

CITIZENS' REPORT
AIR QUALITY AND MOBILITY
CHALLENGES IN HYDERABAD



Centre for Science and Environment
RIGHT TO CLEAN AIR CAMPAIGN

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Research and direction: Anumita Roychowdhury

Research: Vivek Chattopadhyaya

Inputs: Priyanka Chandola, Ruchita Bansal

Cover photo: Vivek Chattopadhyaya

Design: Surya Sen

Layout: Shri Krishan

Production: Rakesh Shrivastava and Gundhar Das

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41, Tughlakabad Institutional Area, New Delhi 110 062

Ph: 91-11-29956110-5124-6394-6399 **Fax:** 91-11-29955879

E-mail: anumita@cseindia.org / cse@cseindia.org

Website: www.cseindia.org

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From grassroots

Cities are desperate to escape the choking haze of pollution, protect health and get out of crippling congestion. Big change is possible only if cities take charge, and deepen grassroots action. Cities can achieve clean air and become liveable if people in the city understand the risks and the solutions, and fire up public opinion to demand change. Success in cities will make the national goals of clean air, energy security and climate mitigation a reality.

The energy and enthusiasm for change is possible if cities begin the conversation now to understand the issues of common concerns, share lessons, know what has worked and not worked and push action. To fulfill these needs this series of citizens' report on grassroots action on clean air and mobility in cities has been initiated to capture local challenges and solution. This report on the capital city of Hyderabad in Andhra Pradesh is second in the sequence that looks at the challenges of one of the fastest growing metro cities in the country.

The common challenge of all our cities is killer pollution and mobility crisis. Growing affluence, increased car ownership, car oriented infrastructure, urban sprawl, are increasing the share of motorized trips and travel distances in our cities. This is marginalizing walking, cycling, bus hopping and increasing harmful and warming emissions. How can cities break this spiral?

It is important to act now when cities are expanding their infrastructure, taking funding decisions and discussing transportation policies at the national as well as local levels. While there are many common challenges across all cities, there are unique imperatives as well that must guide local action. A lot will depend on the way the cities will organise and design themselves and make travel choices. Only this can tame pollution, congestion and energy guzzling.

So far public anger, judicial pressure and executive action have combined to trigger change. Indian federal structure allows cities to make wide technical and administrative choices and take decisions on transportation management, land-use planning, public transport and taxation policy, clean fuel and technology and in-use emissions control. This creates enormous opportunity for change. But this also demands that both national and local policy action are backed by informed choices and public support.

The national government defines the framework for national air quality management and national urban transport policy. But cities decide and act. Cities have an advantage. They can respond quickly and effectively to local problems. They have the flexibility in decision making to meet local air quality targets and mobility management goals. They can enable cohesive coordination amongst different agencies for effective implementation. Take ownership, ensure accountability and transparency. There is no 'one best way'. Solutions will have to be customized for each city according to its imperatives and uniqueness.

Various national policies have begun to take shape to provide the national framework for clean air and sustainable mobility in Indian cities. The National Urban Transport Policy sets the framework for sustainable mobility; National Ambient Air Quality Standards issued under the Air Act sets the benchmark for clean air in cities. The mission on sustainable habitat framed under the National Climate Action Plan, provides for sustainable mobility action.

This citizen's report looks upward from the city to harmonise, and align with the larger national goals while assessing the unique solutions the city needs. This discussion in one flagship city of a state has become important not just for the benefit of one city but to create a template for a state level policy to leverage the change for the entire state. The city action is expected to inform and guide the development of state level policy for air quality and mobility.

WHY HYDERABAD?

Hyderabad is one of the rapidly growing metro cities in the country and reflects the dilemma of cities of the same genre. These cities will have to act fast to deal with the rapid growth and worsening of mobility crisis – growing pollution, congestion, energy guzzling, as public transport, walking and cycling are marginalized.

Hyderabad has a big metropolitan area. In 2007 it had amalgamated with the surrounding municipalities and became as big as 1905 sq m. With nearly 8 million population today – more than 27 percent of the state population in Andhra Pradesh, the metropolitan area is expected to grow to 15 million by 2021. The Greater Hyderabad Municipal Corporation estimates that the city generates 10.3 million trips per day. A lot will depend on the travel choices in the city.

What is needed?

- **Meet clean air and energy saving targets:** Like some other mega cities Hyderabad is also on the verge of losing the initial air pollution gains from the first generation action. It is facing multi-pollutant crisis. Public health implication is serious. Any further delay in strengthening the second generation action on public transport, walking and cycling and cleaner fuels and technologies and land-use planning can entail huge public health and energy costs. The city will have to immediately set the targets for meeting the clean air standards as well as define the energy saving targets for the transport sector. This is possible only with leapfrog technology roadmap and a mobility transition roadmap aimed at significant modal shift towards public transport and non-motorised transport.
- **Upscale public transport:** The big cities have the opportunity to build to scale formal and diverse public transport systems. Hyderabad is already doing that. But the bus sector reforms will have to be accorded priority and accelerated to achieve high frequency, reliable and affordable bus service in the city. The approach to bus management has not been thought through well. The new JNNURM buses and the deluxe metro services are becoming more expensive whereas the conventional service is deteriorating in service and occupancy. The overall system integration for greater efficiency and occupancy at affordable rates is urgently needed to increase the ridership and keep it within the affordability of the urban majority.
- **Integrate informal systems with the formal public transport system:** The city will also have to efficiently integrate its formal public transport with the informal intermediate public transport (IPT). The IPTs that are low occupancy but high frequency and a very affordable services are important part of public transport. These have enormous flexibility to cater to all hierarchy of travel trips and are more permeable. They are very effective feeders to formal public transport. Any erosion of these trips will see massive shifts to personal vehicles specially for short distance commuting. This should be prevented with well designed policy.
- **Integrate all forms of transport to maximize access:** The bigger challenge is integration for optimal use of each mode to maximize public transport usage. But planning for physical and operational integration and efficiency is a challenge of planning and execution. Public transport ridership is 42 percent but is threatened to decline in the coming years. This will have to be prevented. Hyderabad has begun to take unique steps of integrated ticketing among others but a more composite planning is needed to meet its stated goal of increasing public transport ridership to 75 percent by 2021.
- **Walk and cycle more:** Sustainability goal can remain elusive if the city fails to protect its walkers, and cyclists and increase their share of trips with well planned and safe infrastructure and design. This is the most neglected area. Even public transport cannot operate optimally if walking access is impeded and unsafe. This will require a shift in city planning that allows compact and transit oriented design with a clear walking network based on direct shortest route. The city needs street design guidelines for safe, usable and universal design. This is also needed to guide periodic audit of the pedestrian infrastructure that must be mandated.
- **Cities will have to change the spending pattern.** In Hyderabad for instance more than 75 per cent of the transportation funds under the JNNURM programme has been spent on roads and flyovers. Fiscal regime – whether it is budgetary spending or taxation, favours the car over the bus. But the city has also created urban transport fund and is expected to identify a range of revenue streams – vehicles and fuel taxation, advertisement and parking policies, and even enhanced property tax from the liberalized building byelaws for extra built up area along the transit corridor – to build this fund. But these approaches will have to be guided with clear principles of travel demand management, transit oriented development and densification requirements.

- **Need compact dense cities:** This needs network design for the area of influence to make it more walkable and transit oriented. But the strategy of allowing more built up area along the corridor and higher property taxes for land value capture without the target for densification, affordable housing and travel demand management measures can lead to more car ownership and usage. Therefore, the cities will have to develop transit oriented development policies to build these safeguards, and design guidelines to avoid unintended consequences.
- **Metropolitan-wide view for all mitigation strategy:** The scale of the problem is so big in these cities that the city would need to take a metropolitan-wide view for any mitigation strategy. Otherwise, any localized action inside the city can get overwhelmed by the metropolitan influence. Air quality and mobility will have to be managed on that scale. Small steps have been taken to achieve such goals including introduction of same emissions standards in the entire metropolitan region. But a more integrated planning is needed in which land-use and transportation plan are integrated for greater densification, compact city planning to prevent urban sprawl to reduce travel distances.
- **Accelerate institutional reforms:** Hyderabad has already created Unified Metropolitan Transportation Authority and is among the frontrunners to have done this under an enactment. It now remains to be seen how it is going to organise its executive and fiscal functions for high level coordination. But this is an opportunity for integrated planning.
- **Need single landuse and transportation plan:** Under the National Government led JNNURM programme the cities are now required to prepare City Mobility Plan. This plan is in the making in Hyderabad. But it is important to point out that the city should avoid duplicity of plans. Just for one JNNURM programme the city has prepared City Development Plan, and City Mobility Plan. At the same time under the Supreme Court led initiative on air pollution it has prepared a common minimum clean air and so on. It is advisable to have one integrated land-use and mobility plan with air quality and other environmental goals to guide action in the city. The specific thematic plan can be derived as sub plan from the integrated plan. This plan should be notified under the same Act as the master Plan. Only this can ensure effectiveness with adequate legal back up. This will also enable the city government to take ownership. Otherwise most other plans like the CDP etc will degenerate to becoming a project identification process only to source central government of funding and not guide local development.
- **Cities should negotiate harder with the national government for tighter emissions standards to reduce toxic emissions.** At the same time it would need to expand its programme for cleaner fuels – CNG and electric vehicles – with the right incentives and the infrastructure back up. Cities will also have to make a quick transition to an improved vehicle inspection programme and fleet management to lower in-use emissions.
- **Build relevant and credible data bases for policy action:** As we trooped out to the city to understand the information that exists on air quality and mobility it was very clear to us that currently, there is no established practice of generating data on the requisite sets of indicators of mobility crisis and action. Cities need protocol for data generation and management on key indicators to assess and monitor shift to public transport, walking and cycling. Regular surveys should be carried out to generate data on trends in vehicle kilometers traveled by mode, trip distances, fuel use by mode, changes in usage of different modes, performance indicators of public transport, NMT and IPT. Wide ranging indicators for system performance and so on are needed. Otherwise, setting target for modal shift, or reducing transport energy consumption, improvement in performance of public transport etc cannot be tracked and monitored. This will certainly have to be an area of reform in the city.

Strong public opinion, judicial and executive actions have catalysed action in Hyderabad. Soft options have all been exhausted. This has created an opportunity for change. The second generation reforms will need tough action — plan cities for people not vehicles. This is the option for the city to cut killer pollution, crippling congestion, expensive oil guzzling and global warming impacts of vehicles.

—Right to Clean Air Campaign Team

AIR QUALITY AND HEALTH

At risk of losing gains

Hyderabad shares the same dilemma as that of other mega city in India. It has started to take action to control air pollution and seen results. But the city is also on the verge of losing the air pollution gains.

The air quality challenge in the city is complex. Like other southern cities of India overall levels of particulate matter in Hyderabad are lower than the northern cities where the influence of dust is high. But scientists caution that most of the particulates here are from the combustion sources that are more toxic and health damaging.

The city is also in the grip of multi-pollutant crisis. While the particulate pollution continues to be the primary concern other pollutants – especially ozone – have also begun to rise. The average NO_x levels show a declining trend. But this is deceptive as in key locations their levels exceed the permissible limits. Air toxics are dangerous even at trace amounts.

With increase in population, vehicle numbers, and fuel consumption pollution levels are also increasing in the city. Only sulphur dioxide levels have decoupled from the growth trend due to change in the energy matrix in the city.

Hyderabad has its own evidences on insidious health effects of air pollution. Scientists have found high level of oxidative stress, lung function impairment, respiratory ailments due to air pollution.

Drug sales related to respiratory symptoms in key locations of Hyderabad have increased. Studies have predicted significant lives savings if air pollution is controlled. The city needs aggressive and sustained action to protect public health.



- **Tiny particles are rising in the air. The levels are about 1.3 times the standards and falls in high pollution class – according to the air pollution classification of the Central Pollution Control Board.**
- **During the winter months the tiny particles PM_{2.5} shoot much beyond the standards. They go deep inside the lungs.**
- **The recent tightening of the national ambient air quality standards have changed the air quality status of the locations in the city. Some of them have moved from low and moderate to high pollution bracket.**
- **Air toxics like benzene that are strong carcinogen have recorded levels above the permissible limit.**
- **Highest number of drugs related to air pollution linked ailments have sold in Punjagutta and Abids zone that have also recorded highest PM₁ and PM₁₀ levels.**
- **Hyderabad faces the second generation challenge. It will have to take stock and refocus. It will have to leap ahead to keep ahead of the problem.**

AIR QUALITY CHALLENGES

What is the daily dose of poison that the city dwellers breathe in Hyderabad? About 21 monitoring stations track air pollution in Hyderabad. These regularly monitor sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and particulate matter of less than 10 micron size (PM10). Carbon monoxide (CO) is monitored on a limited scale. Others under limited scanner include ozone, PM2.5, and a range of air toxics benzene, toluene and xylene. The city is now preparing to expand monitoring for PM2.5, ozone, lead, benzene, Benzo (a) Pyrene (BaP), arsenic and nickel that have been notified under the new National Ambient Air Quality Standards in 2009. The emerging data paints a daunting challenge.

Killer particles: Like the rest of the country particulates remain the most serious concern. The levels of particulate matter of less than 10 micron size have continued to increase and are about 1.3 times higher than the standard (see Graph 1: PM10 levels in Hyderabad). This brings the city to the high pollution bracket – according to air quality classification of the Central Pollution Control Board (CPCB). Without aggressive measures the city may lose its breathing space.

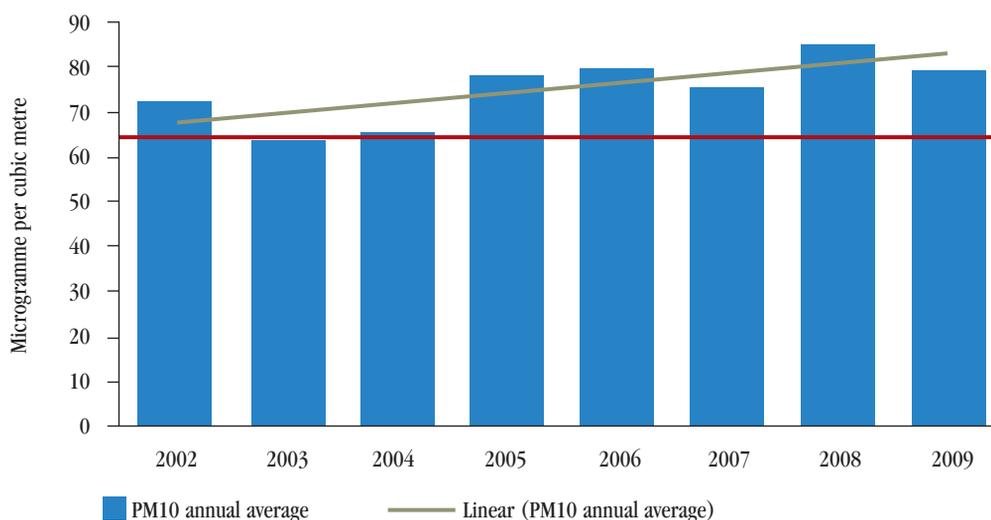
The city average levels do not reflect the crisis in different locations of the city: Paradise, Charminar, C.I.T.D. Balanagar, and Uppal that have recorded PM10 annual average levels in the range 106 microgramme per cubic metre to 119 microgramme per cubic metre. These fall in ‘critical range’ as per the air quality classification system of the CPCB.

Also the annual average trends are often not good indicators of actual exposure to pollution on a daily basis. Even if annual average levels decline, the number of days exceeding the standards may increase subjecting. This means people are exposed to higher pollution on a greater number of days



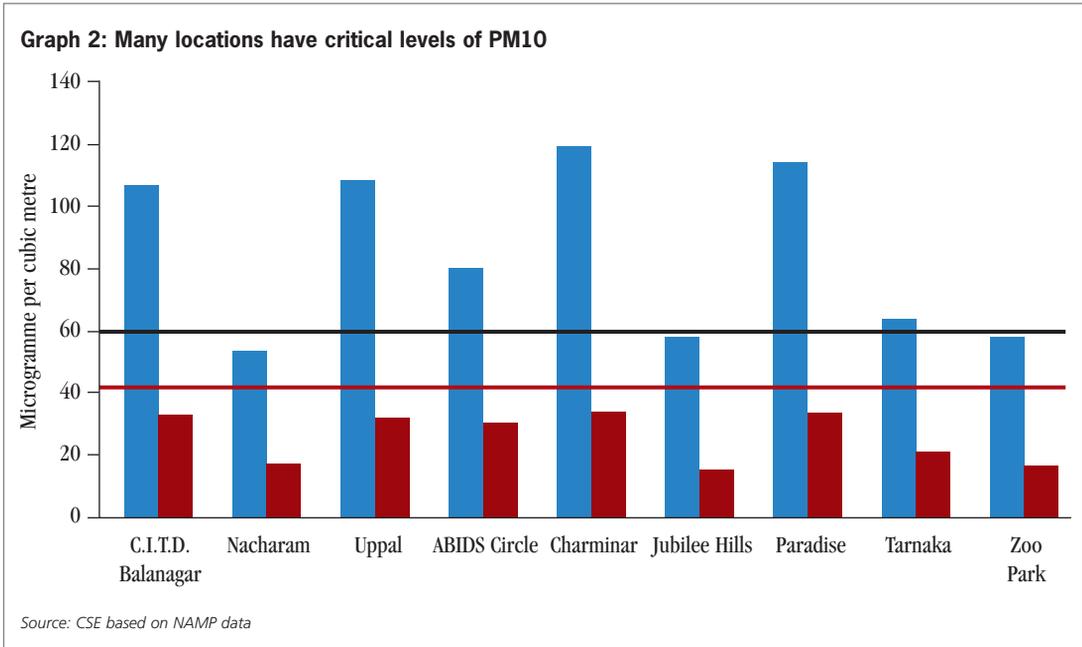
Graph 1: PM10 levels in Hyderabad

Rising levels of PM10 in the city



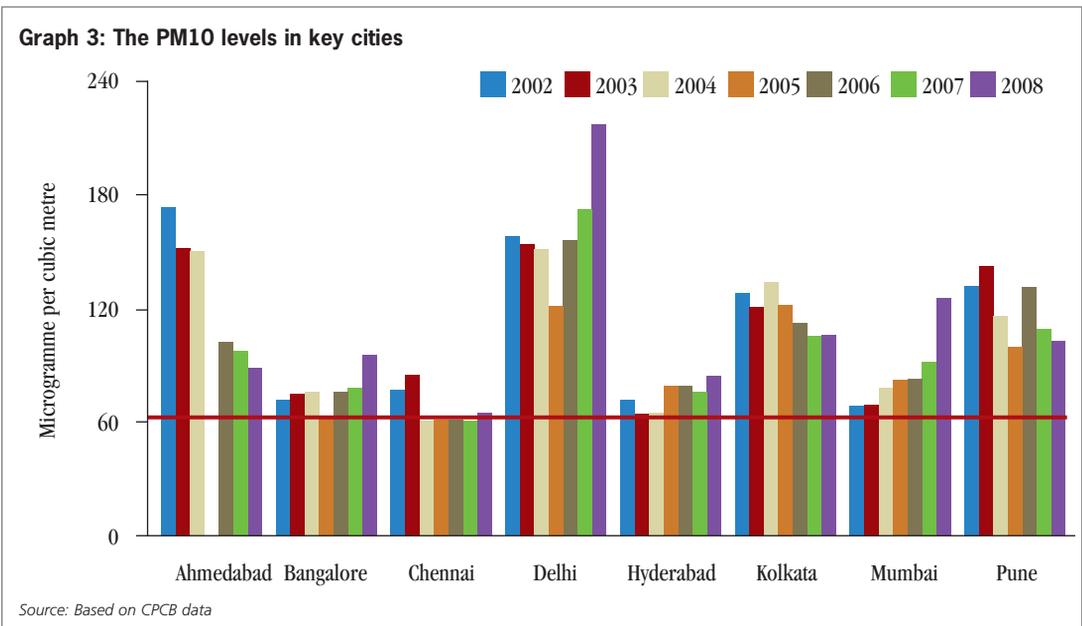
Source: CSE computation based on data provided by Central Pollution Control Board

in a year. PM10 monitoring in Charminar shows that 80 percent of days the levels exceed the 24-hourly standard – reflecting high exposure of populations to deadly particles on a daily basis. In Paradise and CITD Balanagar about two third of days exceed the standard. The levels of exceedances are increasing in other locations as well. (see Graph 2: Many locations have critical levels of PM10)

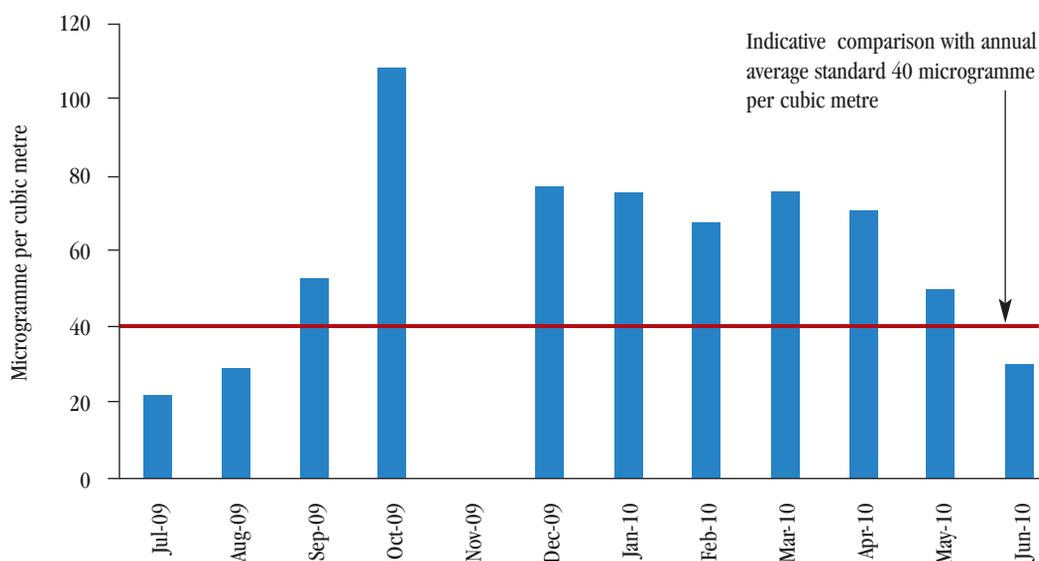


However, the particulate levels in the southern cities like Hyderabad are not as high as those noticed in the Northern and Western cities where the effect of the natural dust is higher (Graph 3. The PM10 levels in key cities). But the state pollution control board scientists caution that in the southern cities most of the particulates come from combustion sources that are more toxic in nature and therefore more harmful.

