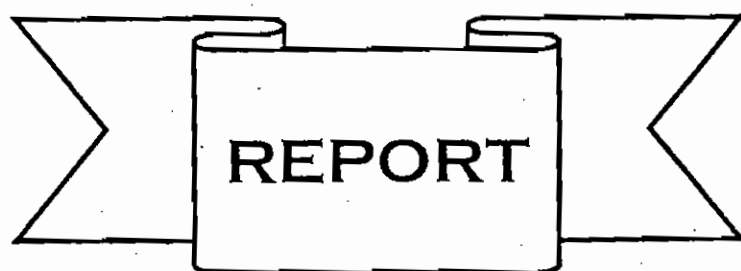


**Working Group on Urban Transport
including Mass Rapid Transport System
for
Eleventh Five Year Plan
(2007-2012)**



**Ministry of Urban Development
Government of India**

October, 2006

Report of the Working Group for the 11th Five Year Plan on Urban Transport Including MRTS

Introduction

The Planning Commission set up a working group on urban transport including MRTS, in the context of the 11th five year plan, with the following terms of reference:

1. To estimate the transport needs, not only for the current urban population of cities but also for the needs of those who are yet to join the urban population.
2. (i) To suggest measures so as to ensure that appropriate comprehensive city development plans with integrated traffic and transportation plans are prepared under the Jawaharlal Nehru National Urban Renewal Mission for each city with integration of land use planning and transportation plans, and
(ii) To make recommendations as to the manner in which all available public transport technologies may be evaluated and the mix of modes and technologies that best suit local condition for each city should be selected.
3. To review the policies, performance of various schemes and programs in Urban Transport including MRTS, externally aided projects during Tenth Plan with particular reference to the achievements of the prescribed objectives, targets and to point out the shortcomings.
4. To suggest necessary modifications in the schemes, if any, required for better implementation.
5. To suggest a pricing policy for public transport which may, inter alia, include suggestions on who should pay for public transport and in what proportion.
6. To suggest a mechanism for common ticketing across various modes of public transport and also a mechanism for revenue sharing between various operators.
7. To suggest objectives, policies, strategies and programs for the improvement of urban transport during the Eleventh Five Year Plan period.
8. To make realistic estimates of outlays required for achieving the desired goals and objectives and targets set for the Eleventh Plan.
9. To suggest financing mechanisms which may, inter alia, include using land as a resource and also levy of dedicated taxes.
10. To estimate requirements for O&M; to suggest how fees can be collected without interrupting flow of traffic.
11. To consider and make recommendations regarding implementation of projects through PPP/BOT mode.

12. To suggest how cities should have urban road systems and adequate bus services; low national norms for urban roads (and storm drains) can be stipulated so as to avoid flooding; how dedicated bus ways can be planned and implemented.
13. To propose standards and bench marks for appraisal of future proposals and also to propose threshold level for population of a city, when planning for Mass Transit Systems should start.
14. To review the measures for suitable bye passes, ring roads, flyovers, as also for truck terminals outside city limits; to suggest policies for preparation of road maps for towns with heavy traffic particularly those with links to national highways and having inadequate provision for appropriate link with State highways.
15. To suggest policies for setting up of unified metropolitan transport authorities in all million plus cities to facilitate more coordinated planning and implementation of urban transport programmes and projects.
16. To suggest measures to use cleaner technologies, to have a time bound schedule of progressively tighter emission norms so that pollution levels are kept within the permissible limits.
17. (a) To suggest policies for building bye laws so that adequate parking space is available for all residents/users of buildings
(b) to suggest policies for parking complexes (including multi-level complexes) and
(c) to suggest legal provisions to be made in appropriate legislation to prevent the use of the right of way on road systems for parking purposes.
18. To suggest what measures require to be taken for capacity building at ULB, State and National levels.
19. To examine and make recommendations regarding all other matters relevant and incidental to the above terms of reference.

A copy of the orders constituting the working group, along with the composition of the working group, is enclosed at Annexure – I.

The working group held its first meeting on 7th June 2006 and decided to constitute sub-groups to examine the following sub-themes:

- Future perspectives and planning
- Technology issues
- Engineering Issues
- Financing issues
- Legal / Administrative / Regulatory issues
- Capacity building and awareness building issues

This report is based on the reports of the different sub-groups and the discussions held subsequently in the working group. Its recommendations cover all the terms of reference though the sequencing of the terms has been altered slightly, wherever needed, so as to bring about a logical flow to the structure of the report as well as allow a better clustering of the terms of reference into broader sub-themes. The report starts with a brief explanation of the context before moving on to the specific recommendations.

The context

India is one of the emerging economies in the world with roughly 60% of the country's GDP coming from the urban areas. If cities are to be the engines of future growth, transportation systems have to be their lifeline. If the cities are to be competitive, they must provide efficient access and mobility to citizens. This, is unfortunately getting threatened.

- Increasing urban population coupled with increased economic activities and increased city size has led to a rapid growth in the urban travel demand. Unfortunately, the increased travel demand has resulted in some undesirable consequences. The most important of these has been a rapid growth in the number of motor vehicles. In the six major metropolises of India this has far outpaced the population growth. Although, on an average, the population of India's six major metropolises increased by 1.89 times during 1981 to 2001, the number of registered vehicles went up by 7.75 times during the same period. Thus the growth of motor vehicles was almost four times faster than the growth of population. An associated problem has been the declining share of public transport vehicles, with considerably enhanced reliance on the personal motor vehicle. This has led to serious costs in the form of travel delays and loss of productivity. Non-motorized transport seems to have lost its earlier importance in the larger metropolises. Studies¹ show that the share of bicycle trips of the total trips in Delhi has declined from 17% in 1981 to 7% in 1994. This is perhaps due to increasing trip lengths and the increasing affordability of motorized personal vehicles. Yet another factor is that non-motorized modes are exposed to greater risk of accidents as they share a common right of way with motorized vehicles. Statistics² show that 57% of the road accident fatalities in Delhi involve cyclists and pedestrians. Thus, not only do longer trip lengths make cycling extremely difficult, non-motorized modes are also exposed to greater risk of accidents. Moreover, cycling to work or using a cycle rickshaw tends to be shunned as it symbolizes a low economic status in society.
- There have also been problems of deteriorating air quality due to automobile exhausts and an increased incidence of road accidents. The increased consumption of petroleum fuels also impacts India's energy security.

While these are the problems of today, the urban population is projected to double in the next 25 years, thus making the problem even more worrying. In fact travel demand is often linked

1 Mohan, Dinesh and Tiwari, Geetam, *Sustainable Transport Systems: Linkages between Environmental Issues, Public Transport, Non-motorized transport and safety*, EPW, June 1999

2 Delhi Traffic Police, *Road Accidents in Delhi, 2001*

to the growth in the economy more than to the growth in population. Since economic growth is taking place at an even faster pace, clearly, proactive measures are needed to deal with the emerging situation..

- In the light of these trends the Government of India has announced a National Urban Transport Policy in April 2006. The policy focuses on the need to “Move people – Not vehicles”. It seeks to do this by encouraging improvements in public transport and facilities for the use of non-motorised modes. It suggests greater involvement of the private sector and innovative financing mechanisms to enhance efficiency and reduce the impact on the public budget. It seeks to reduce travel demand by encouraging a better integration of land use and transport planning.
- It seeks to encourage the use of cleaner technologies. It seeks to create better awareness amongst the people so that there is support for the initiatives that need to be taken and also for some of the compromises that people may need to make. It emphasizes the need to build capacity to undertake good urban transport planning, both at the institutional and individual level.

It is in this context that the terms of reference for this working group have been formulated. We now move on to the suggestions of the working group on the various terms of reference.

To estimate the transport needs, not only for the current urban population of cities but also for the needs of those who are yet to join the urban population.

India's population rose from 350 million at the time of independence in 1947 to 1027 million by 2001. The projections are that it would go up to 1.4 Billion by 2026. This increase would be accompanied by large scale transformation in the rural-urban composition of the population. India' urbanization is 28% (2001) and is expected to reach a level of 34 % by 2021 and 38.2% by 2026. By 2026 a minimum of 5 states will be predominantly urban with Tamil Nadu leading the list of states with over 75% of its population expected to reside in urban areas. The accelerated urbanization and the occupational shift coupled with the increased economic activities would have significant impact on travel demand.

The current urban population is spread over 4378 cities. Of the total urban population of about 279 million in 2001, over 60% (about 172 million) lived in Class I cities (having a population of more than 100,000). Nearly 63% of the Class I city population (about 108 million) lived in the 35 million-plus cities (about 39% of total urban population). Three-cities have a population of more than 10 million. Four others cities have crossed the four million mark. Amongst the mega-cities, the top three – Greater Mumbai, Kolkata and Delhi – accommodated over 65% (about 42 million) of the mega-city population (about 15% of the total urban population).

Historically Indian cities are relatively high density and mixed land use cities which are conducive for high public transit use. However, due to inadequacies in planning and land-use management, and lopsided industrial location policies, cities are beginning to experience rampant urban sprawl greatly increasing trip lengths for some and in turn forcing excessive reliance on personalized vehicles, mainly cars. Managing urban expansion is a critical element towards achieving the goals set by the National Urban Transport Policy. This is even more critical as most of cities are expected to double in size within the next 2-3 decades.

Transportation "needs" cannot be considered an independent variable. The needs are greatly influenced by urban form and access policies. Table 1 below shows mobility patterns in 8 high income cities.³ These data show the tremendous variation in car use, distances traveled, public transport use at similar levels of income. It has been shown that people may use different modes and technologies, public or personal transport, but the daily average motorised travel time varies relatively little. The travel time for all modes, including journeys by foot and by bicycle, differ little as everyone has the same time constraints – twenty four hours with 8-10 hours work day. In low-density cities which are car dominated and have high road space, car owners travel long distances relatively fast, but have high travel times (Houston and Melbourne in Table 2). It is difficult to establish efficient public transport systems in such cities. Those who do not have cars, cannot get to work easily and can get excluded from economic activities. On the other hand, those cities that have a dense settlement pattern, tend to be more public transport friendly and more citizens use non-motorized forms of transport (Tokyo, Singapore and Hong Kong in Table2).

