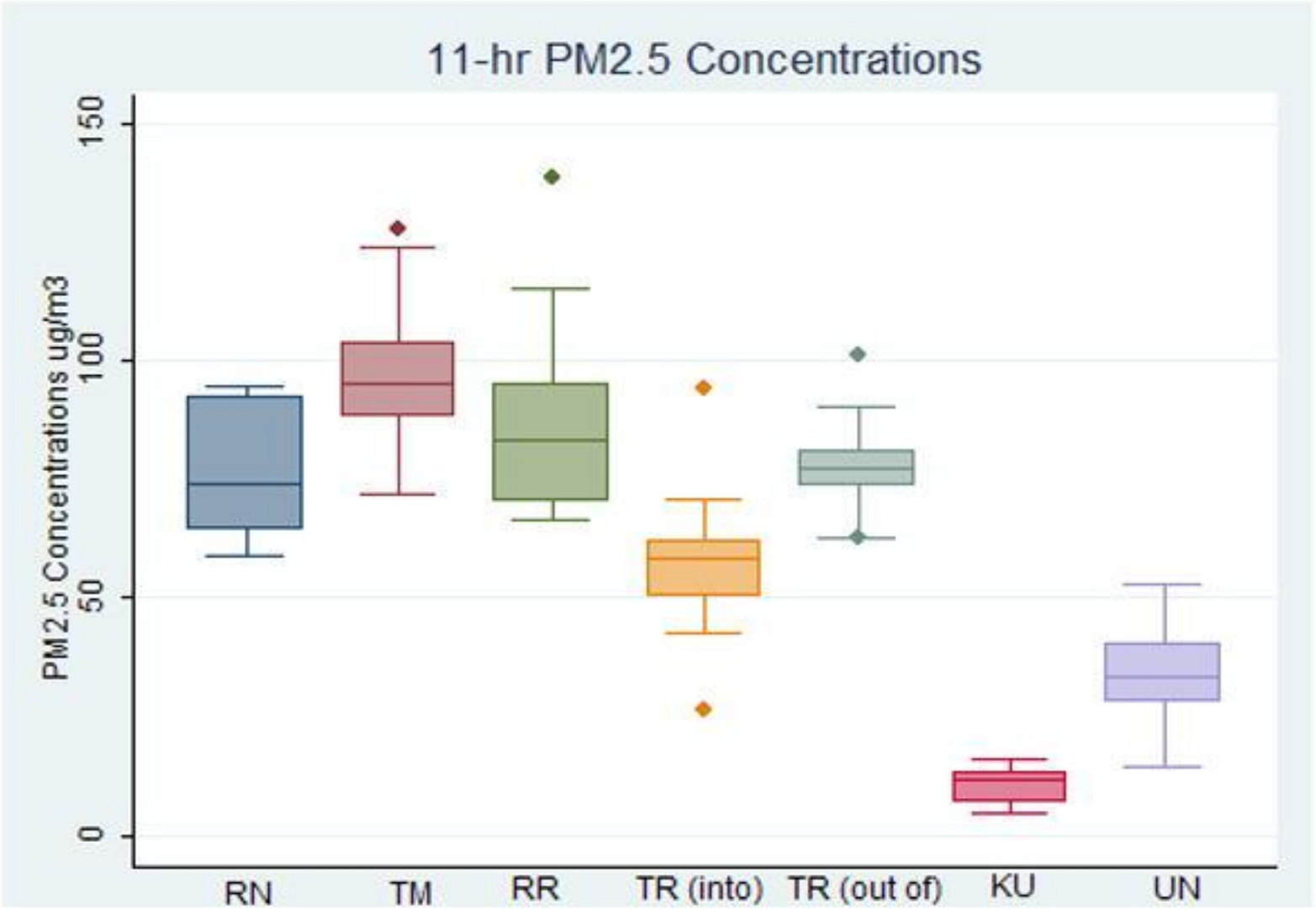
Average exposure to PM2.5 ranged between 192 to 642 micrgramme per cum. Peaks as high as 457 to 1170. The average ambient level ranged between 191 to 277.



Source: Based on CSE exposure monitoring and DPCC data for ambient levels

Traffic Impacts on PM2.5 in Nairobi, Kenya

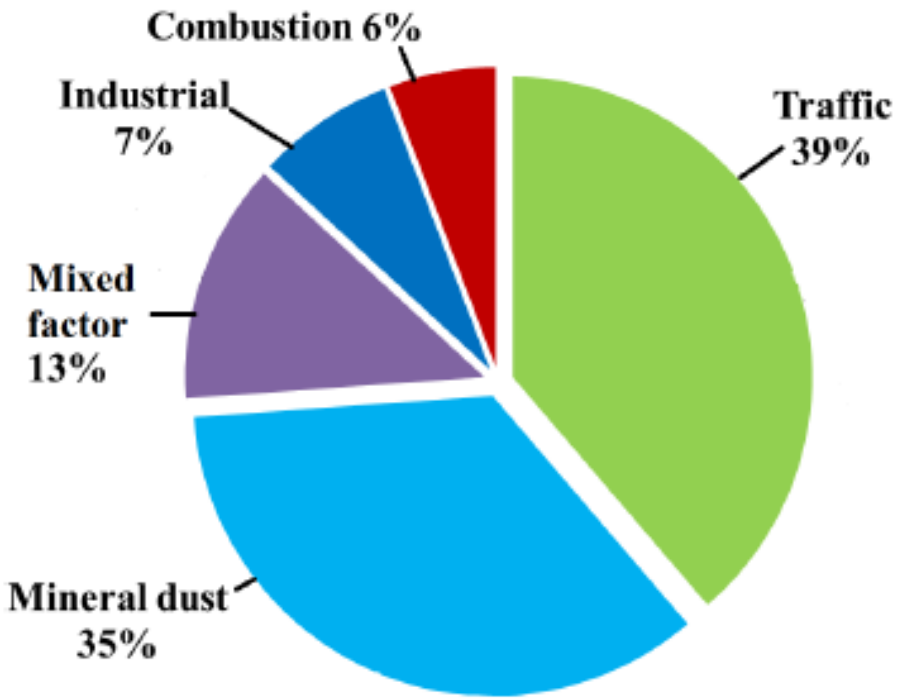
Weekday $PM_{2.5}$ concentrations at five core sites in Nairobi.



http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3138055/figure/F1/

High traffic impacts on PM2.5 levels

Pollution sources in Nairobi: Traffic and mineral dust factors are major contributors to airborne particulate pollutants



Lagos: A study by the Lagos Metropolitan Transport Management Authority (LAMATA) on air quality between 2003 and 2007 indicated that **vehicles contribute about 43% of ambient air pollution**

Greater emissions from **diesel engines.**

Transportation by trucks and heavy duty vehicles add to pollution load.

Atmos. Chem. Phys., 14, 9977–9991, 2014 www.atmos-chem-phys.net/14/9977/2014/ doi:10.5194/acp-14-9977-2014 © Author(s) 2014.

Whither solutions…..

First generation reforms in Delhi…..

Delhi has fought hard to get breathing space

On vehicles

- Introduced low sulphur fuels and petrol with 1 per cent benzene
- Mandated pre-mix petrol to two- and three-wheelers
- Moved from Euro I to Euro IV over the last decade
- Implemented largest ever CNG based public transport programme
- Capped the number of three-wheelers
- Phased out 15 year old commercial vehicles
- Strengthened vehicle inspection programme (PUC)
- Efforts made to divert transit traffic
- Set up independent fuel testing laboratories to check fuel adulteration

On industry

- Relocated polluting units
- Tighter controls on power plants. No new power plants.

Air quality monitoring

- Adopted new ambient air quality standards
- Expanded air quality monitoring and reporting

Other sources

- Emissions standards for generator sets
- Ban on open burning of biomass

First Generation action in African countries

- **Air quality monitoring and management:**
  - Eight countries in the region have **operational routine air quality monitoring systems**.-- Botswana, Ethiopia, Ghana, Madagascar, South Africa, Tanzania, Zambia and Zimbabwe.
  - **Air quality management** developed in South Africa; progress in Ghana; intermediate stage in Botswana, Madagascar, Zambia and Zimbabwe etc.