Even tinier particles of less than 2.5 micron size that come mostly from the combustion sources are high especially during the winter months (See Graph 4: Tiny particles: PM2.5). These go very deep into the lungs and are a serious health threat. National air quality monitoring programme is now shifting towards tracking this pollutant in the major cities.



Graph 4: Tiny particles: PM2.5



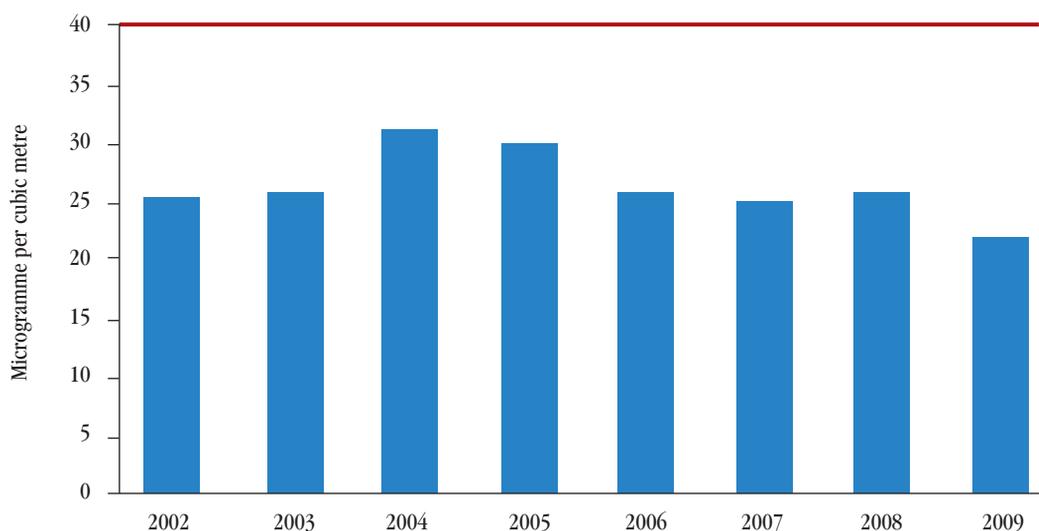
Source: CSE based on data from SPCB

NO_x mixed trend: The trend in nitrogen oxides (NO_x) show a downward trend in the city and have remained below the standard. It is not possible to explain this trend as the traffic volume is steadily increasing in the city. Studies carried out in India have shown that about 60-70 percent of NO_x can come from vehicles. However, there are location-wise variations in the city. Charminar and Paradise have relatively higher levels at about 34 microgram per cubic metre and are close to the standard of 40 microgram per cubic metre. Further assessments of road side NO_x levels in the city are also needed to understand the exposure levels of city dwellers. (See Graph 5: Consistent and falling ambient levels of NO₂).

All cities need to be careful of NO_x not only because it is harmful in itself but also is a major contributor to the formation of another very harmful pollutant in the air – ozone. NO_x triggers reaction amongs other volatile organic compounds in the air under the influence of sunlight that creates ozone.

Graph 5: Consistent and falling ambient levels of NO₂

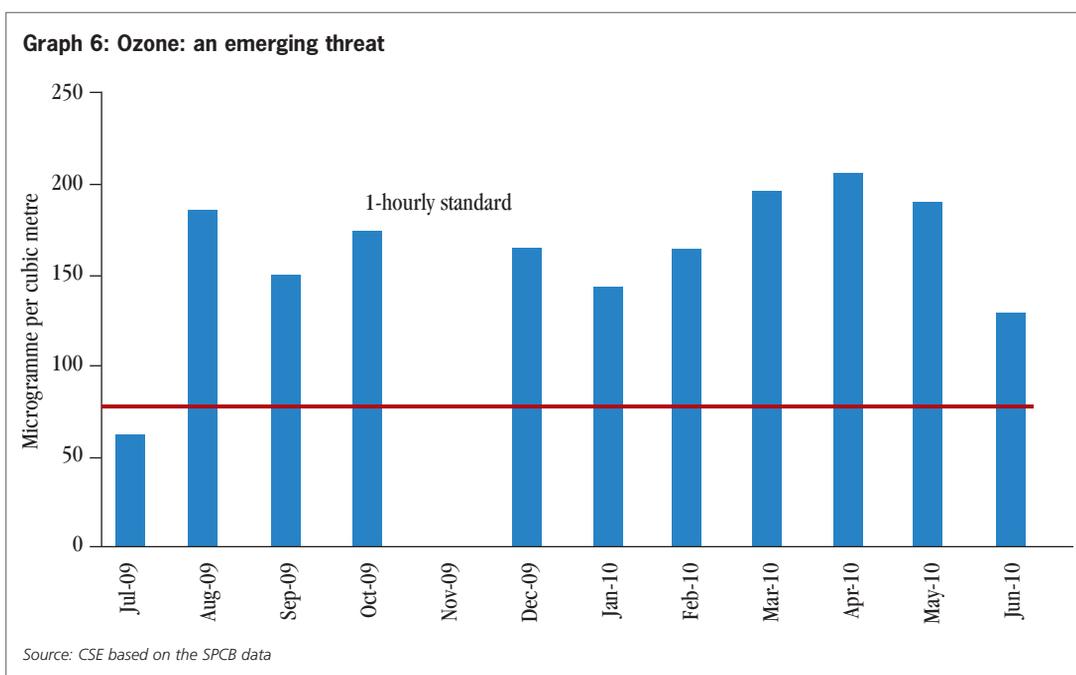
Do we know enough about kerbside NO_x levels?



Source: based on CPCB database



Emerging threat - Ozone: Ozone hitherto an unknown threat is emerging as a problem. Limited data indicate that ozone has begun to exceed standards in the city especially during the summer months (See Graph 6: Ozone: an emerging threat). As mentioned earlier, ozone is not emitted directly by any source. It is formed when other gases in the air – NOx and other volatile compounds react with each other under the influence of sunlight. To control ozone other gases will also have to be controlled. Even a short term exposure to high level of ozone can have a lethal effect on those suffering from asthma and respiratory conditions.



Changing air quality status of locations: Even before the city could reduce its pollution levels effectively the clean air benchmark has become tighter changing the air quality status of many locations in Hyderabad. The recent tightening of the air quality standards by the Ministry of Environment and Forests has changed the air quality status of the locations in Hyderabad. (See Table 1: Change in air quality status of monitoring location in Hyderabad after the new National Ambient Air Quality standards)

For particulate pollution Nacharam has moved from low to moderate level. C.I.T.D. Balanagar and Uppal have moved from moderate to critical bracket. Paradise and Charminar have continued to remain critical.

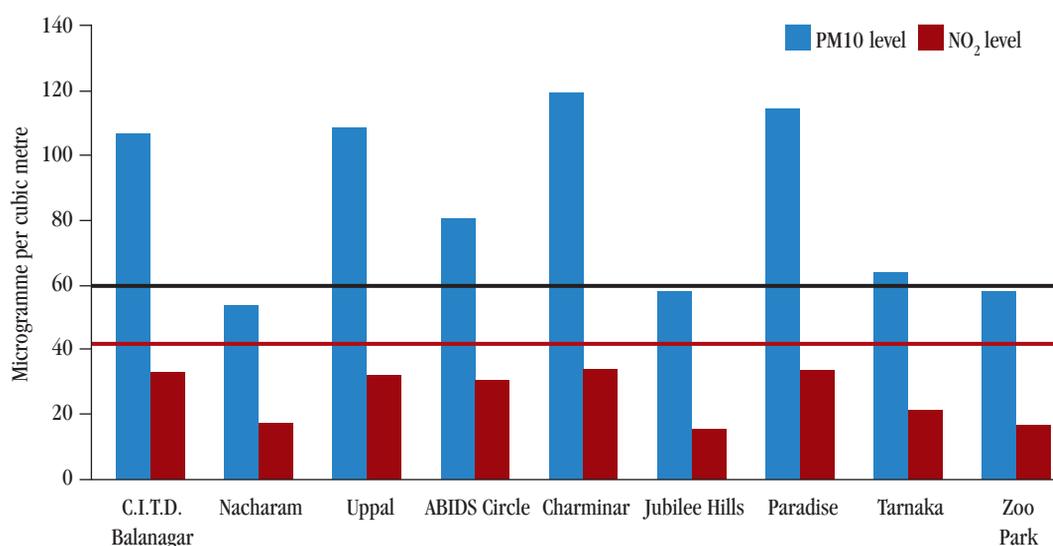
For nitrogen dioxide levels Tarnaka, C.I.T.D. Balanagar, Uppal locations have moved from low to moderate levels. About 66 per cent of the monitoring locations of the city – reported under the National ambient air quality monitoring programme have high pollution problem. This exposes a large number of people to very high pollution levels. (See Graph 7: Comparison of PM10 and NO₂ levels with new air quality standards).

Air toxics: These are a range of toxic gases that are mostly carcinogens and are harmful even at a trace level and in small doses. Hyderabad has begun to generate data on air toxics. Available data on ambient benzene levels during July 2009 to June 2010 shows that the monthly average levels (based on one hourly average) exceed the annual average limit of 5 microgram per cubic metre set by the Central Pollution Control Board. During winter months the levels are comparatively higher and reach as high as 8.1 microgram per cubic metre. (See Graph 8: Benzene levels in Hyderabad (July 2009 to June 2010))

Table 1: Change in air quality status of monitoring location in Hyderabad after the new National Ambient Air Quality standards

Monitoring Locations	RSPM (or PM10)		Nitrogen dioxide	
	Previous air quality status	New air quality status	Previous air quality status	New air quality status
Nacharam	Low	Moderate	Low	Low
C.I.T.D. Balanagar	Moderate	Critical	Low	Moderate
Uppal	Moderate	Critical	Low	Moderate
Paradise	Critical	Critical	Moderate	Moderate
Charminar	Critical	Critical	Moderate	Moderate
Tarnaka	High	High	Low	Moderate
ABIDS Circle	High	High	Moderate	Moderate
Jubilee Hills	Moderate	Moderate	Low	Low
Zoo Park	High	Moderate	High	Moderate

Source: CSE analysis based on CPCB ambient air quality data

Graph 7: Comparison of PM10 and NO₂ levels with new air quality standards

Source: CSE analysis based on CPCB ambient air quality data

APPCB has also started monitoring of ammonia, lead and nickel in ambient air since October 2010 and is preparing for more regular monitoring of a few other new parameters including Benzo(a)pyrene and Arsenic.

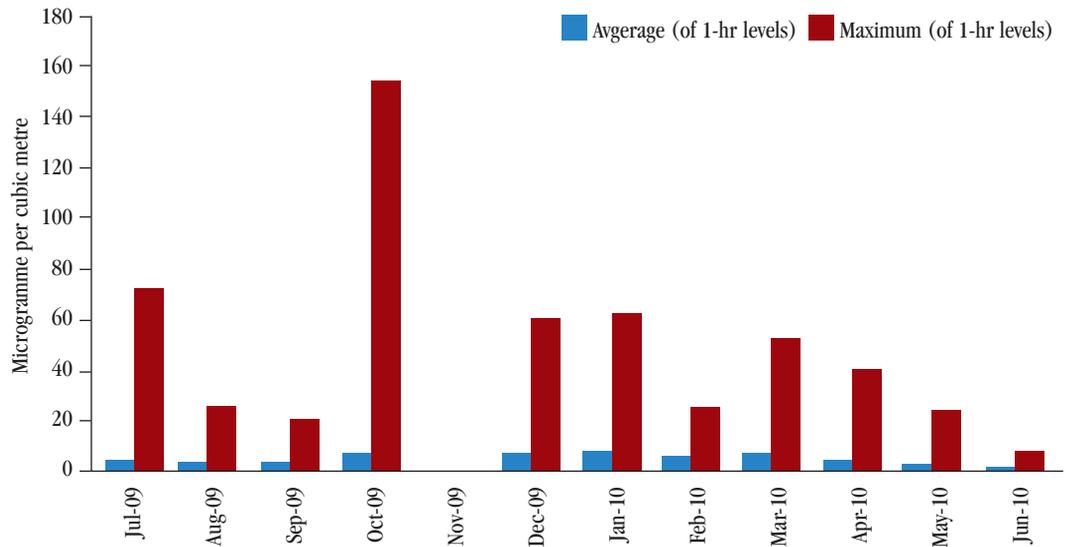
Assessment of aldehyde and formaldehyde (probable human carcinogen) at 6 locations in Hyderabad reveals that the levels are highest in Mehadipatnam followed by Nagarjuna Circle and Lakdikapool. The levels have been recorded as high as 32.7 microgram per cubic metre.

Overall, the complex mixture of pollutants may vary over time and place, depending on the sources and meteorological conditions. This is a serious challenge in our cities where several pollutants together can exceed standards on any single day and hence the city needs to take tough and quick measures to control growing air pollution.

Growth and pollution: The biggest challenge that any city faces is decoupling of economic growth from the pollution trend. How can it grow and travel sustainably without increasing pollution and energy guzzling? The growth indicators in Hyderabad show that the vehicle numbers, transport fuel consumption, population in the city are constantly growing



Graph 8: Benzene levels in Hyderabad (July 2009 to June 2010)

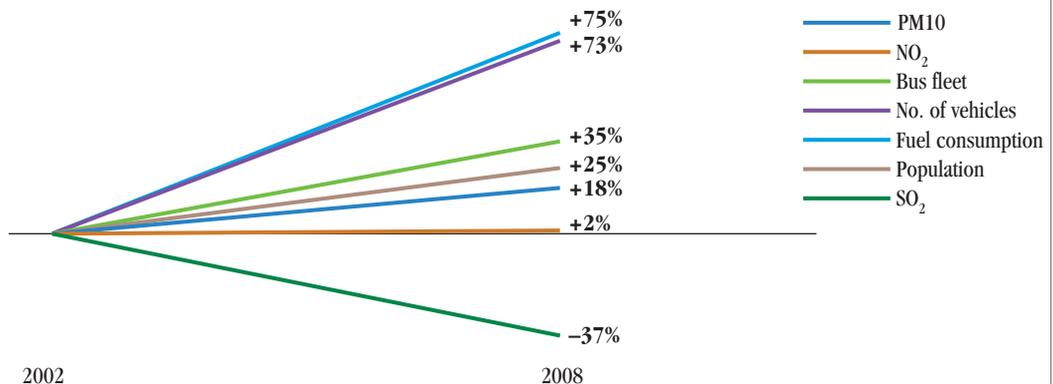


Source: Analyzed from data provided by the Andhra Pradesh Pollution Control Board

Along with that the key pollutants are also rising. The pollutant that has decoupled from growth is sulphur dioxide. This is largely because of the change in the energy matrix in the city. But the challenge of delinking PM, NOx and ozone from motorization and growth will have to drive the change. (See Graph 9: Pollution and Growth in Hyderabad (Percentage change during 2002-2008).

Graph 9: Pollution and Growth in Hyderabad (Percentage change during 2002-2008)

Only trend SO₂ trend delinked from economic growth. Other pollutants rising.



Note: population data pertains to 2001 and 2007, as sourced from MOUD, Wilbur Smith Associate report Study on Traffic & Transportation Policies and Strategies in Urban Areas in India.
Source: CSE estimates

Hyderabad has already initiated action to control air pollution (See Box: First generation reforms in Hyderabad).. The action has targeted both vehicles and industry. The state government has initiated local action plan. The directives from the Supreme Court have further given the impetus. Along with these air quality management programmes as well as mobility policies and investments plans under the urban renewal mission of the National government has set the terms of action in the city. But the game of pollution control cannot be won by catching up, but only by leaping ahead.

FIRST GENERATION REFORMS IN HYDERABAD

Exhausted all soft options

Action on vehicles:

- Implemented the Auto Fuel Policy and moved quickly to Bharat Stage IV norms in the entire area of Greater Hyderabad Municipal Corporation which includes 12 municipalities in Rangareddy and Medak Districts as well.
- Strengthened pollution under control system with new equipment and norms for in-use vehicles. It has introduced networking of PUC centres for data analysis and audits. Out of 164 pollution testing stations licensed in Hyderabad and Rangareddy Districts, 107 stations have been networked. A special drive on Air and Noise pollution during 2010 has led to penalty cases of 10410 and a fine amount of Rs. 35,60,750.
- Introduced LPG programme (40 LPG stations and about half of auto fleet runs on LPG) and small scale CNG programme targeting autos and buses (There are about 2,727 CNG vehicles – largely autos).
- Battery operated three wheelers are being encouraged.
- New buses have been introduced;
- Pre-mix oil dispensers installed in HUDA area for two-stroke engines and most oil dispensing units do not sell loose 2T oil.
- Multi-modal transit system – which is mainly the local trains designed for passenger comfort and with increased frequency – are connected with the APSRTC city services through common ticketing system.

Action on industry

- Most of the industries located in the city have provided pollution control systems such as cyclones, scrubbers and bag filters and non-complaint industries have been identified. There are large number of small and medium scale industries located in Hyderabad/Secunderabad. Industrial units in industrial areas of Azamabad, Chandulal Baradhari, Sanath Nagar and scattered units in Amberpet, Bahadurpura, Candrayangutta and Musheerabad. All these units are surrounded by residential area.ⁱⁱⁱ

HYDERABAD GASEOUS FUEL PROGRAMME

Bhagyanagar Gas Limited is operating 4 CNG stations which have become operational in Hyderabad and 2 more stations are under construction. The average daily sale is 7500-8000 kg. The CNG is presently being supplied from Vijaywada mother station. BGL has received CGD authorization from PNGRB. Gol has allocated 0.1 MSCMD Natural Gas for Hyderabad. The CNG pipeline connectivity is likely shortly. A mother station is under construction in Hyderabad. 60 stations are planned to be set up in 3 years. Three exclusive CNG stations are being set up for three APSRTC depots and 20 more such stations are planned in 3 years. APSRTC is ready to convert their buses to CNG mode and is waiting for CNG supply commissioning.

Number of CNG vehicles in Hyderabad & Rangareddy District is – (4 wheelers 162 & 127, respectively and 3 wheelers 2630 & 98, respectively). 43 auto LPG stations (35 oil companies and 8 private) are operational. 12 more stations are under construction (10 oil companies and 2 private). Number of LPG vehicles in Hyderabad & Rangareddy District are – (4 wheelers 14601 & 13759, respectively and 3 wheelers 31255 & 1846, respectively)

Any replacement of auto rickshaw is permitted with LPG/CNG operation mode only.

As on October 2010 the BGL is operating 4 CNG Stations in Hyderabad at R.P.Road, Nagole, Nampally, Meerpet. The present off take from each of these outlets is 1500-2000 Kgs/day. On an average a quantity of 7500 Kgs/day is sold. CNG is being transported from Mother Station at BGL-Vijaywada through Light Commercial Vehicles(LCV) having a capacity of approx.450 Kgs.

The city needs to adopt a CNG pricing policy that will maintain an effective differential between CNG and diesel prices – city authorities should also waive off the VAT applicable on CNG to promote it as a cleaner fuel. But at the same time the city will have to develop a robust periodic and mandatory safety and emissions inspection for the on-road CNG vehicles, as Delhi has done.

The AP government is preparing to put in place an effective CNG infrastructure for a large scale CNG programme in the city. According to reports the state government in Feb 2011 directed the APSRTC to ensure that at least one-third of the 6,000 buses which it intends to purchase over the next 36 months have to run on CNG (compressed natural gas). The govt. agencies expect that deploying of CNG buses will

continue...



accrue multiple benefits in the form of reduced fuel expenditure, which currently accounts for 37% of the total expenditure of the corporation and less maintenance, apart from significantly creating an eco-friendly atmosphere through reduced vehicle emissions.

Presently, less than 100 CNG buses are being run in the state, most of them in Vijayawada. The RTC runs 22,000 buses in the state including 3,500 in Hyderabad. Its fuel bill is approximately Rs 1,850 crore per annum and it buys 45 crore litres of diesel per annum. The minister said this would go a long way in ensuring healthy profits for the RTC through savings on fuel. The proposed savings for RTC on fuel bill and maintenance through the use of CNG could be in the range of 17% and 23%. Now that two exclusive CNG stations at Hakimpet and Medchal would be made available for RTC, the effectiveness of CNG buses would be more visible in the coming days according to transport minister's statement to press. The government also directed the RTC MD to prepare a detailed proposal to establish CNG stations in as many depots as possible, duly giving preference to the CNG supply routes already identified in the state.

Table: Number of CNG vehicles in Hyderabad

Vehicle Type	Number of CNG Vehicles		Total
	Hyderabad	Rest of the state	
Auto	2,632	4,254	6,886
Cabs	23	19	42
Cars	83	232	315
Buses	*224	253	477
HGV	27	152	179
Total	2,989	4,910	7,899

Source: Andhra Pradesh Pollution Control Board 2010, Present status of the action plan for lowering of air pollution in the city of Hyderabad, October 07, presented at the Hyderabad city dialogue jointly organized by APPCB and CSE

PUBLIC HEALTH: EMERGING EVIDENCES

Discussion on air pollution is relevant only because it affects our health. While the global health community have spawned enormous range of clinching evidences on health effects of air pollution based on studies of massive scale – covering millions tracked over 15 to 18 years to assess the effects, Indian cities have also begun to produce their own evidences. Studies have shown increased hospitalisation for asthma, lung diseases, chronic bronchitis and heart damage. Long-term exposure can cause lung cancer.

