Urban Air Quality in Ethiopia: Guidance framework

(2) Mobility strategies

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Workshop on Guidance Framework for Air Quality Management in Ethiopia:

Ministry of Environment and Forests and Climate Change with
Centre for Science and Environment, India and UNEP
Addis Ababa: March 18, 2016
Link clean air action plan with mobility and transportation strategies

Himachal lung

Look at these black spots on the lung. The unfortunate owner lives in Delhi and has been breathing polluted air. Air full of carbon particles which accumulate in the lungs (black spots). What you can't see is a cocktail of gases and tiny particles, even smaller than carbon that get into our bodies. Actually, you are getting polluted.

Delhi lung

Capital punishment

Scary? But those cars are so sexy!
Africa has less than 3% of the world’s motor vehicles. But more than 11% of global road fatalities. This can even be more.

Nearly 42% of all injuries in Ethiopia happens in Addis Ababa and over 90% of these injuries involve pedestrians.

- Need safe access to promote clean and sustainable modes of transport

Source: Global Burden of Diseases 2010 Study, Leading causes of death worldwide, associated DALYs, and burden attributable to motorized road transport, 2010
Mobility crisis

...... 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..........
Car ownership in cities of Africa

Sources: World Bank (2014a); country communications; IEA databases and analysis.
Ethiopia: Jammed….

A study of East-West Corridor showed that:
On an average about 18,000 veh-min or 38 Veh-day and about 169,000 per-min or 352-person-day are wasted at each major intersection entry.

The city incurs about 5-8 million Birr per intersection only for vehicle and fuel cost annually.

Due to congestion, the average traffic speed is about 10km/hour in peak hour in the city. The resulting congestion reduces the overall effectiveness of public transport services.

On an average, one needs to wait for at least 15 to 25 minutes for a bus or taxi during rush hours. A normal commuting time has increased significantly during peak hours.
Opportunity in Africa and India
Our inherent strength

How people travel in India?
- We have built walkable cities: 
  - 30-60% trips carbon neutral.

How people travel in Africa?
- Majority walk and use public transport

Urban Mobility

PT and NMV based, MTW majority personal vehicles

More than one third of the country’s population live in Addis Ababa.

91% of people walk and use public transport.

Addis Ababa Modal Share
(1) Link clean air action with road design
....
More roads are not the answer
...Lesson from Delhi

Source: On the basis of Economic Survey, Delhi Govt
Roads not designed for public transport walking and cycling can lock in more pollution

Engineering changes once made cannot be reversed easily… It permanently decides our travel choices.
Case Study – Outer Ring Road (Nehru Place Flyover)

Travelling from A to B

Originally 30M across the road

- Pamposh-Enclave
- CR Park
- Nehru Place
- Kalkaji
Case Study – Outer Ring Road (Nehru Place Flyover)

Travelling from A to B – Pedestrian Route 1

1000M via FOB

Cr Park

Pamposh-Enclave

Nehru Place

Kalkaji

B

A

FOB
Do street network planning. Do not do corridor planning.

Source: UTTIPEC
(2) Link clean air action with urban design ....
Lot depends on how we design our cities.

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

Johannesburg: More sprawled cars 37%, walk 31%

Source: Urban Age
Density of Administrative Cores of Global Metros

- New York (Manhattan)
- Madrid (Centro & Arganzuela)
- Paris (the city)
- Hong Kong (Central & Western District)
- Mexico City (Cuauhtémoc, D.F.)
- Tokyo (Chiyoda & Bunkyo)
- London (Westminster)
- Paris (Louvre)
- Berlin (Mitte)
- Chicago (Downtown)
- New Delhi

Population Density at the city core in number of people per km²

Source: Complied

• Delhi has one of the most sparsely populated core in the world.
• New Delhi’s density is more than six times lower than core administrative regions of New York and Madrid.
• Even the heritage Louvre of Paris is 2.5 times densely populated than New Delhi.
Space affluence vs unliveable peripheries
Exclusion hurts poor..

- Develop the urban core

Urban planning and mass transport can push poor out, disrupt livelihood, increase travel distances and costs.

- **TRIPP study**: Delhi Metro has displaced slums --
  For the majority of the relocated households cycling distance increased from 3.27 km to 7.29 km. Bus distance from 4.7 km to 14.68 km. Journey has time increased. Average distance to services and number of trips have increased. NMT use has declined. (*A Arora and G Tiwari*)

- **CEPT study**: Share of transport cost in the household budget increased significantly for the bottom 50 per cent of the population, that on education and health has stagnated.

- Several low income colonies along BRT who can be integrated (*D Mahadevia*)
Shahadra, East Delhi

Delhi Master Plan: At projected population Delhi needs 24 lakh more dwelling units by 2020 -- more than half for urban poor.

Delhi Master Plan requires population density of 2000 persons per hectare.

But density in Lutyen’s Delhi is 40 persons per hectare.

Delhi core – 3% of Delhi’s area has 1% of Delhi’s population
Public transport to define the urban form

1a) High Density Mixed Use within 5-min walk of stations...

Reason for success of BRT in Curitiba:

Maximum people Live, Work & Play within 5-min walk of RAPID TRANSIT Stations
Density disparity along metro line in Delhi….