- **Emissions and fuel quality standards:**
  - Sixteen countries have **set fuel specifications for gasoline and 14 for diesel; 50 ppm sulphur fuels in east Africa and South Africa**;
  - **Five countries have promulgated emission standards for vehicles,** and **eight have set air quality standards** (another two have proposed them);
  - **The phase-out of lead** has now been essentially completed across the region – except Algeria.

http://www.sei-international.org/mediamanager/documents/Publications/sei-pb-2013-africa-transport.pdf

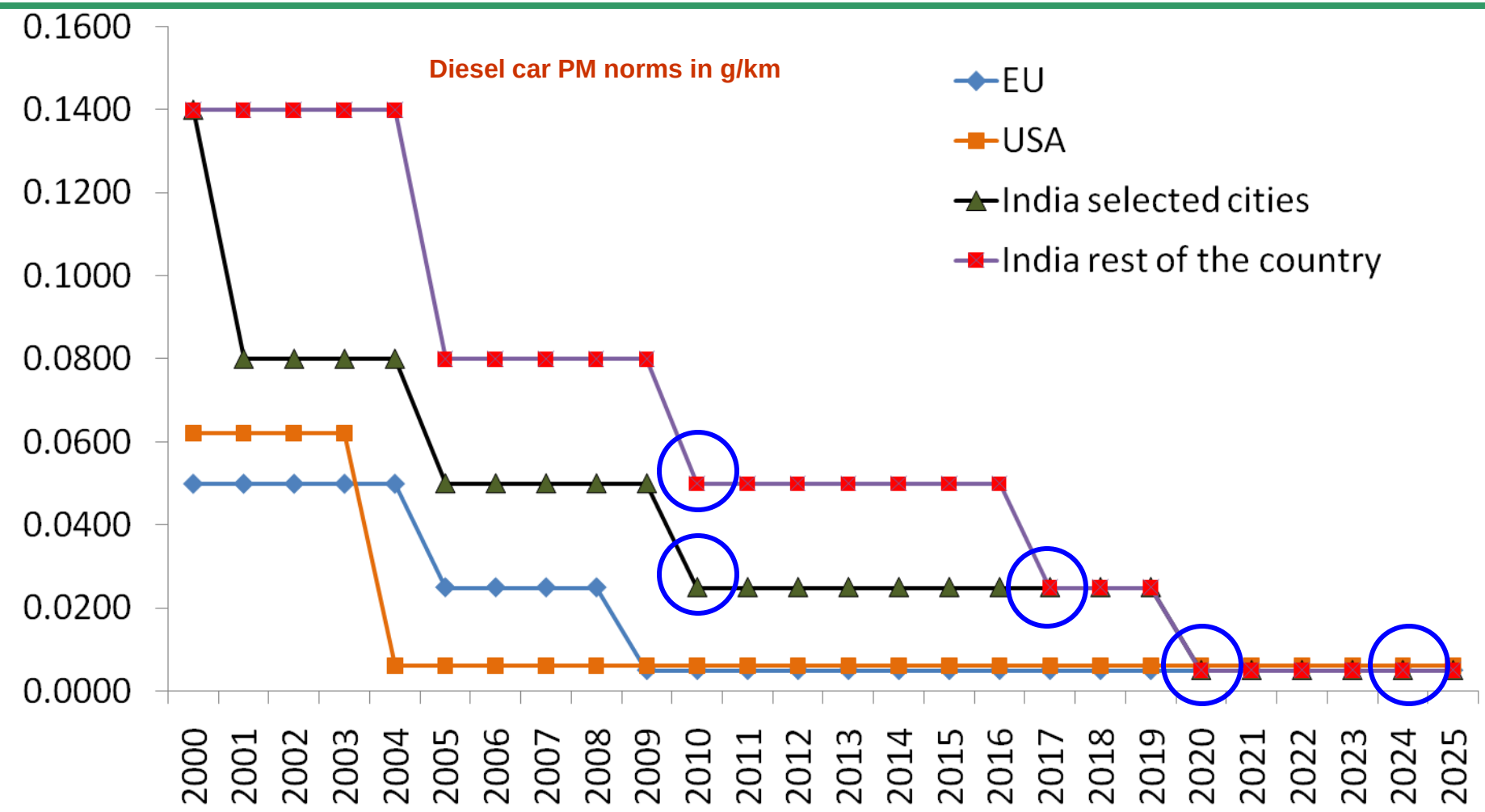
First Generation action in Kenya

- **Regulations on age of vehicles:** 2003: The government set the age limit for imported vehicles at eight
- **Fuel quality standards:**
  - 2005, The government phased-out use of lead in gasoline
  - 2010: The government reduced the standard limit of sulphur in fuel from 10,000ppm to 500ppm
- **2014: Air quality regulations draft** to regulate vehicular emission limits as stipulated in the Kenya Standard KS 1515.
- **Vehicle inspection centre set up**
- **Completed construction of the Eastern, Northern and Western by-passes** to decongest the city Centre
- **Parking pricing**
- **Rehabilitate and extend the commuter rail transport** within the Nairobi city.

(1) Vehicle technology and fuel quality roadmap……

Need quick upward harmonization across regions ….

Technology roadmap: Whither India? 10-15 years behind current emissions standards in Europe



Source: India, Europe compiled from Diesel Net, USA data provided by Axel Friedrich, Germany

Note: Europe has additionally introduced particle number standards at Euro V level

Future norms of US and Europe are tightening NOx norms for diesel more

Emerging roadmap in Africa region

Leaded petrol phased out – except Algeria – A success story

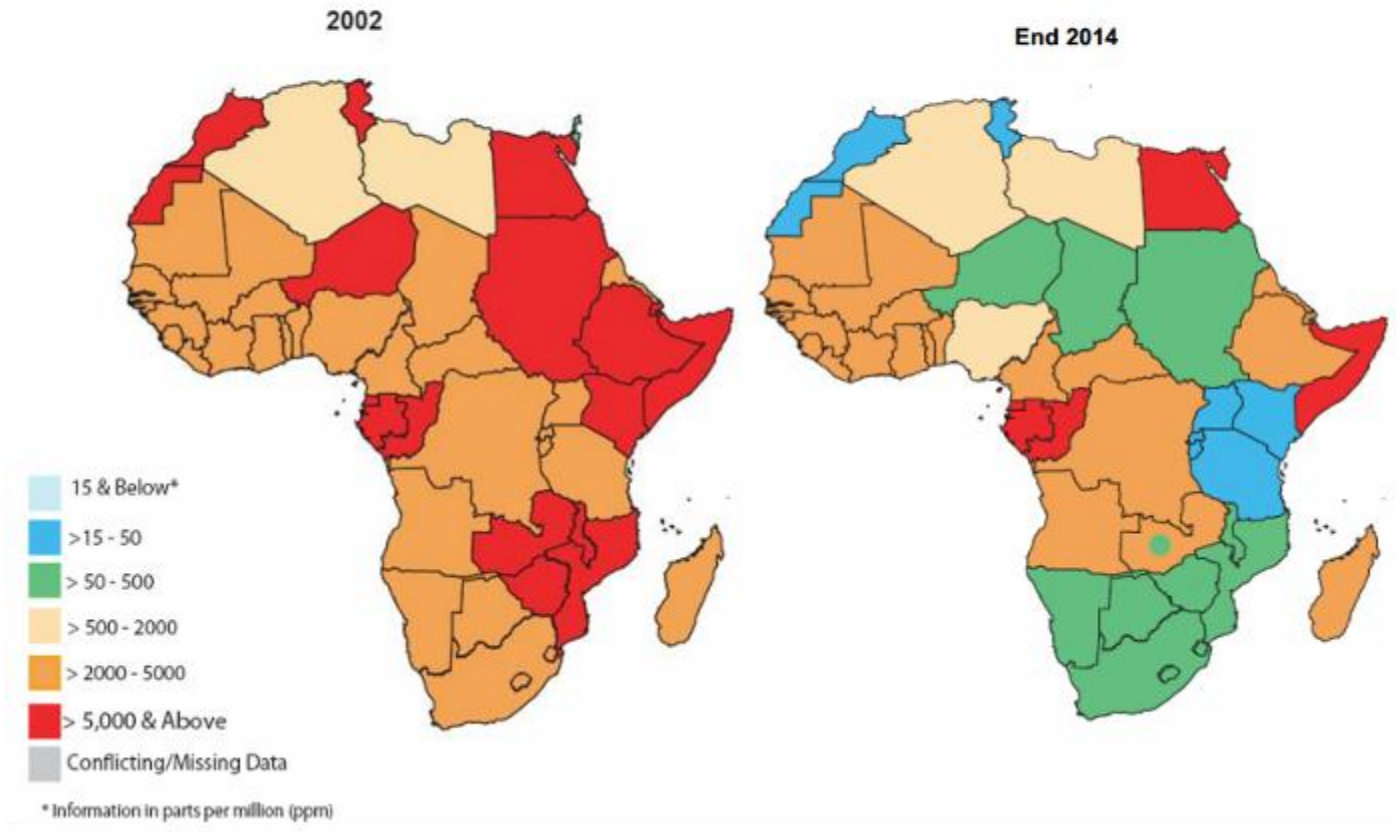
- **Action on low sulphur fuels: Since January 2015:**
  - East Africa: Kenya, Uganda, Rwanda, Burundi and Tanzania moved to 50 ppm.
  - North Africa: Morocco, Tunisia and Mauritius have met 50 ppm or below target
  - Nigeria and South Africa: Euro II emissions standards

- **South Africa**: to introduce 10 ppm by 2017. Six refineries to build capacity. Proposed EU 5 Vehicle emissions

- **In Kenya refinery investments was estimated that USD 6 billion… but health benefits as much as USD 43 billion…**