Hyderabad has also produced its own evidences. It is known quite widely that the estimated health effects of air pollution in India are quite similar to those found in the extensive studies of the western countries. But the grass root action gains credence and strength from the valuable local evidences. The city based studies have helped to deepen the understanding of the nature of the risk. The local evidences have the power to build public awareness and help to convince that adverse health impacts lead to increased use of medication, increased visits to the doctor, more hospital admissions and premature deaths.

The lethal effects of air pollution on the residents of Hyderabad have been proven by numerous studies. The Andhra Pradesh Pollution Control Board has conducted a study that shows how respirable particulate matter (with its benzene, PAH and aldehyde as its components) and CO cause “ventilatory defects” in residents near traffic areas. Data collected from 1998 to 2000 from hospitals in areas representing four high air pollution pockets of the twin cities of Hyderabad and Secunderabad showed higher prevalence of heart attacks in the 30-40 year age group.

Another drug off-take study was conducted by doctors of S V S Medical College to gather data for 56 different drugs being sold within a 5-km radius of the air quality monitoring stations at five of the most polluted zones in the city. It showed that since 1998, the highest drug sale had

occurred in Punjagutta and Abids zones of the twin cities which have also recorded highest PM1 and PM10 levels.

Researchers at Clinical Immunology and Biochemistry department of LV Prasad Eye Institute have assessed exposure of traffic police to air pollutants. This group is at a higher occupational risk. This study concluded that the traffic police of Hyderabad city have lower level of antioxidants in the RBC lysate such as catalase, superoxide dismutase and glutathione peroxidase. These findings indicate that exposure to air pollutants can increase oxidative stress and reduced levels of antioxidants and nitric oxide in the body. This imbalance in the oxidant/antioxidant system may lead to lung damage and is likely to cause respiratory problems in individuals exposed to air pollution.

Another group of scientists have assessed the health risk for the city of Hyderabad due to air pollution and estimated inhalation transfer factors and population inhalation factors for ambient and line source pollution in Hyderabad. The population inhalation of respirable particulate matter was found to be the highest at an average of 4.46 grams per hour. The study also correlated this with the number of persons with respiratory and lung infections observed in Hyderabad during the study period. The number of pollution related diseases observed in different seasons clearly reveals the significance of pollution in triggering health ailments in Hyderabad.

Institute of Health Systems, Hyderabad estimated the health effects in different air pollution scenarios under the Integrated Environmental Strategies programme (IES). They assessed the magnitude of health impacts in relation to PM10 exposure to calculate the health risk and percentage increase in mortality and morbidity per unit increase in air pollutant concentration. The study has found that transportation sector is the largest contributor to air emissions (about 70 per cent of the total load) in Hyderabad. The study has suggested that effective bus transit mitigation can result in one third reduction of PM10 concentrations compared to BAU levels. This can also result in most significant decreases in mortality and occurrence of cardio vascular diseases and other respiratory diseases.

The involvement of the state pollution control board and the local research institutes in generating local health evidences is an important step forward. These initiatives will have to be nurtured and supported to drive policy action and public opinion in the future.

Cities will have to set the terms of action for proper risk assessment and reduce risks:

Set targets to meet air quality standards in cities: Make National Ambient Air Quality Standards legally binding. The quantum of central assistance to states for implementation of the city action plan for clean air should be linked with the progress in implementation of pollution control measures. For this verifiable benchmark and monitoring system should be developed. Introduce elements of incentive and disincentives for meeting air quality standards. Health imperative can help to identify the mechanics for enforcement of the National Ambient Air Quality Standards in a time bound manner to protect public health.

Targeting emissions source to meet air quality standards: The national air quality planning and city action plan would need roadmaps for each source of pollution. Cities should carry out pollution source inventory and apportionment studies to refine their action plans. Air quality management should at the same time prioritise interventions to minimize exposure and address the growing toxic risk of air pollution.

Account for the health cost in decision making: A better valuation of acute and chronic illnesses linked to air pollution needs to be carried out in India and integrated with decision making. The estimation of monetary value of



health benefits associated with changes in air pollutants can serve as an input for the cost benefit assessment of the air pollution-control strategies. Such approaches are critical to build the rationale for policy intervention.

Develop programme for health risk assessment to inform policy making:

Scale up studies and track health effects on an ongoing basis to inform air pollution mitigation policies. This will also make regulations more responsive and dynamic. Give special attention to the effect of a range of modifiers – poverty, high level of pollution, mixture of pollution etc. Use the evidences from toxicological and epidemiological research for policy making.

Need strong baseline data on diseases and deaths as well as robust protocol to support health risk assessment:

Indian cities need health information management standards with clear definitions, protocols and acceptable values for recording data in all medical institutions. The technical network available in the country for disease surveillance needs to get stronger. Computerization of health database would be the first step to better data management. Trained personnel need to be employed in this field. The data recorded should be accurate, consistent and comprehensive.

Air quality monitoring to enable health assessment:

As the epidemiological studies measure the relation between ambient concentration and health response, the surveillance system should be able to capture the variation in the level of air pollution and health status more intricately across different locations and over time. Air quality monitoring should be well designed to enable such studies.

Build public information system on daily air quality with health advisories:

Globally, governments have developed air quality index to inform people about the daily air quality through easily understood air quality bands and issue health advisories for those who are especially those who are vulnerable to air pollution. Some governments even frame pollution emergency measures to reduce the pollution peaks to more tolerable level.

VEHICLES: A SPECIAL PROBLEM

Toxic fumes in breathing zone

A city has many sources of pollution. But vehicles are the fastest growing source of pollution in our cities. Cities can relocate industry and power plants but not vehicles.

People living or working in close proximity to heavily traveled roadways are vulnerable to high level of exposure. A large number of studies show that vehicles cause severe health damages. From health standpoint vehicles need special attention to cut emissions at source.

Motor vehicles emit some of the most health damaging air pollutants and the deadliest carcinogens and compounds. Indian cities are also in the grip of aggressive dieselization of car segment. Diesel emissions are more toxic and cancer causing. Studies in Indian cities have looked at the connection between high exposure to vehicular fume and health effects. Hyderabad has also generated its own evidences on this insidious link especially in high traffic areas of the city. Very high respiratory symptoms have been noted in the locations close to traffic areas.

Vehicles are also emerging as a major energy guzzler. Projections show that the vehicles will be the major propeller of the energy demand. Personal vehicles already account for half of the energy demand in the transportation sector in Hyderabad. This is also pushing up the emissions of the heat trapping carbon-dioxide emissions in the city.

The emerging evidences can help people to understand the growing risk and demand stronger regulatory action on vehicles.

- **Hyderabad has carried out its own estimations of contribution of vehicles to the pollution load and energy guzzling in the city. Such evidences are important to drive regulations at the grass roots.**
- **Vehicles are a major contributor to air pollution. They contribute nearly 70 percent of the total pollution load in the city.**
- **Vehicles are the significant contributor to particulate pollution as well. Studies have shown that vehicles in Hyderabad can contribute 38 percent to 58 percent of the PM₁₀ and 38 percent to upto 68 percent of the PM_{2.5}.**
- **Effect of traffic is most evident from the study that showed dramatic drop in pollution during the truck strike in January 2009. The strike resulted in a significant drop – about 57 percent in black carbon, 60 per cent in particulate matter, 40 per cent in carbon monoxide and 50 per cent in ozone during that period.**
- **Vehicles are also the major energy guzzler. Cars and two-wheelers burn up 50 percent of the energy in the transportation sector in Hyderabad. The total transportation energy in Hyderabad is about 60 percent of the transport energy used in Delhi.**

VEHICLES: A SPECIAL CHALLENGE

From public health perspective vehicles pose a special problem because vehicle emissions take place in the breathing zone of people. This contributes significantly to human exposure to air pollutants. People living or working in close proximity to high traffic roadways have high levels of exposure.

The US based Health Effect Institute scientists have shown in their studies in Indian cities like Delhi that in densely-populated Indian cities more than half of the people living or working close to the roadside are most exposed to the vehicular pollution. This has ominous implications for all densely built Indian cities where more people are expected to live within the influence zone of the high traffic roads. Air pollution data show a marked gradient among local, regional and roadside levels. Roadside levels of respirable suspended particulates, NO_x and NO₂ are reported to be much higher than the ambient levels.

Hyderabad is a city of mixed activities but most of the air pollution comes from rapidly growing number of vehicles. A series of intensive monitoring programme was undertaken during 2005-06 at three locations to address the issue of elevated pollutant levels in the city. Diverse land use areas were chosen for the purpose of monitoring, i.e. residential, commercial, high traffic areas and background areas with minimal pollution. The study was supported by the Integrated Environmental Strategies program and was carried out in collaboration with Andhra Pradesh Pollution Control Board, US National Renewable Energy Laboratory, and the US Environmental Protection Agency.

The study has generated valuable evidences for the city and policy action. The contribution of vehicles has been found to be significant. This varies from 38 per cent to 58 per cent for PM₁₀, and 38 per cent to 68 per cent for PM_{2.5}. The fugitive dust (included soil dust, wear and tear from tires, and construction dust) which is the second largest source of PM₁₀, varies between 19 per cent and 44 per cent and between 5 per cent and 26 per cent in PM_{2.5}. Coal combustion varies between 0 to 36 per cent, showing large uncertainties and incidences of long range transport of industrial sources outside the city center. (See Graph 10: PM₁₀ and PM_{2.5} Source Apportionment Study)

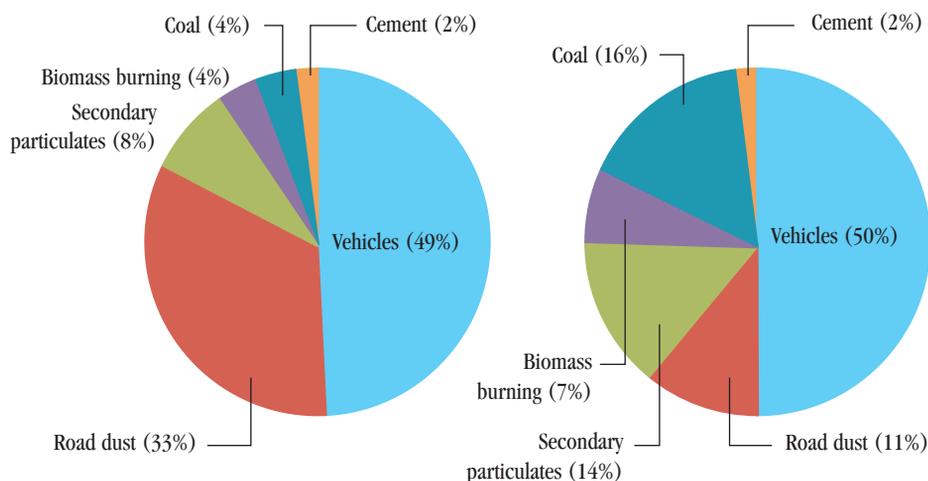
According to Andhra Pradesh Pollution Control Board, vehicles appeared as a major source of particulate matter with average contribution of around 50 per cent at these locations. The PM_{2.5} which are the tinier fraction and a subset of the particles in the air are about half of the PM₁₀. The major components of the PM₁₀ are silica and aluminum while for PM_{2.5} organic carbon and ions (nitrates, sulphates) are the major contributors. This indicates that the small particles come mostly from combustion sources. Other major sources are re-suspended soil (likely to originate from re-entrainment of paved and unpaved road dust), biomass burning and coal combustion (from industrial and cooking sources). Evidences make it clear that vehicles need special attention in the city for public health protection.

A very interesting study was carried out in the city during the month of January in 2009 to see the effect of the nation-wide truck strike on the pollution levels in the city. (See Graph 11: Impact of truck strike on air pollution (5-12 January, 2009). Hyderabad based National Remote Sensing



Graph 10: PM10 and PM2.5 Source Apportionment Study

Mobile sources are the predominant contributors to PM10 and PM2.5



Source: Andhra Pradesh Pollution Control Board 2010, Present status of the action plan for lowering of air pollution in the city of Hyderabad, October 07

Centre had studied the influence of this nationwide truck strike during 5–12 January, 2009. The assessment tracked the impact on black carbon aerosol, trace gases and ground reaching solar radiation. The results showed a significant drop of about 57 per cent in black carbon, 60 per cent in particulate matter, 40 per cent in carbon monoxide and 50 per cent in ozone during that period. This reflects the high correlation between pollution concentrations and truck traffic in Hyderabad that also run on diesel. These studies reflect that black carbon and particulate matter concentrations in Hyderabad are highly correlated with vehicular traffic – especially diesel vehicles. The levels are significantly higher than low-pollution rural areas. Diesel emissions have serious health risks – and are blamed to cause even cancer and other serious non-cancer effects in the exposed populations.

Though precise numbers are not available guess estimates from the transport departments indicate that the share of diesel cars is increasing in the city. This is consistent with the national trend that shows that diesel cars are close to 40 percent of the new car sales. Cities immediately need a strategy to curtail dieselization given the fact that diesel emissions have been branded as a human carcinogen by agencies like the WHO, International Agency on Cancer Research etc. While the national government will have to be pushed to introduce clean diesel fuel and technology (diesel fuel with 10 ppm sulphur level used with advanced particulate traps and NOx control) the state governments also need to adopt policies to disincentivise diesel cars.

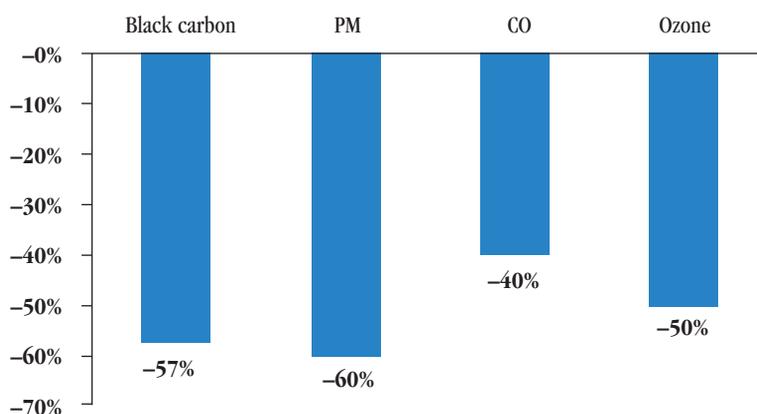
One of the emerging good practices is in Delhi where an environmental cess has been imposed on per litre of diesel sold to create a dedicated fund for pollution control. Also the road tax on diesel cars has been increased to disincentivise its use. Other cities need to develop similar fiscal strategies to reduce the public health risks.

These evidences in public domain can help to build public awareness and push for action.

VEHICLES THREATEN ENERGY SECURITY

Vehicles not only pollute air but they also threaten energy security. Transportation policies will have to address energy security challenge. Vehicles in India currently use up nearly half of petroleum products. International Energy Agency has predicted that the future increase in fuel consumption in the road transport sector of India will largely be driven by

Graph 11: Impact of truck strike on air pollution (5–12 January, 2009) in Hyderabad



Source: Source: Anu Rani Sharma et al 2010, Influence of vehicular traffic on urban air quality – A case study of Hyderabad, India, Transportation Research Part D: Transport and Environment, Volume 15, Issue 3, May 2010

light-duty vehicles, mainly cars growing at an annual average growth of 10 per cent by 2030. Cars will burn up nearly the same amounts of total energy consumed by the entire transport sector today, even though heavy-duty vehicles will splurge the most. This is unaffordable as nearly 80 per cent of our crude oil needs are imported at exorbitant rates and will increase further by 2030. Asian Development Bank has predicted that transport energy use will increase six times by 2020.

This makes for the case that energy imprint of motorization will have to reduce in each city. The grass root action is vital for national energy security.



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Hyderabad is a high growth area. Rapid motorisation has already taken off in this city. The total transport energy consumption in Hyderabad in 2008 was estimated by the SIM Air study to be about 1.4 MTOE which is about 60 per cent of that of Delhi. Personal vehicles will drive this trend in the future. Already cars and two wheelers together use up about 50 per cent of the total transport energy consumption in the city. If the dependence on personal vehicles continues to increase the oil consumption will increase twice by 2030 with largest increase is forecasted to be from four wheelers.

More energy guzzling will lead to higher emissions of heat trapping carbon dioxide. This is contrary to the goals set by the National Climate Action Plan. Among all oil-consuming sectors, CO₂ emissions from transport are increasing at the fastest rate in India – at more than 6 per cent per annum. This is daunting for any national combat plan for climate.

The growing use of personal vehicles in Hyderabad is increasing carbon dioxide emissions from the transport sector of the city. The SIM Air study projections show that the carbon dioxide emissions will increase substantially from four wheelers by 2030 – as much as 3 times. The city will have to carefully assess these new challenges to refine regulatory action.

Cities need aggressive technology roadmap: The combined goals of clean air and energy security will have to drive the technology roadmap in our cities and the rest of the country. State governments will have to push the national government to firm up the post-2010 emissions standards and fuel economy roadmap to reduce emissions and energy impacts of motorization in cities.

- Post-2010 roadmap should introduce uniform and tighter fuel quality and emissions standards across the country. Otherwise polluting vehicles and trucks from outside will undermine the efforts in the city.
- Enforce effective fiscal strategies to discourage diesel cars to reduce toxic emissions.
- Expand and strengthen CNG programme for the public transport for environmental gains.
- Incentivise electric vehicles to increase their market share. Hyderabad already has this policy. Provide infrastructure support as well.

MOBILITY CRISIS

Running to stand still

Mobility crisis begins to build up when a large share of daily trips is made by personal vehicles that occupy more road space but carry fewer people, pollute more, and edge out walkers, bicycles, buses. The sign of this crisis is already evident in Hyderabad.

The city is fighting a losing battle to calm traffic. It is stepping up expenditure on roads, parking facilities. But it cannot solve the problem with more roads.

Though vehicle numbers are still a lot less than Delhi the congestion index is close to that of Delhi. The densely built compact cities are not designed for motorized vehicles. But the traffic count and volume assessed for the key central business districts in the city are comparable with that of Delhi.

Journey speed during the peak traffic hours have already dropped significantly. Key commercial areas are severely affected and gridlocked.

The most worrying are the evidences that the share of public transport is steadily declining and will slide in future. This will make the city incur enormous health and energy costs.

Instead of reversing this trend by scaling up public transport and non-motorised transport the maximum investments has gone into roads and flyovers. Learn from the mistakes of Delhi. Even with the maximum area under roads Delhi has the worst congestion problems in the country. The city will have to reinvent mobility for sustainability and liveability.



- **Hyderabad has about three million vehicles and adds nearly 600-700 vehicles a day. Vehicles are growing four times faster than its population. Cars are increasing at a faster rate than even two-wheelers.**
- **Congestion has slowed down traffic significantly. The average journey speed is steadily declining in the city. It has dropped from 16 kmph in 1991 to 12 kmph in 2006.**
- **Traffic volume often exceeds the designed capacity of the roads.**
- **The share of public transport is estimated to drop from about 35 per cent now to a mere 12 percent by 2031. The share of personal transport is estimated to increase explosively. This spells disaster for the city.**
- **As much as 75 per cent of the funding under the National Jawaharlal Nehru Urban Renewal Mission has gone for roads and flyovers. The city development plan has set a target of increasing the share of area under road network from 9 per cent now to 15 per cent.**
- **The City Development Plan has set the target for public transport share at 75 per cent by 2021. But where is the blue print for this transition?**



MOBILITY CRISIS HITS HYDERABAD

The rate of motorisation and vehicle stock are still lower in Hyderabad compared to Delhi. But given the scale and size of Hyderabad, and its population and density and ever expanding city limits, the current numbers and the rising trend have already created enormous pressure on the city. This city with more than 5.7 million people has close to 3 million vehicles. Traffic is growing four times faster than population in metro cities including Hyderabad. According to the transport officials about 500 – 600 vehicles are registered every day. The road space is limited and it is increasingly becoming difficult to increase the road capacity further. To this is added daily influx of vehicles from outside the city. The suburban areas also pose a threat to already congested road space in the city.

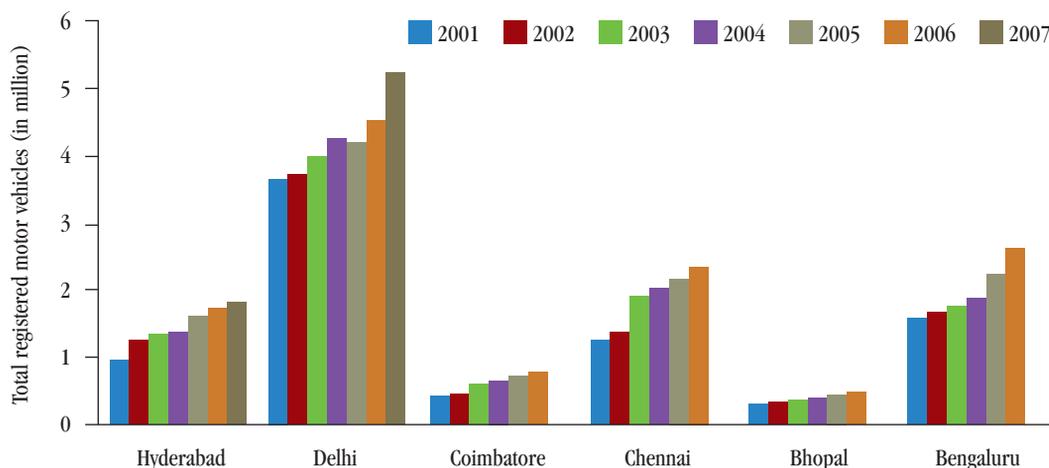
The city has no space left to increase the road space for more personal vehicles – two-wheelers and cars. Congested and saturated roads have slowed down the journey speed leading to fuel wastage and pollution.

Even though the vehicle numbers are a lot less than Delhi, densely built Hyderabad is getting increasingly congested. The key areas show that Hyderabad's central business district has nearly equal volume of traffic as in Delhi (See Table 2: Vehicular traffic flows and their modal splits in the CBD areas of selected cities). According to Wilbur Smith report prepared for the Ministry of Urban Development, the congestion index in the city is comparable to that of Chennai, Bangalore and Kolkata and its is also close to Delhi.