Table 1. Mobility patterns in high income cities (Source: Jean Vivier, 2001)

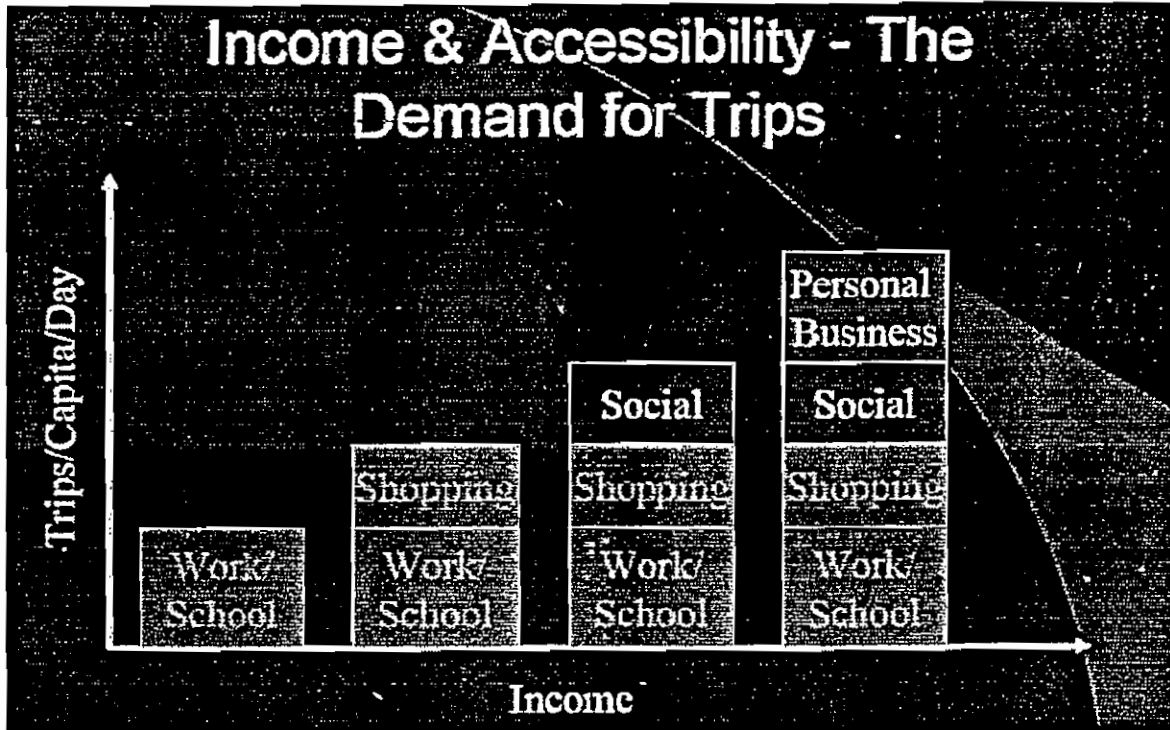
Cities	Motorised mobility (all modes) Km /year/ person	Motorised mobility (Private) km /year/ person	Daily motorized travel time, minutes	Share of the journeys by foot, bicycle and public transport, percent	Density persons/ha
Houston	25,400	25,600	90	5	9
Melbourne	12,100	13,100	70	26	14
London	5,600	7,700	60	51	59
Paris	5,500	7,300	50	56	48
Munich	6,300	8,900	60	60	56
Tokyo	4,300	9,900	70	68	88
Singapore	4,700	7,900	60	48	94
Hong Kong	1,300	5,000	50	82	320

These world wide experiences tell us that access needs (as opposed to mobility patterns) remain similar across cities of different sizes and populations. Basically, during the peak period, every worker and student needs to undertake one trip to get to work or to school/college and another trip back. Figure below shows the relationship between income and demand for trips. As is obvious, the demand for trips changes with income, but the compulsory trips – work and school - remain

3 Jean Vivier (2001) Mobility and Accessibility: Complementary or Contradictory Objectives? *Public Transport International*, 5:4-10.

the same. Therefore, the total number of trips during the peak hour – if limited to work and school – does not increase with increasing incomes. However, with increasing incomes, heavy traffic will be observed over larger parts of the day to accommodate for discretionary trips.

Since transport needs have to be worked out for the peak period, one can say that needs do not change per person over time. What may change are modal shares – and this can be influenced by policy. Since the travel budget remains same for most people, majority trip distances change not so by change in city size, but by change of mode. In most cities of the world, majority of trip distances are less than 10 km. In India, a majority of trip distances are still less than 5 km.⁴



In urban India, over 75% of the trips are on account of employment and education and per capita trip rates range from 0.72 to 1.79⁵. The travel modes include walk, cycles, cars, 2-wheelers, para-transit, etc. 30% of the total trips are undertaken by walk and the share tends to reduce with increasing city size and simultaneously, the share of trips by public transport goes up significantly.

A study carried out by RITES⁶ had estimated that while the intra-city travel demand in 1994 was 759 million pkm per day, it would go up to 2511.23 million pkm / day in 2021. The growth projected in this study, in terms of total number of trips, is shown in Table 2. The growth projected by the study for different categories of cities is as given in Table 3.

4 Baker, J. et al (2004) Urban Poverty and Transport: The Case of Mumbai. The World Bank.
 5 Assessment by the Ministry of Urban Development (Through RITES) covering 21 cities. The share of work trips ranged from 33% in Udaipur (Rajasthan) to 77% in Tiruppur (Tamil Nadu). Similarly, the share of education related trips ranged from 13% in Tiruppur to 40% in Rourkela (Orissa). Recent surveys from Ahmedabad recorded even a higher trip rate (1.9 total and 1.1 vehicular trips per person per day).
 6 RITES, 1988. *Traffic and Transportation Policies and Strategies in Urban Areas in India*

Table 2 Projected number of trips in 2021 compared to 1994

Year	1994	2021
Trips (million)	183	614
Vehicular trips (million)	126	430

Table 3 Projected travel demand for different categories of cities (in passenger-kms)

Class of city	1994	2001	2021	Growth (2021/1994)
A	103.9	149.43	453.25	4.36
B	75.89	90.43	309.57	4.08
C	109.20	148.66	227.23	2.08
D	94.41	132.07	347.08	3.68
E	92.08	97.22	270.30	2.94
F	284.34	420.99	903.80	3.18
Total	759.00	1038.80	2511.23	3.31

Since these projections are based on a study carried out in the mid 1990's, another study has been commissioned by the Ministry of Urban Development to assess the extent to which the projections made in the RITES study have actually been realized and to make fresh projections based on changed trends that may be noticed. The results of this study would be available only after about a year and hence, for the present purpose, the projections made by RITES are being taken to hold.

ii) To suggest measures so as to ensure that appropriate comprehensive city development plans with integrated traffic and transportation plans are prepared under the Jawaharlal Nehru National Urban Renewal Mission for each city with integration of land use planning and transportation plans, and to make recommendations as to the manner in which all available public transport technologies may be evaluated and the mix of modes and technologies that best suit local condition for each city should be selected.

iii) The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) requires the "Mission" cities to prepare a Comprehensive City Development Plan (CCDP) as a-kind of vision document before it is able to access funds. The CCDP is also required to include a broad city investment plan that lists out the priority projects for the city. From the CCDPs received so far it is seen

that though a number of transport projects have been listed, there is no overall transport or mobility master plan. The projects seem to be more of a compilation of the requirements of individual agencies/departments rather than part of an overall mobility plan. This is perhaps due to the fact that multiple departments are responsible for urban transport and there is no single agency responsible for this. Road and bridge projects are proposed by the public works departments or State Road Development Corporations, bus transport systems by the transport departments and metro rail systems by the urban development departments. This is not a desirable state of affairs and needs to be corrected.

In order to get over this problem it is suggested that apart from the CDP, the city should also prepare an overall transportation/mobility plan. This should be an integrated transport and land use plan and should spell out the projected mobility needs as also the manner in which such mobility needs are proposed to be met. Only then will individual proposals fall into place within an overall plan. In this context the following need to be kept in mind:

- Motor vehicles have killed more than 20-30 million people and injured more than 500 million worldwide in the last one hundred years. This is not sustainable.
- Emissions will reduce significantly only if more people walk, bicycle and use public transport. This will be possible only if walking and bicycling is made much safer in our cities and the quality of public transport is improved..
- Cities will be aesthetic and humane only if streets include large numbers of people walking and playing safely. Streets must, therefore, be made safe from crime, disabled friendly and include public amenities like shops and restaurants (street vendors included), toilets, etc. These conditions can be fulfilled only if special attention is given to speed reducing measures along with street designs that facilitate traffic calming.
- Road safety in general and safety of vulnerable road users in particular has to be given as much importance as vehicle emissions for ensuring cleaner and more liveable cities. Road safety has to be included as a necessary condition for healthier life in cities. For sustainable transport policies it would be essential that Indian cities do not get locked into systems that encourage high speeds and greater use of personal car transport.

With increased emphasis on education the number of children traveling to school/college will go up faster than the population and measures to ensure their safe and sustainable travel must be planned for.

These proposals should not be corridor based but should be comprehensive mobility plans for the entire city.

Before the individual projects are considered, the overall transport plan should be appraised and approved.

Needless to add, the mission should support proposals that conform to the National Urban Transport Policy. Thus, proposals for well evaluated and meaningful public transport facilities and non-motorized modes should receive priority over road widening. It would be desirable for

Accidents
Emissions
Safety

school/college
Comprehensive
mobility plan

a clear set of instructions to be issued in this regard so that the cities are able to prepare proposals accordingly. It should be clearly spelt out that an integrated land use and transportation plan is a pre-requisite to receiving funds for any major urban transport projects.

Actions under such integrated transport plans could be categorized into multiple areas as given below:

Land-use interventions:

- Encourage "Transit Oriented Development" with high density areas at or close to public transport stations
- Either develop all future new / satellite townships / Emerging activity centres (SEZ) along the defined major transport corridors or integrate properly with mass transit system in the master plan itself
- Allow land use changes from time to time, (including for public/government uses) to enable efficiency in urban structure through market forces
- Discourage sprawl through introduction of vacant land tax and levy of "Transport Impact Fee" on developments in the periphery

Transport Sector Interventions

- Promote NMV by creating facilities for safe use of such modes and its integration with public transport systems NUTP
- Promote public transit systems that are more cost effective and able to meet the demand levels more optimally NUTP
- Encourage investments in premium bus systems (AC, Express, etc.) that persuade personal motor vehicle users to also shift to public transport NUTP
- Develop ring roads and city bypass roads as well as Rail Line Bypass
- Develop freight transport terminals outside city limits

Shift interstate bus terminals from the city center to the peripheries, with linkages to an intra-city bus service as Interstate bus terminals (IBTs) sometimes cause congestion in cities, but less than similar number of people using cars for inter city travel. Before deciding on the shifting of IBTs to the periphery of the city a proper origin destination survey of passengers may be done to assess the impact of the measure.