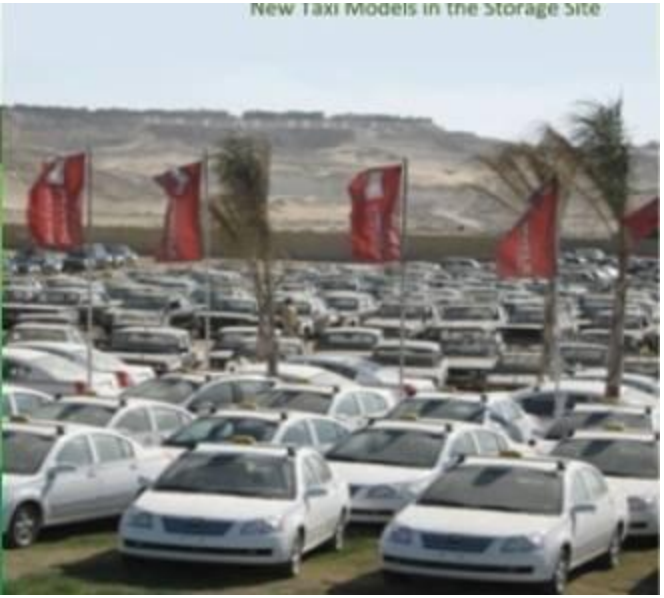
http://www.unep.org/Transport/PCFV/pdf/10gpm/10GPM_AfricaRegionalUpdates.pdf

Diesel Fuel Sulphur Levels: Africa



http://www.unep.org/Transport/PCFV/pdf/10gpm/10GPM_AfricaRegionalUpdates.pdf

CNG programme in Africa
Old taxis replacement programme in Cairo, Egypt



- This was a regulatory initiative. Under the Traffic Law owners of mass transport vehicles (e.g. taxis) that are greater than 20 years old are not eligible for operating licenses.

- This programme was initiated as a voluntary programme in 2009

- About 85% of all taxies are 22 years old. 50,000 taxis are eligible for replacement

- Financial incentives provided to the fleet owners to purchase new vehicles

- **Old taxies replaced and scrapped. The new fleet runs on CNG**

Nigeria: CNG taxis

- Pilot project between the Nigerian National Petroleum Corporation (NNPC) and NIPCO, through a joint venture, Green Gas Ltd.

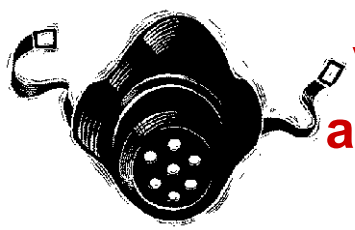
- This drive resulted in significant infrastructure development in and around Benin City.

- Use of natural gas led to significant savings for taxi drivers. Green Gas refuels over 4,000 taxis and cars

- Policy and regulatory support from the government is needed

- **Drive CNG programme with effective emissions and safety regulations**

Import of old vehicles… a special challenge in the region….

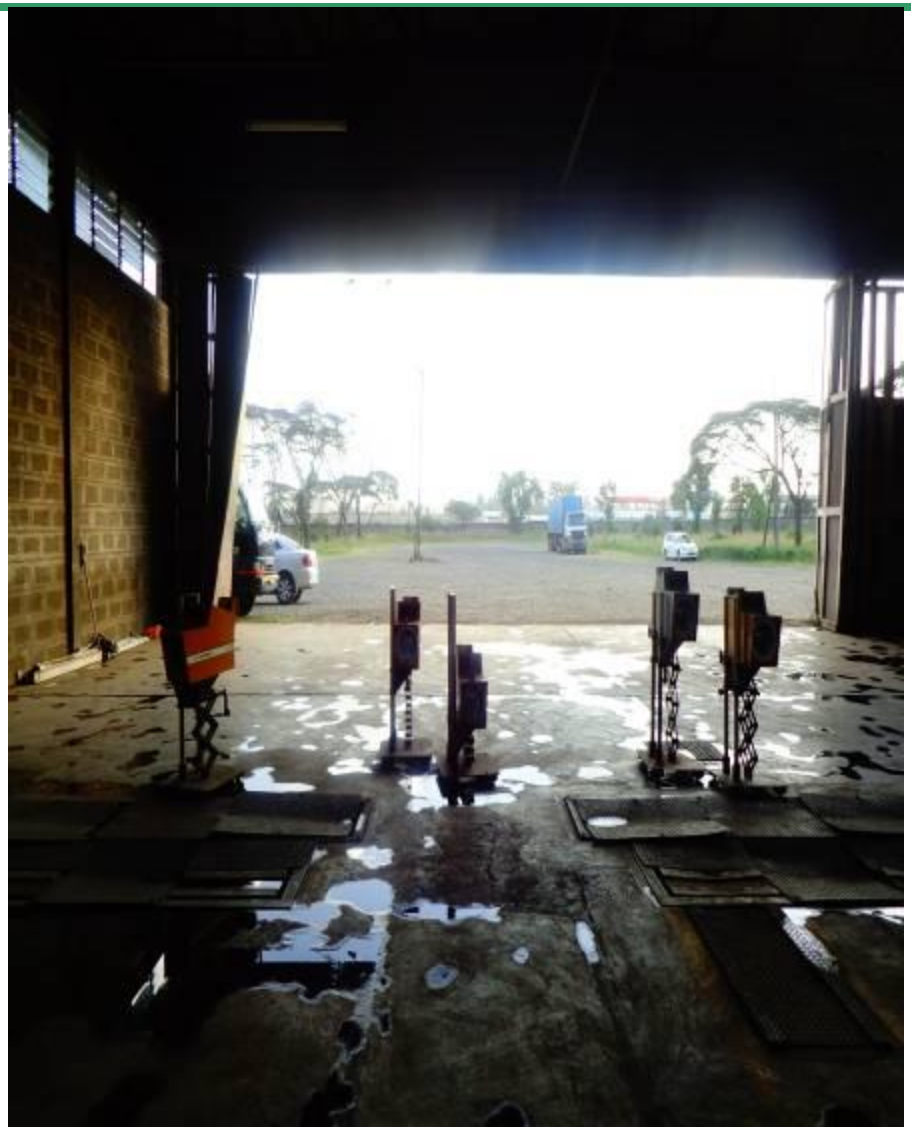


Vehicle import policies -- Opportunity to influence and harmonize policies on vehicle's emission norm, road-worthiness and age

- **Angola:** Motor companies not allowed to import used vehicles; individuals allowed to import regardless of age
- **Botswana:** Maximum of 100,000 kms on the vehicle
- **Burkina Faso:** No import restrictions on vehicle age basis
- **Mali, Malawi, Zambia, Central African Republic, Democratic Republic of Congo, Cameroon:** No import restrictions on vehicle age basis
- **Chad:** vehicle inspection upon importation
- **Côte d'Ivoire**: A fine of FCFA 150.000 is imposed on vehicles older than 10 years and an additional FCFA 10.000 for every year.
- **Gabon:** Used vehicles must be less than four years old
- **Ghana:** Used vehicles over five years old pay graduated penalty according to year of manufacture and capacity
- Seychelles: Used vehicles must be less than five years old
- **Sudan:** -imported second-hand vehicles are illegal, except for immigrants, vintage and racing cars, vehicles adapted for physically disabled, and donated vehicles for welfare organizations
- **The Gambia:** Import of second hand vehicles restricted through taxation – increases in vehicles exceeding 10 years and roadworthiness must be proven before import
- **Mauritius:** Has a three year age restriction
- **Zimbabwe:** Banned importation of vehicles older than 8 years old

http://www.unep.org/Transport/new/PCFV/pdf/Maps_Matrices/Africa/matrix/SSAFuels_Veh_matrix_January2015.pdf

Vehicle inspection system in Nairobi.. A step forward



- There are 19 vehicle inspection centres across Kenya including one at Likoni Road, Nairobi

- Mainly public service vehicles and commercial vehicles – matatus, buses, tuk-tuks, taxis and trucks come for annual inspection

- From January 2015, all private vehicles more than 4 years will also have to undergo the inspection

- At present only visual tests are done. Its basically seen if the vehicles are fitted with a speed governor and are in good mechanical condition

- Emissions testing -- limited

Rwanda Vehicle emissions testing: A step forward

•**Rwanda National Police and Rwanda Environment Management Authority to implement vehicle emissions testing programme:**

•All vehicles to undergo emissions inspection at the inspection centre. Norms for roadworthiness and emissions being implemented.

•Commercial vehicles to undergo test every six months for emission standards compliance. Private vehicles every year.

•Traffic Police can ask for impromptu emissions testing for any grossly polluting vehicle.

•Failed vehicle to be impounded or pay high monetary penalty

•Challenges: But needs to limit age. Older vehicles pay less tax than the newer vehicles

Mobility solutions to pollution and congestion…

Congestion in our cities…..

…… an increasing share of our daily trips are being made by cars that occupy more road space, carry fewer people, pollute more, guzzle more fuel. They edge out pedestrians, bicycles, cycle rickshaws and buses……..

Mobility crisis in Indian cities….

- **Air pollution and congestion to worsen with increased dependence on personal vehicles and erosion of pollution neutral modes….**

- Between 2011- 2030:
  -- Daily travel trips will double;
  -- Share of public transport trips to fall from 26% to 16%;
  -- Share of personal vehicle trips to increase from 34% to 51%;
  -- Peak traffic to crawl at 8km/hour compared to 16 km/hour.

Nairobi: Jammed….