- Chawri Bazar
- Race Course
- Green Park

Source: CSE
Case Study – Gurgaon Sector 28
Accessing Metro from ITC Laburnam Apts

- Shortest route not possible.
Case Study – Gurgaon Sector 28
Accessing Metro from ITC Laburnam Apts

Emerald Court
IGFCO Chowk
ITC Laburnam Apts
MGF Plaza Mall

1800M
Sprawled and gated...

For the 12 largest Indian cities, satellite imagery shows that, the proportion of built-up area outside a city’s official boundaries exceeds that within its boundaries; exceeds the proportion of population, -- low density sprawl. (World Bank 2015)

New developments often filter rich residents as property values are high.....

Neighbourhoods get homogenised in terms of income etc. This keeps poor people out. Conflicts in neighbourhoods

Legal norms and guidelines are needed for inclusive planning....
Changing urban form --- Moving away from strength....

**Central Kolkata:** Dense network of streets with excellent connectivity. Small blocks with permeable streets....

**New Town Kolkata:** low density super blocks
Gated and exclusive zones are not public transport friendly

Super blocks

No mid block crossings for pedestrians – Advantage to vehicles
More FAR/FSI does not necessarily mean densification

In India policy is expected to incentivise ‘high-density’ development for optimal use of urban space and resource efficiency.

Higher FAR do not automatically result in densification.

-- Provision of large unit-sizes defeat the purpose of densification.

Link the FAR threshold with a minimum density requirement – dwelling units/ha

-- Maximum permissible FAR and densities to be based on the capacity of public transport, circulation network and the physical infrastructure thresholds of the area, other services – water, waste etc. .

Provide a variety of mixed-use, mixed-income housing, employment and recreation options within walking/cycling distance of each

Source: Kolkataskyline.wordpress
Delhi setting norms for high density requirements

Delhi framing Transit Oriented Development Policy (DDA/UTTIPEC)

Density minimums as per the table below:

<table>
<thead>
<tr>
<th>Gross FAR (site)</th>
<th>Minimum permissible density (with ±10% variation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential dominated project (Residential FAR ≥ 50%)</td>
</tr>
<tr>
<td>Below 1.0</td>
<td>Under-utilization of FAR (not permitted)</td>
</tr>
<tr>
<td>1.1 - 2.0</td>
<td>200- 400 du/ha</td>
</tr>
<tr>
<td>upto 3.0</td>
<td>400 - 600 du/ha</td>
</tr>
<tr>
<td>3.1 - 4.0</td>
<td>600 - 800 du/ha</td>
</tr>
</tbody>
</table>

* Site level FAR shall be based on Approved TOD Influence Zone Plan.

-- **Mixed land-use norms**: At least 30% residential and 20% Commercial & Institutional use of FAR is mandatory within the Influence Zone

-- **Mixed income building typologies** – low income, middle and high income, shelterless, chronically poor
Barcelona: High Density doesn't mean high rise

Barcelona has density ranging between 200 dwellings per hectare to 500 dwellings per hectare

Source: Mid-rise, high density. Until what extent does density matter? - Prof. Joaquim Sabaté
Transit oriented development (TOD) ……

TOD, densification and mixed land use are needed for compact cities to reduce travel distances, reduce fuel use, improve efficient use of public transport, reduce car use, make cities walkable and pollution free…….

This will require parking policy as a travel demand management tool
National Habitat Standard Mission of the Ministry of Urban Development

Guidelines for compact mixed land use

-- 95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance.

-- 95% residences should have access to employment and public and institutional services by public transport or bicycle or walk or combination of two or more.

-- At least 85% of all streets to have mixed use development.

-- Need small block size with high density permeable streets etc

UTTIPEC guidelines

<table>
<thead>
<tr>
<th>Hierarchy of Facilities</th>
<th>Accessibility Standard from each home/ work place.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRTS Station</td>
<td>Approx. 800 m or 10 min walk</td>
</tr>
<tr>
<td>Metro feeder/ HOV feeder Stop</td>
<td>Approx. 400 m or 5 min walk</td>
</tr>
<tr>
<td>Bus Stop</td>
<td>Approx. 400 m or 5 min walk</td>
</tr>
<tr>
<td>IPT/ auto-rickshaw Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Cycle Rickshaw Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Cycle Rental Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Shared private parking garage</td>
<td>Approx. 500 m or 6 min walk</td>
</tr>
</tbody>
</table>
(3) Plan for people’s movement and not vehicles’ movement

Need integrated, affordable and efficient public transport plan – *(buses, para transit system (mini taxis) and other systems)*
How do we make public transport attractive and affordable?

Delhi
Buses are getting marginalised

Addis Ababa
Importance of mini taxis in public mobility needs

Lagos
Understand this mobility transition

Source: Based on analysis of data provided in reports: 1) ICLEI-South Asia 2009 2) WSA/MOUD 2008
Why buses?.............

-- Spine of public transport: Buses provide the bulk of public transport services – as much as 40-60 per cent – in cities that have city bus services.

-- High targets for public transport share can be met only with bus system: Delhi targets 80% public transport share by 2020 – about 73% of this share will be met by buses.

