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## EXECUTIVE SUMMARY

### CONTEXT, INVESTMENT NEED AND FINANCING

Presently cities and towns contribute to more than 60%, approximately two third of the total 'gross domestic product' of India. By 2030, this figure is estimated to grow to about 70%. For the cities to remain livable, bankable and as engines of economic growth, it is utmost important that the urban mobility issues are effectively addressed and the present gridlock in most of the big urban agglomerations is immediately taken care of so that the lack of proper mobility for all, including the poor does not become a major dampener. The urbanization is growing rapidly. From 28% population in urban areas in 2001, it is projected that by 2031 about 40% population i.e. about 600 million people would be living in urban areas. However, provisioning of urban services has not kept pace of urbanization leading to a situation of chaos and gridlock in most of the cities and also in many of smaller cities and towns. Tackling this huge challenge would require massive investment in urban areas both for clearing the backlog as well as for newly urbanized areas. Two recent independent study reports, one each by Mckinsey Global Institute and the 'High powered expert committee' commissioned by Ministry of Urban Development Government of India have projected that Mass rapid transit services and roads (The main infrastructure for urban transport) together require nearly more than 50% of the projected investment for urban services including housing in cities in India (More than Rs one lac crore per year for the next 20 years for urban transport).

The present scene of urban transport across India is categorized by sprawling cities; declining share of public transport and non-motorised transport; focus on supply side yet with low investments; sheer neglect of pedestrians, cyclists and public transport users; and increased motorization leading to pollution and high road fatalities/injuries. The problem is getting further aggravated by multiplicity of authorities/departments involved in urban transport often with conflicting agenda as well as a lack of understanding of the authorities as well as public of various issues relating to urban transport. Such a scenario is neither desirable nor sustainable even for the present and needs to be proactively reversed on urgent basis. In order to achieve

the same, the following 10 goals have been identified in the 12th Five Year Plan (FYP) in line with the National Urban Transport Policy-2006 (NUTP-2006).

1. To create an effective institutional and Implementation framework that will manage the huge investments envisaged;
2. To build capacity of state and city officials and other stakeholders – today hardly any state or city has an urban transport professional on its roles;
3. To create facilities for walking and cycling in all 2 lac+ cities and State capitals – these are non-polluting modes that do not use fossil fuels and provide social equity;
4. To develop an upgraded cycle rickshaw as an integral part of the last mile connectivity for city wide public transport network – this is a non-polluting mode that does not use fuel and provides employment.
5. To augment public transport with part funding from Government of India so as to:
  - a. Introduce organized city bus service as per Urban Bus Specifications issued by MOUD in all 2 lac+ cities\*<sup>1</sup> and State capitals;
  - b. Add BRTS @ 20 km/1 Million population in 51 cities with population > 1 Million\*;
  - c. Add rail transit @ 10 km/ Million Population, start planning rail transit projects in cities with population in excess of 2 Million\*, and start construction in cities with population in excess of 3 Million\*. The estimated financial progress during the 12<sup>th</sup> plan period is envisaged at 25% of total cost;
  - d. Expand rail transit in existing mega cities i.e. 4 Million +, @ 10 km per/yr. i.e 50 km in 12<sup>th</sup> FYP,
  - e. Provide Suburban rail services in urban agglomerations with population > 4 Million\*;
  - f. Improve and upgrade Intermediate public transport vehicles and services.
6. To improve accessibility and mobility in cities through:
  - a. Developing hierarchical road network in newly developing areas
  - b. To complete 25% of major road network in all 2 lac\* + cities with missing links including opening up of dead end roads for better utilization.

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<sup>1</sup> \*Population figures are as per 2011 census

- c. To improve and maintain road surface to the highest standards with good drainage. To regulate and coordinate Work of utility agencies. Today utility agencies do not hesitate in cutting up the road for their work as and when they like and leave it unrepaired or badly repaired.
7. To provide grade separated entries and bye-passes for through traffic;
8. To improve road Safety and security against vandalism, crime and terrorism – introduce a system of safety audit;
9. To use technology for multimodal integration, enforcement and traffic management;
10. To promote innovation, research and development in guided transport; and to support pilot projects with 100% funding from Government of India.