Majority commuters get caught in traffic jams every day.. ..**Results in loss of human hours, and fuel and increase pollution**

- **Traffic jams cost the Nairobi City County approximately KSh 30- 50 million daily** in fuel consumption, manpower time wasted and cancelled business appointments

- On a Monday morning **it takes 2 to 3 hours** to reach CBD In Nairobi

Lagos

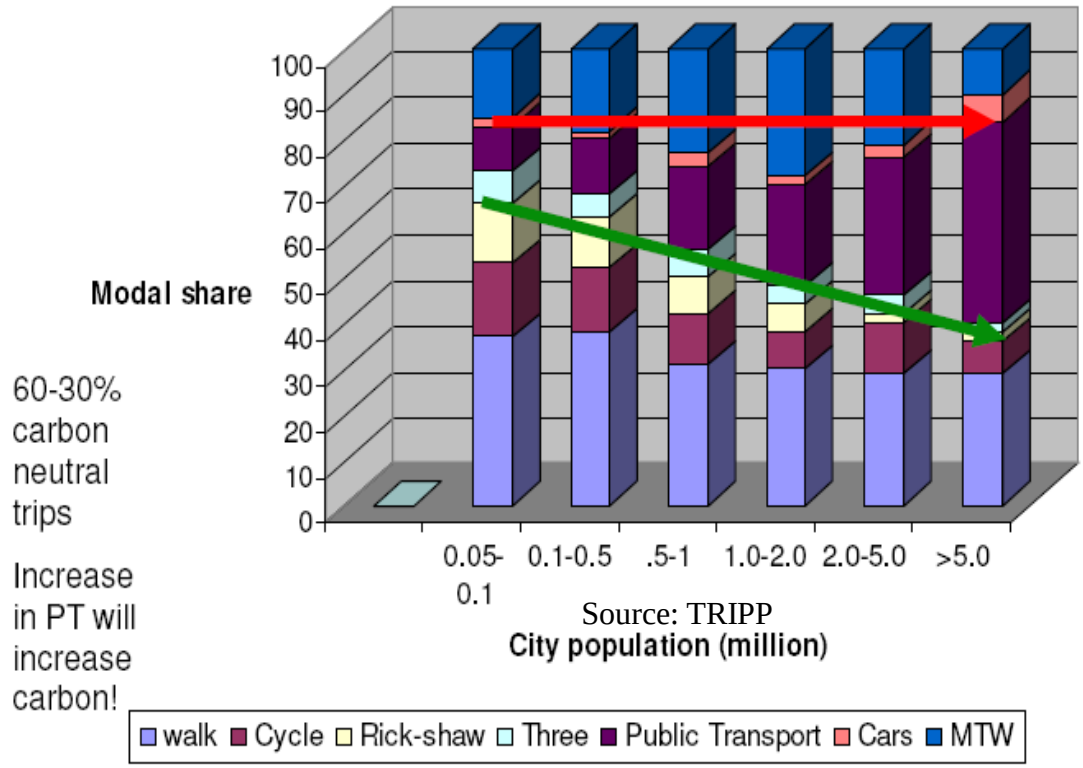
http://sunnewsonline.com/new/?p=86252

Our inherent strength in India…

- Even today majority in our cities walk and use public transport….
- About 30-60% trips are carbon neutral.
- Build on this baseline

Urban Mobility

PT and NMV based, MTW majority personal vehicles



60-30% carbon neutral trips

Increase in PT will increase carbon!

Source: TRIPP

Opportunity in African cities
Majority walks and cycles…..

Based on: International Association of Public Transport (2010) 'Major Trends and case studies'

State of bus in cities of Africa

- **Bus seats per thousand people:**
  - World Bank's Urban Transport Indicators database-- average number of bus seats per thousand urban residents of Latin America, Asia, the Middle East, and Eastern Europe is around 30 – 40.
  - In Africa the average number is 6 bus seats per thousand residents.
- **Transport affordability:**
  - High travel costs… The average cost of a one-way trip is about 0.30 $, which is high in relation to the average household budget.
  - This has increased walk share

.

http://www.eurist.info/images/Projects/UBA_Finance_Africa.pdf

Bus reorganisation in Kigali, Rwanda: A step forward

- Kigali city has adopted a net cost contracting method to procure privately delivered bus services from three firms to serve four zones and its central business district (CBD).

- This has improved service coverage and quality of vehicles. But service schedules, fares, and customer care are failing to meet the performance standards of the contracts.

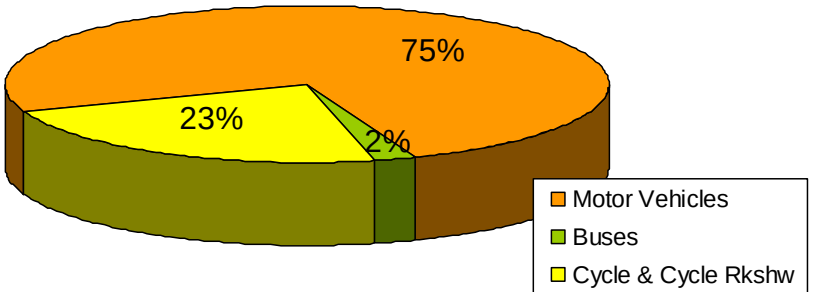
- The reliability and level of service remains inadequate due to the peak hour congestion, shortage of vehicles, and inadequate service provision by operators

http://www.theigc.org/wp-content/uploads/2014/08/Bajpai-2014.pdf

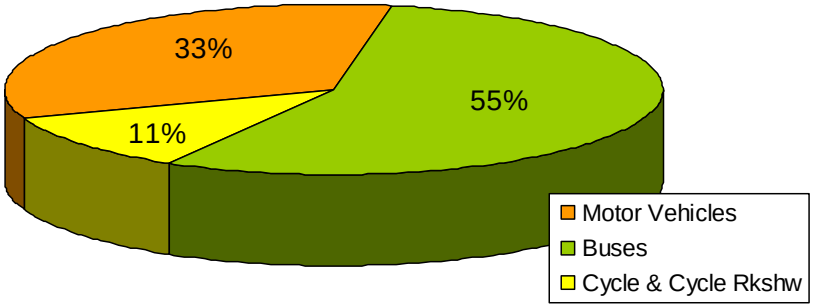
Reinventing bus transport

Delhi Bus Corridor: Moving vehicles vs. moving people

Distribution of Vehicles - By Mode



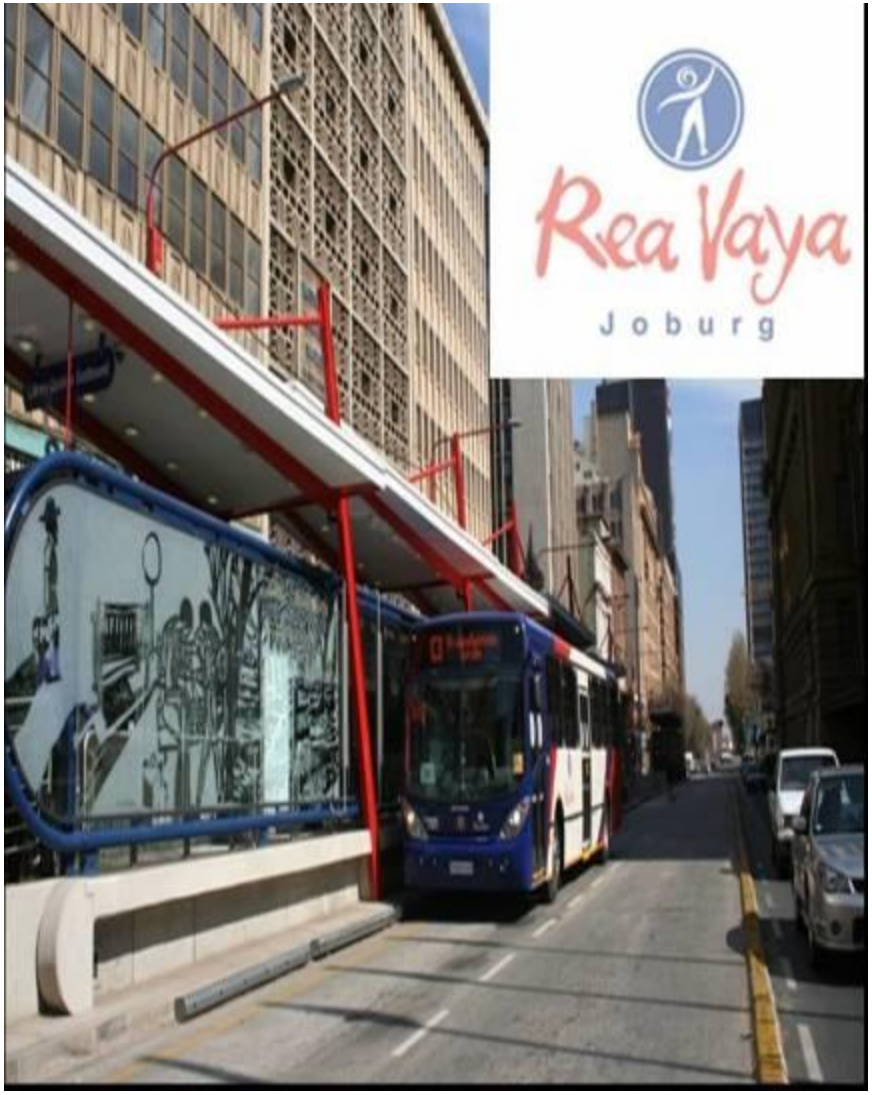
Distribution of People - By Mode



Dar Rapid Transit
- BRT in Dar es Salaam

- Succeeded in creating Political Awareness to look into Transport as a separate Issue and not along with Road Construction.
- Sorted out the roles of Infrastructure providers and operators in the city of Dar es Salaam.
- Created Public Awareness about the need of Sustainable Mass Transit in Tanzania.
- Sensitized the existing Daladala operators about the need for efficient Public Transport through making them an active part of the decision making process.
- Constructed a close BRT of Gold standards with high design standards.
- Pedestrianisation of congested areas and TDM based parking supply, planned along with the corridors.