The City Development Plan reports that in the core areas of the city the traffic volume often exceeds the designed capacity of the roads due to high influx of vehicles to the city core. Major traffic issues arise as numerous commuters get to the central core (MCH area) from its hinterland through a high capacity radial network. But, the low capacity carriageway in the

Graph 12: Motorisation trends in key metros

Hyderabad registers 600-700 vehicles every day. There are nearly 3 million vehicles.



Source: Based on MOSRTH data, transport departments

core area is unable to accept the influx of these flows leading to jams and delays.

Peak hour flows on major travel corridors carry more than 9000 passenger car units. The mixed traffic conditions present additional problems in maintaining lane discipline thereby reducing the lane capacities further. The City Development Plan of Hyderabad shows that the traffic volume on key roads such as portion of NH 9 between Sanath Nagar and Dilsukhnagar via Ameerpet, Pajmagutta, Khairtabad, Nampalli, Chaderghat and Malakpet; from Ameerpet to Secundrabad (S.P. Road) via Greenlands, Begumpet, Paradise and Parade ground; from Paradise to Madina via Tankbund, Liberty, Abids, MJ Market and Afzal gunj; from Secundrabad to Afzal gunj via Musheerabad, RTC cross roads, Narayanaguda, and Koti; from Tarnaka to Chaderghat via Osmania University, Hindi Mahavidyalaya, Barkatpura, Kachiguda and Moti bazaar and Uppal to Afzal gunj via Ramanthapur, Amberpet, Chaderghat and Gowliguda has very high traffic volumes. Roads have to bear more traffic than they have been designed for.

Table 2: The vehicular traffic flows and their modal splits in the CBD areas of some selected cities

City	Population (in millions)	CBD-Mid block flow (pcu/day)	2W	3W	Car	Others*	Total
Delhi	>10	50,000-60,000	6	8	18	86	100
Hyderabad	5-10	50,000-60,000	24	9	12	67	100
Pune	2-5	40,000-50,000	45	9	15	46	100
Jabalpur	1-2	30,000-40,000	37	2	2	59	100
Rajkot	1-2	30,000-40,000	35	1	16	64	100
Patna	1-2	30,000-40,000	20	10	12	70	100
Vijayawada	1-2	30,000-40,000	29	25	7	46	100

Source: ICCT 2009, Innovative Transport Solutions (iTrans) Pvt. Ltd., TBIU, IIT Delhi, New Delhi., For: International Council for Clean Transportation (ICCT) & The Institute for Transport and Development Policy (ITDP)

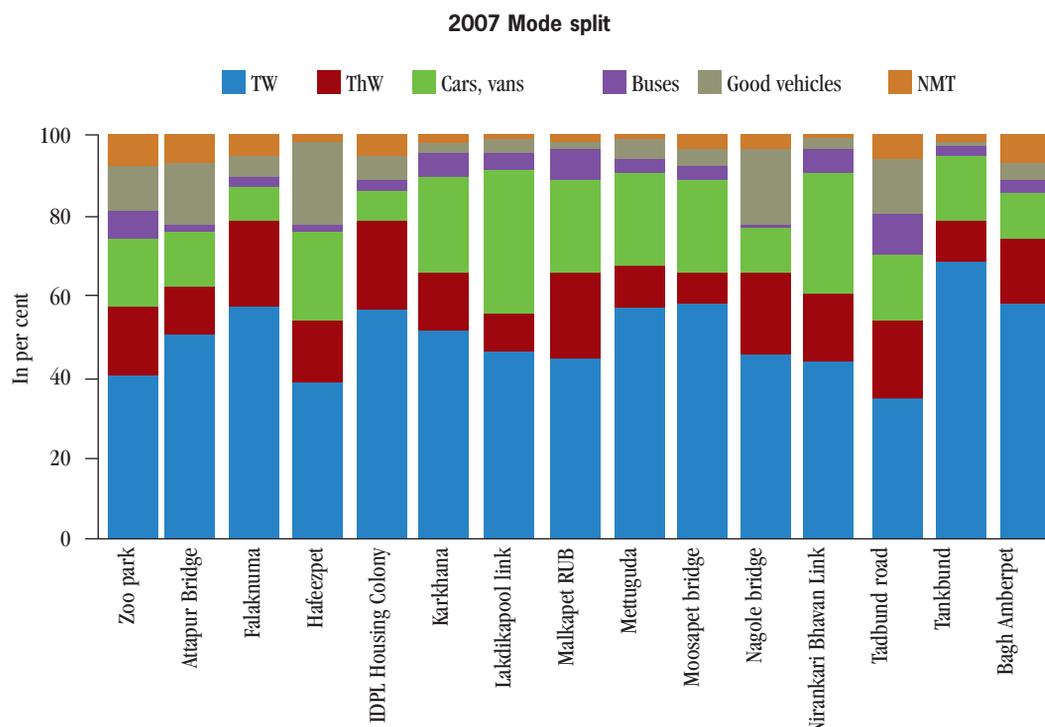
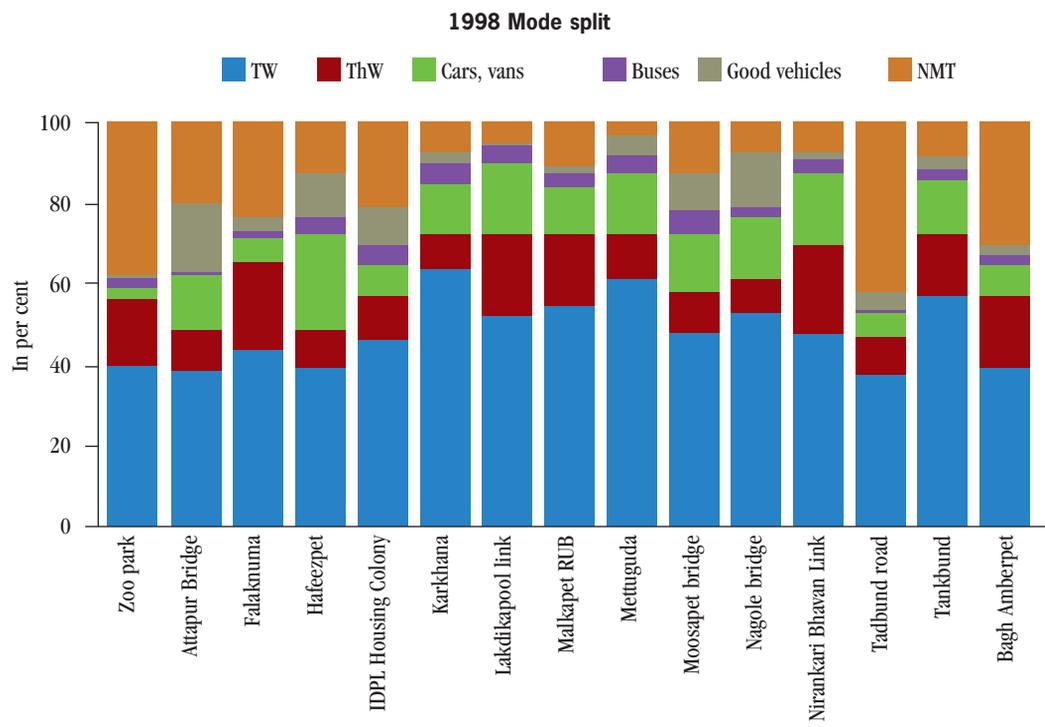
More detailed data brings out the change in the way people are traveling in Hyderabad (see Graph 13: Trend in modal share in key locations of Hyderabad). The traffic data from different locations show that there has been a steady erosion of public transport and non-motorised transport in many key locations of the city. Cars and two-wheelers have begun to dominate the traffic.

Dependence on personal vehicles is rising steadily in the city. Two wheelers are about 75 percent of the trips and cars are 15 per cent in many locations of the city. City development plan report finds that cars and jeeps have higher decadal growth rate than two-wheelers. However, in terms of numbers both cars and two wheelers occupy the maximum road space and in terms of modal share the private vehicles are about 50 per cent. Each new batch of vehicles though a little cleaner barely makes an impact on air quality as its rising numbers swamp the effect. This will change the pollution and congestion profile of the city in the coming years. More recent modal share data in *Study on Traffic & Transportation Policies and Strategies in Urban Areas in India* by Wilbur Smith Associates for Ministry of Urban Development shows that personal vehicles dependence – especially two wheelers is high in Hyderabad, Chennai and Bangalore compared to other metros. (See Graph 14: Modal share: How people travel in Hyderabad).

People are traveling more (see Graph 15: Increasing per-capita trip rate in Hyderabad). But they are increasingly getting dependent on personal vehicles as alternatives to cars have not scaled up to become more attractive. Growing population and increase in spending power have resulted in greater demand for travel and greater dependence on cars.

Graph 13: Trend in modal share in key locations of Hyderabad

Between 1998 and 2007 – Share of two wheelers and cars in the traffic has increased to 70%. But the share of NMT has dropped from 17% to 4%



TW: Two wheeler; ThW: Three wheeler; NMT: Non Motorised Transport

Source: Christoph Walter and Tanja Schäfer, Analysis and Action for Sustainable Development of Hyderabad, Transport Model For A Sustainable Hyderabad, Research Report 16, Megacity Project



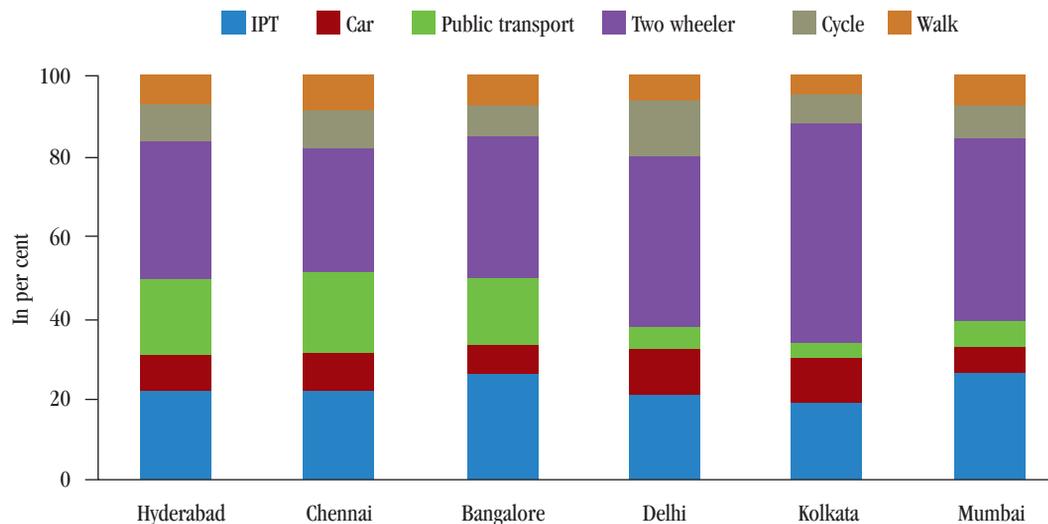
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Graph 14: Modal share: How people travel in Hyderabad

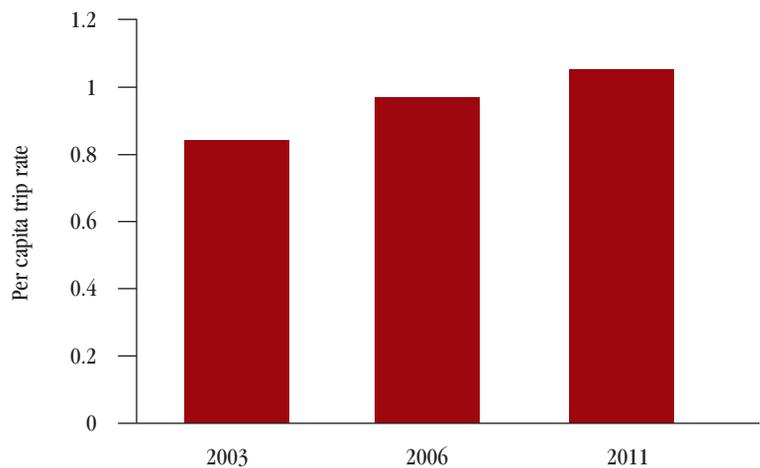
Share of public transport is 35% and under threat



IPT: Inter mediate para transit (Auto/tempo)
Source: MOUD

Graph 15: Increasing per-capita trip rate in Hyderabad

Travel demand will increase phenomenally



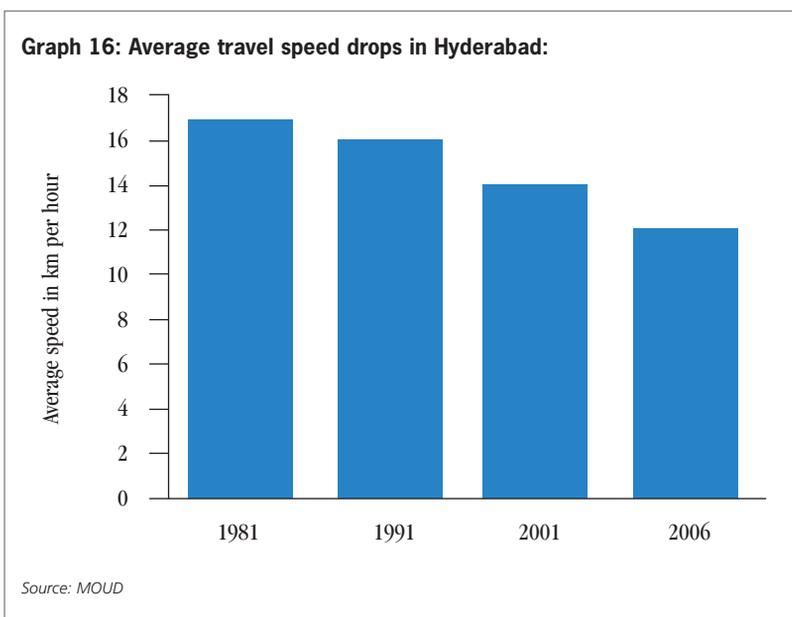
Source: CDP

Choked: The ugly manifestation of this growing congestion is slowing down of peak hour traffic. About 9-10 per cent of the city area is under road network. The vehicle density in Hyderabad is 720 vehicles per km of road (passenger car units per km of road) compared to 290 (Chennai) and 240 (Mumbai), which is very high, according to the City Development Plan. This is leading to enormous delays at intersection, waste of time, energy loss, and high emissions.

The ugly manifestation of growing congestion is slowing down of peak-hour traffic. The average speed in Hyderabad has plummeted to 10 to 20 Kmph and even slower on some stretches. (See Graph 16: Average travel speed drops in Hyderabad). At about 53 per cent of the total road length of 419 Kms of roads in the city, the average journey speed lies between 10-20 Kmph. Also, the average journey speed is consistently falling in the city. During 1981 it was 17 Kmph; 1991— 16 Kmph; 2001 — 14 Kmph and 2006 — 12 Kmph. The central business district mid-block traffic in Hyderabad

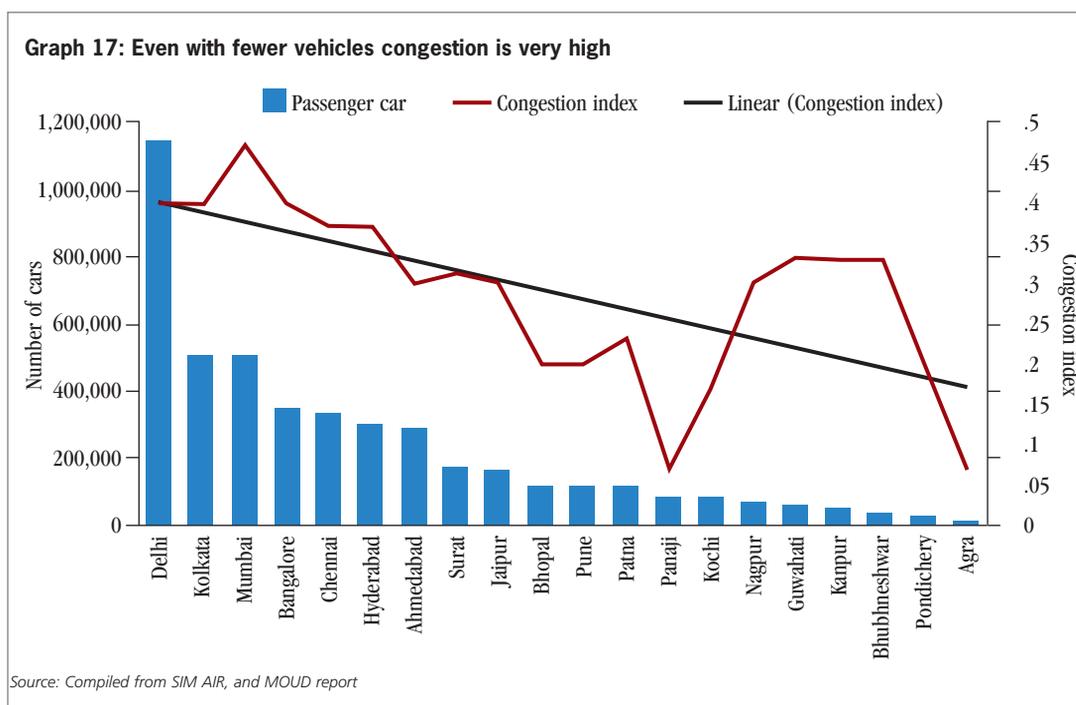
was observed at 50,000 to 60,000 passenger car units per day which is comparable to that of Delhi.

Even though the total number of vehicles in the city is lower than Delhi,



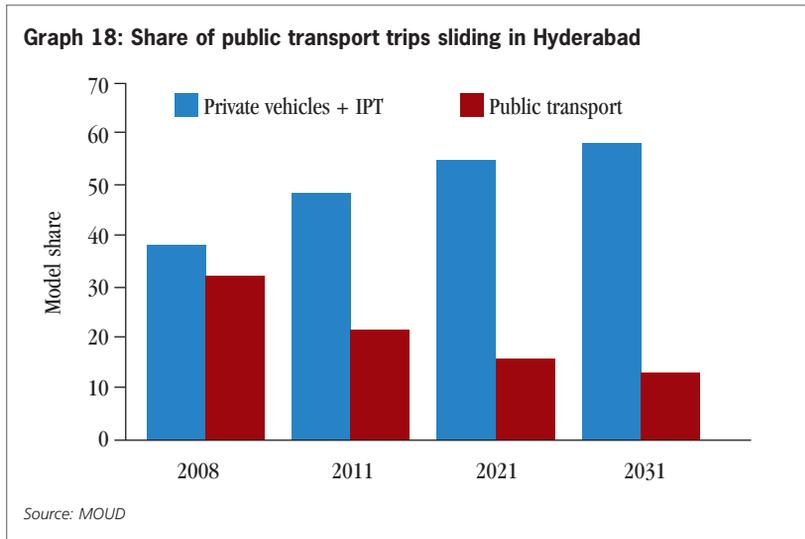
the congestion index for the city is high and nearly close to Delhi (See Graph 17: Even with fewer vehicles congestion is very high). The densely built Indian cities are not designed to handle high motorized traffic. Compact and dense city network can get easily clogged up with motorized travel. Alternatives including public transport, non-motorised transport and intermediate transport will work very effectively in these cities.

So far little has been done to strengthen the public transport in the city and improve its connectivity with other modes. According to Hyderabad City Development Plan the modal share of private vehicle have reached (cars, jeeps & two wheelers) about 50 per cent which reflects that increasing people have shunned public transportation modes. CDP blames this to the deficiency in frequency of APSRTC buses and minimal coverage,

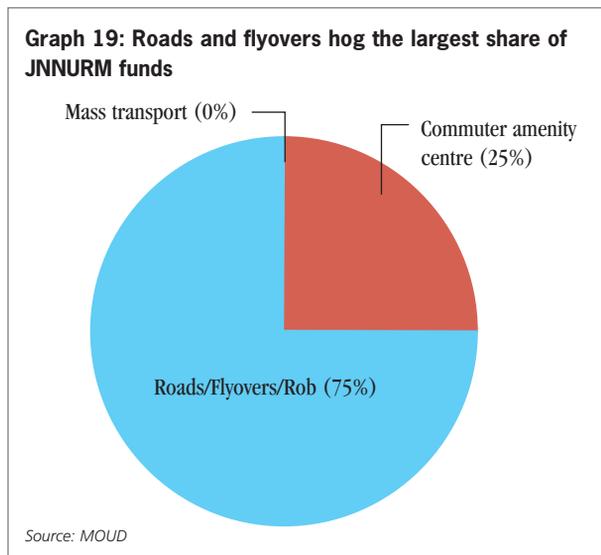


poor frequency and information system of local rail services (MMTS) as reasons for the growth of private vehicles. Clearly a massive initiative to increase other sustainable modes of transport is needed along with steps to restrain the growth of personal vehicles at this massive motorization scenario.

The future projections show that the public transport trips will continue to slide and the personal vehicles trips will increase overwhelmingly (See graph 18: Share of public transport trips sliding in Hyderabad). This demands urgent intervention to reverse then trend.



Funding signals wrong priority: How the future is going to look like will depend on the way the city decides to spend its money on transport. The available evidence shows that the car centric infrastructure – roads and flyovers and parking structures, is still the major obsession in the city. This hogs the maximum share of transport spending. This is very starkly evident from the way the central funding under the JNNURM has been leveraged (See graph19: Roads and flyovers hog the largest share of JNNURM funds). As much as 75 per cent of the JNNURM transport funds have gone to the roads and flyovers. The city development plan targets further increase in the area under road network from the current 9 per cent to 15 per cent by the year 2030. More investments will flow in there. Clearly, the plan to scale up public transport and non-motorised transport will have to be planned and implemented immediately to bring about the big change.



PEOPLE WANT CHANGE

Scary future for our cities. Foretold

Centre for Science and Environment has trooped out to find out how the people of Hyderabad perceive the emerging air pollution and mobility problem in the city. How do they understand the solutions to the problem?

A rapid perception survey was carried out of the city citizens. They were asked a variety of questions related to air pollution, health, congestion, and the strategies for solutions.

The purpose was also to involve people in the collective thinking and create space for a public dialogue and discussions to build public opinion.