-- Buses allow greater flexibility, geographical coverage, cost effectiveness, and space efficiency. Can flexibly and easily meet the needs of changes in demography and land use. It can cover areas with lower travel demand.

-- A bus occupies twice the road space taken by a car but carries 40 times the number of passengers. Bus can displace anywhere between 5 and 50 other vehicles and allow enormous oil and pollution savings (IEA).

-- Poor people are most dependent on affordable public transport to access jobs and services. Urban poor can use upto 25-30 per cent of their income on transportation.

-- Buses minimise interchange and reduce cost of travel

-- Per person emissions several time less than cars
Reality check in Delhi
Public transport losing ground. We are losing our advantage.

Source: Anon 2008, transport demand forecast study: study and development of an integrated rail multi-modal public transport network for NCT of Delhi, RITES, MVA Asia Ltd, TERI, September
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 transport system in Addis Ababa

• Anbessa is the formal public transport mode.
• Operates fleet size of 759 buses consists of 300 old buses and 459 new buses.
• While 70 per cent of the services offered are standard scheduled, special premium account for 20 per cent and the rest 10 per cent as feeder services.
• Around 415 buses operate on 104 routes from 4 terminals.
• An average of 1.1 million trips are made by buses every year.
• The daily ridership is about 400,000 commuters.
• The daily kilometer run for the scheduled service is about 48,589.
• The bus ridership has declined by 17 per cent from 2007 to 2011.
• Since 2010, there is an increase in the ridership. About 65 per cent of the buses are assembled in the country.

Anbessa bus transport ridership (million)
Formal transport in Addis Ababa

- The two LRT lines totaling 32 km, with 32 stations, 10 of which being hub stations, are under construction.

- One BRT line of around 12 km is in the planning stage with a further six possible lines identified.

- ICCT’s estimates suggest that a BRT system in Addis Ababa will result in considerable overall health benefits in the range of $41 to $45 million per year in 2035.
Design roads for all road users
Give priority to clean mode of transport to protect public health

Moving vehicles vs. moving people
Action: Bus sector reforms

-- Augment bus fleet and bus infrastructure

-- Improve fleet utilisation

-- Service level benchmark and service guarantee -- reliable and frequent service

-- Need route rationalise to ensure that all neighbourhoods are served efficiently. Apply ITS to monitor bus operations

-- Improve overall economic efficiency of bus transport

-- Integrate all systems well. Need public information on bus service

-- Design public transport network in a way that it minimises the need to for interchange -- This makes public transport unattractive and more expensive
(4) Need integration
Integration: The game changer

Integrate transport systems – LRT, BRT, bus, Minis bus taxis, walkways

Expand well designed and safe pedestrian facilities to support public transport

The interchange points of LRT, BRT and bus stations need to be planned and executed carefully for easy transfers and access

Common ticketing
Need norms for multi-modal integration
Case study from Delhi

Metro station in Delhi

Now

After
Delhi is developing guidelines for modal interchange location

**Delhi-- UTTIPEC/DDA guidelines**

- **Bus stop, cycle rental:** within 50 meter level walk from station exit
- **Cycle and two wheeler parking:** within 100 meter level walk from station exit
- **Auto rickshaw stand:** within 150 meter level walk from station exit
- **Private car/taxi/auto rickshaw “drop off”:** with barrier-free of exiting pedestrians and NMT

Pedestrian exits, bus-stops and Cycle-rickshaw stands must be closest to main pedestrian exits from station.

**Car parking if provided,** must be BEYOND 250 M distance of Station/ or PT interchange point

**Pairing of Origin-Destination (O-D) Nodes:**
Provide cycle/ auto stands at nearby important destinations.
(5) Need informal intermediate public transport service....

White and blue mini buses/vans, Matatus, Boda Boda....are low occupancy but high frequency modes – very efficient and affordable. Can penetrate deeper into neighbourhoods. Irreplaceable in many areas
Lagos is more sustainable than Los Angeles
Protect and organise intermediate public transport systems: 
*Mini bus taxis – lifeline of affordable public transport*

Modal share of public transport modes

<table>
<thead>
<tr>
<th>PT-mode</th>
<th>Seating Capacity</th>
<th>Fleet size</th>
<th>Passenger Carried daily</th>
<th>Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Bus Taxi</td>
<td>11</td>
<td>10,500</td>
<td>1.6 million</td>
<td>73%</td>
</tr>
<tr>
<td>Midi Bus (Higer)</td>
<td>25</td>
<td>439</td>
<td>180,000</td>
<td>8%</td>
</tr>
<tr>
<td>Anbessa Bus</td>
<td>100</td>
<td>750</td>
<td>420,000</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>2.2 million</td>
<td>100%</td>
</tr>
</tbody>
</table>
These are high frequency services with very high throughput of passengers

Provides the most reliable and frequent service both during peak and non-peak hours

Can penetrate deep into neighbourhoods and provides the most efficient last mile and first mile connectivity

Involves least interchange and therefore allows lower cost of travel

Demand for this service will remain strong in cities with high population densities. In Delhi introduction of formal mass transport systems like metro rail or big bus service has not reduced their demand. In fact Delhi is increasing their numbers
Intermediate public transport systems like mini bus taxis are reliable, affordable and provide high frequency public transport services

These meet more than 70% of public transport service in African cities

Do not destroy this affordable system. In 2011, an assessment by Ethiopian Institute of Architecture found that transport fares have increased much more than household income in the last three years. This has made bus services unaffordable for a large percentage of the population.