Progressive action on BRT in African countries



• **Johannesburg's Rea Vaya BRT is the first BRTS system in South Africa**

'Phase 1 of the BRT system, linked Soweto to the centre of Johannesburg.

Rea Vaya currently carries 16 000 passengers per day.

Introduced smart card system to be integrated with Gautrain and Joburg Metro Bus.

By 2020, the City plans to roll out 122 kilometers of mainline BRT corridors served by 150 stations and 250 kilometers of formal feeder routes.

The long-term objective is to provide a network of some 330 kilometers (of lanes that are easily accessible to more than 80% of the people of Johannesburg.

•**First BRT Cooperative Limited in Lagos**

Walk and cycle….

Very high share walking in all our cities.. More than half in Nairobi, 60-70%V IN Kigali city, 34% in Delhi; 56% in Mumbai….

Why?

-- Compact city design allow shorter and walkable travel distances

-- Poverty and lack of affordable transport options. Public transport is expensive for many

-- Congestion has increased share of walking …

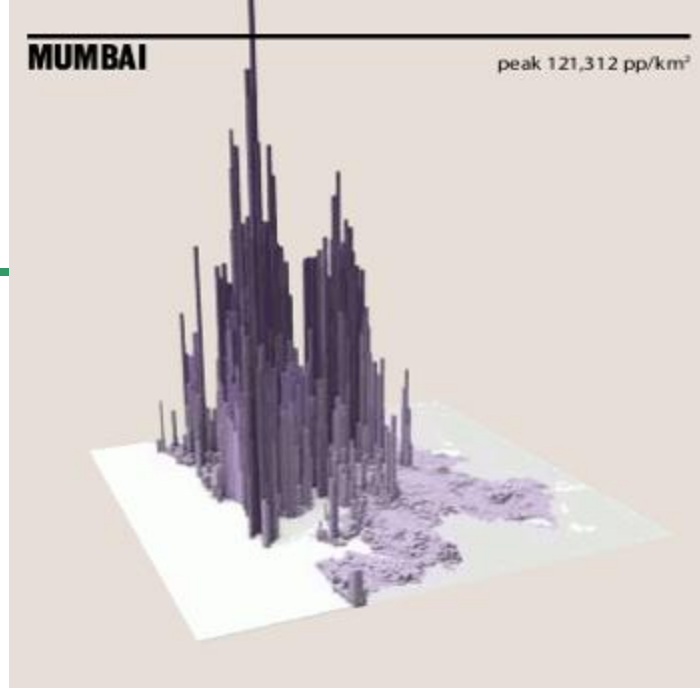
-- Walking and active transportation for health security

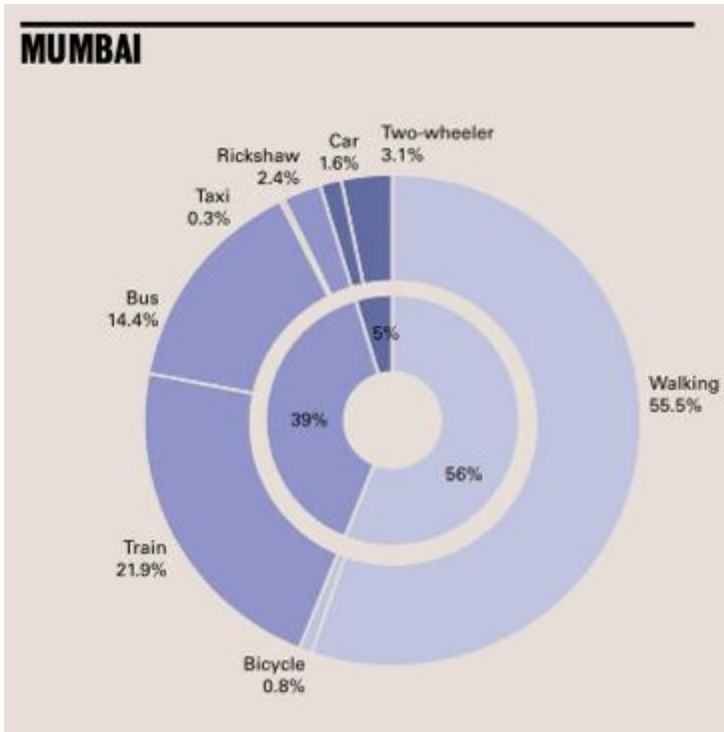
It also depends on how we design our cities

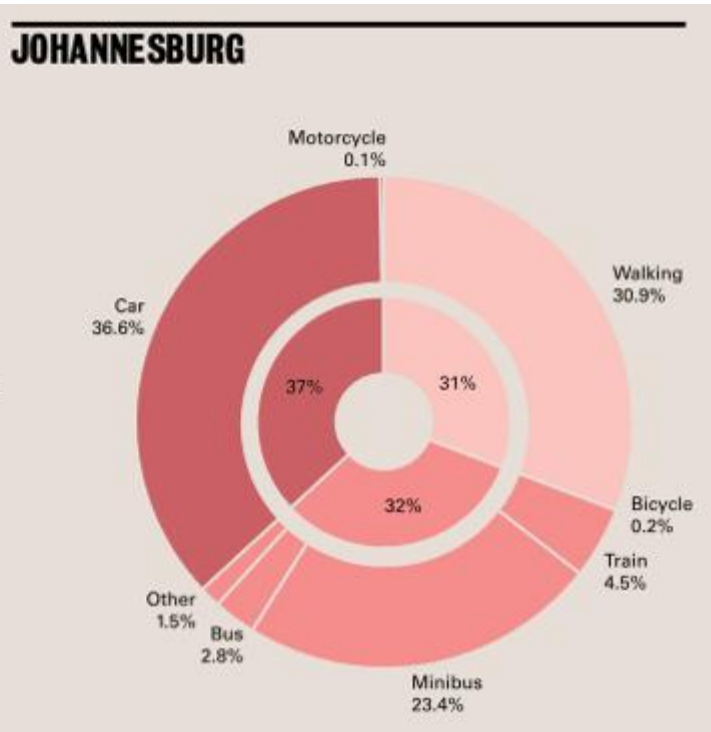
Mumbai: High density development -- cars 1.6%, Walk 56%

Johannesburg: More sprawled cars 37%, walk 31%

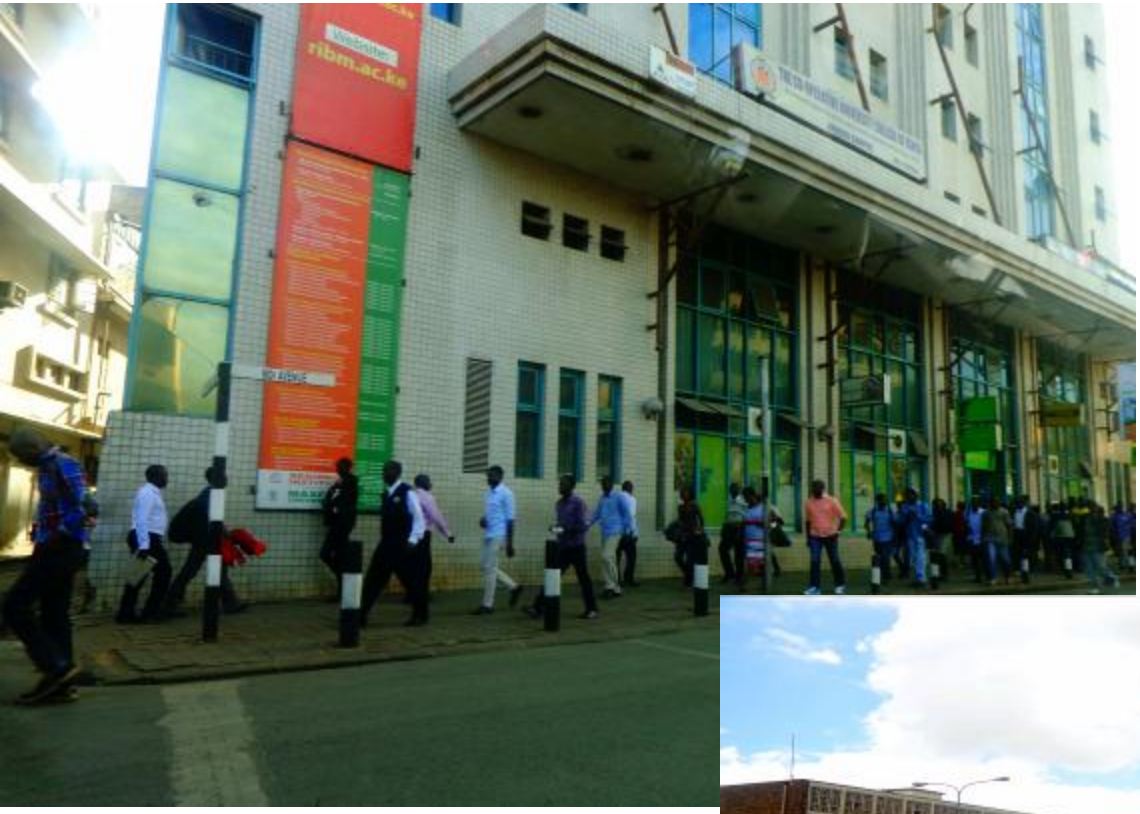
http://lsecities.net/media/objects/articles/urban-age-cities-compared/en-gb/