It is actually quite stunning that the majority perception has already diagnosed the problem and agrees with the key strategies that are needed to solve the problem. This is an important message for the policy makers.

There is a tacit recognition that the city is facing serious public health crisis due to growing air pollution. Vehicles are a special problem. There is recognition of the benefits of the first generation action in the city. It helps to know that there is public support for the solutions needed in the city.

There are also those who are still indifferent. Sizeable section still believes that more roads are the answer. Public awareness can help to make the majority voice that thinks otherwise, stronger. This brings out the importance of public debate and community involvement in the clean air and mobility planning for the city.



- **The majority – a whopping 82 per cent have said air pollution is worsening. About 73 percent have said incidence of respiratory diseases, asthma, eye irritation are on the rise.**
- **More than 90 per cent have identified congestion as a big problem in the city**
- **About 43 per cent think new roads and flyovers can help to clean up the air and about 45 per cent think that they do not help**
- **Majority (77 per cent) have said that cycles and cycle rickshaws are important and should be given segregated space**
- **Nearly 16 per cent have rated public transport services good, 26 per cent have rated city public transport services average and 40 per cent as poor. There is nearly unanimous support for improved public transport. Nearly 82 per cent have supported dedicated lanes for buses.**
- **Nearly 92 per cent think that growing demand for parking of vehicles is leading to the problem of encroachment of footpaths, open spaces and leading to congestion**
- **The majority find walking infrastructure poorly maintained and as a result of this they do not enjoy walking. This needs immediate attention as pedestrian traffic is the strength of the city**
- **Nearly 40 per cent have supported the gaseous fuel programme as an effective step in the transport sector to clean up the air**

PEOPLE OF HYDERABAD WANT CHANGE: PERCEPTION SURVEY

Centre for Science and Environment has carried out a rapid stakeholders perception survey to understand people's perception of air pollution and mobility problems in the city. The respondents are from different target groups – experts, officials, commuters, doctors, teachers, business, civil society among others.

They have reflected on the core issues that must be looked into for making the next generation action agenda. (See Graph 20 a-n: *Findings of the stakeholders' survey in Hyderabad*). This survey was carried out in a participatory way to involve the citizens group, students and people of Hyderabad to assess the problem and suggest solutions. This brings out clearly that people of Hyderabad consider air pollution, public health and mobility crisis to be a serious problem. There is public understanding and demand for the second generation reforms targeted at the public transport strategies and reforms.

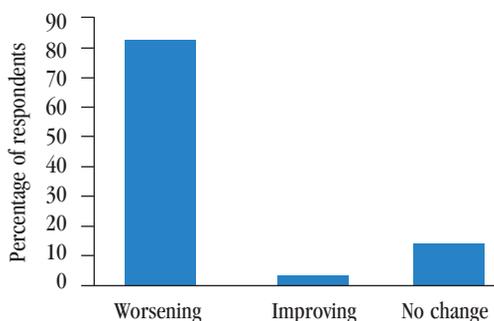
Citizen volunteers have carried out a rapid stakeholders' survey in Hyderabad to understand people's perception of air pollution and

Graph 20 a-d: Findings of the stakeholders' survey in Hyderabad

Majority agree that air pollution problem is worsening in the city

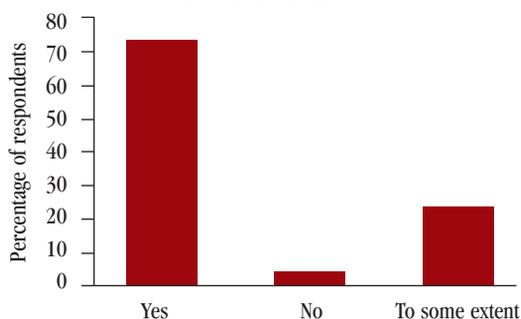
a. What is your perception of air quality in the city?

A whopping 82 per cent say air pollution is worsening



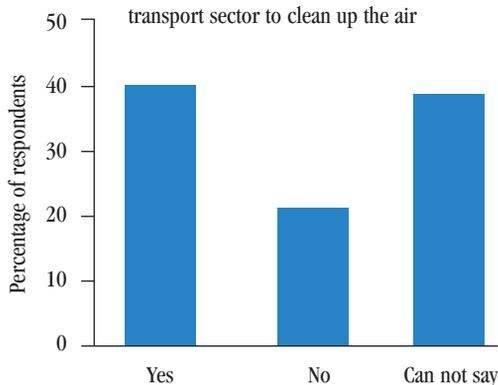
b. Are health problems increasing in the city?

Majority agree that respiratory diseases, asthma, eye irritation are on the rise



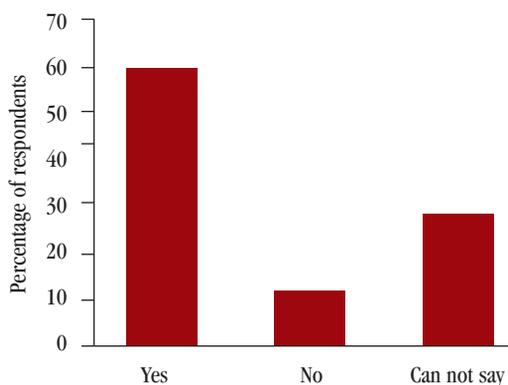
c. Introduction of gaseous fuel programme has improved air quality?

Nearly 40% applaud it as an effective step in the transport sector to clean up the air



d. Do you think that fuel is adulterated?

At least 60% say fuel adulteration is still a problem

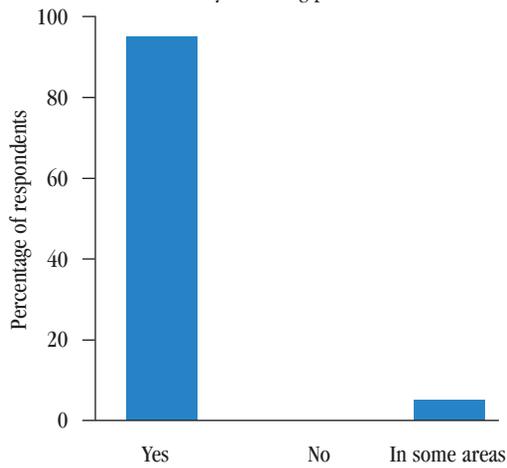


Graph 20 e-j: Findings of the stakeholders' survey in Hyderabad

Majority agree that air pollution problem is worsening in the city

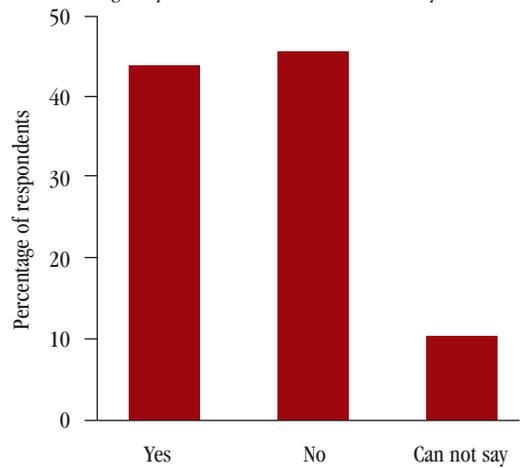
e. Road congestion is a big problem during peak hours?

Everyone suffers the wraths of congestion as 90% identify it as a big problem



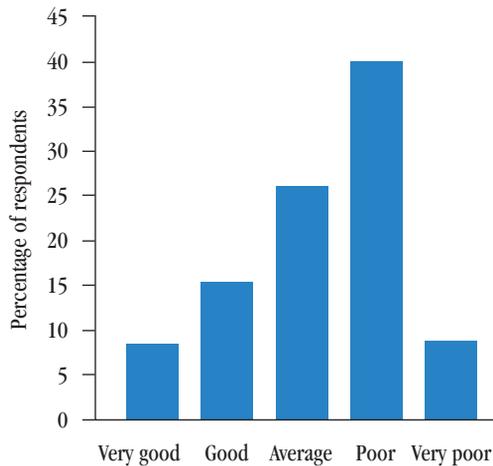
f. New roads/flyovers reduce congestion and improve air quality?

45% think new roads and flyovers do not help and marginally outnumber those who think they can



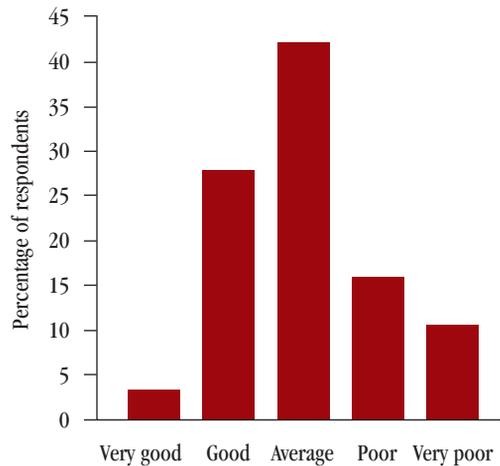
g. Rate public transport service in your city

Dissatisfaction with public transport services is clear as majority rated it as 'poor'



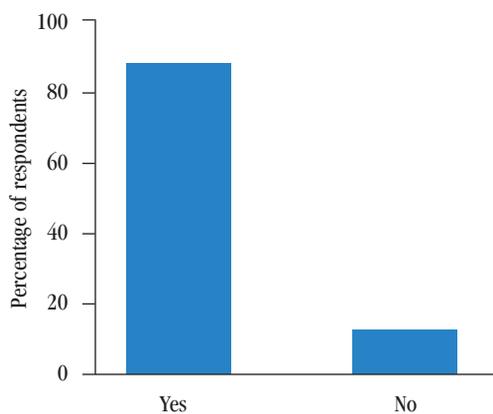
h. Rate the intermediate public transport service in your city

About 28% feel that intermediate transport is 'good'



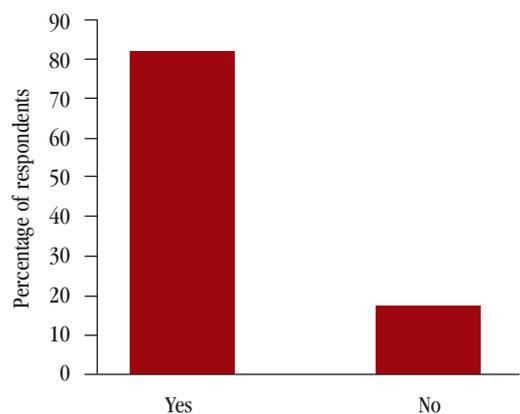
i. Will you shift to using buses if more comfortable, high quality properly designed urban buses are brought to your city and have reliable frequency?

87% will prefer to take public transport if it improves



j. Do you feel special dedicated lanes that allow buses to move in great speed will help your city to reduce the usage of personal vehicles and congestion?

Nearly 82% support dedicated lanes for buses

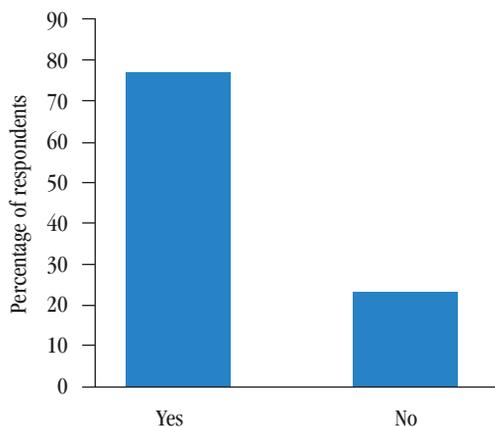


Graph 20 k-n: Findings of the stakeholders' survey in Hyderabad

Majority agree that air pollution problem is worsening in the city

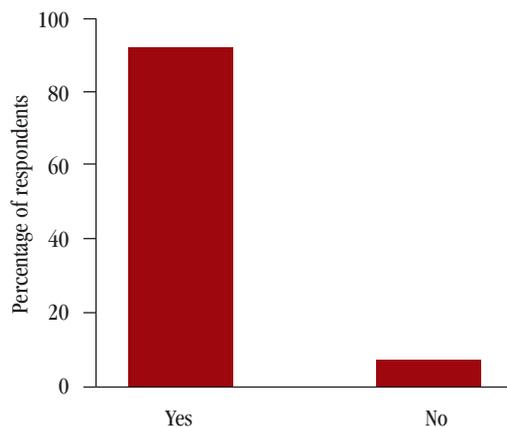
k. Do you think Govt. should reduce taxes on buses and increase taxes on private vehicles to fund public transport and clean air measures?

Majority favor this stance



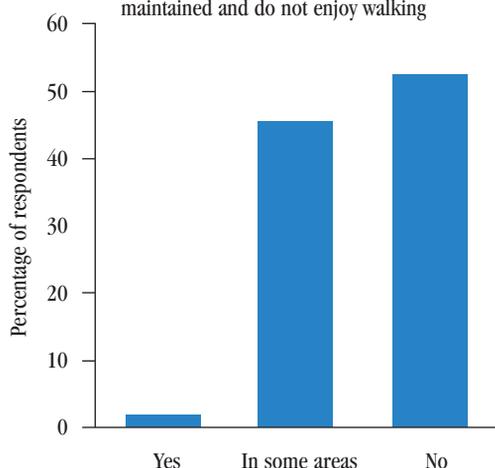
l. Do you think growing demand for parking of vehicles is leading to the problem of encroachment of footpaths, open spaces and leading to congestion?

92% blame parking for encroachment and congestion



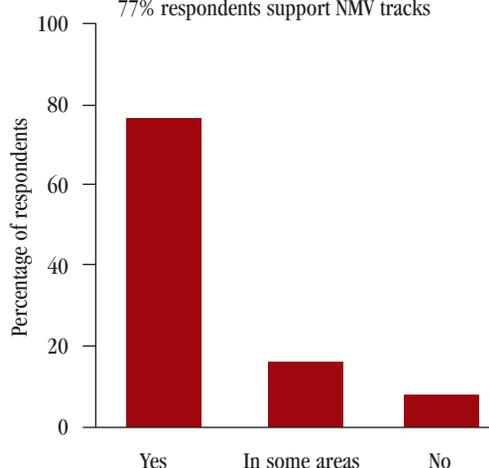
m. Do you find the footpaths in your city well maintained, clean and walkable?

The majority finds walking infrastructure poorly maintained and do not enjoy walking



n. Do you think that cycles and cycle rickshaws are important and should be given segregated space?

77% respondents support NMV tracks



The people's perception bring out very clearly that:

- The majority – a whopping 82 per cent have said air pollution is worsening and about 21 per cent of them have said the air is heavily polluted
- About 73 per cent have said incidence of respiratory diseases, asthma, eye irritation are on the rise.
- More than 90 per cent have identified congestion as a big problem in the city
- Nearly 40 per cent have supported the gaseous fuel programme as one of the most effective step so far in the transport sector to clean up the air
- Nearly 54 per cent have identified the cleaner domestic fuels as the next clean step
- About 17 per cent have indicated improvement in emissions standards as contributing to cleaner air, majority (56 per cent) remain uncertain about this aspect
- About 43 per cent think new roads and flyovers can help to clean up the



- air and about 45 per cent think that they do not help
- Majority (77 per cent) have said that cycles and cycle rickshaws are important and should be given segregated space
 - Nearly 16 per cent have rated public transport services good, 26 per cent have rated city public transport services average and 40 per cent as poor
 - About 28 per cent feel that intermediate transport is good
 - There is nearly unanimous support for improved public transport.
 - Nearly 87 per cent have said that they will prefer to take public transport if it improves
 - Nearly 82 per cent have supported dedicated lanes for buses
 - Nearly 92 per cent think that growing demand for parking of vehicles is leading to the problem of encroachment of footpaths, open spaces and leading to congestion
 - The majority find the walking infrastructure poorly maintained and as a result of this they do not enjoy walking. This needs immediate attention as pedestrian traffic is the strength of the city
 - Majority opine that government should reduce taxes on buses and increase taxes (road tax, parking tax, congestion tax etc) on private vehicles to create a dedicated fund to finance improvement in public transport and pollution control strategies
 - At least 60% have said that fuel adulteration is still a problem



VOICES IN HYDERABAD

Citizens of Hyderabad had gathered to debate the agenda for action on air quality and mobility challenges in a joint platform of Centre for Science and Environment and the Andhra Pradesh Pollution Control Board in Hyderabad on October 07, 2010. This public debate had stirred passion, and energy for change.

K MADHUSUDAN RAO, Member Secretary, APPCB

In our race to be faster we are becoming slower as with increasing vehicle numbers, the average speed of vehicles is falling down. Also, the new emerging health information about exposure impact zones of vehicular emissions is startling as vehicular emissions not only affect the commuters but also to nearby areas of about 500m. Accordingly about 70 to 80 percent of the Hyderabad city is in the vehicular exposure and impact zone. The central part of city because of highest density of traffic is the most polluted. Strengthening of walking facilities is important as the data from Ministry of Urban Development shows that most trips in the city fall in the range of 0 to 4 Km.

In Hyderabad, there are 21 air quality monitoring stations along with a continuous monitoring station installed at the APPCB. Our observation of the real time monitoring within about five km radius from the station shows that generally whenever there is a traffic jam or congestion in the vicinity, the air quality gets affected proportionately. APPCB is planning to install 4 more continuous monitors at the four corners of the city. This will greatly help in giving real time information on air quality in the city.

Overall observation of the long term trend of RSPM in air in Hyderabad shows that during 1999 and 2001 the levels were very high but now it has reduced to about 84 microgram per cubic metre. Measures including LPG programme, tighter emission norms among others implemented in the city have helped to reduce the pollution levels. But we need to strengthen the alternative fuel programme by enhancing the supply of CNG.

Outer ring road will help to reduce the impact of transit truck traffic in the city. Transport department has also introduced a taxation scheme on old vehicles. Multi-modal transit system and transport reforms are underway. Industrial pollution control measures are also being strengthened and online air quality monitoring in the industrial areas is on the agenda. We are taking steps to control air pollution in the city, but this will be effective when we have co-operation from different stakeholders.

SATISH KUMAR KANNAPA, Senior faculty on Environment health, Institute of Health Systems

Air pollution and public health challenges in Hyderabad

Public health is usually regarded as the forte of medical experts. But we are working towards expanding the ambit of public health research by bringing in different disciplines including environmental health.

The Ministry of Environment and Forests has commissioned a study on 'effect of air pollution on cause of death profile in Hyderabad city' to correlate the cause of death data with the air quality data. The health impact studies of different transportation scenarios have been conducted in partnership with EPTRI under the *Integrated Environmental Strategies* programme. The rates of diseases were computed in business as usual and four different mitigation scenarios. The study revealed that transportation sector is the largest contributor to air pollution in the city – as much as 70 per cent. In the analysis of the mitigation scenarios – the "bus transit mitigation scenario" resulted in most significant decreases in mortality and respiratory diseases on account of reduction in air pollution.

The biggest challenge that we face in doing these studies is the poor system of maintaining vital data registration system in our cities. The cause of death reporting is not recorded scientifically. It took Institute of Health Systems a long time to rectify the errors that abound. The ongoing correlation between air quality and cause of death is expected to be completed soon. But this has also brought out very clearly that air quality modelers, epidemiologists, economists and policymakers will have to come together for this kind of risk assessment.

C RAMACHANDRAIAH, Convener, Citizens for Better Public Transport in Hyderabad

Perspective of civil society on public transport in Hyderabad

Where is a platform for common people in Hyderabad to tell how difficult it is to walk? There have been many studies and they have already shown the state of affairs of public transport in Hyderabad. About 40,000 to 50,000 pedestrians use the Punjaghatta cross roads but have been completely marginalized because of the two flyovers meant for cars. Who recommended these



VOICES IN HYDERABAD

flyovers? A total of 12 more flyovers have been planned and recommended for the core city. Most of these areas are thronged by thousands of pedestrians every day. Are we not destroying the city forever for pedestrians, cyclists for bus users?

Hardly any efforts have been made to improve the bus based public transport in the city run by state road transport corporation. Today Hyderabad has about 3,000 buses but needs about 5000 buses. BRT on some corridors has been approved since 2003 but still there is no clarity on which routes is it going to be implemented. The first BRT corridor was approved from Kokatpally to Dilshukhnagar 25 km (Rs 250 crore) but project has not seen the light of the day. The state government must invest in Phase I and Phase II of MMTS. Investment in Phase II has been approved long back but till now not a single rupee has been released on this project.

Hyderabad cannot become a world class city by constructing an elevated Metro Rail. Hyderabad Metropolitan Region is only coming at the behest of real estate companies, private coach manufacturers, contractors, and corrupt bureaucracy which is pushing this project. Today, not a single document about this project is available publicly. No public hearing was held by the authorities in Hyderabad.

The Elevated Metro will physically destroy the city streetscape going through the core of the city. Unfortunately, in Hyderabad the heart of the policymakers is where there is big money and only projects with huge investments such as elevated metro takes the government's attention. In the last 10 years we have not seen a even a km of pedestrian path coming up in Hyderabad, we have not seen an MLA taking pride in it, we have not seen a minister inaugurating it, because there is no money in footpaths.

Our biggest challenge is how to stop this elevated metro rail project that will deface the Hyderabad and destroy the life of people on the streets for the generations to come. We must reclaim Hyderabad for the citizens of Hyderabad.

KANTHI KANNAN, The Right to Walk Foundation

How to make Hyderabad more walkable?

It is well known that our cities are not walkable; it is true in Delhi and in Hyderabad. Many of us describe a footpath as walkable but we must understand what do we mean by walkable? In Hyderabad the walkability is restrained not by the hawkers or anything else but mainly by parking of the vehicles. You cannot just distribute road space only to cars and motorbikes; you also have to ensure that the pedestrians get a fair share of the road space.

The walkways must be designed with safe access to all pedestrians, height not more than six inches from the road or carriageway, continuous flat surface and tiled, and enjoyable surroundings. Walking should be an option it should not be a compulsion. It should be a joy to walk on a street, there should be enough space for two to three people to walk from each side to walk on. There should be space for people to sit on the footpaths, there should have space for our hawkers and cobblers, the space also should have utilities like urinals and drinking water, bus shelters, kiosks informing about the city.