Institutional/Regulatory Interventions

- Modify the enabling legislations
- Establish fare policies and a fare regulator
- Implement fiscal measures that encourage use of public transport

ii) With regard to the public transport technologies, choice has been a matter of debate for quite some time. Arguments favoring the need for high capacity systems have generally been based on traffic forecasts that tend to be gross overestimates. While these systems, where ever they have been developed at a very high cost, provide high quality service for very few, the problems of congestion and basic accessibility remain. Riderships have been far short of projections and well within the carrying capacity much lower cost options. Excessive subsidies, both for capital and operations, extending over large number of towns would not be feasible within the resources available for the sector.

It must be remembered that the European and American cities that have extensive rail based public transport developed the same in the period 1900-1950, i.e. well before large scale private vehicle ownership became common. This resulted in the natural development of a Central Business District (CBD) which was fed by metro systems. Typically, cities like Tokyo, New York, Paris and London provided exceedingly large central business districts with more than 750,000 jobs. Virtually no other urbanized area in the developed world has a central business district with more that 400,000 jobs and most are in the range of 50,000 to 200,000. The massive central business district employment numbers and densities support a high degree of substitution by rail of automobile use that is not possible in smaller central business districts (because there is too little demand and it is too dispersed). The prerequisites for rail success are thus high residential population density and massive central business districts.⁷

According to the 2001 Census of India, the main workers in India constitute about 30-35 % of the population. Of these workers, a significant proportion (say about 30%) are self employed, daily wage labour, hawkers, etc. who are not likely to use any form of motorized transport. Therefore, workers as the potential motorized transport users would amount to about 20% of the population. This means, that a city to have a CBD to attract 750,000 trips by motorized means would need to have a population close to 4 million and all of them should be working in the CBD. As against this, in all the large Indian cities development is taking place on the periphery and the cities are poly-nuclear. Hence, there are few if any cities that will be able to feed very high capacity (>30,000 pphpd) mass transit systems.

It would, thus appear that the following criteria should be adopted in evaluating the mix of modes and technologies for public transport:

1. All proposed public transport systems must be financially viable, at least in their O&M costs without requiring substantial external subsidy. A subsidy, if necessary, must be met by taxation of local city residents (eg pollution tax, road tax, congestion charges, etc from private vehicle owners and transportation tax from employers) and not by diverting taxes paid by residents of other cities.
2. Technologies could be grade separated or at-grade. Most of them, like buses, light rail, etc. can be run either as grade separated systems or at grade systems. Though grade separated systems offer considerably higher carrying capacity, they are also several

7 Keys to Urban Rail Success. 2001 www.publicpurpose.com — Wendell Cox Consultancy.

times more expensive than at-grade systems. Hence, there needs to be a very special justification for use of the former showing that all possible options have been exhausted

3. EIA and safety audit must accompany all proposals and it must be shown that the system proposed can cover all major arteries of the city within a reasonable period.

To review the policies, performance of various schemes and programs in Urban Transport including MRTS, externally aided projects during Tenth Plan with particular reference to the achievements of the prescribed objectives, targets and to point out the shortcomings.

And

To suggest necessary modifications in the schemes, if any, required for better implementation.

At present, the Ministry of Urban Development is only implementing a scheme under which it provides support in the preparation of Detailed Project Reports and in the conduct of comprehensive traffic and transportation studies, to the extent of 40% of the cost. In addition, funds required for the Delhi Metro Rail Project, in the form of equity, and sub-ordinate debt are provided in the budget of the Ministry. A similar arrangement would be followed in respect of the Bangalore Metro Rail Project.

It is seen that although the scheme of providing 40% support in carrying out a traffic and transportation studies has resulted in many such studies being carried out, yet, these have not subsequently translated into a meaningful set of projects. Most DPRs funded under this scheme also appear to be in respect of projects that did not automatically flow from base line traffic and transportation studies, but were pre-decided projects for metro rail systems.

By and large, the following investments have been made in the past few years in an attempt to improve transport:

1. Construction of flyovers in a large number of cities
2. Widening of roads
3. Construction of MRTS in Delhi

The construction of flyovers and widening of roads have not produced the desired improvements in all locations. These policies have to be reviewed critically and best practices adopted taking into account the experience of cities considered "good" internationally.

The construction of flyovers and widening of roads has, unfortunately, also been accompanied by the removal/reduction of pedestrian facilities. Considering that India has very high pedestrian mortality rates, this practice must be stopped immediately. It must be mandatory to provide at least a minimum of a prescribed area for pedestrian and bicycle facilities on all arterial roads (say 4-5m combined in each direction)

The MRTS in Delhi is operating at about 20% of its projected capacity for December 2005 (4-5 lakh passengers per day vs. projection of 21.8 lakh passengers per day). The Kolkata MRTS is operating at 10% capacity. Therefore, the operating experience of metro rail systems in India should be taken into account in the proper planning and design of new systems.

It is also seen that there are considerable weaknesses in the proper planning of urban transport, which is a highly complex area. The skills and competencies required for urban transport planning are vastly different from those required for inter-city planning. Hence, a major capacity building initiative would be essential if meaningful proposals for improving urban mobility are to emerge from the State/city level authorities.

In the light of the above, the following suggestions are made for changes in the scheme for the purpose of the 11th Plan:

- 1) The existing scheme of providing 40% support may be continued, but with the condition that the State Governments would set up a mechanism to review their reports and translate base line studies into meaningful project proposals.
- 2) Proposals for preparation of Detailed Project Reports should be preceded by an open minded and professional evaluation, by technology neutral agencies, of alternative technology options before a specific technology is decided upon.
- 3) A comprehensive programme of capacity building should be formulated and implemented during the 11th Plan period. This should not only include capacity building of the human resource, but also of the Public Institutions/agencies that would be involved with urban transport. A programme of research and knowledge upgradation in urban transport, in the Indian context, should also be a part of this capacity building plan.

To suggest a pricing policy for public transport which may, inter alia, include suggestions on who should pay for public transport and in what proportion.

The basic question here is whether investments in mobility should be paid for by the direct users only or even by the indirect beneficiaries. Thus, should the users of the public transport system alone pay for the system or should car users and other city residents also pay a portion as indirect beneficiaries of reduced congestion and improved air quality. Similarly, should those who benefit from enhanced land value also pay for it, even if they do not use the public transport system? In this context, the NUTP suggests that in financing mass transit systems, the basic principle should be that the government should provide the infrastructure but users/commuters must pay for operating costs and the rolling stock. This implies that the infrastructure and capital investments should come from all beneficiaries, both direct and indirect, whereas the operations and maintenance expenses should come from direct beneficiaries.

At present a number of towns and cities in India, have a public bus service. However, the quality of service is not up to the mark and most citizens who can afford private transport prefer not to use the bus service. Since the poor, who do not have access to other modes of transport, usually use public transport, it would be advisable to render different type of service for different groups of people. Keeping this in mind, the NUTP envisages the use of different types of public transport services for different segments of commuters. According to the policy, ...those who place a premium on cost are the poorest sections of society and need to be given affordable prices. The cost for providing public transport for them needs to be subsidized by

other sections of society. However, there is another segment that values time saved and comfort more than price. This segment is comparatively better off and would shift to public transport if their quality expectations are met. The cost of providing transport service to them need not be subsidized and can be met from the fare revenues.....”

The following suggestions can also be made as guiding principles for the pricing of public transport:

- Fares should not be pegged at levels lower than that required to cover the operating costs as per established performance standards, unless this is done for very special reasons of “public good”. In such cases, where special fares or concessions are offered to any section of users as a measure of public good, the concerned departments/local bodies should compensate the operators. For example, the revenue loss as a result of concessions to students should be fully reimbursed by the Ministry of Education or any other concerned department.
- Fare structure should be balanced to avoid large distance slabs, which may be enhanced gradually along with increasing distance.
- Ordinary as well as concession tickets should be revised annually to partially meet the increases in operating cost. Steep fare hikes with time spans of 3 to 4 years creates strong public resentment.
- Tickets of public bus undertakings should be comparable to that of Metros or suburban trains, at least for average distance lead.

The NUTP recommends that to ensure fair and reasonable tariffs, the Central Government would require that a regulatory authority be set up by the State Government to, inter *alia*, regulate the prices to be charged by different types of public transport services. This recommendation needs to be implemented.

To suggest a mechanism for common ticketing across various modes of public transport and also a mechanism for revenue sharing between various operators.

Unlike in the case of inter-city transport systems, urban transport systems have to be well integrated and should provide seamless travel from origin to destination. Unless this is done, it would be difficult to attract users of personal motor vehicles to public transport. One of the methods of providing such seamless travel is to have a common ticket covering different modes of public transport. Such a ticket creates a psychological impression of easy transfer, particularly since it does not require multiple purchase of tickets and may also offer benefits of telescopic fares.

Thus, the benefits of common ticketing to the operators are reduced transactions and lower recurring costs. For the passengers it means a saving in time and greater convenience.

Unfortunately, despite these advantages, the system of common ticketing has not picked up in public transport systems in India.

A necessary condition for common ticketing across operators is the creation of a mechanism which allows a fair sharing of the revenues earned from such common tickets. If there is only a single service provider, sharing of revenue is not a problem. However, with multiple providers this is a complex task. Fortunately, advances in information technology provide us with an opportunity to enable such sharing across various operators and modes of public transport. However, an institutional mechanism is required for the single point collection of the revenue and its sharing. Indore has been a pioneer in this having set up the Indore City Transport Service Ltd. which arranges for the issue of common tickets and also for its sharing on a fair and agreed basis.

To suggest objectives, policies, strategies and programs for the improvement of urban transport during the Eleventh Five Year Plan period.

And

To make realistic estimates of outlays required for achieving the desired goals and objectives and targets set for the Eleventh Plan.