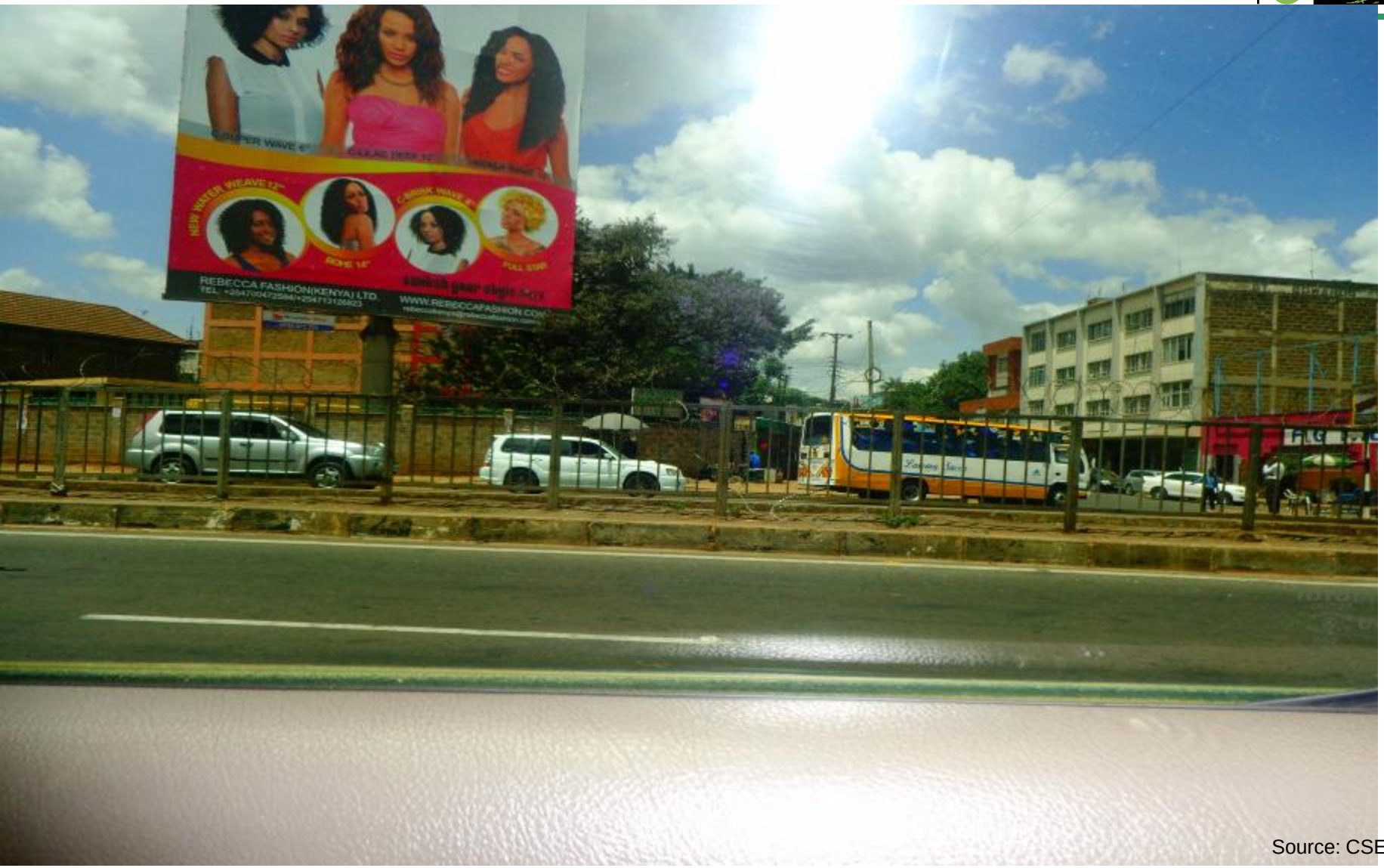




Public transport strategy will require massive expansion of walking infrastructure…



Road design gives advantage to vehicles. Not pedestrians and public transport users



Source: CSE

Disadvantage: Pedestrians

Source: CSE

Source: CSE

Foot over bridges discourage walking and use of public transport….

Citizens TV of kenya reported in 2014 that over 100 pedestrians were arrested in Nairobi's industrial area and arraigned in court for failing to use foot over bridges.

It is inconvenient for people to negotiate stairs to cross roads…

Give priority to peoples movement….

Source: CSE

Evidence from Delhi: Photo documentation by Traffic Police shows how wrong road design force people to cross in unsafe manner

Source: Satyendra Garg, Joint CP/Traffic, Delhi, Walkability and pedestrian initiatives

Underreporting of road death data in Africa and India

The 2009 WHO Global Status Report on Road Safety compared with WHO mortality models, suggested significant under-reporting of the problem.

For 2013, India underreported road death estimates by 78%.
Countries in SubSaharan Africa under-report road crashes by over 500%.

Reported data in African region is 7.2 per 100,000 people. Modelled data shows it is as high as 32.2 per 100,000 people – a five time increase

•WHO 2013: 38% of road traffic deaths in Africa involve pedestrians -- 16 percent higher than the world

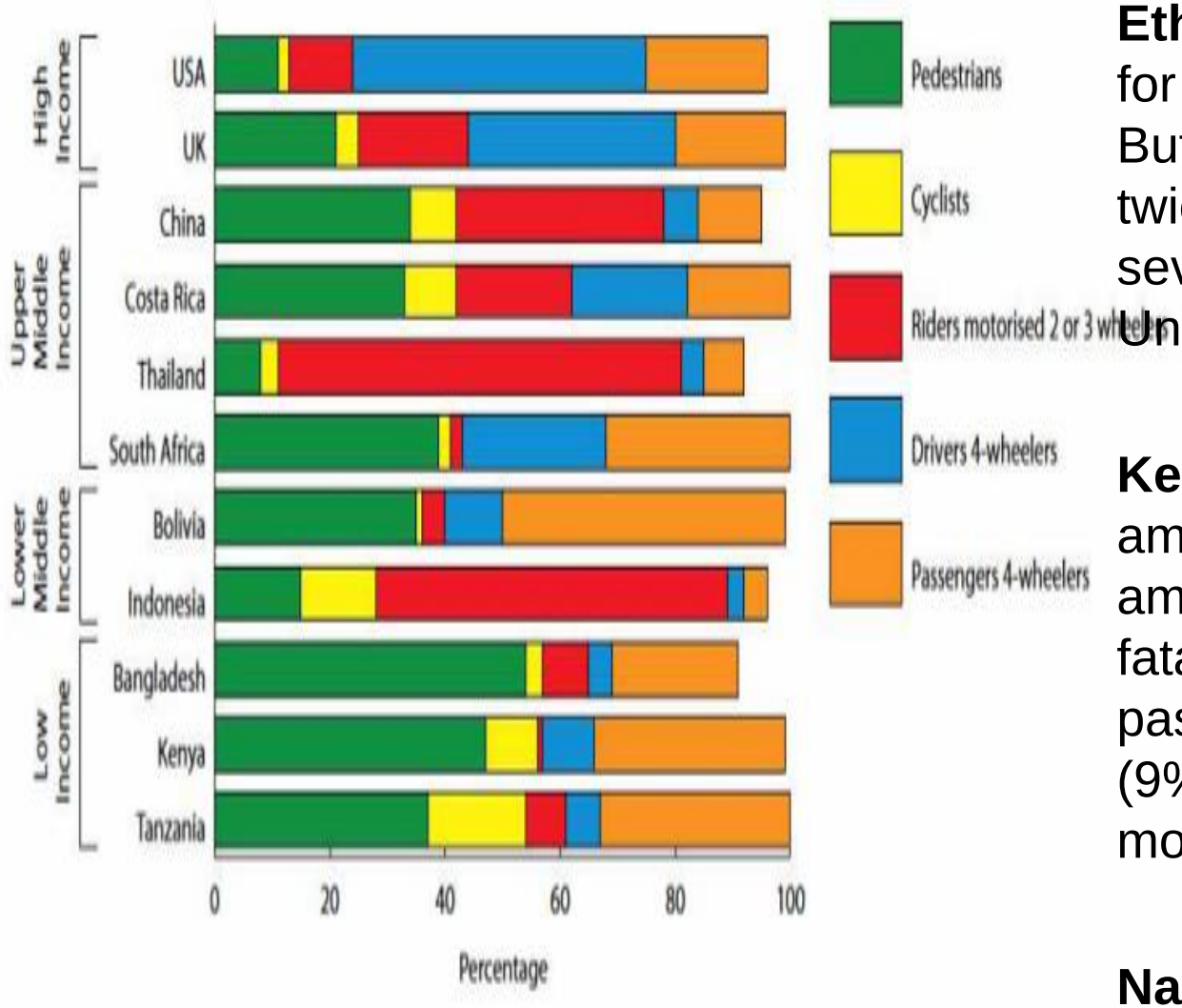
Table 4. Road traffic deaths by WHO region using reported and modelled data