Bigger formal systems like LRT and BRT will be more expensive. Increase interchange points

Need supportive systems of mini bus taxis. Congestion will worsen if these are replaced by cars.
Initiative in some cities to organise and manage minibuses/minivans: A good practice among developing countries

-- Eg Addis Ababa --- Owners of blue and white taxis organised under 13 owners' associations based on the zoning system reintroduced in 2011.

-- Number of members in each association varies, with a minimum number of 500. These associations engage in service route management

-- The 13 minibus taxi owners associations are to be reorganized into two bigger share companies. -- Members of the associations are expected to change their vehicles into midi buses, with a capacity of up to 24 passengers.

-- Similar initiatives in Nairobi

Mini and midi bus taxis should NOT be phased out if light rail system comes. These should only be improved
Indian cities also reorganising intermediate public transport
These are vehicle of the future

-- 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.
-- E-rickshaws
How can para transit services be improved and integrated with other modes?

Is it possible to provide fiscal support to fleet renewal and scrappage in this segment linked to emissions standard?

Potential of introducing clean fuel/electric vehicles with fiscal support in this segment

How can they be better organised?

Organise them as feeder service to LRT etc
(5) Need non motorised transport policy and street design guidelines to make cities accessible and safe
Compact and closely built city design allow shorter travel distances.

Average trip length in most African cities less than 5 km. This makes city very accessible and walkable

Congestion have increased share of walking in our cities...It is faster to walk

Nearly 45 to 60 per cent of daily commuters walk in Addis Ababa.

According to the Authority, 20 per cent of the city has road network. About 2006 km of pedestrian walkways have been provided. The sidewalks have 3 m to 8 m width and accessible height.
Delhi: wrong road design force people to cross in unsafe manner. This compromises public transport usage

In Delhi accidents near foot over bridges have increased

Public transport needs safe walk access

Source: Delhi Traffic Police
Disadvantage: Pedestrians
It is inconvenient for people to negotiate foot over bridges...

Assessment of sidewalks in most African cities show many road facilities are wide, with no signals, striping, or pedestrian islands, have long gaps between crossings, -- This makes pedestrian movement difficult.
Delhi has adopted street design guidelines

Indian Road Congress guidelines for roads have been reformed to make pedestrian and cycling friendly

Adopt street design guidelines for design solutions

Make them mandatory
It is possible to transform streets to make them pedestrian friendly

- Streets of Delhi retrofitted

Connaught Place
Design roads for all street activities
Informal market needs space too...

This gives street vitality. Makes streets safe from crime. Improves livelihood security
In Indian city of Bhubaneswar: Space for vending built into road design

Raj path road,
Bhubaneswar, India

Eye on the street: Activities make public space safe

Source: CSE
Action: Adopt non-motorised transport and pedestrian policy

Ethiopia’s Local Development Plan aims to “promote cost-effective movement systems” and “accessibility through improving relationships between people, places and activities”.

-- Need policy on non motorised transport. Uganda and Nairobi have NMT policy

-- Mandate people friendly street design guidelines for all road projects

-- Mandate periodic street safety and accessibility audits for corrective measures

-- Discourage car centric road design

-- Promote physical design for multi-modal integration

-- Master plan/ zonal plns to focus on infrastructure for non-motorised transport

-- Need policy to protect pedestrian rights and pedestrian infrastructure
Questions for action plan?

-- Ethiopia needs a non-motorised transport policy

-- Need legal framework to protect pedestrian rights, protection of pedestrian and cycling infrastructure, pedestrianisation and safe access for all

-- Make pedestrian plans mandatory to infrastructure funding.

-- Public transport plan needs linkage with pedestrian plan

-- Reform and mandate guidelines for pedestrian infrastructure to make it people friendly

-- Make it mandatory for urban local bodies to conduct walkability and safety audits

-- Need zero tolerance policy for road accidents

Involve communities on decisions on use of road space. Need pedestrian network plan and adopt traffic volume reduction plan
(6) Restrain car usage to reduce congestion and pollution...

**Global strategy** – congestion charging (London and Stockholm), electronic road pricing (Singapore), capping sale of vehicles (Beijing, Shanghai, Singapore etc); Low emissions zones (Berlin etc)

**First steps in global south:**
Parking policy and vehicle taxation policy as demand management measure for clean air.............
What’s going wrong with parking?

- **Parking: wasteful use of cars**: For about 90 to 95 per cent of the time a car is parked. (CRRI)

- **Insatiable demand for land**: Annual registration of cars generate demand for land bigger than 310 football fields in Delhi! Land is expensive and can be used for other social and public amenities.

- In Lagos the parking demand of the existing car fleet is equivalent to 115 football fields. In Addis Ababa the parking demand of the existing car fleet is equivalent to 110 football fields.

- **Inequitous use of land**: A car is allotted 23-26 sq m for parking. In Delhi only 18-25 sq m allotted to very poor families in Delhi.