The city administration and government think that 'Infrastructure' development only means roads, road widening, and building flyovers. The infrastructure definitely means footpaths also. There are discussions about the foot over bridges but there are no plans for 'at grade crossing facilities'. Everybody talks about NMT but do nothing about it due to their unwillingness to do so.

The JNNURM programme has not allocated any funds for footpaths because footpaths have not been defined under it. There is no single authority in Hyderabad for footpaths and pedestrian crossings. There are 6 different government departments without any coordination; we need to constitute a "pedestrian safety cell". Walkability surveys have been planned for the city and GHMC has agreed in principle to carryout walkability surveys for the entire central zone.

We must make walking a fundamental right and ensure that facilities are provided. The government authorities must wake up to the needs of common people.

TAKE A BUS

Set the terms of action

It is time to set new terms of debate and action. The action has been driven both by the Supreme Court as well as the executive action. In 2003 Hyderabad came under the Supreme Court surveillance with seven other cities for action on clean air.

Since then the city has worked incrementally on various strategies including gaseous fuel programme, in-use vehicle management, and public transport strategies. The gaseous fuel programme is being closely monitored by the Environment Pollution (Prevention and Control) Authority.

The city has a Task Force to oversee the planning and implementation of clean air plan. It is constantly trying to strike a balance between composite and priority action for an effective impact.

In the meantime, newer policy developments and investments plans of both the central and state governments have created more opportunities for change in the city. The bus funding scheme under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) has opened up new opportunities for reforms.

The city government has committed to initiate institutional and fiscal reforms for public transport management and implementation; parking and tax policies for restraints on travel and car usage.

The city can make a lot of difference if this reform agenda is leveraged effectively. But is this happening? Is the city on track? How can this process be guided for effective impact? This needs public support.



- **Despite the odds public transport ridership is still high. When walking trips are included in the modal share the combined share of cars and two wheelers remains at 28 per cent, but the rest – as high as 72 per cent – is met by public transport, walking, cycling, and intermediate public transport.**
- **Bus transport has been a victim of neglect. Since 1995 the bus ridership has increased only marginally. The number of buses has also stagnated considerably.**
- **Proper surveys and assessments have not been carried out to ascertain the critical bus numbers that the city needs, as well the plans for rationalisation of the bus routes and integrations with train systems.**
- **The Wilbur Smith survey of Indian cities shows that the public transport accessibility in Hyderabad is medium compared to the other metro cities.**

BUS TRANSPORT: BUILD ON STRENGTH

Buses provide the bulk of the public transport services. In Hyderabad, its share is 35 per cent of all the motorized and non-motorised trips (Graph 21: Hyderabad's strength and opportunity). This reflects the strength of the city. But unfortunately, the dependency on personal vehicles is increasingly eroding bus trips. Bus ridership is declining. The city will have to make a massive effort to meet the stated target of attaining 75 per cent share for public transport by 2030. There is an opportunity.

Buses are affordable, cost effective, and space efficient public transport systems. Improved services and better performance will only increase the number of commuters. A bus network has much more flexible outreach. It can also cover areas with lower travel demand and prevent car dependency. With much lower investments buses can dramatically improve travel time and accessibility. Journey and access time has an overwhelming influence on the choice of transport mode.

City's bus fleet has stagnated for a long time. It has not been able to meet the increased travel demand. The population in Hyderabad has increased massively from 46.4 lakh in 1991 to 79.86 lakh in 2007 but the number of passengers carried by city buses has increased very marginally (see Table 3: APSRTC bus fleet and number of passengers carried everyday)

The city is in the process of building its bus numbers. The total fleet size including the Andhra Pradesh State Road Transport Corporation (APSRTC) owned fleet as well as hired services total to 3521 buses. The bus stimulus package under the JNNURM programme in 2009 has been an opportunity for the city to expand its bus fleet. It has added 611 JNNURM funded buses.

The Wilbur Smith estimates shows that the city bus transport supply index is not as good as some other metro cities. (See Graph 22: City bus transport supply index) But public transport accessibility index for Hyderabad is comparatively better (Graph 23: Public transport accessibility

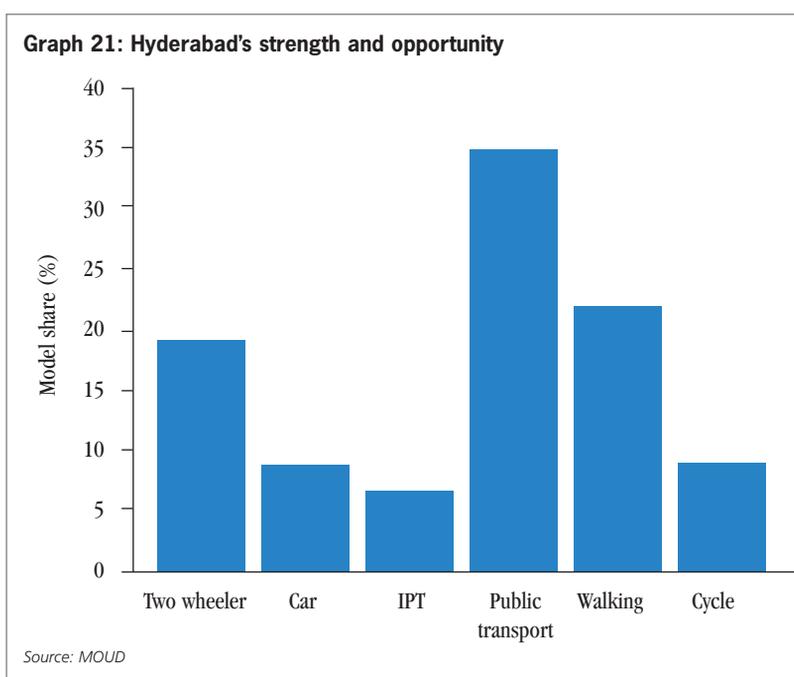


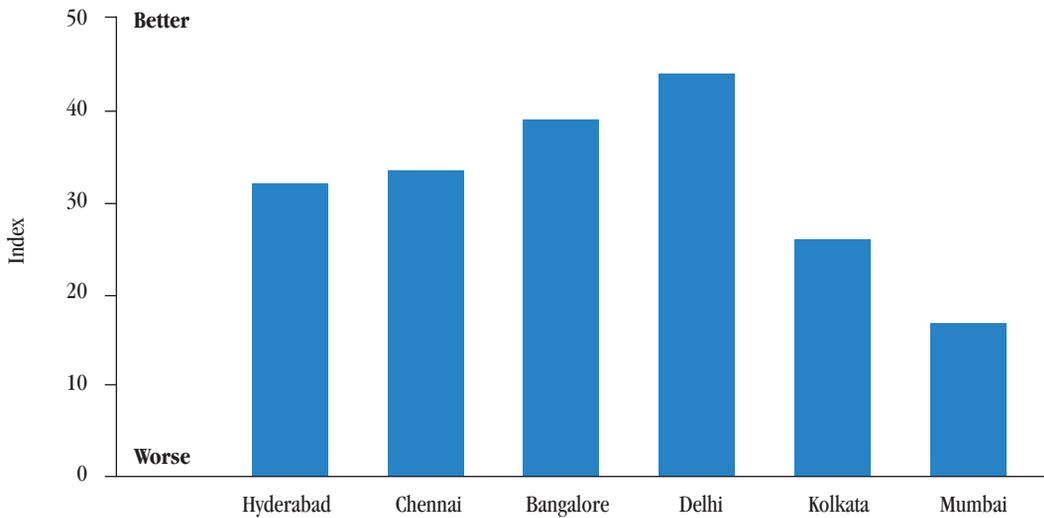
Table 3: APSRTC bus fleet and number of passengers carried everyday

	Bus fleet	Occupancy ratio	Number of passengers carried per day in lakhs
1995-96	2018	74	30
1996-97	2122	75	32
1997-98	2217	69	31
1998-99	2328	70	33
1999-00	2425	63	31
2000-01	2480	58	29
2001-02	2605	59	31
2008-09	3185*	77*	39**
2009-10	3521*	66*	37**

Note: * Figures pertain to as on July 2009/July 2010,**These figures are for the financial years
 Source: City Development Plan (2006), Hyderabad; Operational data APSRTC Hyderabad city region (2010); MOUD study on traffic and transportation (2008)

Graph 22: City bus transport supply index

Higher index value refers better city bus supply



Source: MOUD

index: Higher the index, better is the accessibility).

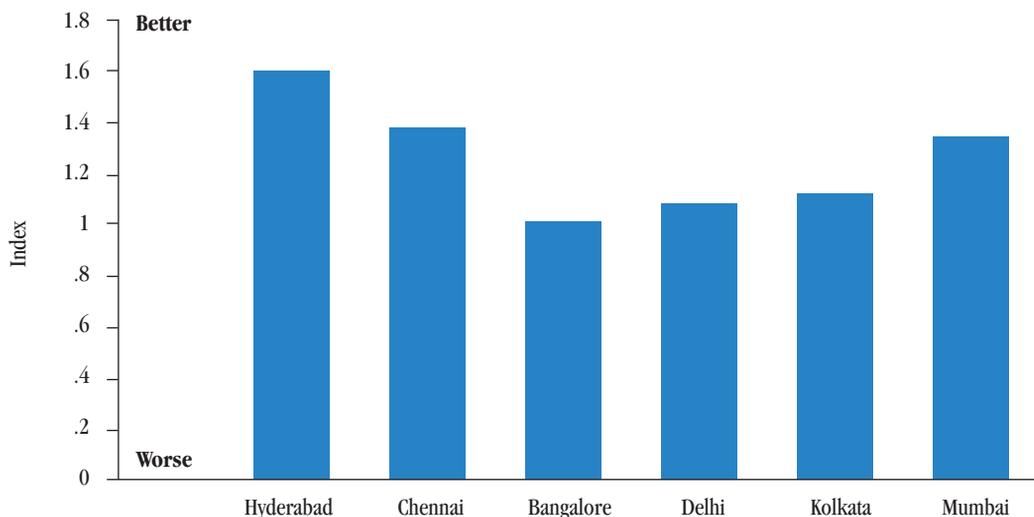
In the absence of any other data it is difficult to verify some of these ground realities. Only buying buses will not help. It will require route planning, fare policy, and efficient management model. Proper surveys and assessments are needed to ascertain the critical bus numbers that the city needs. The city need plans for rationalisations of the bus routes and integrations with train systems. Wherever possible consider giving traffic priority to the buses to improve their speed. Hyderabad needs new management framework for both state owned and privately owned buses so that Transport Corporations do not suffer from mismanagement and inefficiencies. Private bus service may require a proper business model and cost sharing arrangement.

Lack of focus: The ongoing reforms and improvement plans for buses also bring out inconsistent approach. At one level modern buses and express services are being introduced but at another level the conventional services that form the bulk of the affordable public transport service are being neglected. This has created problem for the commuters.

Composite planning is missing. The improved system includes the JNNURM buses, Metro Express and Metro Deluxe buses including the

Graph 23: Public transport accessibility index

Higher the index, better is the accessibility



Source: MOUD

modern Volvo buses. These are more expensive as these have higher bus fare and makes commuting more expensive. Metro Express when compared to the ordinary bus, costs Rs.2 to Rs.3 more per person, while the same in Metro Deluxe costs Rs.3 to Rs.5 more. The conventional buses have become less frequent and unreliable. It has been reported that over the last three years, the number of special buses, that is, Metro Express, Metro Deluxe and air-conditioned Volvo buses has increased from 755 to 1141. During the same time, the number of ordinary buses has grown from 2,348 to 2,403. Remove the suburban and mofussil services from these, and the number is reduced to 1,500. These buses have also deteriorated.

APSRTC needs to rationalize its fare structure for all categories and keep them within affordable range and expand the services. It has plans to provide Global Positioning System for JNNURM buses.



Centre for Science and Environment
RIGHT TO CLEAN AIR CAMPAIGN

CITY ACTION

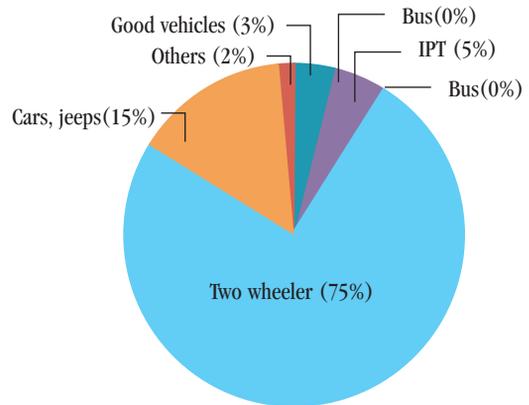
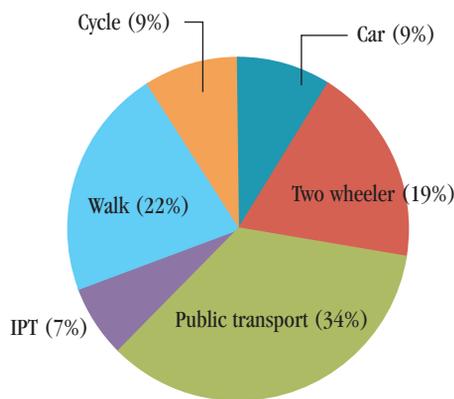


Graph 24: Allocate road space equitably. Plan for people. Not vehicles. Take buses out of congestion.

More people use bus, walk and cycle. But cars and two-wheelers dominate the road space

Modal share: Nearly 73% of the people in Hyderabad use buses, autos, walk or cycle.

Vehicle share: Cars and two wheelers dominate with very high numbers and occupy maximum road space



Source: Ministry of Urban development and Transport Department, Hyderabad

Priority to buses: In the citizens survey an overwhelming majority has supported dedicated lanes for buses for greater efficiency and speed. The Hyderabad City Development Plan has stated that buses caught in congestion cannot cater to the peak hour passenger demand. This leads to longer waiting time and slower speed. This has led to a larger issue of reallocation of road space to more sustainable modes including buses. Personal vehicles are nearly 90 percent of the fleet and occupy more road space. But buses, autos, cycles and walking carry 72 percent of the travel trips but are space constrained and are victims of congestion. (Graph 24: Allocate road space equitably. Plan for people. Not vehicles. Take buses out of congestion.)

The much awaited bus rapid transit system (BRT) for the city has remained sidelined in planning, overlooking its benefits to provide an affordable and faster mode of transport to the majority. The proposed BRT in the route (Rethibowli to Hi-Tec City to JNTU, Kukatpally) needs to be expedited. The city action plan must identify more BRT routes and freeze them for immediate implementation.

It has been noticed that there is public angst over the neglect of buses and sidewalks when the maximum resources are being diverted towards capital intensive metro. Hyderabad is creating a transit spine based on a combination of mass rapid transit – rail and bus based. The city needs an integrated public transport plan to design deployment, operations and management of buses. It needs clear plans for rationalized routes, affordable fares, reliability, high frequency, technology upgrades and subsidy management. Time bound execution of such plan is needed urgently to reverse the slide in public transport ridership and increase public transport share to 75 per cent by 2021.

INTEGRATE

Link them all to improve access

Investments in public transport systems can go waste if the new system remains underutilized and the car numbers continue to grow exponentially. The underlying principle of any transport planning is to maximize mobility by improving access to different modes of transport in the city.

Easy and smooth transfers from one mode to another mode of transport ensures that all forms of transport – mass rapid transit system, buses, and intermediate transport, walks and cycle – operate at their optimum carrying capacity.

Suitable hierarchical feeder systems is needed with passenger friendly interchanges. Hyderabad has implemented multi-modal transportation system that includes both bus and rail based systems. But the share of public transport is still declining.

Hyderabad has taken the lead to introduce integrated ticketing systems. But this is not working to its best potential because of poor integration of the transportation modes and the available services.

For effective multi-modal integration institutional reforms are also needed for operational planning and coordination for interface between different modes of transport. It needs unified authority to manage all transport modes in an integrated manner.

Hyderabad is quite unique in its initiative to have enacted a legislation to form the Unified Metropolitan Transport Authority (UMTA). This is being seen as a model for other cities. But a lot more will have to be done to make it effectively operational to enable effective decisions and integrated planning and operations of sustainable modes of transport.



- **Hyderabad has laid down extensive plans to implement and strengthen city bus service, multi-modal transport system, and metro.**
- **Hyderabad has introduced common ticketing system. Multi-modal transit system – which is mainly the local trains connected with the APSRTC city bus services through common ticketing system.**
- **Lack of integration of intermediate public transport systems including three-wheelers with the formal bus transport is leading to competition between two important modes of public transport. This is edging out high frequency and affordable small informal system.**
- **The city will have to strengthen multi modal integration and passenger information systems. Ensure seamless integration at the physical infrastructure, information and fare levels.**
- **Hyderabad has set up Unified Metropolitan Transport Authority (UMTA) under a special enactment. The UMTA is for the Hyderabad Metropolitan Region for planning, coordination, supervision, promotion and planned development of Hyderabad Metropolitan Region.**

INTEGRATE ALL MODES OF TRANSPORT

Making provisions for public transport systems is not enough. They need to be integrated for seamless transfers and to maximize the mobility benefits. Hyderabad has plans of implementing bus rapid transit system, Metro, expansion of city bus services, and intra city train service between twin cities through multi-modal transport system. The city also has great strength in its intermediate public transport — the autos. But these are not part of any composite and integrated planning.

Immediate system designs are needed for physical integration as well as service and operational integration to help optimization of each mode. Otherwise, there will be a problem of getting the passengers to and from the new systems and the existing systems.

Common ticketing but underutilised: One of the key approaches to integration is integrated ticketing system that allows easy transfers from one mode to another and also reduces extra cost of transfers. It is a matter of pride that Hyderabad is the first in the country to have implemented the common ticketing system for its multi-modal transport systems – intra-city trains and the buses. This has been implemented in MMTS Phase I. This has the potential to improve easy transfer from trains to buses and vice versa. But a lot more will have to be done to utilize the system to its capacity.

When the CSE checked out its utility it was clear that the bus services and the locations of the bus stations have not been rationalized to enable such transfers. Even with a common ticket accessing a bus is a problem. Often bus stations are at a distance. Timetable of the buses are not optimized. Walking access to the bus stations is highly impeded and often not walkable. This clearly disincentivises optimum use of the system. This will have to be addressed immediately.

Intermediate public transport and small transport buses at risk: Yet another weakness in the integration framework is the neglect of intermediate public transport. This low occupancy but high frequency and affordable transport is an important spine of the public transport in the city. But there is no plan to integrate them with the formal public transport system. As noticed in other cities autos are getting marginalized and getting caught in conflict with the bus system. This is leading to competition between two important modes which is detrimental to each other. There is need of system design that integrates waiting areas of autos on the roads and also an operational plan to deploy them as an efficient feeder services to the formal public transport. Discussion with the city officials shows that there is no policy focus on this yet.

The IES study has also pointed out that a large number of bus routes have come up due to popular demand in various interior areas and also because of urban sprawl. This has resulted in two drawbacks. Firstly the bus system has become a ‘destination oriented’ system with low frequencies and poor quality of service. At the same time, big buses are getting into narrow roads that are more suitable for mini buses, and auto rickshaws that should act as feeders to big buses. Instead the buses are competing with their feeder system..

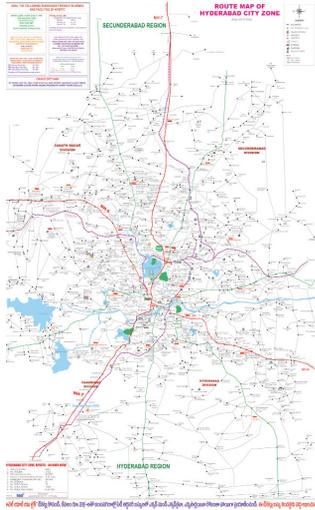
Hyderabad should focus on developing both the formal and informal



Table 4: Multi-modal transportation plan

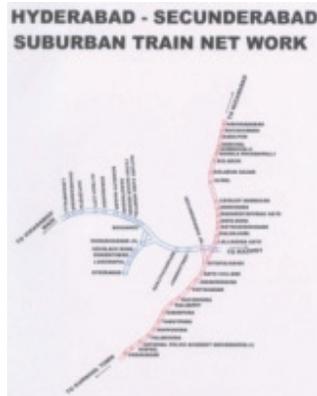
City bus route map

City bus service:
 APSRTC Hyderabad city zone:
 No. of buses: 3521,
 Trips operated per day more than 40,006
 Passengers transported per day: 36 lacs (avg)
 Bus routes covers entire city
 Bus rapid transit system (planned) between Kukatpally JNTU – Rathibowli Via Hi-tech City



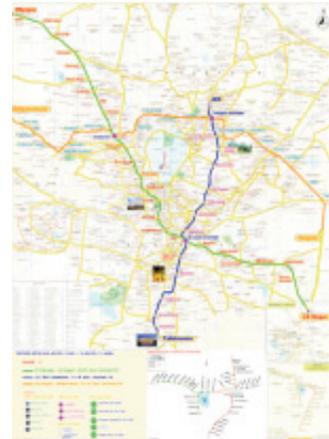
Multi modal transport system

Intra city train service twin cities
 Passengers transported per day: 1 to 1.2 lacs
 50 km, 84 services
 Plans for expansion



Metro map

Hyderabad metro (planned):
 Miyapur with L.B.Nagar – 28.87 km,
 Secunderabad to Falaknuma –14.78 km,
 Nagole and Shilparamam –27.51 km



modes of transportation including non-motorised transportation linkages in an integrated way and not one at the cost of the other. But the city is already beginning to see the conflict between formal and informal public transport systems. The advent of the intermediate public transport systems is seen as eroding the space of the bus system. Also buses are being blamed for congestion. There are efforts to create bus bays in the city. However, the role of the intermediate public transport should be recognized as effective feeder for the bus transport and also for efficient linking of all neighbourhoods. Routes of the buses will have to be rationalized.

INTEGRATED INSTITUTIONS: UMTA

Quality of public transport and mobility planning is often compromised because of poor management and weak institutions. With scaling up of transport systems a complete institutional overhaul is needed to manage them, integrate them, and govern the city mobility management well. This is the reason why the JNNURM reform agenda has mandated formation of the Unified Metropolitan Transport Authority (UMTA) in each city to achieve very high quality of coordination in planning and implementation. UMTA is expected to be the integrated planning authority.