WHO REGION	REPORTED DATA[a]		MODELLED DATA[a]	
	n	RATE PER 100 000 POPULATION	*n*	RATE PER 100 000 POPULATION
AFRICAN REGION	52 302	7.2	234 768	32.2
REGION OF THE AMERICAS	139 466	15.5	142 252	15.8
SOUTH-EAST ASIA REGION	143 977	8.4	285 020	16.6
EASTERN MEDITERRANEAN REGION	76 912	14.1	175 668	32.2
EUROPEAN REGION	113 346	12.8	117 997	13.4
WESTERN PACIFIC REGION	135 316	7.6	278 321	15.6
GLOBAL	**661 319**	**10.1**	**1 234 026**	**18.8**

[a] Adjusted for 30-day definition.

http://www.un.org/ar/roadsafety/pdf/roadsafetyreport.pdf

Road casualties by transport mode
Pedestrians and cyclists are the most vulnerable…..



Ethiopia: Fewer than 10 cars for every 1,000 inhabitants. But road traffic deaths are twice as high as in India and seven times higher than in the United Kingdom.

Kenya: Pedestrians (47%) among the largest group among reported road traffic fatalities, followed by passengers (33%), drivers (9%), cyclists (9%) and motorcyclists (1%)

Nairobi: 50-70% of accidents involve pedestrians

Action on road safety….

Some African cities have begun to initiate action on road safety:

• **Kenya:** National Transportation Safety Authority established to manage road safety

• **Uganda:** Approval of nation wide non-motorised transport policy

• **Gambia**: Developing an inter-ministerial committee on road safety but does not have funding to implement yet.

• **Zambia**: MoU with the relevant organisations

• **Tunisia**: Road safety observatory which includes many parties

• **Senegal:** An inter-ministerial committee to look at the issue and is working with driving schools

• **Nigeria:** Road safety programme

Nairobi: Retrofitting change

- 1.70km UN Avenue: This includes three-metre wide sidewalk on both sides, and a three-metre two-way segregated cycle lane.
- Redesigning the intersection in Limuru road, adding a slip-turn lane with a corner island to facilitate pedestrian crossing.
- Bus stop relocated a few meters to avoid conflict with turning vehicles abd reduce accidents..

Source: CSE

Pedestrians: a whiff of change

Source: CSE

Design road for all street activities
Vending needs space too…

Source: CSE

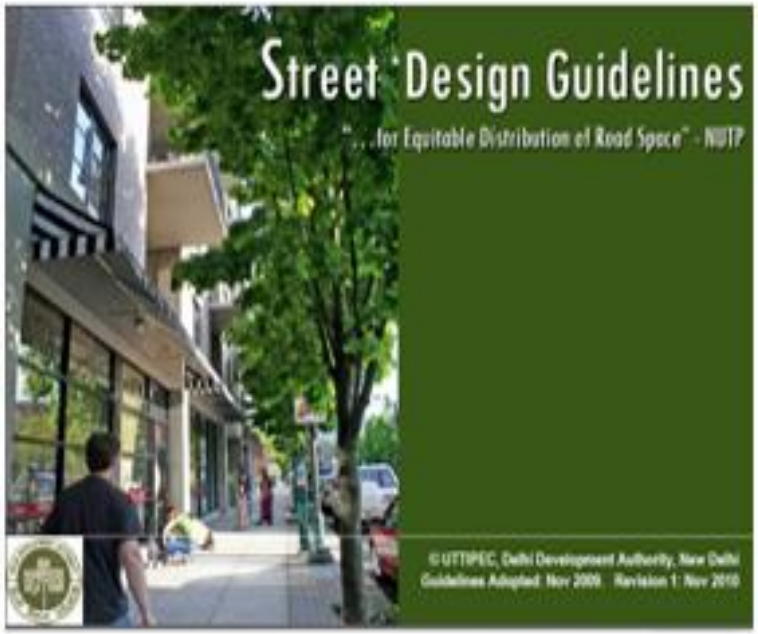
In Indian city of Bhubaneswsar: Space for vending built into road design

Raj path road,
Bhubaneswar, India

Activities make public space safe

Source: CSE

Delhi has adopted street design guidelines



UTTIPEC guidelines

Acknowledgements

The preparation of Draft Pedestrian Design Guidelines was initiated after a detailed presentation on "Great Pavements for Delhi" was made by Sr. Consultant, UTTIPEC in the Governing Body meeting on 24.4.2009. The presentation was appreciated and road owning agencies were requested to adopt some of the best practices on pilot project basis. As a follow up, these set of guidelines were put together, based on best practices available around the world and customized to ground conditions and challenges in India, particularly in Delhi. In this, the UTTIPEC Core team was helped immensely by the advise, time and material provided by several experienced and respected experts in the field, mentioned below:

- Sachdeva, Pradeep, Architect, Pradeep Sachdeva Design Associates
- Gandhi, S., Arora, A., Varma, R., Sheth, Y., Sharma, S., Jawed, F., Interface for Cycling Expertise (ICE), Manual for Cycling Inclusive Urban Infrastructure Design in the Indian Subcontinent, 2009
- Aggarwal, Anjlee, Executive Director, Samarthyam, Guidelines for Inclusive Pedestrian Facilities, Report for IRC, 2009
- Transport Research And Injury Prevention Programme (TRIPP), IIT Delhi, BRT Design Specifications, 2009
- Choudhury, Anumita R., Associate Director, Centre for Science and Environment, Footfalls: Obstacle Course to Livable Cities, Right to Clean Air Campaign, 2009
- Hingorani, Akash, Oasis Designs, Inc.
- INTACH, Delhi Chapter

In due course, a review of Pedestrian Design Guidelines was initiated after 6 months of its publication to include some more chapters related with Storm Water Management, Kerb heights, Slip Roads, Bus Corridors and updates on Signalized left turn lanes, radius of turning movement of left turns, etc. and an overall review was done to incorporate various suggestions received from experts & implementing agencies.

Sh. S.N. Sahai, Chairman of WG-1A and Sh. Ashok Kumar, Commissioner (Plg.) DDA, Co- Chairman of WG-1A have given their complete support with timely advise for revision and completion of this guideline document within a particular time frame. Sh. B. K. Jain, AC (TC&B), DDA has provided necessary guidance/advise, which has helped complete the process of preparing the final document.

Several external consultants have also voluntarily helped in the preparation of drawings and sketches incorporated in the guidelines including Ms. Ran Chen, u2 International and Mr. Nishant Lall, NilaA Architecture & Urban Design. The document was prepared and finalized by the UTTIPEC Core Team under Ms. Paromita Roy, Sr. Consultant with the assistance of in-house consultants and interns from SPA with a special mention to Mr. Sahil Sasidaran, during the period from 19th May to 19th July.

All the other Sub-group members and special invitees who have attended various meetings of Working Group I-A and the Sub-group, have provided necessary inputs for formulating and finalizing the Street Design Guidelines. List of references is placed at Annexure-II. List of Working Group members, sub-group members, UTTIPEC Core Consultants team and other participants/special invitees is placed at Annexure-III.

Shri Ashok Bhattacharjee,
Director (Plg.) UTTIPEC

Uganda NMT National Policy

- With the support of UNEP's Share the Road programme, Uganda frames Non Motorised Policy to increase awareness of walking and cycling; and support effective design and infrastructure provision at a national level.
- The policy recognizes walking and bicycling as non-polluting, sustainable, environmentally friendly and healthy transport options, and the promotion of these modes is part of its environmental policy.
- The strategy also acknowledges the importance of using universal accessibility principles for all new and refurbished transport infrastructures and requires all urban road designs to include a non-motorised transport statement explaining how the needs of pedestrians and cyclists have been incorporated.
- Finally, it recommends the establishment a National Road Safety Authority (NRSA) responsible for road safety, management and coordination.