In order to achieve the above goals, a total investment of about Rs.3, 88,308 crore is required in the 12th FYP from all sources. Out of this, the estimated investment to develop the street network, both new and for upgrading the existing network to compensate for the backlog, as well including pedestrian and bicycle facilities is Rs. 1,67,218crores. The projected investment in public transport i.e. buses, BRT, rail/guided transit, bus infrastructure (i.e. depots, terminals and workshops), other associated features such as Intelligent Transport System (ITS) and Area Traffic Control (ATC), parking, institutional development and capacity building is estimated as Rs. 2, 02,628 Crore. A summary of component-wise investment required is tabulated below:

| S.No  | Component                           | Investment (Rs in Cr) |
|-------|-------------------------------------|-----------------------|
| 1.0   | <b>Street Network - New Areas</b>   | <b>1,01,159</b>       |
| 1.1.1 | Pedestrian, NMV, Streetscaping      | 15,174                |
| 1.1.2 | Road                                | 85,985                |
| 2.0   | <b>Street Network - Upgradation</b> | <b>66,059</b>         |
| 2.1.1 | Pedestrian, NMV, Streetscaping      | 27,335                |
| 2.1.2 | Road                                | 38,724                |
| 3.0   | <b>TOTAL STREET INFRASTRUCTURE</b>  | <b>1,67,218</b>       |
| 4.0   | <b>PUBLIC TRANSPORT</b>             | <b>2,02,628</b>       |
| 4.1   | <b>Buses</b>                        | <b>13,759</b>         |

| S.No  | Component                                      | Investment (Rs in Cr) |
|-------|--|-----------------------|
| 4.2   | <b>BRTS</b>                                    | <b>29,603</b>         |
| 4.3   | <b>Metro Rail</b>                              | <b>1,30,726</b>       |
| 4.4   | <b>Commuter / Regional Rail</b>                | <b>19,780</b>         |
| 4.5   | <b>Bus Infrastructure</b>                      | <b>8,760</b>          |
| 4.5.1 | <b>Depots</b>                                  | <b>5,220</b>          |
| 4.5.2 | <b>Terminals</b>                               | <b>1,280</b>          |
| 4.5.3 | <b>Workshops</b>                               | <b>2,260</b>          |
| 5.1   | <b>ITS and ATC</b>                             | <b>8,520</b>          |
| 5.2   | <b>Parking</b>                                 | <b>1,943</b>          |
| 6.0   | <b>Institutions and Capacity Building</b>      | <b>5,000</b>          |
| 7.0   | <b>Innovations, R&amp;D and pilot projects</b> | <b>1,000</b>          |
| 8.0   | <b>NMT and IPTS projects</b>                   | <b>2,000</b>          |
|       | <b>GRAND TOTAL</b>                             | <b>3,88,308</b>       |

All the various components in which the investment would be required in the 12<sup>th</sup> Five Year Plan would need to be funded through a combination of funding from Govt. of India, State Govt./urban local body, development agencies, property development, loan from domestic and financial institutions as well as PPP.

A study of the global experience in urban rail transit provisioning shows that PPPs have not been very successful. The analysis of metro rail systems in 132 cities in the world provides a comprehensive understanding of the ownership structure and use of PPP in metro rail development. In 113 cities having metro rails, 88% have been developed and being operated in public sector mode whereas in only 12% cities some form of public private partnership exists. In fact outside India, no city anywhere in the world (except the failed experiment of STAR and PUTRA Metro Rail in Kualampur in Malaysia) has attempted in last few decades provisioning of Metro Rail in a full city on PPP. Even the new metro rail projects, which are being developed, are largely being taken up on public sector mode rather than PPP, even though PPP has been an important financing mechanism of the other modes of transport. Accordingly, it has been proposed to take up urban rail transit with primarily Government funding except in very rare



cases of high density corridors of metropolitan cities where such PPP can be attempted for elevated corridors.