It is notable that Hyderabad has taken the lead to form the Metropolitan Development Authority (HMDA) that has been set up under a special enactment for the Hyderabad Metropolitan Region for the purpose of planning, coordination, supervision, promotion and planned development of Hyderabad Metropolitan Region. Hyderabad is now among the few cities including Bangalore, Chennai, Jaipur and Mumbai which have set up UMTA. In Hyderabad UMTA is backed by legislation and has the following salient features:

- “Hyderabad UMTA has been assigned the task of overseeing the implementation of various traffic and transportation measures undertaken by various agencies in the Metropolitan Region;
- to ensure effective coordination and implementation of various traffic & transportation measures undertaken by various Government agencies;
- to deliberate and recommend effective transportation strategies for Hyderabad Metropolitan Region;
- processing of funds for implementation of proposals;
- approval of all traffic and transportation proposals / projects from any agency in the metropolitan region and all new initiatives and brought the attention of the Members to the stipulation prescribed that the recommendations/instructions of the UMTA shall be binding on all the concerned departments and of the maintenance of an escrow account in the HMDA in which 0.25% of estimated cost of all projects of traffic and transportation undertaken by various departments is to be deposited together with 0.25% of development charges collected by the HMDA , GHMC and other local urban bodies to be added to this account annually.”

There is a requisite statutory backing to the UMTA for facilitating coordination, planning, implementation and management of urban transport system/projects.

However, this is still in a very nascent stage. The UMTA has yet to play its full blown role. The city is still facing the problem of coordination between different agencies in planning for providing public transport services and overall mobility planning. Different departments work within their own jurisdiction and plans. In fact, as city officials point out — this has raised a larger concern over how UMTA will co-exist with all other line departments and solve the territorial and jurisdictional issues.

It has been pointed out that only if the funding decision is routed through the UMTA the integrated planning will gain teeth. Otherwise, its role may remain advisory without real power. It seems the UMTA is expected to have some financial powers and decision making powers over transportation projects. Its actual operations will bear out its inherent strength and weaknesses. The city will have to assess the requisite reforms to leverage UMTA for better planning and coordination amongst different development agencies to implement a sound public transportation system in the city.

It has also been pointed out that UMTA should take up the agenda of transportation demand management on board – as several key policies on sustainability not only depends on a public transport system but also on how the transport demand is managed to shift people from personal vehicles to public transport.

Create single land-use and transportation plan with legal back up to guide action: Increasingly now, as the investments at the national levels are being scaled up for focused spending in the transportation sector – as evident in the JNNURM programme – cities are being pushed to prepare city based plans to source funds. Both City Development Plan as well as City Mobility Plans as prescribed under the JNNURM programme have become instruments for identifying projects in the city to access funds. But these plans at best remain a menu of projects for potential funding and are incapable of guiding local decision making on mobility, town planning and transportation strategies that are required for more integrated planning and implementation with legal back up.

State governments have no ownership on these plans if national funding is not available.

Cities need a single plan as envisaged in Master Plans prepared under an Act. This will create the opportunity to influence town planning and transportation planning together to meet the objectives of sustainability. By



a policy Indian cities will have to retain the inherent advantage in dense mixed land use planning to keep travel distances short and amenable walking, cycling and public transport. Prevent sprawls. But project based mobility plans cannot engineer this change nor create ownership at the city level. The UMTA should be effectively aligned with the integrated land-use and transportation planning of the city with a legal back.

WALKING AND CYCLING

Make cities walkable

All travel trips begin and end as a walk trip. Our cities were built to be walkable. High density, mixed land use, and narrow streets have made walking for work and recreation feasible and popular in Indian cities. In any typical city the core could just be 5 km across. Studies have shown that more than 40 to 50 per cent of the daily trips in our cities have distances less than 5 kilometers. This is easily walkable within a reasonable time.

Hyderabad has the same advantage where most trips are in the range of 0 – 4 km. But the city has not paid any attention to promote safe walking. Hyderabad has one of the worst road safety index. Pedestrians are the biggest victims of the road accidents in the city.

The percentage of the road with pedestrian footpaths runs hardly in 30 per cent in most Indian cities. Cities have marginalised the needs of the pedestrians to give priority to automobiles.

Metro, bus rapid transit system, buses cannot work optimally if the city is not walkable. A good pedestrian network is needed for integration as well as last mile connectivity to improve usage of public transport.

Yet walkways are most ill designed, encroached and least protected. The current engineering guidelines for pedestrian facilities are inadequate. Same is the state of bicycles.

The city needs to adopt appropriate street design guidelines, make their implementation mandatory, and initiate periodic audits to ensure improvement in walkability.

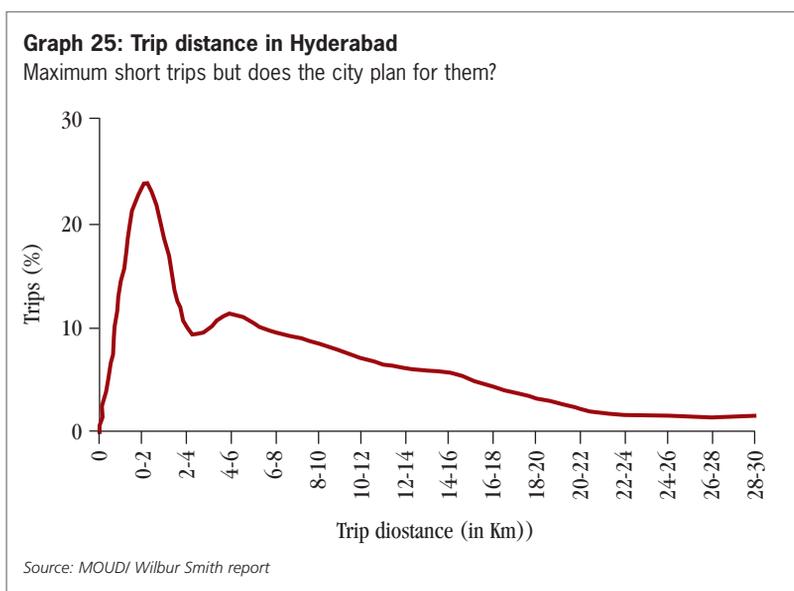


- **Even today nearly 22 per cent of daily travel trips in Hyderabad – much higher than the trips made by cars at 9 per cent, are walk trips.**
- **Walk share may decline as very little has been done to rebuild well designed sidewalks and cross walks.**
- **The Ministry of Urban Development under a Global Environmental Facility (GEF) funded project on Sustainable Urban Transport Project has included Hyderabad for improvement in pedestrianisation to improve access in the precincts of MMTS stations. But the efforts are not at the scale which is needed to meet the pedestrian demand across the city.**
- **Instead of focusing on improving at grade walking infrastructure focus is shifting towards making foot overbridges that are pedestrian unfriendly.**

BUILD CITIES FOR PEOPLE

Protect high pedestrian traffic. Even today nearly 22 per cent of daily travel trips in Hyderabad (much higher than the trips made by cars — 9 per cent), are walk trips. In most Indian cities people who commute by walking outnumber those who use their vehicles. This is an enormous strength in our cities. Our cities were built to be walkable. High density, mixed land use, and narrow streets have made walking for work and recreation comfortable, feasible and popular in traditional Indian cities. More than 40 to 50 per cent of the daily trips in many of our cities have distances less than 5 kilometers, in Hyderabad majority of trips falls in the range of less than 4 kms. This has enormous potential to convert to non-motorised and especially walking trips. But wrong policies are making walking unattractive, leading to urban sprawl, increasing journey distances and making cities less walkable.

In Hyderabad most trips are in the range of 0 – 4 km this can enable cycling and walking (See Graph 25: Trip distance in Hyderabad). Therefore, it is important the pedestrian friendly infrastructure is maintained across the city and foot over bridges should not be seen as the solution. This strategy if neglected dependence on car and two wheelers even for short distances will increase.



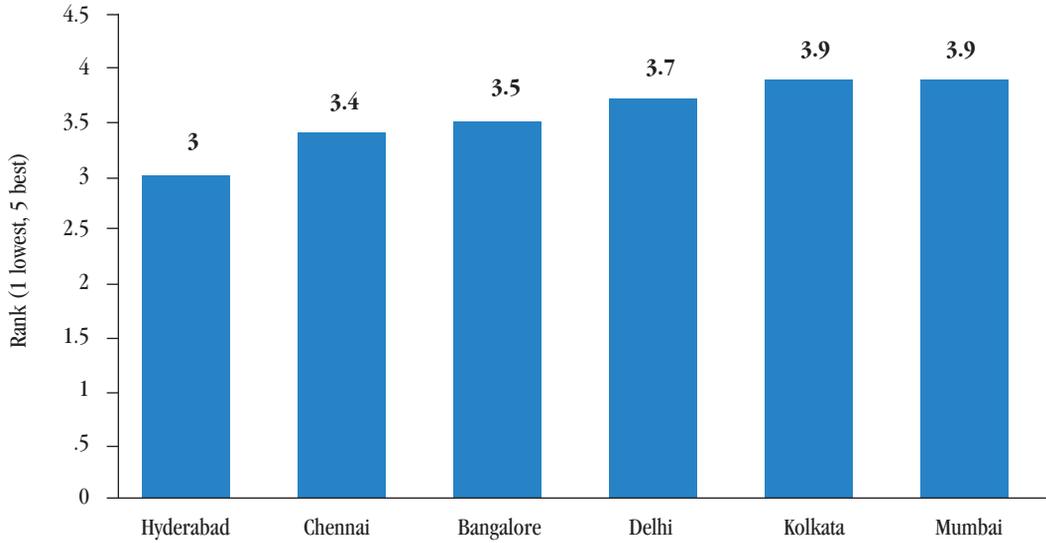
There is considerable unrest in the city about the poor state of the sidewalks. Hyderabad ranks very poor in the order of quality of pedestrian infrastructure in the country (See graph 26: Ranking of pedestrian facilities).

This has made walking very unsafe. The city has poor road safety index (See Graph 27: Road safety index). The CDP informs that about 40 percent of the accidents in the city involve pedestrians as victims. This is attributed to poor pedestrian facilities. Most fatal accidents involving pedestrians occur while crossing roads. This is largely because approach speeds are high more than 60 kmph; waiting time for pedestrian is too long; peak hour



Graph 26: Ranking of pedestrian facilities

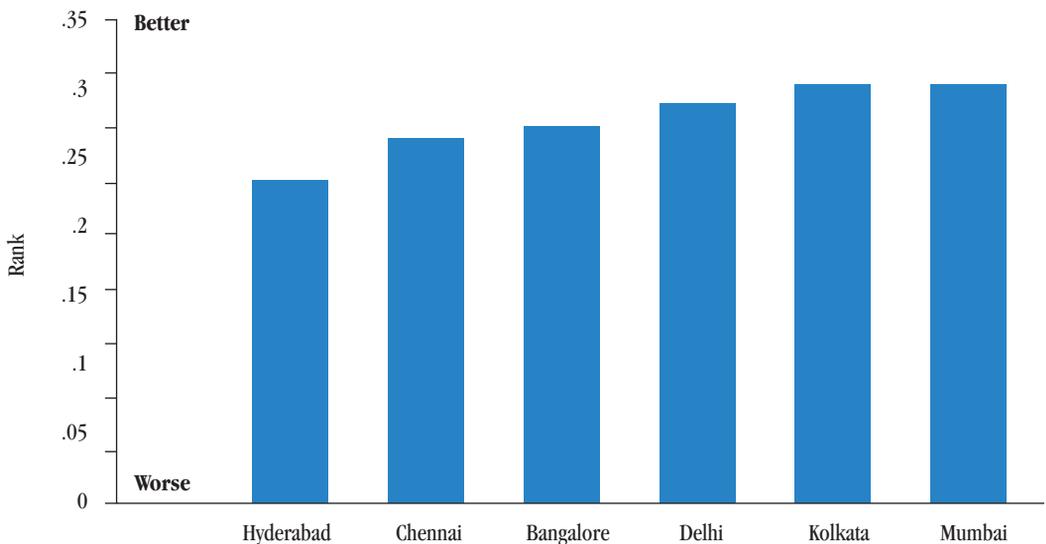
Pedestrian facilities in Hyderabad have lower rank



Source: Ministry of Urban Development and Wilbur Smith Associates 2008

Graph 27: Road safety index

Unsafe for walking and cycling

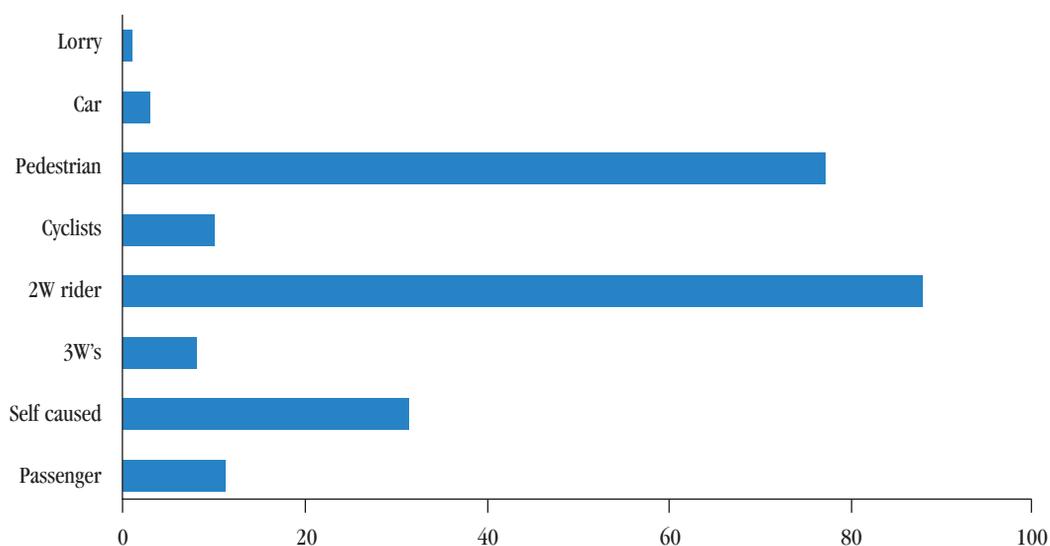


Source: Ministry of Urban Development and Wilbur Smith Associates 2008

volume for pedestrian and vehicles are very high for the divided carriageways. According to the data released by the traffic police in Hyderabad, 77 per cent of the accident victims are pedestrians (See Graph 28: Fatal accidents: victim profile)

Even increase in public transport ridership will increase walking as all public transport trips begin and end with walk trips. Even 50 per cent increase in kilometer traveled by public transport would lead to massive increases in walking. Roads will have to be planned with more well designed sidewalks and safe cross walks. Therefore, the city has to plan the pedestrian infrastructure to cater to the present and future demand for walking in the city. Urban poor are too poor to even afford a bus ride for daily commuting. Often the only option for them is to walk.

Graph 28: Fatal accidents: victim profile



Source Hyderabad Police

Yet the policy approach is not clear. This is clear from the City Development Plan which is expected to guide the infrastructure investment in the city. The CDP states that as a significant proportion of the trips of up to 2 km in length are performed on foot and since pedestrians are more vulnerable to accidents, it is necessary to protect them through provision of Guard Rails, Zebra Crossings, and Pelican signals or through Grade separations. The CDP has thus proposed an investment of Rs 36 crore for improvement in pedestrian facilities, comfort and safety. This includes subways, foot over bridge and Rs 220 crore on signage for pedestrian crossing.

This has completely disregarded pedestrian convenience and appropriateness. It has ignored that pedestrian facilities need to be at grade, and the network has to retain the direct shortest routes for people



Centre for Science and Environment
RIGHT TO CLEAN AIR CAMPAIGN

CITY ACTION



to walk. Subways and foot over bridges or grade separation are adjuncts to car centric infrastructure that disables a large majority and discourages walking. This defeats the purpose. The entire investment in subways and foot over bridges become wasteful. Foot Over bridge projects are being implemented in Hyderabad under “fund for own city: scheme of Govt. of Andhra Pradesh.

There are now efforts underway as Ministry of Urban Development and Global Environmental Facility have funded a project on Sustainable Urban Transport Project. There is renewed interest in walking globally to reduce energy, pollution and climate impacts and improve livability of cities. This programme has included Hyderabad for improvement of pedestrian infrastructure and pedestrianisation to improve access in the precincts of Multi Modal Transport System (MMTS) stations.

The proposal includes improvement in the pedestrian facilities for better accessibility to the MMTS. Pedestrian access in the precincts of MMTS stations are intended to be improved. This involves rendering the pedestrian facilities free from encroachments. Design and construct facilities with sufficient detail to function efficiently for transfer of passengers to MMTS. The Components proposed under the project are: proper pedestrian safety measures, encroachment free continuous footpaths, zebra crossings, installing pedestrian signals and construction of foot over-bridges, proper and wide access roads, ample parking areas near the stations to encourage park and ride concept for people with bicycles and two wheelers. 15 MMTS stations have been identified. Improvements have been suggested within area of 2.5 km radius of the locations. Project outlay for the proposed components is estimated at INR 59.3 Crores.

Clearly the efforts are not at the scale which is needed to meet the pedestrian demand across the city.

All new roads must have well and appropriately designed pedestrian ways that makes walking safe, comfortable and convenient. The pedestrian facilities need to provide the shortest direct route to destinations. Road engineering interventions once made cannot be changed easily but it will permanently decide the design of the network and influence travel choices of people. It is imperative to ensure that road design does not increase dependence on and usage of personal vehicles. That is possible only if policy focus shifts to public transport, walking and cycling.

There are proposals of earmarking spaces that will be made vehicle free zones in addition to the plans of creating well designed footpaths along major roads. But there is little progress on this front.

- Government should mandate pedestrian plans and make it conditional to infrastructure funding;
- Immediately reform engineering and environmental guidelines for walkways and make their implementation mandatory: Ensure these guidelines are incorporated by all road building agencies.
- Harmonise existing laws for effective implementation: While relevant laws will have to be harmonised it will have to be combined with more direct legal protection of pedestrian space and rights.
- Need a comprehensive Road users act for targeted pedestrianisation; segregation of space by users; system of penalty to prevent encroachment in pedestrian space; prevent usurpation of pedestrian space for motorised traffic without proper justification.
- Urban local bodies must implement walkability audits of pedestrian ways
- Public transport plans must include pedestrian plan for multimodal integration.
- Need zero tolerance policy for accidents

PARKING

Use parking to restrain car use

Parking policy has been included in the transportation reform agenda linked with the JNNURM funding for buses in cities. As this reform process is expected to meet the goals of the National Urban Transport Policy (NUTP) the principle of restraint on personal vehicle usage becomes an important focus. The NUTP has very clearly stated that the parking pricing should be linked to the value of the urban land that the vehicles occupy to promote alternatives like public transport.

Parking demand is insatiable and more parking spaces will only induce more car ownership and usage. Therefore, design parking policy in a way that it reduces parking demand and car usage. Parking spaces can be capped, priced high and parking revenue can be used to build public transport.

But clearly, in many cities parking regulations are being designed to only supply more parking spaces. Huge amount of investments are getting tied with the multi-level car parking.

Hyderabad represents this dilemma. It has not yet adopted the restraint principle. Building bye laws aim to create huge parking capacity. In commercial complexes the parking provision can be as high as 66 percent of the total built up area. In many parts parking is free. Even tax concessions are available for providing more parking. Policy and public understanding will have to be deepened about using parking policy to limit the demand for parking.



- **Close to 29 per cent of the road length in Hyderabad is used for parking whereas the same in Delhi is 14 per cent. There is huge pressure of on-street parking.**
- **On street parking causes congestion and erode public spaces. Hyderabad has one of the worst on-street parking interference index according to the Wilbur Smith report.**
- **More than 60 per cent of the built up area in shopping malls, multiplexes and IT buildings are reserved for parking, about 30-40 per cent in commercial buildings. Other opportunity costs and other uses of the same space are ignored.**
- **In Hyderabad new registered vehicles daily create additional demand for land for parking nearly equal to about 100 football fields. How can the land constrained city continue to meet such insatiable demand?**
- **Equity demands use of urban space for other community uses – affordable and low cost housing, schools and of larger community interest. Locking up valuable and scarce urban space for parking hurts the urban majority and also adds to congestion and pollution. Other governments are using parking policy for air pollution control and mobility management.**

PARKING POLICY FOR LIVEABILITY

In most cities parking policy is expected to satisfy the growing demand for parking spaces as vehicle numbers grow. But this wisdom is not accepted any more. There is a growing realization that the parking policy has the potential to help address the mobility crisis in which personal vehicles are steadily edging out public transport buses, cycle and walking, and occupying more road space for carrying much lesser number of travel trips. Congested roads are causing unacceptable delays, fuel wastage and pollution.

With the help of parking policy it is possible to arrest and reverse these unsustainable trends. This can work well in Indian cities where public transport, cycling and walking still carry more than half of all daily commuting trips. Cars may be choking our cities. But a substantial part of daily commuting is by buses, on foot and pedal. This is the strength that the Indian cities need to build on.

But this will be possible only if additional measures are taken to encourage people to shift from personal modes to public transport and non-motorised transport and reduce their dependence on cars. Parking management offers that opportunity as well as to reduce traffic chaos.

Parking demand is insatiable, it entails enormous cost and uncontrolled parking supply encourages more car dependency. Cars are aggressively encroaching upon the scarce and limited urban space that can have other and more important uses. In Hyderabad the additional demand for land for parking of new vehicles registered daily is nearly equal to about 100 football fields. Close to 29 per cent of the road length in Hyderabad is used for parking whereas the same in Delhi is 14 percent (see Graph 29: On - street parking on major road corridors). There is huge pressure of on-street parking that causes congestion and erodes public spaces. Hyderabad has one of the worst on-street parking interference index according to the Wilbur Smith report. Can any city afford this? But it is possible to influence and reduce parking demand with parking pricing, stringent enforcement, parking controls etc.