- **Need implementation strategy…….**

http://www.unep.org/Transport/sharetheroad/PDF/StR_DesignGuidelines_web.pdf

Car free day Kampala, Uganda

http://www.fabio.or.ug/page19.php

Do not destroy informal intermediate public transport service…. Matatus, Boda Boda in African cities Or Auto rickshaw and cycle rickshaws in Indian cities…

Informal public transport in Nairobi (*Matatus*)

• *Matatus* or mini buses are the major form of public transport in Nairobi. Estimates show *matatus* transport 12 million commuters everyday in Kenya .. Meets nearly 70% of demand for motorised travel

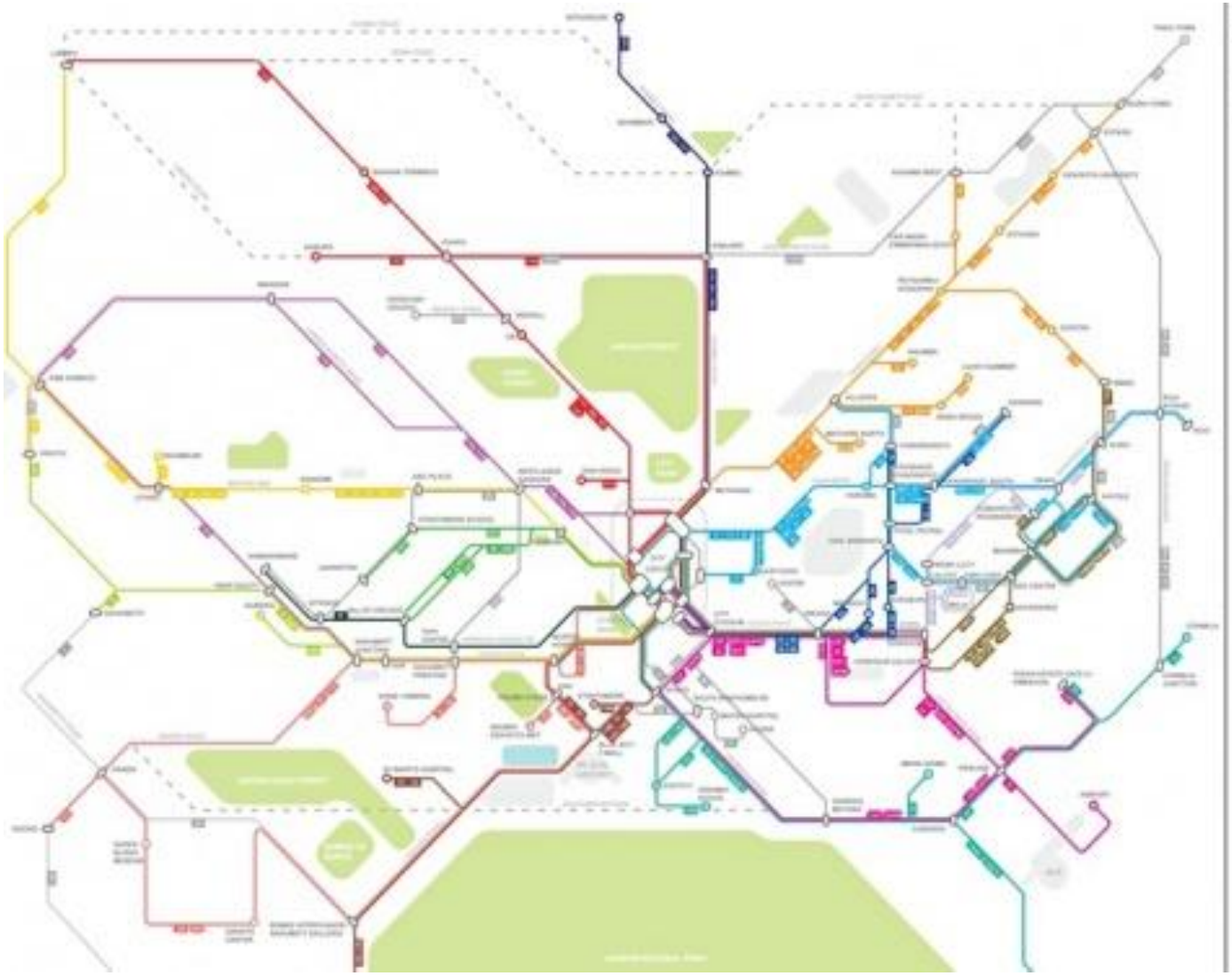
Government regulates the *matatus* – about 87 cooperatives or *Saacos* have been formed in Nairobi. A Sacco should have a minimum of 30 matatus.

Government is trying to phase out commonly seen 14 seater *matatus* and replace with high capacity *matatus*. Their permits will not be renewed.

• These ply on specific routes between downtown Nairobi to the suburbs and charge 30 KSh for a ride

Government is trying to phase out commonly seen 14 seater matatus and replace with high capacity matatus. Their permits will not be renewed.

Digital Matatus: Mapping Nairobi's public transit – a step forward



Boda-bodas – motorcycle taxi

Integrate Motorcycle taxis or *boda-bodas*

Clean them up -- Polluting modes as these are two-stroke engines

Regulations have been enacted that secure the riders safety through safety gear such as helmets and reflective jacket

Intermediate public transport in Delhi..

Patiala Green Cabs:

Auto rickshaws in Delhi

Amritsar Ecocab

Three-wheeler policy in Delhi:

-- All three-wheeler drivers to get public service vehicle badge and smart cards.

-- GPS connectivity to improve the meters and compliance.

-- In-use vehicle fitness and emission testing systems

--Integrate with mass transit system.

Parking management in Nairobi: Step forward

- Nairobi introduces priced parking
- Cashless parking strategy
- High penalty
- Build on this. Remove barrier to implementation

Source: CSE

Get the principles of parking right

- **Establish goals of the parking policy –** It is a travel demand management tool to reduce pollution and dependency on personal vehicles
- **Limit parking requirements -** cap absolute supply of parking spaces
- **Make parking standards flexible based on accessibility -** Parking plans need to account for the changes in parking demand with improvement in public transport in different zones
- **Parking should be public, shared and priced**
- **Need good on-street parking management**
- **Prepare parking management plan for a zone and not a site**
- **Need appropriate street geometry to reduce modal conflict and protect walk and cycle lanes from parked cars**
- **Improve efficiency in utilisation of available parking spaces**
- **Design parking for multimodal integration and improving public transport usage**
- **"Park and Walk" facilities may be included in zonal plans**
- **Multi-level parking should not be planned in isolation for a site but as a overall parking plan of a zone**
- **Enforce strict penalty for violation of parking regulations and walkway encroachment**
- **Meet the parking needs of public transport buses, non-motorised transport and freight**
- **No free parking –** introduce high and variable parking rates according to duration of parking etc
- **Promote common public-shared-priced parking in residential and mixed land-use parking**

Change approaches to vehicle taxation

Implement polluter pay principles.

Motorists should pay the full costs that include congestion, pollution, ill health, and climate change. This can bring additional revenue to pay for the alternatives like public transport, walking and cycling infrastructure

Delhi: Cars pay a miniscule amount of one time road tax when they are purchased. But buses are made to pay much higher road tax annually. The total burden of taxes on buses in India is nearly a quarter of the total cost of the bus. This increases bus fares.

Kenya: Minibuses pay all taxes as those applicable on cars. This should be rationalized.

Public transport services are for public good and should pay lower taxes. Cars that are part of unsustainable modes should pay higher taxes.

Create dedicated urban transport funds

ASTF Action Framework: Opportunity for change in African cities

Action on road safety, accessibility and infrastructure, emissions and enabling conditions…

Priority area	Actions	Time bound target
Road safety	**Implement the African Action Plan** for the Decade of Action for Road Safety 2011 – 2020	
	Set up dedicated institutions for road safety and allocate funding	2017
	Insure comprehensive data collection and reporting mechanisms on road safety incidents and trends	2015
	Develop and adopt a **Non-Motorised Transport Policy**	2015
	Develop and adopt Non-Motorised Transport Design Guidelines	2015
Vehicle emissions and energy efficiency	Ensure air quality monitoring takes place in all main cities	2017
	Develop vehicle emission standards and suitable inspection and testing	2016
	Develop vehicle import regulations at both regional and national levels, based on either vehicle age, mileage or emissions	2016
	Develop regulations for the **adoption of cleaner fuels** - especially low sulphur fuels - at a national level	2017
	Undertake a country level **fuel economy analysis and develop a national level policy** to improve fuel economy	2017
Accessibility and sustainable infrastructure	Develop a **national policy on sustainable urban transport**	2017
	Develop integrated transport plans with a specific focus on multi-modal transport	2018
	Undertake an assessment and develop a national policy on mass-transit systems	2017

Our cities need upscaled transition to cut pollution and health costs

Strengthen air quality monitoring and management. Inform people and issue health advisory

Leapfrog vehicle technology and fuel quality

- Emissions standards
- Fuel economy standards

Scale up and integrate public transport systems

Implement walking and cycling stratgeies

Reduce demand for travel and vehicle usage

- Parking policy as a restraint measure
- Land-use planning
- Road pricing
- Tax rationalisation

Frame fiscal strategy to fund the transition

This needs support. Must not be allowed to fail…Otherwise what??

Thank You


Do you think we are not seeing the point?
AUTO INDUSTRY
GOVERNMENT