The 11th Plan should set itself the objective of significantly improving urban mobility in the country, so that economic activities can continue unhindered and urban areas in the country can function as the true engines of India's economic growth. The broad policy for this purpose has already been laid out in the National Urban Transport Policy which was approved by the Government of India in April, 2006. More specifically, the plans should include the following:

- a. All cities must prepare a master plan for non-motorised transport and must develop and implement plans for adequate and safe pedestrian and bicycle facilities on all arterial roads.
- b. Street vendors and hawkers are essential service providers for non-motorised modes and they are also essential for maintaining low street crime rates. Therefore, all cities should formulate a realistic hawker policy on roads.
- c. All cities should prepare a plan for traffic calming to reduce emissions and road accidents rates.
- d. All million plus cities should prepare plans to introduce / upgrade existing bus services as also introduce BRT systems on selected arterials during the 11th plan period.
- e. All cities should upgrade taxi and three-wheeler fleets and use ITS for the same.

The specific measures will vary from city to city and will depend on the city size and shape. For the sake of convenience, all urban areas with a population of over 1 lakh have been targeted. These, in turn, have been divided into 4 categories, namely:-

- Cities in the population range of 1-5 lakhs;
- Cities in the population range of 5 lakh-1 million;
- Cities in the population range of 1 – 4 million;
- Cities in the population range of more than 4 million.

Mobility needs in small and medium towns (1 – 5 lakh population)

The small and medium towns do not yet face the kind of mobility problems that are faced in the larger cities. However, unless their growing transport needs are channelized into sustainable directions from now itself, they could easily go the way larger cities have gone. The objective of the interventions in this category of towns would be to (1) enable smoother flow of traffic and (2) prevent a decline in the use of non motorized modes. This would be largely through ensuring that non motorized modes continue to be safe despite the increase in motorized modes of travel. Such cities would not need a regular public transport system at present but would need improvements in para-transit, especially shared para-transit, as a means to prevent a shift to the use of personal motor vehicles. The specific interventions that may be required would be the following:-

- Providing for pedestrian pavements and cycle tracks.
- Some improvements in the quality of roads
- De-congestion of some of the crowded areas like Inter State bus stations, major hospitals, central market areas, major Government offices, railway stations, etc. through improved traffic flows, shifting of small shopping units to higher storied complexes, and a host of other measures.
- Improvement of some intersections
- Developing transport corridors in advance to enable the orderly growth of new settlements in a manner that would facilitate a preference for public transport.
- Creation of parking spaces for para-transit and other vehicles.

It is expected that all this would be in the form of short term investments, to be completed within a period of 3 or 4 years in the cities selected for the purpose. It is also expected that 50% of the towns in India coming in this range would be covered within the 11th plan period. The remaining cities would spill over to beyond the 11th plan period.

It is estimated that each such town would require an average of Rs 20 crores. With the assumption that 50% of the 370 towns in this category would be covered during the 11th plan duration, the requirement of funds would be Rs 3700 crores.

Mobility needs of 0.5-1 million population cities

At this population range, the problems of urban mobility begin to manifest themselves to a somewhat larger extent. If these problems are addressed at such an initial stage, they would not grow into larger problems at a later stage.

The focus of investments here would be largely similar to those in the 1-5 lakh population towns, with the addition that improvements in the facilities for public bus services will have to be added. In addition some pedestrian subways and larger parking facilities will be needed. As part of the renewal process, some facilities such as wholesale markets, jails, inter-state bus terminals, warehouses, etc. may have to be shifted to city fringes.

The following interventions are envisaged:-

- Improvement of some busy intersections
- Construction of pedestrian paths and subways
- Provision of improved parking spaces
- Improving traffic flow at selected congestion points
- Improving passenger facilities for bus systems
- Shifting of certain facilities from the city center to the fringe areas.
- Construction of freight terminals and bus terminals on a BOT basis
- Addition of bus lanes to existing roads
- Construction of new corridors for the development of new settlements
- Linkages with smaller towns falling within a regional context

It is estimated that cities coming in this category would require an average of Rs. 200 crores each. It is also been assumed that 50% of the 39 cities coming in this population range can be covered during the 11th plan period. Half of them would be eligible for resources under the JNNURM and the remaining half under UIDSSMT. Based on these assumptions, the financial requirements for all the cities to be covered are estimated at Rs. 3900 crores over the plan period. The requirements for the remaining cities would spill over into the post 11th plan period.

1-4 million category cities

This category of cities will also need the kind of interventions that 0.5-1 million population cities would require. However, in these cities it will also be necessary to plan for a low to medium capacity mass transit system along some of the high density corridors. Such a mass transit system would have to link with a larger network of lower capacity feeder systems. An approximate cost of Rs 20 crores/km has been taken as the cost of such low capacity mass transit systems based on the available estimates. It is also assumed that on an average each city will develop such a mass transit system over a length of 50 kms of arterials and will also have a network of feeder systems covering a wider area.

It is estimated that these cities would need an average of Rs. 415 crores each within the plan period. All the 28 cities coming in this category would be covered during the plan period. Based on this, the estimated requirement of funds during the plan period would be Rs. 11600 crores.

4 million plus cities

This category of cities would need the same investments as the 1-4 million population cities with the difference that the mass transit systems would have to be of medium to high capacity. A larger network of sub-systems and feeder systems would be required.

Currently only 7 cities fall in this range and the cost estimates have been arrived at by taking into account the cost of metro and other rapid transit systems that have already been planned.

Implementation would be taken up in all the cities coming in this category. The estimates have been prepared separately accounting for the MRT systems and the other interventions required. The cost of the MRT systems has been taken based on the estimates available in the DPRs that have been prepared.

It is estimated that each city would require an amount of Rs 860 crores for non MRT investments. With seven cities falling in this category, the requirement would be Rs 6020 crores. The requirements for the MRT systems proposed would be Rs 32,000 crores.

Overall Financial Requirements

The estimated total financial requirements come to Rs. 57,320 crores as summarized in the table given below:-

Requirement of funds - Summary	Rs in Crores
Capacity Building	100
0.1 - 0.5 million cities	3,700
0.5 - 1 million cities	4,000
1 - 4 million cities	11,600
4 million plus cities	6,000
MRT for mega-cities	32,000
Total	57,400

It may be noticed from the above that out of the proposed allocation of Rs 57,400 crores, as much as Rs. 32,000 is only for MRT systems. This disproportionately high outlay proposed for MRT systems is primarily because many cities have come up with proposals for very high cost metro rail systems. Given the experience with the Delhi metro, where riderships have been far short of the projections, there is a need to rigorously evaluate all such proposals, and compel a complete and thorough evaluation of other technological alternatives. If this is done, the required outlays may come down significantly. While all forms of public transport need to be encouraged, cities should be discouraged from considering metro rail primarily due to its glamour.

In order to enable a rigorous evaluation to be carried out, it is felt that the justification for having an Empowered Committee to approve proposals for various extensions of the Delhi metro should either be reconsidered or this committee should be aided by a professional appraisal agency as is being done in the case of proposals before the PIB. This would also apply in respect of the empowered committee set up in connection of the Bangalore metro. The role of the empowered committee should be limited to facilitating the resolution of inter-ministerial

problems that may come up during implementation and not replacing the normal investment approval machinery of the government, especially for very high cost investment proposals.

To suggest financing mechanisms which may, inter alia, include using land as a resource and also levy of dedicated taxes.

As presented above, the outlay required for urban transport investments comes at Rs 57,400 crores during the 11th plan period. As suggested in the NUTP, the following methods of additional resource mobilization need to be tapped:

- Commercial exploitation of land and air rights over the land used for transport infrastructure
- Use of private capital in such activities that are financially viable and can be provided by the private sector in a competitive environment
- Use of betterment levies to make those whose property values have improved to also pay for the investments that enhanced the value of their properties
- Fees collected from parking, etc.

The following sources are being suggested:

- The JNNURM, in respect of cities which are eligible for funds under the scheme
- The UIDSSMT, in respect of cities that are not included amongst the mission cities
- Viability Gap Funding scheme, in respect projects that are taken up as Public Private Partnerships
- Government of India's other budgetary sources.
- State Government resources
- Resources of the Urban Local Bodies
- Financial Institutions
- Private promoters

A rough estimation of the requirements from the different sources is given below:-

Source of funds	Rs in Crores
NURM (GOI) (incl. UIDSSMT)	15,000
Non NURM	4,400
Viability Gap	2,300
States/ULB	19,500
Financial Institutions	9,400
Private promoters	6,800
Total	57,400

To estimate requirements for O&M; to suggest how fees can be collected without interrupting flow of traffic.

It is not possible to estimate the requirements for O&M at this stage. However, for most investments, at least in facilities like parking complexes, truck terminals, bus terminals, operation of public transport systems, etc. the O&M costs should be fully recovered from the fees/fare charged. Capital investments in public transport systems would have a good case for being supported from the public budget, in view of the considerable positive externalities that they offer. However, the O&M costs should get met from the fares and other sources, like rentals, advertising etc. These are unlikely to involve any interruption in the flow of traffic.

It is not possible to have toll roads within a city, primarily due to the constraints of having to interrupt the flow in traffic in collecting tolls. However, such toll roads are possible as city bypass facilities. Though the currently prevalent systems in the country do involve interruptions in the flow of traffic, IT based technologies are available for the automatic deduction of the toll amount from a pre-paid smart card that can be attached to the windscreen of a vehicle. This technology can be used for minimizing interruptions to traffic flow in collecting tolls.

To consider and make recommendations regarding implementation of projects through PPP/BOT mode.

Investments in urban transport would be for a variety of facilities. They can be classified into the following categories:

- Investments in road infrastructure covering;
 - New roads
 - Widening of existing roads
 - Flyovers and Road over-bridges
 - City by-passes
 - Ring roads
 - Intersection improvements, etc
- Investments in facilities for pedestrians and non motorized modes;
- Investments in parking facilities;
- Investments in Truck terminals and Bus terminals;
- Investments in improved public bus services;
- Investments in high cost public transport systems.

Investments in road infrastructure as well as in facilities for pedestrians and non motorized modes will have to be taken up by a public entity and funds have to come from the public budget. Only city by-passes may be possible on a BOT basis as toll collection is possible. However, investments

in parking facilities, terminals, bus operations as well as in the high cost public transport systems should be encouraged under the PPP route to the extent possible. This would not only make operations more efficient, but cost effective.