The public private partnership experience in operating bus based transit systems appear to succeed if it is done on a gross cost model with the revenue risk taken by the Government. Accordingly, though financing from Central Government for urban bus procurement would be essential for driving the change, remaining cost as well as operation and maintenance can be taken up on PPP adopting gross cost model. As far as BRTS systems are concerned, the infrastructure cost will have to be borne by the Government, while the depots, terminals and workshops can be developed preferably on PPP.

As far as streets in developing areas, they are to be developed within urban development planning framework. The resources required are to be raised through Development Charges, Betterment Levy and such other mechanisms. Hence the source of fund for the same is stated as 'self financing'. However, upgradation/improvement of existing street network will require support from government as rising of resources linked to development is difficult. For promoting bicycles, modernisation of auto rickshaws, developing walking facilities, a new scheme is proposed. The infrastructure cost for these would be borne by the Government while the operation and maintenance should be on PPP. Based on the above principles, the funding requirement from each agency, for each component has been assumed/envisaged as under:

| S.No | Component                           | Investment  |
|------|-------------------------------------|---|
| 1.   | <b>Street Network - New Areas</b>   | Contribution from private party as the cost of development itself i.e. self financing |
| 2.   | <b>Street Network - Upgradation</b> |   |
| a.   | Pedestrian, NMV, Streetscaping      | 50% by GoI and 50% by State Govt./ ULB/ Parastatal                                    |
| b.   | Road                                | 20% by GoI, 80% by State Govt./ULB/Parastatal   |
| 3.   | <b>Public Transport</b>             |   |
| a.   | Buses                               | 50% by GoI, 30% by State Govt./ULB/Parastatal, 20% by private investment              |
| b.   | BRTS                                | 50% by GoI and 50% by State   |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| S.No | Component  | Investment  |
|------|--|---|
|      |  | Govt./ULB/Parastatal  |
| c.   | Metro Rail, Commuter / Regional Rail   | About 20% projects are envisaged on PPP with 20% Viability Gap Funding from Gol and 20% Viability Gap Funding from State Govt.<br><br>For the remaining 80% of projects, funding envisaged is 20%(30% in exceptional cases) from Gol as equity/subordinate debt/grant (as a suitable combination), 20% from State Govt./Parastatal, 5% from property development,5% from Developmental Agencies, 50% as loan from international and domestic financial institutions |
| 4.   | Bus Infrastructure (Depots, Terminals, Workshops)  | 50% by State Govt. and 50% by PPP   |
| 5.   | ITS and ATC  | 50% by Gol and 50% by State Govt./ULB/Parastatal. The operation and maintenance is envisaged on PPP   |
| 6.   | Parking  | 20% from Viability Gap Funding support by Gol and rest on PPP   |
| 7.   | Scheme for modernization of auto rickshaws and taxis management system and public bicycle scheme | 100% funding by Gol   |
| 8.   | Innovations, research and development for guided transit projects and pilot project scheme       | 100% by Gol   |
| 9.   | Institutions and Capacity Building   | 100% by Gol   |
| 10   | Introduction of Public Bicycle Scheme and upgradation of cycle rickshaws                         | 100% funding by Gol   |

In order to facilitate highly capital intensive projects like Metro Railway etc. It is essential to provide cheaper and long tenure finance. Accordingly, the domestic debt is to be facilitated by the Government with Government guarantee and also interest subsidy to the SPV. The Government of India portion is to be met out of the gross budgetary support and/or a dedicated non lapsable and non fungible statutory National Urban Transport Fund to be set up in first year of the 12th Five year Plan.

With the above financing pattern, the detailed financing plan from different sources for the total investment required for urban transport in the 12<sup>th</sup> Five Year Plan works out as follows:

| Source  | Rs in Cr |
|---|----------|
| Central Government                              | 85,843   |
| State Government / Development Authorities      | 1,07,585 |
| Property Development                            | 5,268    |
| Private Sector                                  | 1,35,560 |
| Debt from Multilateral / Bilateral institutions | 31,606   |
| Debt from domestic financial institutions       | 22,447   |