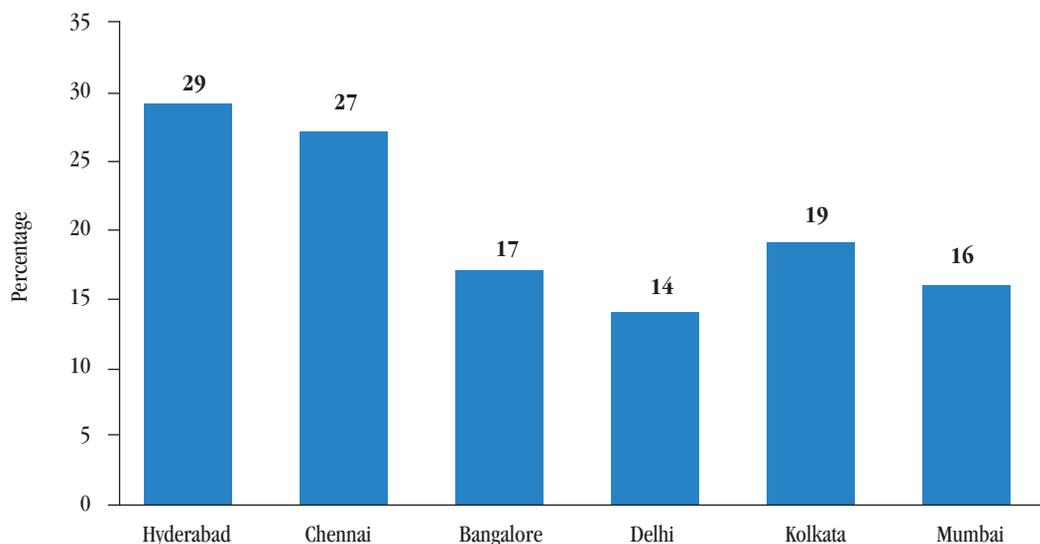
There is a huge hidden subsidy for car owners. Use of valuable urban space is offered for parking either free or for a pittance. This perpetrates hidden subsidy to car owners as the cost of using up scarce and valuable urban space for parking are not recovered through proper pricing and taxes. There are other opportunity costs of parking spaces. The subsidy to the car will work out to be even higher if the rental or the land cost of the parking space is considered. Increased investments in expensive multistoried structured car parks in prime areas will further enhance the subsidy as the parking rates are not expected to recover this cost. If pegged to the recovery of the capital cost of multi-level car parks parking charges should be as much as Rs 39-40 per hour. But the multi level parking charges in Delhi is only Rs 10 per hour.

The pressure on urban space for parking has also raised concerns regarding equity issues related to urban land-use. More land is allotted for one car slot while building a multilevel parking structure than to a low cost housing scheme for poor people. A city can never have enough land for parking and the same land will have other and more important essential uses. Disproportionately high share of urban land is devoted to cater to the parking needs for handful of people.



Graph 29: On -street parking on major road corridors

In Hyderabad 29 per cent of road length is used for parking – one of the highest amongst metro cities



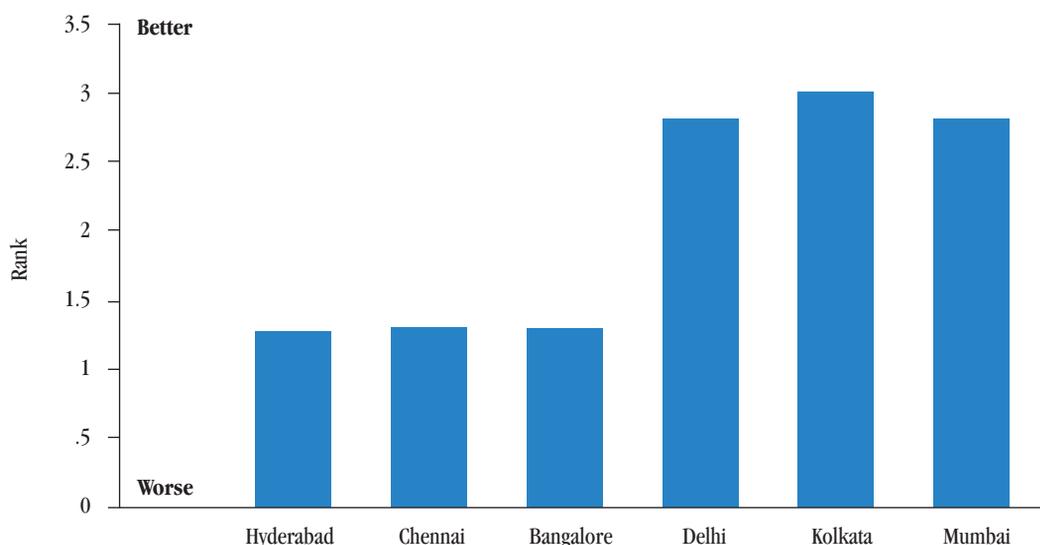
Source: MOUD Report

The Wilbur Smith study for the Ministry of Urban Development has estimated one of the worst on-street parking interference index for Hyderabad (See Graph 30: Onstreet parking interference index).

Locked up in infinite supply of parking spaces: The parking policy in Hyderabad is currently designed to meet the infinite demand and not reduce the demand. It has not yet adopted the principle of NUTP (See box Parking principles in National Urban Transport Policy).

Graph 30: Onstreet parking interference index

Hyderabad has high on-street parking which causes congestion and eats away public space for walking, cycling



Source: MOUD

NATIONAL URBAN TRANSPORT POLICY: A REALITY CHECK

The National Urban Transport Policy (NUTP) is the first attempt at the national level to reorient the goal of parking policy. The NUTP has laid down some key principles:

- Land is valuable in all urban areas. Parking places occupy a large part of such land. This should be recognized in determining the principle of parking space.
- Levy high parking fee that represents value of land occupied
- This should be used as a means to make use of public transport and make it more attractive. Graded parking fee should recover the cost of the land.
- Public transport vehicles and non-motorised modes of transport should be given preference in the parking space allocation. This along with easier access of work places to and from such parking spaces can encourage the use of sustainable transport
- Park and ride facilities for bicycle users with convenient interchange are a useful measure.
- Multilevel parking complexes should be made a mandatory requirement in city centres that have several high-rise commercial complexes through public-private partnerships. Encourage electronic metering so that there is better realization of parking fees to make the

investments viable and also a better recovery of the cost.

- In residential areas also, byelaws need changes to free the public carriageway from parked vehicles impeding the smooth flow of traffic. Make provisions in the appropriate legislation to prevent the use of right of way on road systems for parking purposes.

But there is also a contradiction in the NUTP that creates the loophole for more supply oriented approach. The NUTP also asks the state governments to award building byelaws in all million plus cities so that adequate parking space is available for all residents, that the FAR laws are made more liberal and multi level parking be made mandatory in cities. The JNNURM funding is tied to parking infrastructure. Thus, it treats parking as an essential infrastructure that must service all buildings and ties public infrastructure funding with it. If this is not linked with the rest of the principles it can only induce more parking demand and car usage defeating the overall principles of NUTP. But JNNURM has also included parking policy in the reform package for the transport sector. This makes reiteration of the NUTP principles essential – that have codified the travel demand management principles.

Hyderabad has revised its building bye laws to allow massive expansion of parking spaces. It has laid down the requirement according to building usage. It requires a minimum percentage of total build up area to be provided as parking area. For residential and institutional buildings 30 percent and 20 percent of the built up area are required to be set aside for parking; 40 percent and 30 percent in commercial buildings, and 60 percent and 50 percent for shopping malls, multiplex complexes and IT buildings. Several parking lots have also been allotted to parties to manage the parking places in GHMC area.

In addition to this a range of fiscal and tax incentives are being offered for encouraging parking construction. These include Transferable Development Right; Set-backs relaxation of 50 percent of the required on 3 sides set-backs other than front side; Exemption from fee and other charges; Moratorium on property tax for 5 years and after 5 years property tax to be levied at lowest slab.

In the commercial vehicle segment the city administration provides parking for trucks at 7 locations and for contract carriage buses lots have earmarked.

There is some focus on on-street enforcement. According to the available data the Hyderabad Traffic Police have booked 172,466 cases in 2009 and 46,912 cases in the 2010 till March for wrongly parked vehicles. As of October 2010 there were 159 Roadside parking lots in the jurisdiction of GHMC categorized into High and Low intensity parking lots. The city government is also studying the feasibility of vertical parking in the city.

One important move is to prepare plans to make the old city pedestrian friendly by supporting the infrastructure and reducing the vehicular



activity. But this Charminar pedestrainisation project is going on a slow pace.

Parking strategy will have to be completely overhauled. Public response to parking policy as a demand management tool is still very lukewarm because its benefits for both car owners and non-car users as well as for city environment are not well understood. Parking if managed well can also dampen the demand for parking and restrain car usage. These benefits need to be explicitly identified. Parking policy will have to integrate the key demand management principles that include — disincentivise personal vehicle usage, especially during peak hours; promote public transport, para-transit and non-motorised modes; limit parking space and use priced parking to reduce demand for parking and vehicle usage; and tap parking revenue for creation of dedicated transport funds; instead of allowing each building to have minimum parking spaces allow limited but common, shared, and public parking on a city-wide basis.

However, public support for this strategy can get stronger if people understand the benefits.

- **Benefits to the vehicle user — reduces traffic chaos:** Car users can have more reliable and predictable advance information about availability of parking spaces that can reduce cruising time. Efficient billing makes payment more transparent and accurate. If short term parking is managed well then the chances of finding a space for quick errands improves and reduces waiting and cruising time as well as fuel spent on cruising. This decreases traffic chaos due to indiscriminate on-street parking. Smoother parking also reduces social tension, road rage and law and order incidences. Many people have been injured over parking scuffle in Delhi.
- **Benefits to non-car user:** Well managed parking will help to protect footpaths and allow barrier free walking, frees up public spaces for cycle tracks, rickshaw parking, autoriskshaw-parking, play grounds and also improves access to bus-stops. Improve safety of children, women and elderly people. Well managed common parking can make it easier for emergency vehicles like ambulances, fire trucks, police, etc. to reach all homes/ offices/ buildings. Removal of cars from the shopping frontage improves visibility and access to shops for more customers, improves shopping experience, and increases throughput of customers. Walkable neighbourhood fosters mixed use, improves overall environment, green areas and public recreational spaces.
- **Environmental Benefits:** Paid and restricted but well managed parking can reduce car use/ dependency which can reduce air pollution and congestion in the city. Air pollution is already taking heavy toll due to respiratory diseases like asthma, cardiac problems. Long term exposure to high air pollution levels can lead to increased occurrence of cancers. Noise level lead to stress and disease. Global experience shows that when parking policy is designed as a travel demand management it reduces car usage and therefore congestion, air emissions as well as fuel use. Boston froze the parking requirements in the city at a level that is only 10 per cent higher than the parking requirement level that existed in 1973. This helped Boston to control car usage and meet the federal clean air standards. In New York very high parking fees and limited parking supply have lowered car ownership far below the average rates in other US cities and reduced air pollution. Portland, Oregon has set an overall cap of parking spaces downtown. This has increased public transport usage from 20-25 per cent in the 1970s to 48 per cent in mid 1990s.

The parking agenda should focus on the following:

- **Limit parking infrastructure to augment public transport:** World over it is recognised that demand for parking is infinite and any amount of supply cannot meet this demand if additional measures are not implemented to control car growth and usage and also use parking lever itself to control the demand. Hong Kong and Tokyo have more restricted car infrastructure in terms of wide roads and parking facilities. Even though Tokyo has one of the highest car ownership in Asia – 350 cars per 1000 people the share of car trips in Tokyo is 29 per cent – much less than Singapore. The lowest share of car trips is in Hong Kong – only 11 per cent – even less than Delhi. Despite high car ownership Tokyo provides less parking slots – only 0.5 slots per 100 sq meters in commercial buildings. But Delhi with 85 cars per 1000 people provides 2-3 parking slots per 100 sq meters. Hyderabad has even lesser number of cars. Tokyo has also invested in public transport instead of car centric infrastructure. Let us learn too.
- **Eliminate free parking for motorized vehicles. Free parking should be allowed only to non-motorised transport.** Parking rates should be higher for bigger cars and SUVs.
- **Introduce variable parking rates** according to peak hour, duration of stay etc. The intelligent parking system through card readers which automatically note down the check-in and check-out timings of the vehicles at the parking lots and deduct the charges from the pre-paid cards cash balance for the used time has been found to be yielding good results and resultant parking discipline has considerably improved. However it should be coupled with high charges so that people prefer to visit commercial areas in public transport.
- **The parking charges in multilevel parking should be linked to the actual cost of providing the parking.** Car parking should not be subsidized. Estimates from Delhi show that the cost of providing parking in multi level parking is nearly Rs 4 lakh to 6 lakh per car space. This translates into a parking fee of at least Rs 30-39 per hour. But people have got used to paying paltry for using high cost services. The existing policy perpetrates hidden subsidy to rich car owners as the cost of using up scarce and valuable urban space for parking are not recovered through proper pricing and taxes. Worldwide experience shows that appropriately priced parking can influence demand for parking and commuter choice for alternatives.
- **Integrate parking with multi-modal integration and transit oriented development.** Promote park and ride and park and walk.
- **Manage on-street parking efficiently** to avoid traffic chaos and congestion.



FISCAL SOLUTIONS

Tax the bad to fund the good

Financing public transport is the most contentious issue as cost recoveries are a challenge. A great part of the public transport is state funded. But public transport suffers as it figures low on state priorities and budgetary allocation remains constrained.

Though private sector funding has begun on a cost sharing basis there is barely any strategic planning to enable the projects to remain remunerative while meeting the social objectives.

Subsidy burden is enormous and this gets further enhanced due to operational and management inefficiencies.

An efficient revenue neutral funding framework is needed. To address this a dedicated urban transport fund has been recommended under JNNURM reform. Revenue streams have been identified for this fundt. Hyderabad has created a Metropolitan Development Fund.

City governments are looking at both conventional revenue sources like vehicle taxation, advertisement policy, and parking policy and also at non-conventional sources like land value capture. This will have to be guided with good principles.

Cities would need to minimize taxes on bus transport. Hyderabad has taken steps to introduce green tax on older vehicles. It also has a tax incentive programem for cleaner technologies.

Taxing the bad to subsidise the good based on polluter pay principle have to the guiding principles for fiscal management.



- **Like many other cities Hyderabad taxes buses higher than cars. Cars and two-wheelers pay lifetime tax of 9 per cent of the cost of the vehicle. But a bus pays 5 percent of the gross traffic earnings every year.**
- **Studies carried out by the Hyderabad Administrative Staff College have shown that the tax incidence on buses is so high that it makes two-wheeler ridership a lot cheaper than bus. This has serious implications as the tax distortion and the bus fares can easily shift sizeable trips to two-wheelers.**
- **Hyderabad has created Metropolitan Development Fund with a seed capital of Rs 200 crore and a revolving fund of Rs 100 crore under the enactment. This is an important step forward.**
- **Green tax is a unique strategy in Hyderabad. The taxes on commercial vehicles that are more than 7 year old and personal vehicles that are more than 15 year old are higher. But LPG, CNG and battery operated vehicles are exempt from the tax.**
- **The city will have to work on innovative financing strategies to meet the cost of the make over.**

FUNDING THE TRANSITION

The City Development Plan of Hyderabad in its vision for traffic and transportation has set the target for increasing the share of public transport to 75 percent by 2021. (Table 4: CDP: setting goals for Hyderabad). This certainly is challenging given the experience in many other cities that are planning a significant revamp. Funding this transition will be critical.

Table 4: CDP: setting goals for Hyderabad

Vision indicators	2005-06	2011	2015	2021
Road network as a percentage of % of total area	9%	12%	15%	15%
Share of public transport	42%	45%	55%	75%
Rail transport as share of total public transport	2%	10%	30%	40%
Average speed in km per hour	12	20	30	35
Sidewalks length to total road length	25%	Half of the requirement	75% of the requirement	95% of the requirement
Usage of alternative fuels	5%	40%	60%	60%
Road accidents	Not known	Reduced by 25%	Reduced by 50%	Reduced by 70%

Source: Hyderabad – City Development Plan

Cities have begun to look at different funding approaches. The first gen strategies include the conventional sources that include rationalized budgetary allocation, vehicle and fuel tax rationalization, tapping of parking and advertisement revenues and so on. The next steps are non-conventional non-budget sources that include land value capture along the transit corridors, betterment levies, travel demand management strategies like congestion pricing etc.

Rationalisation of the existing tax structure will be of immediate interest. Tax burden on bus transport will have to be reduced to cut both capital and operational costs of buses. But unfortunately, in most of our cities buses have to shoulder higher tax burden than cars. A cursory review of existing transportation taxes in most cities show severe distortions. While private cars pay a miniscule amount as road tax, buses pay several times more. But cars carry disproportionately lower number of daily commuting trips in comparison to higher road space they occupy, and cause more pollution per passenger. While tax burden on buses should be lowered and that on personal cars should be increased.

A cursory estimate of road taxes paid by different modes of vehicles indicate that buses pay much higher taxes than the private vehicles. In Hyderabad for cars and two wheelers the lifetime tax is 9 per cent of the cost of the vehicle. For buses the tax rates is 5 per cent of the gross traffic earnings in the city every year. The taxes on cars if amortised over lifetime, a car costing Rs 4 lakhs pays Rs 2,400 as tax but buses pay annually – which is much higher than that of cars. The earnings data for APSRTC Hyderabad City Region of July 2010 indicates that a bus earned about Rs 5,258 per day and the total earnings for July 2010 is about Rs 56 crore. Therefore, total incidence of taxes on buses can be substantial.



Hyderabad based Administrative Staff College of India has studied the cost of tax incidence for different modes. According to the study cited in *Integrated Environmental Strategies Study for City of Hyderabad, India (2005)* a scooter owner pays 19 paise (ps) per trip and a car owner pays about 45ps per trip and a passenger traveling by a three wheeler auto pays less than 1ps per trip as road tax. A seven seater auto pays 4 ps. But a bus passenger pays 48ps as road tax per trip. Hence the passenger traveling by buses pays more taxes than a passenger traveling by a two wheeler or car. It has resulted in two-wheeler travel becoming cheaper than bus travel and hence significant increase in two-wheeler population. The IES report indicates that APSRTC paid about Rs. 470 per bus per day as taxes. Comparison with other state undertakings also shows that the taxes in Andhra Pradesh are very high for buses as compared to other states except Maharashtra.

Bus is treated as a commercial operation and therefore taxed higher. The tax policy does not acknowledge bus as a public service.

Green tax: Hyderabad has begun to reform its tax policy to meet environmental objectives though this is in a very nascent stage. The Andhra Pradesh government in November 2006 introduced additional tax on older vehicles perhaps as a strategy for fleet renewal. Commercial vehicles that are more than 7 year old pay Rs 200 per annum. Personal vehicles that have completed 15 years of age from the date of their registration pay a different rate – two-wheelers pay Rs 250 for five years, and others Rs 500 for five years. However the vehicles running on LPG, CNG, battery or solar power are exempted from green tax. Intention is good but the tax rates are low.

In order to promote alternate fuels and technologies, the Andhra Pradesh Motor Vehicles Taxation Act, 1963 provides for exemption of motor vehicles tax for a period of 5 years from the date of registration of motor vehicles using CNG, battery and solar power.

Most of these measures have been introduced recently. It is therefore, not yet possible to assess the impact of these schemes. Implementation of these schemes should be publicized adequately to make the target groups aware and to encourage them to avail of the benefits. It is also important to monitor the impact from time to time to assess if the schemes are making the desired impact.

Urban transport funds: Based on the principle of National Urban Transport Policy the JNNURM reform agenda now requires cities to form Urban Transport Fund created from different revenue streams. Hyderabad has taken the lead to create Metropolitan Development Fund, with a seed capital of Rs 200 crores and a revolving fund of Rs 100 crores has been created under the enactment itself. There are provisions for creation of a fund for UMTA for research, studies and training in the field of traffic and transportation. Expediting pooling for the transport fund is needed to support public transportation investments in city. This is an important step forward.

This will be an opportunity to rationalize many of the existing taxes on vehicles and fuels, parking, advertisement to augment and tap to create this dedicated fund. Such rationalization will have to be driven by the principle of travel demand management. There are examples from other cities. Delhi has imposed an environment cess on diesel fuel to create Air Ambience Fund to fund pollution control efforts and increased taxes on diesel cars. Surat has already created a dedicated urban transport fund partly through budgetary allocation and the rest is to come from parking revenue, property tax, etc.

As per the mandate of the JNNURM reform package cities will now increasingly looking at the non-conventional funding sources that primarily

include land value capture and land-use densification through enhanced property taxes, betterment levies or purchase of land development rights etc. This essentially means that building byelaws will be liberalized in cities along the new transit corridors where a metro or a BRT line will be executed. The objective is to gain from the enhanced property value along the corridor and use part of it to plough back for public transport investments. Make the beneficiaries pay for the public transport improvement. This will be linked with the transit oriented development strategies. This has an enormous potential to mobilize resources.

Capturing of land value gains for public investment and capital financing is a new area of financing in Indian cities. But this has risks if proper regulatory safeguards are not built into a composite policy for transit oriented development. Increased values and land speculation can potentially stifle development of affordable or mixed-income housing projects along transit corridors. Developers may prefer higher income households. This has the risk of urban transportation projects becoming heavily dependent on the real estate development without meeting the objectives of transit oriented development that must ensure higher usage of public transport.

For such funding strategies cities need to adopt policy with clear targets and safeguards. The policy should set a target for densification to bring more people close to the transit corridor, ensure a certain share of affordable and low cost housing, and enforcement of travel demand management including limits on parking provisions etc to make people use public transport. Therefore, regulations and safeguards must attach primacy to the public transport usage, densification and equity.

Cities should therefore frame inclusionary zoning regulations that will require that all new housing developments to include a portion of units as affordable housing. Also strong TDM measures should be in place before these strategies are enforced to increase public transport ridership. Zonal regulations and its stringent implementation should be made contingent to land based financing.



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