With regard to public transport, publicly owned bus undertakings in India have been incurring losses and few are able to meet their operating costs. Such undertakings find it difficult to even maintain existing assets. Increasing fleets to meet the rising demand is therefore out of question.

Under the circumstances, attempts were made to privatize public transport in a number of cities - Delhi, Jaipur, Bhopal, Indore, Visakhapatnam etc. It was expected that these private buses would reduce the burden of the public bus undertakings and benefit commuters at the same time. However, instead of making the daily commute easier, the private operators brought in a new set of problems. For example, in Delhi, a private bus operator is supposed to operate on all type of routes prescribed by the Delhi Transport Corporation (DTC), irrespective of whether it is economical or not. However, as a general practice, they began to operate only on profit making routes. In addition, they would miss trips during non-peak hours, stop their buses anywhere at the request of the commuters, indulge in rash driving with inadequately trained crew, etc. Not only has this practice led to disruption in traffic movement, but the number of fatal accidents has also gone up.

In light of the above, the following recommendations are made:

- The private operation of public bus transport in large cities is a viable option, provided certain conditions are met - (a) differential quality of services are made available - low - fare ordinary bus service and high - fare deluxe bus service (b) strong and effective regulation of bus services (c) an urban transport authority to co-ordinate and regulate the operation of these buses through a set of norms for route allocation, fare fixation, safety and pollution control.
- The private sector can play an important role in activities like the operation and maintenance of parking facilities, repair facilities, construction and management of terminal facilities etc.
- Management of rail based transport infrastructure may be continued on the lines of the existing system of public management because of its highly cost intensive nature. The Government may finance fixed infrastructure like tracks and the balance (e.g. rolling stock etc.) could be outsourced on BOT basis. However, the need for such high cost systems needs to be carefully and rigorously evaluated. They should be well justified and not approved on the basis of sentimental a priori decisions. In particular, exaggerated estimates of ridership that seek to justify them should be guarded against.

To suggest how cities should have urban road systems and adequate bus services; low national norms for urban roads (and storm drains) can be stipulated so as to avoid flooding; how dedicated bus ways can be planned and implemented.

And

To review the measures for suitable bye passes, ring roads, flyovers, as also for truck

terminals outside city limits; to suggest policies for preparation of road maps for towns with heavy traffic particularly those with links to national highways and having inadequate provision for appropriate link with State highways.

Road-network Planning

Currently, road network patterns are not planned and implemented in a systematic manner and street are not designed to segregate different modes of transport so as to promote equitable use and ensure safety. Urban road systems need to be planned in a hierarchal manner comprising arterials, collector roads, etc. They should encompass a wide variety of urban travel needs and cover the requirements of motorists, pedestrians, cyclists, public bus users, etc. They should provide for good drainage so that the road quality is not compromised. This hierarchical network should be properly integrated and a standard design should be prescribed for each level of road in the hierarchy. Road networks should also be complete and should aim at a topology that provides alternative routes of movement.

A hierarchical road network system could consist of:

- ◆ Ring Roads with partial access control and having a maximum right of way of 60 metres. Cities with a population of more than 1 million could plan for these.
- ◆ Arterial Roads with partial access control and a maximum right of way of 45 metres could be planned in cities with a population of more than 5 lakh
- ◆ Other major roads with a maximum right of way of 30 metres could be planned in cities with a population of more than 1 lakh
- ◆ Distributor / Collector Roads with a maximum right of way of 30 metres could be planned in all other cities

All roads with a right of way of 45 meters must have a dedicated bus lane and those with a 30 meters right of way should provide for a lane to be reserved for public transport and high occupancy vehicles during peak periods.

Depending upon the structure and size of the city various types of road network patterns can be planned, i.e. grid-iron, ring-radial etc. Since most Indian cities have spread in all directions, the ring-radial pattern of road network is most suitable. The grid-iron pattern creates more intersections and alternative routes orthogonally but the diagonally oriented movements are at a disadvantage. However, it is suitable for implementation of one-way and turn ban type area management system. The grid-iron network can be planned for commercial pockets of the city centers within the overall ring radial pattern for the network city.

The cross-sections of the roads should be planned with pedestrian footpath, service roads, cycle tracks, mix traffic lanes, bus lanes, and a wide median (for future expansion, right turning lanes, etc.) based on the hierarchy of the road and R/W. All roads in urban areas should be either paved or green covered.

Final road levels should be permanently fixed, so that re-carpeting does not change the road levels from time to time affecting the drainage and other parameters. The road intersections should be

properly designed as per various IRC guidelines by providing channelizers, signals, flyovers, grade separated interchanges, signal coordination / synchronization, Automatic Traffic Control systems, etc.

Infrastructure for pedestrians and cyclists

Well planned facilities are important for safe pedestrian and cyclist movement and proper crossings for these modes must be made an integral feature of all urban roads. Special consideration should be given in designing pedestrian and cyclist facilities along the road and at intersections. The needs of the physically challenged persons should be taken care of. The entire road network including footpaths, road crossings service roads, carriageways, median, bus stops terminals, mass transit stations, parking facilities etc. should be considered as per disabled friendly design principles. Guidelines for provision of transport infrastructure for disabled persons should be framed.

Grade separation (foot over bridges without or with escalators, underpasses) should be designed at suitable locations when the pedestrian traffic intensity is high. While providing pedestrian subways the road level should be raised half way up to reduce the depth of the pedestrian subway.

Footpaths must be physically segregated from the carriageway to avoid conflicts and their widths should not be less than 2 meters. They should not be taken as a provision of future expansion of the carriageway. Informal sector operating on footpaths should be planned and integrated with the design of the pedestrian facility.

Crowded commercial areas with a large number of pedestrians should be taken up for complete pedestrianization and properly integrated with parking facilities and a limited number of eco-friendly vehicles being allowed for the movement of the disabled and aged.

Road Side furniture such as appropriate road markings, lane changing zones, proper lighting, traffic signals and signages, land scaping and aesthetics, ITS components, guide maps, etc. must be provided as per IRC guidelines

Drainage

Comprehensive planning of the storm water drain network is extremely important to ensure road quality. Timely planning is essential to keep the drains in working condition. There should also be a mandatory plan for drainage during the construction activities to ensure the flow storm water. A mechanism (say by out-sourcing) should be developed by local urban bodies to monitor & maintain the drainage system. Rain water harvesting should be adopted to prevent flooding. Use of porous concrete for footpaths/shoulders/etc. should be considered for maximum recharge of ground water and minimum surface run off. De-silting of storm water drains (development of de-silting ponds) should be taken up to avoid flooding and also to clean water before discharge.

Linkages to State and National Highways and Terminals

Truck Terminals should be planned at the periphery of cities along the major rail and/or highway. All the wholesale activities should be located at the periphery of the city rather than in the center. Multiple long distance (inter-city) passenger terminals (Rail & Bus) should be provided when the city radius goes beyond 15 kms and population beyond 40-50 lakhs.

Parking

Parking spaces must be provided at appropriate locations, on-street / off-street, with proper management, and use of ITS. Appropriate parking fees should be levied to manage the demand and reflect the cost of the urban land used up for the purpose.

Ring roads and by-passes

All large cities have to create facilities that enable through traffic to not burden the city road systems. Similarly large cities must create suitable road networks that allow central core areas to be bypassed if they are not the origin or destination of a trip. This is usually done through city by-pass roads and ring roads.

Ring roads should generally be planned at a distance of about 5 Kms as they would relieve traffic congestion in the central area and also allow balanced urban development. Similarly, a bypass should be planned at a distance of at least 10 Kms., if not more, if it is to serve its purpose meaningfully. Developments along such a bypass should be controlled and should ensure appropriate setbacks. To avoid such bypasses becoming arterial roads of the city in future, it is important that all new/satellite townships/emerging activity centres (SEZs) planned for future are either developed along defined major transport corridors and/ or integrated properly with mass transit system in the master plan itself.

To propose standards and bench marks for appraisal of future proposals and also to propose threshold level for population of a city, when planning for Mass Transit Systems should start.

In order to meet the increasing travel demand in a sustainable manner, all million plus cities should plan for a good and efficient public transport system so that dependence on private motor vehicles is kept to a minimum. While cities with the population of less than 1 million may be able to meet the required travel demand through informal public transport and para-transit systems, cities with a population of more than 1 million must think of formal public transport systems. There is a range of technology options for such public transport systems. The choice of technology would depend on a number of factors, such as, the urban form, the number of transfers that may be requires, the capital costs and O&M costs involved, impact on city aesthetics etc. Hence, a choice of technology has to be made in a very city specific context and can not be made through a general population standard.

An important consideration is that any planning for such transportation systems must be comprehensive in nature and can not be limited to only a few corridors. It should be thought of in a multi model context with low cost and low capacity systems being used as feeders that integrate efficiently with high capacity systems along trunk routes. In this context, it is important to remember that easy and safe access to public transport is an important determinant of the attractiveness of public transport. People would not be willing to walk long distances to access public transport nor walk long distances to reach their destinations after alighting from a public transport system. Thus, the access and egress trips are important elements in the attractiveness of public transport. The relative importance of these access and egress trips reduces as the long haul trip becomes longer.

Thus, access and egress trips are unimportant in inter-city travel. However, in urban or intra-city trips, the long haul trips are relatively short and, hence, access/egress become important decision parameters.

Low rise and sprawling cities would normally generate a relatively large number of low density travel corridors. As against this, a high rise and linear city would generate a small number of high density travel corridors. In such cities, a limited number of high carrying capacity corridors will not attract enough ridership, unless there is extremely efficient inter-linkage with a wide network of feeder systems. A better strategy in such a city would be to have a larger network of lower capacity systems. Similarly, cities that are high rise and narrow / limited in size would require a limited number of high capacity systems, with access/egress being made easy through effective improvements in pedestrian crossing facilities and park and ride facilities. These are important determinants of an optimal technology.

As against this, a recent trend has been for very high cost systems being proposed without adequate consideration of a comprehensive city wide mobility plan. Quite often, they are not conceived as part of a larger transport master plan and are conceived as stand alone systems. A good example to learn from is the Delhi metro, which due to poor planning of feeder systems has not been able to generate the levels of ridership that were initially projected. Hence, proposals for investment in high cost mass transit systems need to be professionally appraised and the following should be insisted upon, at a minimum:

- A thorough analysis of alternative technologies being carried out
- A comprehensive mobility plan into which the proposal must get integrated
- Reasonableness of ridership projections being professionally assessed
- Professional analysis of financial sustainability
- Possibility of involvement of the private sector being adequately explored

To suggest policies for setting up of unified metropolitan transport authorities in all million plus cities to facilitate more coordinated planning and implementation of urban transport programs and projects.