Since the huge investment needs at Central Government level, cannot be met from traditional budgetary sources alone, innovative financing mechanisms will, therefore, require to be tapped if we have to not only catch up with the backlog but also provide for the future. With the traditional methods we shall continue to move from one crisis to another rather than being in control of situation. Learning from the global examples, on the "polluter pays principle", and the Central Road Fund, a dedicated (non lapsable and non fungible) Urban Transport fund should be set up at National level as envisaged in NUTP-2006. Funds at National level should be generated as follows:

- A Green Surcharge of Rs. 2 on petrol sold across the country- the rationale behind the fact that petrol is consumed exclusively by the personalized vehicles. A Green Surcharge on Diesel is not recommended because of multiple uses of diesel and the problems anticipated in segregated diesels sold to personalized vehicles. The green surcharge from petrol in the base year is Rs. 3108 Crore and over the period of first four years of 12th Five Year Plan is 14,050 Crore;
- A Green Cess on existing Personalized Vehicles: at the rate of 3 percent of the annual insured value both for car and two wheelers. It is estimated that during first year will be Rs. 18,163 Crore and the amount over first four years will total to Rs. 83, 753 Crore. For the ease of collection the annual cess will be collected through insurance companies.

Insurance companies presently collect approx 4% of the insured value as insurance premium now they will collect 7% of the insured value and would return 3% of insured value to the government to be put in the dedicated fund;

- Urban Transport Tax on Purchase of new cars and two wheelers at 7.5% of the total cost of the petrol vehicles and 20% in case personalised diesel cars. This will be Rs 20,929 Crore in the first year and Rs. 95,739 Crore over first four years. Diesel cars have been assumed to be 30% of the total cars as against 35% of the present annual sales;

**The total annual yield from the three sources will be Rs 42, 199 Crore in the first year, and Rs 1,93,542 Crores in four years of 12th Five Year Plan period**

The above levies will serve twin purpose of generating dedicated and sustained stream of resources for the dedicated urban transport fund and also, on the other hand serving as a disincentive for use of personalized vehicles as a demand containment measures because merely adding to the supply side of the urban transport is not enough to bring commuters on board.

A similar fund would also need to be set up at State & city level albeit with different sources of funding.

Since there are number of technologies for public transport and some of the technologies especially metro rail are highly capital intensive, it is necessary to have certain guidelines for choice of different modes. However, it is emphasized that buses are and will continue to be the major mode of public transport in all cities and hence citywide organized city bus service as per urban bus specifications under a city specific SPV has to be set up in all cities with a population of 1 lac + Bus rapid transit system, being a cost effective, flexible, scalable and reliable mode of public transport has to be taken up in all 1 M+ cities. It also is to be

noted that in many a cities metro rail, BRTS and buses will have to work seamlessly in an integrated manner along with para transit and Non Motorized Transport (NMT). The guidelines for the choice of different modes are as follows:

| Mode choices  | PHPDT in 2021                              | Population as per 2011 census (Million) | Average Trip length for motorized trips in km |
|---|--|---|---|
| <b>Metro Rail #</b>   | >=15000 for at least 5km continuous length | >=2                                     | >7-8  |
| <b>LRT primarily at grade</b>                                     | =<10,000                                   | >1                                      | > 7-8   |
| <b>Monorail @@</b>  | =<10,000                                   | >2                                      | About 5-6                                     |
| <b>Bus Rapid Transit System</b>                                   | >=4,000 and Upto 20,000                    | > 1                                     | > 5   |
| <b>Organised City Bus Service as per urban bus specifications</b> |  | >1 lac, 50,000 in case of hilly towns   | >2 to 3                                       |

*# for having Metro Rail, the city should have a ridership of at least 1 million on organized public transport (any mode)*

*@@ Monorail is desirable only as a feeder system or where the narrow roads are flanked on either side by high rise buildings. In monorail while the cost of construction, operation and maintenance is almost the same as elevated metro rail, the carrying capacity is much lesser.*

Furthermore, it is to be emphasized that the provision of public transport along certain corridors alone will not be sufficient and number of measures would be required for improving the share of public transport. The critical measures for improving the share of public transport are as follows:

- City wide networked connectivity with efficient interchanges and multimodal integration;

- Focus on accessibility by NMT;
- Funds allocation for major transport infrastructure to be linked to achieving targets for creating facilities for NMT;
- Passenger information system and other ITS Measures, Integrated ticketing through common mobility card, safety and security;
- Travel Demand Management (TDM)
- Integrated landuse and transport planning and Transit oriented Development (TOD).