- Parking takes away walkspace, urban common, green spaces, etc.
2006: National Urban Transport Policy in India

Land is limited and there is a limit to the additional parking space that can be created in the city. The provision of parking for personal motorised vehicles cannot be considered as a matter of public good.

- Individual user of personal vehicle should pay for the use of the space for parking and parking facilities.
- The ‘user pays’ principle should govern the pricing of parking.
- Government should not subsidise this cost.
- Use a wide variety of tools for pricing parking -- time variable rates –etc.
Conventional parking planning: Supply oriented…

The parking demand in the markets

### Parking demand estimation in Delhi

- **Total parking supply (ECS)**
- **Current peak parking demand (ECS)**
- **Maximum projected demand in 2010 (ECS)**

#### Note:
*Compound annual growth rate of car (10 per cent) and two-wheeler (6 per cent)*

Source: Based on CRRI 2006, *Congestion and parking problems of selected locations in Delhi*, Final report, New Delhi
The key elements of parking policy.....

-- Develop parking policy as a demand management and car restraint policy

-- Need parking district management plan

--- Develop parking management and enforcement framework

-- Need variable parking pricing to reduce demand for parking

-- Need different parking strategy in areas with good public transport connectivity (transit oriented areas)
• Addis Ababa has taken the lead to introduce priced and variable parking to reduce demand for parking and car usage.

• The Addis Ababa Municipality manages parking in the city.

• Parking charge is in accordance with a specific pricing structure for each zone (0.5 to 1 Birr for one hour).

• Parking charge is directly related to the vehicle size and duration of stay. The parking charges vary from Birr 0.6 to 9.2 depending on the vehicle size and parking duration. There is further scope of increasing the charges.
How to position this debate?

There is a plan to build 20 multi-story parking garages are to be constructed in the capital. The Addis Ababa Transport Bureau (AATB) to build the first of six smart parking facilities with an outlay of 80 million Birr

- Nominally, developers need to provide one parking space per large apartment, one parking space per 5 moderately-sized apartments, one parking space per 10 small apartments, and 1 parking spot for every 70 square metre of commercial space provided. -- But these standards are poorly enforced. It is often found that the parking space is used for other purposes.

Transport Policy, "lack of off-street parking facilities and over utilization of road space by parked vehicles" is high on the list of infrastructure issues
Poor management leads to chaotic parking stress on roadside but many off street parking areas remain underutilised.

Mostly uncontrolled parking supply except in some designated areas and yet parking shortage.

Large share of private residential parking remains underutilised.

Poor management of parking queues, lack of design for enforcement,

No survey and inventory available on parking spaces in any area.

Spillover from commercial areas on residential streets is inevitable but requires management; resident participation.

Through-traffic vs search traffic. Huge search traffic contributes to congestion. Need design solutions.

Green and common areas, footpaths, vulnerable to night parking.

Need parking area management plan
Before looking for more areas for parking
manage the available parking well:

On-street vs off-street....

Need judicious use of on-street parking

This can lower demand for land for expensive off-site parking which is scarce

Off-street needs more space and land for access; adversely affects walkways and open areas

Entry exit from high capacity structured parking adds to local traffic circulation and congestion

International experience shows that efficient management and proper utilisation of legal parking lots can increase parking capacity by at least 20-40 percent.
Do not do spot fixing with multi level car parking
Do area management

What may go wrong? Example from, New Delhi

-- Expensive multi level car parking created in a busy commercial area
   – But remains underutilised
-- Approach roads ill designed, get clogged easily. Long queues.
-- It has not been integrated with the larger surface area parking
-- They allow 25% of the structure to be used as shops to earn revenue. This creates additional parking demand and chaos.
-- Poor enforcement in surface parking
-- Shopkeepers’ cars dominate
-- Para transit and cycles not integrated with parking plan

...But cars taking over space
Integrate multi-level parking with local area parking planning to reclaim public land, create pedestrian plaza….

Parked cars adversely effects the shopping experience

One parking slot of shop owner can be used by 7-9 shoppers in a day. Therefore higher volume of business

**Globally,** customers agree to pay high parking charges if they get good shopping and pedestrian environment. Increases volume.
With integrated local area planning more open spaces can be freed up and reduce congestion

Proposal:
-- Inventorise available parking spaces. Free up some surface area
-- Need common management for structured parking and surface parking.
-- Rationalise and coordinate parking rates for surface parking and structured parking.
-- IT application and public information system,
-- management strategy for surface parking
Enforcement: Tame the chaos

- Map out high and low demand area
- Open up underutilised off street parking for public parking
- If managed well on-street can meet most of the demand
- Demarcate legal parking spaces. Organise them well. Inventorise the parking spaces. Put out the list on the website
- Prevent encroachment of walkways
- Put up signages and information systems
- Introduce metering
- Impose penalty
- Move motorists to low demand streets during peak time to address spill over

Demarcation in other cities – Chennai, Pune, Pimpri Chinchwad etc

Pune, Pimpri Chinchwad getting organised
Design on-street parking well to reduce congestion impacts

Inventive design, Source: I Trans
Upgrade parking management

The agreement with the parking contractors need technical upgrades. Need protocol for contract and competitive tendering:

-- Set management rules
-- Signages and pricing meters and mode of payments like the smart cards
-- IT systems for information and enforcement; prevent illegal parking that can compromise safety
-- Facilities to clamp or tow away vehicles
-- Parking monitoring
-- Parking data collection and analysis for policy feedback
-- Street design and management of queues
-- Street reconstruction services
-- Carry out proper surveys to know the expected revenue.
-- Link parking pricing with linked with parking management goals. The co-benefit is revenue and local area development
How much parking is enough?