The current legal institutional arrangements for managing urban transport were developed at a time when urban transport was not a major problem. As a result, there is a high degree of fragmentation and separate enactments cover different modes of transport. Apart from this, the planning and implementation of urban transport infrastructure rests with multiple agencies, which do not necessarily work in a coordinated manner. In most States, the Transport Department carries out regulatory functions of setting the fares for public bus systems. Roads are build and management by the local bodies or State PWD. A State Transport Corporations operates public buses.

Such a fragmented system of planning and implementation of urban transport projects is not desirable and there should be meaningful coordination in all urban transport activities. Several changes need to be made in the existing regulatory and administrative systems. They have to be conceptualized

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Such a fragmented system of planning and implementation of urban transport projects is not desirable and there should be meaningful coordination in all urban transport activities. Several changes need to be made in the existing regulatory and administrative systems. They have to be conceptualized

The nodal department should also be required to lay a report in the State Assembly on the action taken on such recommendations and for this purpose it should obtain a report from the concerned departments of the State Government.

To suggest measures to use cleaner technologies, to have a time bound schedule of progressively tighter emission norms so that pollution levels are kept within the permissible limits.

Emissions from transport vehicles, both public and private, are a major contributor to air pollution in our metropolitan cities. Vehicular emission is directly related to the fuel used, the technology employed and the driving technique.

A step towards the use of cleaner technologies is through improvements in the current fuel quality. Improvement in fuel quality can be achieved through removal/reduction of emission related constituents in the fuels such as sulphur in diesel and sulphur, lead, benzene and other aromatics in petrol. Further reduction of emissions can be obtained through improved engine technology and exhaust treatment systems.

The Auto Fuel Policy approved by the Government of India in 2002 lays down the roadmap for tighter emission regulations up to 2010. The roadmap envisages the following:

Vehicle Category	Bharat Stage II (Entire Country)	Bharat Stage III (11 Metros)	Bharat Stage III (Entire Country)	Bharat Stage IV (11 Metros)
Passenger Cars	01 April, 2005	01 April, 2005	01 April, 2010	01 April, 2010
Commercial Vehicles	01 April, 2005	01 April, 2005	01 April, 2010	01 April, 2010
2 & 3 Wheelers	01 April, 2005		Preferably April, 2008 but not later than 01 April, 2010	

Although these specifications are only relevant for future vehicles, a serious concern is the large fleet of old vehicles that are still running and have been built on the old standards. The vehicles produced before the first mass emission norms were introduced in the country in 1991, would require to be replaced through some method, if air quality is to meet the national standards.

Ministry of Road Transport and Highways (MoRTH) has appreciated the need for strengthening the Inspection & Certification (I&C) and inspection & Maintenance (I&M) systems for in use

automobiles in the country and has instituted several studies on the subject. This has major implications both for air-quality as well as safety of in-use vehicles on the roads.

Currently, a system of fitness testing exists as per Section-56 of Motor Vehicle Act and Rule-62 of Central Motor Vehicle Rules for commercial vehicles. The procedure adopted is for the owners to get their vehicles attended at dealer/private workshops and to offer them for inspection to the Transport Department in their respective places. Certificates are issued generally after visual inspection and are normally valid for a period of one year.

Given the continuous upgrading of vehicle specifications and technologies, the present system may not fully serve its intended purpose. It is also not designed to cope with the continuously increasing vehicle population.

Presently, the centre in Delhi (at Burari), which handles I & C for commercial vehicles is the only semi-automated inspection facility. Another wing of that centre handles safety-related inspection of CNG buses operating in Delhi with ASRTU providing technical expertise for that wing.

Given the magnitude of the task and the late start we have had in India, it is proposed that 10 pilot I & M centres be established in select places on the lines of the Burari Centre. These could be funded by the Central Government. These centres could be operated by the private sector or on Private Public Partnership (PPP) basis. The government may authorize such centres and monitor and regulate their activities and the fee structure. Ultimately, they could be empowered to issue certification with minimal over-check by the State Transport Authorities.

Non-hydrocarbon fuels such as solar energy are regarded as clean fuels. However, vehicle systems based on their applications are still in various stages of development and not yet commercially available.

Electric vehicles are perhaps the only zero emission vehicles available in the market today. A major barrier to greater use of electric vehicles seems to be the absence of adequate infrastructure to facilitate charging of batteries or a suitable mechanism for replacing a run down battery with a charged battery. A detailed study needs to be carried out to assess the other barriers to commercialization of electric vehicles. Measures should be adopted in atleast a few cities to help commercial viability of the the electric vehicle as a mode of personal mobility.

Greater use of alternative fuel vehicles would be an important means to clean the environment. SIAM has proposed the following time frame for adoption of different fuels:

Time Frame	Technology
Short term	Ethanol, CNG, LPG
Medium term	Bio-diesel, EV, HEV
Long term	Hydrogen/Fuel Cell

For the industry to carry out the necessary development activity and introduce alternative fuel vehicles, there is a need to have an accepted and agreed roadmap, clearly indicating the time frame under which the infrastructure for supply of these alternative fuels would be set up. Besides, for any alternative fuel to have a meaningful penetration in the market, the following enablers are also essential:

- ◆ a) Cost economics through incentives so that they are competitive vis-à-vis the current vehicles.
- ◆ Legislative mandating e.g. only zero emission vehicles are allowed near the Taj Mahal in Agra, thus promoting the use of Battery Operated Vehicles (BOV).
- ◆ An integrated approach encompassing cleaner vehicle technology, fuel quality and in-use vehicle emission management.

To suggest policies for building bye laws so that adequate parking space is available for all residents/users of buildings (b) to suggest policies for parking complexes (including multi-level complexes) and (c) to suggest legal provisions to be made in appropriate legislation to prevent the use of the right of way on road systems for parking purposes.

Given the rapid growth in the number of personal motor vehicles, parking has become a major problem in most cities. It is necessary to have building byelaws, specially for multistoried complexes, to provide adequate parking space within the land available to them. Multi storied parking complexes also need to be created at convenient points in a city. Parking at such complexes should charge a fee that would reflect the true cost of the land used for the purpose. A clear message needs to be conveyed that parking is not free and must be paid for. The only exception would be for such parking which integrates with public transport systems in the peripheral areas of the city and incentivise people to use public transport to travel to central areas.

To suggest what measures require to be taken for capacity building at ULB, State and National levels.

Urban transport planning is an extremely complex subject being far more complex than planning for inter-city transport. It has important implications on livelihoods and air quality. It has to be integrated with the urban form and land use patterns. It has to be closely aligned with the nature of economic activities and the manner in which new settlements come up. Being a relatively new area of concern in India, the requisite expertise for comprehensive, integrated and holistic urban transport planning is lacking in the country. Solutions to urban transport problems have, therefore, tended to emerge as piece meal solutions, which merely seek to create additional capacity on selected corridors, without a complete understanding of how this additional capacity would impact travel demand in the long run and the implications it would have on various other aspects of urban planning. Most of the planning also tends to be undertaken by those whose experience has largely been on planning and designing inter-city transport systems.

It is in the above context that the need for a comprehensive program of capacity building for urban transport planning is essential.

Objectives

The objective of the program of capacity building should be to:-

1. Develop a manpower base for good and sustainable urban transport planning. This should include not just the manpower already working in various organizations and the government in the area of urban transport but also create a pool of competent and skilled manpower that would become available in the country for employment, by strengthening academic programs in urban transport. This should also result in developing urban transport specialists into a community of professional practice, preferably with an agency that would certify and accredit urban transport professionals.
2. Set up/strengthen institutions that are appropriately equipped to support/undertake urban transport planning. These would include institutions that could coordinate the development and dissemination of new knowledge in the field, especially in the local context, and institutions that are equipped to provide a pool of highly skilled personnel who can undertake specialized tasks for the State and city governments.
3. Create a system for continuous learning and updating of knowledge and information
4. Develop legal, regulatory and institutional frameworks for the most effective management of urban transport systems. Such legal, regulatory and institutional arrangements should move beyond the existing systems that are largely focused on inter-city transport systems and are not adequately equipped to deal with the special requirements of urban transport.

The specific initiatives proposed during the 11th plan for achieving each objective have been spelt out in the sections that follow.

Development of Manpower

For the development of manpower, the focus would be to:-

- ◆ Develop existing manpower in the Government and other institutions that are already charged with the responsibility of urban transport planning through training, and
- ◆ Creating a pool of qualified manpower, through academic/educational programmes, for the future years.

Training Programmes

This component of the program will develop the required training facilities and resources for training in urban transport planning on a continuous basis and should aim to train at least 2500 participants across the country during the five years of the plan period. While the first year would be spent in designing and developing the training resources as well as setting up the facilities, the actual training would be carried out in remaining years. The initial phase of training itself would train the trainers, with the assistance of leading institutes globally. These trainers would then become the local resource for continuing the activity with the larger target group in India.

The following systematic approach needs to be adopted:-

1. The specific personnel at the State/city level, who are concerned with activities relating to urban transport planning, should be identified.
2. A training needs analysis should be carried out to identify their current skill/knowledge gaps
3. A set of training modules and training material should be designed and developed through professional help.
4. A set of potential faculty for these training programs should be identified both at central and state training institutions.
5. Training of trainers programs should be carried out to develop 75 such trained trainers.
6. 2500 participants from the target group should be trained through programmes conducted as part of this project and continued thereafter as an ongoing process

Academic/Educational Programmes

The objective should be to identify and set up three "Centers of Excellence" that would run post graduate programs in urban transport and also carry out research in this area. The effort should be to identify and set up such centers in a mix of engineering institutions as well as schools of urban planning. A detailed assessment will need to be made of the nature of strengthening required and the kind of academic modules and teaching material that needs to be prepared. This should also be implemented in a systematic manner involving the following stages:-

1. Invite proposals from leading engineering and planning schools that are willing to set up Centres of Excellence.
2. Have detailed studies carried out to design a strengthening plan.
3. Develop appropriate teaching material; strengthen libraries, computer systems and other support facilities.
4. Sponsor a certain number of chairs to meet the teaching/research faculty needs.
5. Sponsor research activity that would not only sustain the educational programs but also add to the knowledge base in the country
6. Create a revolving fund to support such research activity on a regular basis by inviting sponsorships from industry.