### **POLICY INTERVENTIONS TO REALIZE THE GOALS FOR THE 12<sup>TH</sup> FIVE YEAR PLAN**

To achieve the sustainable scenario, several policy interventions are needed. Cities should grow as compact cities and be livable and walkable. Public transport should be the ‘preferred’ mode of transport. Urban transport, which is presently a constitutional and institutional orphan, has to be properly recognized in the constitution as well as in the institutional mechanism. The important policy interventions for this are:

- Urban transport to be provided in the concurrent list (List III of Schedule VII) of the Constitution of India;
- A new department of urban transport to be set up in the Ministry of Urban Development at Government of India level and in Municipal Administration and Urban Development Department in each state / union territory within full time Secretary as incharge.
- Setting up of Commission for Urban Road Transport Safety to cover safety certification and audit of road vehicles and road infrastructure in urban areas;
- Setting up of a Commission for Metro Railway Safety;
- Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination and setting up Unified Metropolitan Transport Authority in all million plus cities under the MPC/DPC duly supported by Transport Cell manned by trained Urban Transport professionals;

- The funds flow for urban transport projects to various implementing agencies (as they exist today) to be routed through UMTA;
- Providing infrastructure status to bus transport;
- Setting up of a National Urban Rail Transit Authority;
- Corporatization of suburban rail services – both existing systems and new systems;
- Tax exemptions to be provided for public transport, both for Metro rail as well as for buses so as to make provision of quality public transport cost effective;
- Setting up of Dedicated Urban Transport Fund at National, State level and city level;
- Taking up of new Central Sector schemes for innovation, research and development in guided transit to promote indigenization and development of low cost technologies, pilot projects, public bicycle scheme, improvement of para-transit through Intelligent Transport Systems and setting up of a research, design, standardization and standard setting authority for Metro Railway;
- Continuing the existing schemes of Urban Transport Planning and capacity building in urban transport with additional allocation and scope;
- Cities to be empowered to take care of its needs including Urban Transport;
- Creation of separate NMT cell in each Municipal corporation/ Municipality;
- Tying of small cost projects with large size projects for improving the effectiveness of large size projects;
- Making separate budgetary allocation for different components in the budget especially pedestrianisation, cycle facilities, ITS etc as whatever get budgeted gets done.

## CAPACITY BUILDING

All the above cannot be achieved without strong and effective institutional and implementation framework as well as a massive capacity building effort. At Central level, as envisaged in the NUTP (2006), the Institute of Urban Transport needs to be adequately strengthened with grant funding from GOI to serve as the premier research body and a National level repository of knowledge database for urban transport. Similar institutes may be required at the State Government level as well. Four Centres of Excellence in Urban Transport have been set up. In

addition to further strengthening of these, six more are required to be set up in 12<sup>th</sup> plan with financial support from GOI. The focus has to be on developing sector through creation of a pool of urban transport professionals. The four key activities; Education, training, knowledge creation and dissemination in the field of land use transport would have to be introduced in several institutions across the nation. Training of City and State officials needs to be taken up to develop awareness and skills. Leaders and change agents to be developed in this field through leaders program for in-service officers and young leaders program for the post graduates and other young professionals. State government and city governments/ parastatals need to create jobs for these professionals with common state cadres. At least 1.5% of the cost of each project needs to be earmarked for capacity building efforts.

#### **INSTITUTIONAL AND IMPLEMENTATION FRAMEWORK**

In order to achieve the goals set out for the 12<sup>th</sup> Five Year Plan and also to take up and manage various urban transport projects, it is important that proper institutional and implementation framework is urgently created. Presently urban transport is not the responsibility of any organization and there is general lack of planning skills. Urban transport professionals are generally not employed by city agencies or the State Governments. Accordingly, the following institutional and implementation framework is recommended:

- Set up a new department of Urban transport in the Central Government;
- Set up a new department of urban transport in each state and union territory;
- Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination;
- A dedicated Urban transport authority in million plus cities or for a group of small cities;
- Existing city agencies engaged in implementation and operation of UT related projects to continue with their roles.