Or is this a right question?
The confounding questions……How much parking is enough?

Public policy decides how much parking to be built in buildings and in public space.....

In Indian cities the “minimum” requirement is prescribed.

The minimum requirement also varies across cities

**Delhi Master Plan** 3 ECS/100 sqm in Commercial; 2 ECS/100 sqm in residential; 1.8 ECS/100 sqm in Government buildings.

**Kolkata and Pune** specify ECS per 75 sq m;

**Hyderabad** – upto 60 per cent of built up area……and so on

Very supply driven...
Why are we wasting so much valuable space for parking: Huge loss to households and the city

A 100 sqm plot built to the full allowable FAR (315 sq m) needs 161 sq m of parking space by Law more than half. If provided in the built up area it will gobble up one and half storey or space of 4 EWS dwellings.
Global cities are capping the parking requirement: Setting maximum limits

Shifting from minimum requirement to maximum/caps

Flexible standards: Eg. In Hong Kong parking provision is decided based on accessibility of an area. In Tokyo parking norms in CBD lower than Delhi.....

Rigid norms can create over capacity: Account for improved accessibility to limit future expansion and reduce parking demand

- Sites may change from parking deficit to parking surplus. The parking plans must account for the changes in parking demand with improvement in public transport. For Eg, -- In CP parking demand dropped by 10% after introduction of metro.

- The feasibility study for Mangalam Place projects shift in modal split in favour of public transport after metro. DMRC study shows that in Vikas Marg metro can reduce the trips of different modes. That will indirectly impact upon parking demand.

Opt for common and shared parking. Discourage individual – private parking
Strategies for parking pricing.....
There are short term and long term parkers: Design the system differently for them

In many sites 50 to 85% of users stay up to 2 hours

Source: Based on CRRI Study
Different parkers behave differently

**Short term parkers** want most convenient parking. But short term shoppers contribute significantly to peak parking. Their parking duration can be influenced by variable parking.

**Long term parker** *(office goers etc)* are more sensitive to day long priced parking and can move to cheaper off-site parking, public transport or park and ride.

**Resident parking is inflexible.** Good management and permit can make a difference.
Irrational parking rates for MLP and surface parking
Integrate management and make on-street more expensive than off-street

FOR CARS
Rs 20 for 2 hrs,
Rs 40 : 2-4 hrs
Rs 60 : 4-6
Rs 100 : 6-10 hrs
Rs 250 : 24 hrs

No “on-street” parking proposed but not implemented

Car: Rs 10 for 12 hrs
2Ws: Rs 5 for 12 hrs
Mumbai: Discrepancy in rates can lead to underutilisation of MLP

INOX the multiplex in Nariman Point: Before construction of MLP: No. of surface parking spaces: 140, Utilisation: 100% during office hours

After: No. of parking spaces: 540, Utilisation of MLP during office hours: 10% Parking rates are Rs 5 per 30 minutes or Rs 10 per hour.

Surface parking rates: Rs 5 per hour and Rs 3 for every additional hour.

Resolve this

New game in town: Free floor space index (FSI) to builders to builders to create free parking lots.

Situation in INOX Parking area on 5th May 06 – a weekday at peak time of 11:am

Source: Mumbai Environmental Social Network
Principle for setting parking pricing

Introduce variable parking rates according to Commercial areas

• Peak and non peak hours – price should be variable by the hour so that it changes behaviour
• Higher prices for on street parking and the most convenient place
• Weekdays and holidays
• Lower charges for park and ride on light rail or BRT
• Lower charges for park and walk
• Remote parking can be cheaper than in the heart of the city

Residential areas
Residential parking permit for use of public land for parking. A monthly fee can be paid for this. This is also needed to control multiple car ownership

Ideally parking rates should be market driven
Impose high penalty for illegal parking
Global pricing levers

Japan

Proof of parking regulations and ban on night parking on streets: Vehicle owner procures a “garage certificate” from the Police department for vehicle registration. This is re-issued in case of change of ownership or address.

Singapore and Hong Kong have stringent approaches towards restraining car ownership and usage.

Hong Kong has been more effective in restraining car ownership – about 60 cars per 1000 people vs 110 cars per 1000 people in Singapore. Singapore has three times more private car kilometres of travel per person than Hong Kong.

This is explained by the Hong Kong’s more expensive parking.
Sikkim transport department notification makes it mandatory for buyers to produce an availability-of-parking-space certificate before registering vehicles:

- The superintendent of police issues certificates after physical verification of the parking space.
- This is followed by an inspection by motor vehicles inspector, who submits details to the transport department along with a rough map of the site.
- Car dealers are cannot sell cars without the proof of parking.