Development of Institutions

In terms of developing institutions it is necessary to think of two types of institutions. One should function as a central repository of data, information and knowledge required for policy makers, planners, academics & researchers, etc. It should function as a single point resource center and also a co-ordinating agency for all research and information dissemination. It should also function

as an agency that promotes urban transport planning as a professional practice. Its activities should include:-

1. Developing and managing a national data base containing a comprehensive set of data items required for urban transport planning
2. Acting as a clearing house of specialized information in respect of urban transport.
3. Co-ordinating research activities and other studies/surveys undertaken in the field of urban transport with a view to facilitate effective dissemination of the results of such research/survey/study.
4. Organizing a national conference on urban transport every year and such other periodic workshops/seminars as may be necessary.
5. Maintaining a data base of specialized man power in the field of urban transport available in the country.
6. Publishing a high quality journal on urban transport.
7. Carrying out any other activities of similar nature that would help to promote the development of professionalism in the field of urban transport planning in India.

The first stage should be to engage a professional agency that can develop a strengthening plan for an identified institute as also a roadmap for the institute to be equipped to perform the responsibilities envisaged. The detailed cost estimate for such strengthening would also have to be developed.

A second institute should be a consulting organization that would provide a pool of highly skilled manpower to develop comprehensive, integrated and holistic city level transport plans. This is necessary as urban transport is indeed a very complex area and it will be difficult for every city, or even every State, to develop the necessary expertise. Hence a common pool of expertise should be available to serve the needs of multiple cities. This is ideally placed in an institution promoted by the Government so that States/cities feel confident about the quality of its expertise and do not have to go through a complex procurement process. In subsequent years, other such organizations should come up with the manpower of the first institute serving as an initial nucleus of core skills. Such an institution would need expertise in a wide variety of disciplines including engineering, economics sociology, urban planning, transport planning, demography, etc. so that it is fully equipped to develop holistic and meaningful transport plans rather than generate only piecemeal project solutions that serve a temporary or partial purpose. Such an institute should also be open to all available technologies for public transport rather than be biased towards one or other technology.

The following stages of implementation are suggested:-

- ◆ Identify an agency that could be developed as a professional consulting organization for all cities in the area of urban transport.
- ◆ Engage a consultant to develop a strengthening plan and a business plan for this agency. This would also include an estimation of the costs involved and the manner in which such an agency would attain financial sustainability for the purposes of seeking this approval a rough amount has been suggested as a possible ceiling.

Other Support Activities

Conferences & Journals

Urban transport is a growing field all over the world and the knowledge base on this is developing rapidly and continuously. Therefore, the exercise of capacity building, especially in terms of the knowledge and skill development, cannot be a one time effort but will have to be a continuous one. Unless this is done the specialized manpower that is developed at considerable cost and effort will quickly become out of date.

It is also well known that the "state of the art" in any field cannot be learnt through structured training programmes alone. This is because there is invariably a time lag between the "state of the art" and the time by which such "state of the art" can find a place in structured training programmes. It is for this reason that various communities of professional practice such as doctors, engineers, etc. have a system of annual conferences as a mechanism to update their skills and knowledge. Urban transport planning will also have to be developed as a similar community of professional practice for which the members of the community will have to be encouraged to participate in such conferences, both in India and abroad. Similarly publication of journals is an important element in facilitating the continuous updating of knowledge, by being a mechanism for disseminating the findings of research and other studies/surveys.

Keeping this in mind the following activities are proposed as part of the support activities for capacity building:-

- ◆ A high quality annual conference be held in India with participation from national and international experts so that urban transport professionals in India get an opportunity to be exposed to new developments globally
- ◆ The publication of a high quality journal, based on quality papers that are presented at such a conference.
- ◆ Nomination of 20 Indian professionals annually to such conferences abroad so that they get a wider exposure to global best practices.

Standards, Manuals and Codes

As stated earlier, Urban transport is a relatively new field in India and is extremely complex. It involves co-ordinated working with a number of other disciplines, such as, land use planning, urban demography, urban economics, urban poverty, spatial planning etc. Similarly, for mass transit systems, there are several technologies around the world which are suited for medium sized cities but are yet to be adopted in the country. There is also a need for reviewing the existing road standards as well as urban bus designs, which were developed in India for meeting the needs of inter-city transport. For example, buses used in the cities use a truck chassis which is not suitable for urban buses. As such, a series of standards, manuals and codes will have to be developed for making urban transport planning more professional. Standards would also help in enabling quality and safety certification as also in ensuring some degree of uniformity across the country.

Through a series of workshops and brain storming sessions a list of such standards, manuals and codes that need to be developed should be identified. Professional consultants, including international experts, should be sourced to help in building up such standards, manuals and codes.

Costs

A total amount of Rs 100 crores is estimated in implementing such a comprehensive capacity building plan during the 11th plan period as per the following break up:

	Rs in Crores
Manpower Development through training programs	34
Manpower development through academic programs	40
Knowledge enhancement, conferences and journals	6
Institutional development	20
Total	100

To examine and make recommendations regarding all other matters relevant and incidental to the above terms of reference.

Intelligent transport Systems

Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system’s infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance productivity. Applied effectively, Intelligent Transport Systems and Services (ITS) can save lives, time, and money as well as reduce threats to our environment and create new business opportunities.

Some of the key ITS applications could be the following:

Advanced Traffic Management Systems

ATMS systems endeavor to eliminate or, at least reduce the traffic congestion, and results in doubling the number of vehicle-kilometers traveled. Characteristic components of an ATMS are roadside sensors to monitor traffic flow, computer coordinated traffic signalization to optimize urban arterial traffic flow, and variable message sign as or highway advisory radio for dissemination of traffic and travel information for example, an alternative-route recommendation upstream of a highway incident to motorists. The ATMS systems comprise inputs (traffic-flow data), data processing capability (both at intersections and by computers in a traffic control center, or, for fully integrated ITS systems, in a transportation management center), and outputs (timings to traffic signals, VMS messages to motorists, incident advisories to tow trucks, and so on).

Advanced Traveler Information Systems

Advanced Traveler Information Systems (ATIS) are an integral component of the concept of

Intelligent Transportation Systems. ATIS are envisioned to enhance personal mobility, safety and the productivity of transportation. ATIS can play a pivotal role in reducing traffic congestion. The primary services of ATIS include pre-trip and/or route traveler information concerning traffic conditions, route guidance, and "yellow page-type" information related to traveling as well as entertainment, dining and other services.

The function of ATIS is to assist the travelers with planning, perception, analysis and decision making to improve the convenience and efficiency of travel. ATIS technologies include:

- ◆ On-board display of maps and road way signs.
- ◆ On-board route guidance systems
- ◆ On-board traffic hazard warning system.

Electronic Toll Collection

Electronic Toll Collection (ETC) is a fairly mature technology that allows for electronic payment of highway tolls. ETC equipment substitutes for having a person (or coin machine) to manually collect tolls at toll booths. In addition, it allows such transactions to be performed while vehicles travel at (almost) highway cruising speed.

ETC systems take advantage of vehicle-to-roadside communication technologies to perform an electronic monetary transaction between a vehicle passing through a toll station and the toll agency. ETC systems require onboard units (OBU), vehicle detection and classification as well as enforcement technologies.

Cooperative Intersection Collision Avoidance Systems

Intelligent intersection systems can save lives and prevent injuries by helping drivers avoid crashes. Each year intersection-related crashes take a heavy toll on lives, productivity, and the economy. Intelligent intersection systems offer a significant opportunity to improve safety by enhancing driver decision-making at intersections that will help drivers avoid crashes.

Intersection collision avoidance systems use both vehicle-based and infrastructure-based technologies to help drivers approaching an intersection understand the state of activities within that intersection. Cooperative intersection collision avoidance systems (CICAS) have the potential to warn drivers about likely violations of traffic control devices and to help them maneuver through cross traffic. Eventually, CICAS may also inform other drivers (i.e., potential victims) about impending violations as well as identify pedestrians and cyclists within an intersection.

Emergency Transportation Operations

ITS technologies can help to identify the appropriate response and get the correct equipment and emergency personnel to and from the scene quickly and safely.

This can improve the management of all forms of transportation emergencies through the application of ITS technologies. Advances in in-vehicle communication and information systems will provide access to essential real-time data about an incident and about transportation conditions on all routes throughout the affected region.

Integrated Vehicle-Based Safety Systems

Integrated Vehicle Based Safety Systems *could prevent over the rear-end, run-off-road, and lane change crashes.*

The widespread deployment of advanced integrated driver assistance systems has the potential to reduce rear-end, road departure, and lane change collisions by 50 percent. Integrated systems will provide better hazard information from multiple sensors and provide coordinated warnings to reduce driver distraction. The Integrated Vehicle Based Safety Systems (IVBSS) initiative aims to demonstrate the technologies necessary to equip all new vehicles with advanced driver assistance systems that would help drivers avoid the most common types of deadly crashes.

ITS Technologies to Reduce Pedestrian Injuries and Fatalities

Pedestrians represent about 30% of all roadway fatalities. In general, half of pedestrian fatalities are caused by pedestrian inattention/error, and half are caused by driver inattention/error. Experience with various ITS based pedestrian safety systems such as pedestrian detection devices, lighted crosswalks and countdown pedestrian signals has shown that such devices generally improve pedestrian safety, especially help slower moving pedestrians and save motorists time.

Vehicle Assist and Automation Systems for Transit Operations

Operating buses in extremely narrow lanes is difficult and can be dangerous. Vehicle assist and automation systems (VAA) allow precise operations of buses in such circumstances. VAA supports precision docking, vehicle guidance, vehicle platooning and automated operations. VAA has the potential to improve mobility, improve bus rapid transit amenity and accessibility and increase efficiency and productivity of bus operations. While the primary focus of this initiative is transit vehicles, this technology has implications for commercial vehicles as well.

Vehicle assist systems have the potential to allow transit vehicle operators to safely implement service in situations where there are inadequate operating conditions, such as vehicle maintenance yards, narrow lanes or bus-only shoulders on freeways.