The cities should be empowered to take care of their needs including urban transport. The Central Government will take care of issues such as financing, PPP, capacity building, developing a database and R&D. State Government should support the city with an



organizational set up, legislation, a resource generation policy and professional staff. An urban Road Transport Safety Board should be set up at the state level also in each State to deal with safety issues in a comprehensive, scientific and a systematic manner. It should be supported by relevant R&D. Rescue services should be organized for fast relief.

## 1 TERMS OF REFERENCE, REVIEW OF PREVIOUS FYPS AND APPROACH TO 12TH FYP

### 1.1 WORKING GROUP ON URBAN TRANSPORT – TERMS OF REFERENCE

The Planning Commission had constituted a working group under the Chairmanship of Dr. E. Sreedharan, MD/DMRC to make recommendations on urban transport for the 12<sup>th</sup> FYP vide its letter reference No.PC/H/5/4/2010-HUA dated 18th May, 2011 (**Annexure A**). The terms of reference of the working group are as follows:

**Table 1-1: Terms of Reference**

| S. No. | Terms of Reference   |
|--------|--|
| 1      | To critically evaluate the progress achieved under 11 <sup>th</sup> plan in addressing urban transport problem set the goals to be achieved in 12 <sup>th</sup> Plan period. To estimate the financial outlays required for achieving these goals. |
| 2      | To suggest strategy to ensure that urban transport Planning and spatial planning integrated.   |
| 3      | To suggest measures for incentivizing shift from private to public transport.  |
| 4      | To determine broad norms for selecting the different mode of transport in Indian cities.   |
| 5      | To suggest measures for improving the share of non-motorized transport in overall transport within an urban areas and safety.  |
| 6      | Suggest appropriate financing mechanism to meet the outlays required for achieving the goals set for 12 <sup>th</sup> plan period.   |
| 7      | Suggest areas and mode of private sector involvement in development, operation and maintenance of Urban Transport Infrastructure.  |
| 8      | Suggest measures for transportation in cities for their decongestion.  |
| 9      | Suggest ways for achieving proper integration of sub-urban rail network with other modes of Urban Transport like Metro, Buses, Para-transit, Non-motorised transport etc.  |
| 10     | Policy level interventions required as well as capacity building requirements to achieve the goals set for 12 <sup>th</sup> plan period.   |
| 11     | Any other item with the permission of the chairman.  |

## 1.2 REVIEW OF PREVIOUS FYPS

The Constitution of India, as it was framed by the Constituent Assembly, did not specifically foresee urban transport as a problem area and the subject of urban transport was subsumed in the definition of intercity rail and road services in the Constitution. After relative denial of urban transport as a problem for three decades, it was the Sixth Five Year Plan, which for the first time recognized the complexity and seriousness of the increasing urban transport problems and provided some tentative policy direction.

Even though the Sixth Five Year Plan acknowledged the urban transport problem for the first time, it was the Eight Five Year Plan which emphasized on creation of a unified coordination body, articulated the consortium approach to financing as well as that of exploring the options to set up a separate financial institution for tackling the urban transport problems. The plan also categorically emphasized the critical need of a distinct role for Ministry of Railways in planning and providing Metro Rail Systems despite the fact that from 1986 onwards the subject of urban transport policy and planning responsibility was transferred to the Ministry of Urban Development. The total financing allocation to urban transport, since inception of planning in 1950 up to the 8<sup>th</sup> Five Year Plan in 1997, was meager.

The provisions of Ninth FYP were revolutionary. It accepted for the first time, that urban transport was an institutional orphan and there was critical need to develop urban transport institutions to tackle the complex problem. It accepted that there was no escape from upfront heavy investment in Rail based mass transit in metropolitan cities and that private sector financing was not the answer for the same. It mandated financing of metro rail through dedicated levies on both users and non-users and for the first time introduced the idea of setting up of “National Urban Transport Fund”. It emphasized an active co-operation and joint collaborative action by central, state and city governments as the only solution to combat the deteriorating situation of urban transport in cities of India. Unfortunately however, nothing

much happened regarding Urban Transport Fund during the plan period.