Aizawl in India – gazette notification in 2011:

- The vehicle owner must obtain a certificate from the transport department saying he has a garage, within his own residential or business compound or in some other place, or a garage to hire from other person, for parking the vehicle he intends to purchase (The Mizoram Gazette, Vol XXXIX, Issue No. 295, August 2010).
Residential parking

-- Unbundle parking from property
-- Sell it separately
-- This will allow sharing and more efficient usage of available spaces
-- Manage as public facility
-- Do not hide the true cost of parking for the owners and tenants
-- Residential parking permit
-- Supreme Court has ruled that developers cannot sell parking lots separately as independent real estate units as parking areas like stilt parking are common areas and facilities
-- This has not outlawed pricing of common parking and permits.
-- Developers of residential apartments or commercial buildings must hand the parking areas over to the management organisation like 'housing society'.
--- They can find that charging/unbundling is a useful way to manage conflict over their on-site parking.
Why should we support residential parking pricing?

Several benefits for the residents:

They have assured parking spaces in the neighbourhood.

Pricing allows equitable sharing of local parking spaces. One car owner vs 5 car owner

Will control multiple car ownership as permits will limit their numbers

People by deciding not buy multiple cars can save on permit fee. This incentivises lower car ownership

This will also prevent invasion and encroachment from neighbouring colonies
How stringent parking policy reduce car usage?

“If you tighten controls, what will I do? Public transport is so inadequate!!!!!!”....

Good pricing trigger many commuting decisions:

-- Combine trips
-- Avoid peak time
-- Share car with family members and colleagues
-- Look for cheaper parking areas off-street
-- Take auto or a taxi
-- Just walk or cycle
-- Take metro or a bus – especially if you are a long term parker
-- Influence parking duration and purpose of parking
Other countries are limiting and pricing parking

**Capping parking supply**

- **Portland, Oregon** Overall cap of 40,000 parking spaces downtown. This increased public transport usage from 20-25 per cent in the 1970s to 48 per cent in mid 1990s.
- **Seattle** allows a maximum of one parking space per 100 square metres at downtown office
- **San Francisco** limits parking to seven per cent of a downtown building’s floor area

**Parking pricing strategy to reduce car usage. Benefits public transport**

- **New York**: Very high parking fees and limited parking supply lowers car ownership far below the US average.
- **Bogota**: Removed limit on the fees charged by private parking companies. The revenue goes to road maintenance and public transit improvement.
- **Shenzhen**: Hike in parking fees during peak hours leads to 30% drop in the parking demand.
- **Bremen**: No free parking in city centre. Parking charges higher than public transport cost.
- **Barcelona**: Parking revenue directed to a special fund for mobility purposes.
- **London**: parking income channeled to transportation projects.

**Strong enforcement and penalty**

- **Tokyo**: Enforcement against parking violations cuts congestion drastically. Private firms allowed to issue tickets for parking violations. This makes on-street parking expensive.
  - **Antwerp**: parking fines are invested into mobility projects

**Free up public space**

- **Paris**: Street space freed for bike sharing and trams
- **Copenhagen**: Streets freed up for bike lanes etc
Parking and clean air

It is still not clear to many how parking management and restraints can reduce air pollution and give public health benefits.

**Boston** froze their parking requirements at a level that is only 10 per cent higher than the 1973 level to meet the Federal clean air standards.

**New York**: very high parking fees and limited parking supply have lowered car ownership far below the average rates in other US cities.

**Amsterdam** - parking fees expanded to meet EU directives regarding NO2 and PM10 emissions. Car plate numbers are registered with emissions information. Trucks are allowed to unload for a maximum of 15 minutes in spots where they are not allowed to park.

**Zurich** considers total NO2 emissions when determining the amount of parking to be allowed.
Ban parking in green areas

Parking provisions for public transport and commercial vehicles – Delhi is not being able to buy buses because of lack of parking and depot space

Facilities for bicycle parking
Deepen public awareness about the benefits of parking management and restraint

Public support can be stronger if people understand the benefits of parking management

**Car user will benefit:**
- Reliable and predictable information about parking availability reduce cruising time, fuel cost and pollution.
- Efficient billing makes payment more transparent and accurate.
- Chances of finding a space improves and reduces waiting time.
- Decreases traffic chaos due to indiscriminate on-street parking.

**Non-car user will benefit:**
- Protects footpaths and allow barrier free walking;
- Frees up public spaces for cycle tracks, rickshaw parking, autorickshaw-parking, play grounds etc
- Improves access to bus-stops, metro stations.
- Improves safety of children, women and elderly people.
- Improves visibility of shops, shopping experience and throughput of customers.
- Improve overall environment, green areas and public recreational spaces.
- Makes it easier for emergency vehicles like ambulances, fire trucks, police, etc. to negotiate

**Urban local bodies to benefit:** Public revenue generation for transportation projects

**Public health and climate benefits:** Reduced dependence on cars reduce air pollution, GHG emissions, congestion, noise level and fuel loss.

Build public support for parking tool that restrains car usage
Global awareness campaigns on parking regulations

Downtown Pasadena, California Redevelopment: Parking Meter Zone (PMZ) -- Dedicated revenue from parking to area improvements -- included new street furniture and landscaping, police patrols, street lighting, more street and sidewalk cleaning, pedestrian facility improvements, and marketing. Each parking meter had a sticker saying, “Your Meter Money Will Make A Difference: Signage, Lighting, Benches, Paving.”