Vehicle Infrastructure Integration (VII) for Mobility

As the economy grows, so also does traffic congestion. This initiative will examine the potential for using this communication technology to enable a new generation of active traffic operations services. These services use emerging intelligent vehicle and vehicle-infrastructure wireless communication technologies to improve traffic flow. These potential applications include active queue management, dynamic intersection control and merge assistance.

ITS in Public Safety

In India large number of persons get hospitalized, receive minor and major injuries due to road accidents every year. The ratio of deaths: serious injuries: minor injuries is in the order of 1:15:70 which is very high. According to official statistics- 84, 210 persons were killed and 3,42,200 were injured. However since not all Road traffic accidents are reported to the police, about 1,200,000

required hospitalization and 5,600,000 received minor injuries. In these and other emergencies, lives depend on how fast rescuers reach the scene.

The emerging technologies in transportation and communication can both save lives on the highways every day and form the technology foundation for a stronger disaster preparedness network. ITS, can be a vital link for the entire community of emergency responders: law enforcement such as police, fire and rescue, emergency management, and emergency medical services (EMS).

Integrated Corridor Management Systems

Through the Integrated Corridor Management Systems initiative we can improve mobility and enhance productivity in metropolitan cities. Traffic congestion continues to grow, with the greatest concentration of congestion along the principal routes in major metropolitan areas. These "critical corridors" that link activity centers (e.g., business centers, shopping areas) with residential areas carry the highest volumes of people and goods.

Corridor management can be achieved through collaboration and coordination between the operations and planning communities and through integration of the services. Collaboration between planning and operations communities and integration of travel management tools could help shift travel demands between facilities and modes, thus reducing delays and increasing reliability and predictability of travel. Unused corridor capacity often exists on parallel routes, on the non-peak direction on freeways and arteries, within single-occupant vehicles, and in transit vehicles. Shifts in travel demand to unused capacity can be accomplished by delivering real time travel data through in-vehicle devices, changeable message signs, as well as through various traffic and transit management strategies, including adaptive traffic signal and ramp metering systems. A planned model deployment will show how proven and promising ITS technologies, working together, can improve corridor mobility and productivity.

ITS should be effectively used for setting up traffic information centres that would help in performing multiple functions. One of them would be to facilitate smooth movement of traffic and the handling of emergencies and temporary traffic build-ups in an effective manner. Another extremely useful function would be to collect data on a continuous basis and thereby provide a scientific basis for future policies and plan. These initiatives can be taken in 4 or 5 pilot cities begin with and then replicated in all the million plus cities of the country. An appropriate ITS infrastructure should be put in use and model regulator should be established through pilot initiatives as mentioned above.

Conclusion

The 11th five year plan could prove a watershed in achieving sustainable urban transport and enhancing the economic efficiency of the cities as also improving the quality of life of urban residents. The launching of the JNNURM has provided the necessary financial means and the formulation of the National Urban Transport Policy has provided an effective framework towards this end. This recommendations contained in this report have tried to approach the problems of all categories of cities above the one lakh population mark, in a comprehensive and holistic manner. The recommendations also include a comprehensive capacity building proposal that is so essential for

a proper understanding of the urban transport problem. There is an attempt to recognize that thinking for urban transport is very different from the thinking for inter-city transport and hence the capacity building recommendations.

The working group has also tried to emphasize the importance of promoting all proven technologies for public transport and not be enamored by a limited number of choices, so that the most optimal solutions for a given situation are adopted, with an open mind. The Delhi metro has undoubtedly been a great success in terms of its project implementation, but the failure of the system to attract the projected ridership should mean that there are important lessons to be learnt before we choose to make such high cost investments. Although an outlay of over Rs 57,000 crores has been projected, the actuals could come down if appropriate technologies are chosen and high cost technologies are not pre-decided in a semi-professional manner.

The working group is confident that the implementation of its recommendations would go along way in putting sustainable urban mobility in India on the right track. This has been long overdue and hopefully the 11th plan will help India catch up on lost time.

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Yojana Bhawan, Sansad Marg
New Delhi, dated 1st May, 2006

ORDER

Subject: Constitution of Working Group on Urban Transport including Mass Rapid Transport Systems for Eleventh Five Year Plan (2007-2012).

In the context of formulation of the Eleventh Five Year Plan (2007-2012), it has been decided to set up a Working Group on Urban Transport including Mass Rapid Transport Systems for Eleventh Five Year Plan (2007-2012). The composition of the Working Group will be as follows:

- | | | |
|------|--|----------|
| (1) | Secretary, Ministry of Urban Development, Govt. of India | Chairman |
| (2) | Adviser (HUD), Planning Commission | Member |
| (3) | Pr. Adviser (DP), Planning Commission | Member |
| (4) | Adviser (Transport), Planning Commission | Member |
| (5) | Representative of Railway Board (in charge of Mumbai Suburban Transport or Kolkatta Metro) | Member |
| (6) | Smt. Reeta Prakash, Director, Department of Expenditure, Ministry of Finance | Member |
| (7) | MD, RITES | Member |
| (8) | Managing Director, DMRC | Member |
| (9) | CMD, HUDCO | Member |
| (10) | Chief Planner, TCPO | Member |
| (11) | Director, CRRI, New Delhi | Member |
| (12) | Professor O.P. Mathur, National Institute of Public Finance & Policy | Member |
| (13) | Professor Dinesh Mohan, IIT, Delhi | Member |
| (14) | Pr. Secretary, Transport, Govt. of NCT Delhi | Member |
| (15) | Pr. Secretary, Urban Development, Govt. of Maharashtra | Member |

(16)	Pr. Secretary, Urban Development, Govt. of Karnataka	Member
(17)	Pr. Secretary, Urban Development, Govt. of Andhra Pradesh	Member
(18)	Pr. Secretary, Urban Development, Govt. of Assam	Member
(19)	Pr. Secretary, Urban Development, Govt. of Punjab	Member
(20)	Pr. Secretary, Urban Development, Govt. of Orissa	Member
(21)	Pr. Secretary, Urban Development, Govt. of Gujarat	Member
(22)	Prof. Shivanand Swami, Centre for Environmental Planning & Technology (CEPT), Ahmedabad	Member
(23)	Representative of Society for Indian Automobile Manufacturers (SIAM)	Member
(24)	Representative of Association of State Road Transport Undertakings	Member
(25)	Addl Commissioner of Police (Traffic) Delhi.	Member
(26)	Officer on Special Duty, MRTS, Min of Urban Development	Member –Secretary

2. The Terms of Reference of the Working Group are as follows:

- (1). To estimate the transport needs, not only for the current population of cities but also for the needs of those who are yet to join the urban population.
 - (2.1) To suggest measures so as to ensure that appropriate comprehensive city development plans with integrated traffic and transportation plans are prepared under the Jawaharlal Nehru National Urban Renewal Mission for each city with integration of land use planning and transportation plans.
 - (2.2) To make recommendations as to the manner in which all available public transport technologies may be evaluated and the mix of modes and technologies that best suit local conditions for each city should be selected.
- (3) To review the policies, performance of various schemes and programmes in Urban Transport including MRTS, externally aided projects during the Tenth Plan with particular reference to the achievements of the prescribed objectives, targets and to point out the shortcomings.
- (4) To suggest necessary modifications in the schemes, if any, required for better implementation.
- (5) To suggest a pricing policy for public transport which may, inter alia, include suggestions on who should pay for public transport and in what proportion.
- (6) To suggest a mechanism for common ticketing across various modes of public transport and also a mechanism for revenue sharing between various operators.

- (7). To suggest objectives, policies, strategies and programmes for the improvement of urban transport during the Eleventh Five Year Plan period.
 - (8). To make realistic estimates of outlays required for achieving the desired goals and objectives and targets set for the Eleventh Plan.
 - (9). To Suggest financing mechanism which may, *inter alia*, include using land as resource and levy of dedicated taxes.
 - (10). To estimate requirements for O&M; to suggest how fees can be collected without interrupting flow of traffic.
 - (11). To consider and make recommendations regarding implementation of projects through PPP/BOT mode.
 - (12). To suggest how cities should have urban roads systems and adequate bus services; low national norms for urban roads (and storm drains) can be stipulated so as to avoid flooding; how dedicated busways can be planned and implemented.
 - (13). To propose standards and bench marks for appraisal of future proposals and also to propose threshold level for population of a city, when planning for Mass Transit Systems should start.
 - (14). To review the measures for suitable bye passes, ring roads, flyovers, as also for truck terminals outside city limits; to suggest policies for preparation of road maps for towns with heavy traffic particularly those with links to national highways an having inadequate provision for appropriate link with State highways.
 - (15). To suggest policies for setting up of unified metropolitan transport authorities in all million plus cities to facilitate more coordinated planning and implementation of urban transport programmes and projects.
 - (16). To suggest measures to use cleaner technologies, to have a time bound schedule of progressively tighter emission norms so that pollution levels are kept within the permissible limits.
 - (17). (a) To suggest policies for building bye laws so that adequate parking space is available for all residents/users of buildings (b) to suggest policies for parking complexes (including multi-level complexes) and (c) to suggest legal provisions to be made in appropriate legislation to prevent the use of the right of way on road systems for parking purposes.
 - (18). To suggest what measures require to be taken for capacity building at ULB, State and National levels.
 - (19). To examine and make recommendations regarding all other matters relevant and incidental to the above terms of reference.
- 3.1. The Chairman of the Working Group may co-opt any additional member(s), official or non-official and constitute smaller group, sub-groups as may be considered necessary.

- 3.2 The expenditure on TA/DA of the official members in connection with the meetings of the group will be met by the respective Government Department/Institutions to which they belong. TA/DA of non-official members will be borne by the Ministry of Urban Development as admissible under Government Rules
4. The reports of the working group may be submitted to the planning Commission within four months.

Sd/-
(Harish Chandra)
Director (HUD)

To

Chairman and all Members of the Working Group.

Copy to:

1. PS to Deputy Chairman, Planning Commission .
2. PS to Minister of State.
3. PS to all Members, Planning Commission
4. PS to Member Secretary, Planning Commission
5. Pr. Advisers/Advisers/Head of Divisions.
6. Ministry of Finance (Plan Finance).
7. Administration (General), Planning Commission.
8. Accounts-I Branch, Planning Commission.
9. Information Officer, Planning Commission
10. Director (Admn.)/ (PC)

Sd/-
(Harish Chandra)
Director (HUD)