Ventura, California: Municipality introduced a byelaw -- , “All moneys collected from parking pay stations, and meters shall be placed in a special fund, -- devoted to purposes within the parking district. This encouraged the residents to support

Aspen, Colorado Downtown parking Pricing: Marketing campaign to let motorists know about the meters and parking violation. This reduced parking problems and was supported in a municipal election by a 3-to-1 margin.

City of Regina, Canada Parking Awareness Campaign to help residents avoid getting parking tickets. Linked parking management to public safety, -- eg violation if parking too close to a fire hydrant or parking too close to an intersection blocking sight lines. This built public support
Principles for parking policy

- **Adopt flexible parking standards and move towards maximum caps** to account for improved public transport access and reduction in personal vehicle travel.

- **Take area approach towards parking management** – off-street and on-street

- **Stringent controls and enforcement**

- **Reforms parking pricing for good management** -- Minimise free parking, restrict on-street parking, use variable parking rates, avoid fixed annual payment, price parity between surface and multi-level parking etc. Discard one time parking charge

- **Integrate parking design with multi-modal integration; Parking strategy for buses, IPT, freight**

- **No parking on green spaces, pavement, NMT lanes etc. Non-negotiable.**

- **Need parking strategy for residential areas and mixed land use areas. Promote priced, shared, common parking**

- **Use parking revenue for local area development, public transport; Stringent penalty on parking violations.**

- **Develop parking strategy for special localities** like hospitals, railway station, cinemas, shopping malls, schools, high impact events etc

- **EIA of large commercial buildings to assess parking impacts and seek mitigation**
Effectively priced parking can make a difference

Grosvenor square, London

Source: TRL in ITDP (2011): Europe’s Parking U-Turn
(7) Fund the transition….need fiscal strategy
World bank study in India: Buses pay more taxes

In Delhi:
Buses pay at least Rs 13,000 per year as road tax
Cars: One time road tax works out to be a mere Rs 300 per year

Ethiopia: Evaluate the current tax structure on vehicles
Pimpri Chinchwad – city in India
Framing innovative funding strategy for public transport

• They allow extra built up area and densification along the BRT corridor – this increases earning from direct beneficiaries
• Advertisement revenue and incremental property tax are the key sources
• This has already generated revenue worth Rs 92 crore (2012-13).
• This is used to construct and maintain BRT

Total income potential of BRT corridors

- TDR Premium; Rs. 1745 Crs; 61%
- Devp Charges; Rs. 780 Crs; 28%
- Advertisement; Rs. 205 Crs; 7%
- Incremental Property Tax; Rs. 110 Crs; 4%

Source: Commissioner PCMC 2013, Financing the development of BRT corridor, Pimpri Chinchwad, Pune, SUTP
Need funding strategy for public transport...

-- Improve overall economic efficiency of bus transport
-- Reduce tax burden on buses
-- Rationalise budgetary allocation in the transport sector. A lot money tied to signal free roads and flyovers that impede bus routes can be ploughed into bus transport. This will release enormous amount of money.
-- Reform rates and policy of some key revenue heads like advertisement, parking, and vehicle taxation to be able to tap substantial amount of earnings from them.
-- Formal bus companies to can undertake commercial development in their depots and terminals
-- Apply travel demand management measures to increase taxes on personal vehicles. Use the additional revenue for public transport.
-- Explore best practice models -- like tax on wage bill, station naming, fuel surcharge, congestion tax etc, TDM measures to generate revenue, and increase bus ridership
World Bank assessing similar approach in other cities…((Yet to be released study)

Potential revenue in billion units
Fares – 35 billion units
Rent on property – 40
Parking -- 30
Station naming rights – 5
Betterment – 75
Fuel tax – 15
Vehicle registration – 2
Advertisement -- 3

Generates a lot more than the target of meeting the O&M cost of 93 billion units

(Source: OP Agarwal, UMI)
Questions for action plan

Design fiscal policy to accelerate change to achieve clean air

-- Evaluate the current tax burden on public transport and cars and reduce tax on public transport
-- Differentiated taxes on imported used cars and new cars; diesel vehicles vis a vis petrol cars
-- Create urban transport fund through innovative fiscal strategies
Clean air action plan

Principles of co-benefit to guide the roadmap of clean air action plan

-- Set and meet clean air target to protect public health

-- Reduce energy and climate impacts of growth and motorisation

-- Adopt affordable strategies that are equitous and meet the needs of the poor and all other vulnerable sections

--- Ensure safe mobility for all

-- Enhance quality of life

-- Integrate the needs of livelihood security
Thank You
(8) Change the mindset....
Whiff of change………..
Abuja drafting cycling policy
Car free day Kampala, Uganda

http://www.fabio.or.ug/page19.php
Cities are moving away from car centric infrastructure.....

Seoul’s Cheonggyecheon restoration project

Cities that have destroyed roadways

San Francisco
Milwaukee
New York
Portland
Toronto
Seoul
Dutch Minister visits the queen on a bicycle

Source: GIZ