The Tenth Five Year Plan articulated the need for legislation as well as the desired financing strategy for Metro Rail development in Indian cities with three million plus population. It reiterated the need to clarify the responsibility of each department of government involved such as the Railways, Urban Development and the State Governments concerned. It recommended setting up a National Urban Transport Development Fund (NUTDF) with seed money of Rs 3,000 Crore with equal amount to be raised through tax/cess. There was no implementation of this recommendation.

The 11<sup>th</sup> FYP laid stress on the need to upgrade the quality of urban infrastructure. It accepted that 'urbanization' is a natural outcome of the process of development and it is therefore necessary to gear up to meet the challenge of the need for providing and upgrading infrastructure and utilities in the cities.

The subsequent midterm appraisal by the Planning Commission noted the emphasis on developing physical infrastructure, including transport to support the accelerated growth of the country's economy. The 11<sup>th</sup> Plan also stressed the need for improving productivity and efficiency and fostering the development of various transport modes in an integrated manner. The thrust in the transport sector was to augment capacity through technology upgrade and modernization.

The aggregate picture emerging from the Mid-Term Appraisal (MTA) is that both physical and financial achievements are better than they were in the past, but they fall short of targets set for the Eleventh Plan. During the first three years of the Eleventh Plan, the central road transport sector is likely to spend Rs 372.92 Crore, against the approved outlay of Rs 1,000 Crore at constant prices, which in percentage terms works out to about 37 per cent. The progress on construction of standalone ring roads, bypasses, grade separators, flyovers, elevated roads, tunnels, road over bridges, underpasses, and service roads on a BOT (Toll) mode scheduled to be completed by December 2014 is not adequate. As on 31<sup>st</sup> July 2009, a length of 19 km was under implementation while the remaining 681 km was yet to be awarded.

Close monitoring of programmes and projects was suggested. This was also considered necessary to set the stage for faster development of this crucial sector in the Twelfth Plan.

The MTA suggested that an integrated view of transport development and policy is taken over a longer-term framework to strengthen the public transport system in the country. To begin with, it is proposed to provide financial assistance for latest technologies such as GPS/GSM based vehicle tracking system, computerized reservation system, automatic fare collection system, and electronic ticket vending system, inter-modal fare integration, and passenger information as well as for preparation of total mobility plan for the entire state. This is bound to improve productivity and efficiency in the public transport system.

The MTA suggested that priority should be given to improving road safety to prevent accidents, save precious lives, and improve safety of all road users. In the Central sector, road safety programmes are implemented through the Road Safety and National Data Base Network and Studies schemes. However, to address road safety issues with vigour and zeal, some new schemes, such as the setting up of the National Road Safety and Traffic Management Board and setting up of Inspection & Certification (I&C) centres in the country are being introduced during the Eleventh Plan.

### 1.3 APPROACH TO THE 12TH FIVE YEAR PLAN BY PLANNING COMMISSION

In the 10<sup>th</sup> Plan the GDP growth averaged 7.7 %.Over the 11<sup>th</sup> Plan period, GDP growth is likely to average 8.2% (short of the 9% target, but still remarkable given the global crisis and drought). However progress on inclusiveness was less than expected. In the 12<sup>th</sup> plan the basic objective is “Faster, More Inclusive, and Sustainable Growth” and could aim at 9.0 to 9.5 percent GDP growths.

For the 12<sup>th</sup> Plan, the Planning Commission has launched a very wide consultative process on the challenges. The feedback suggests a strong demand from all sectors of society to improve implementation, accountability and service delivery. Total Quality Management needs to be introduced at all levels. Professionally managed delivery organizations are needed with clear

mandates and accountability. Mechanisms need to be created at all levels to understand the needs of vulnerable sections of the society and to inform policy-makers.

The objective in transport infrastructure is to ensure sufficient provision for maintenance of the already-built roads; invest in unified tolling and better safety on highways; improve bus services/public transport in smaller cities, towns and districts; and introduce Metros in urban areas through PPPs wherever feasible and through government funding where PPP cannot yield desired result.

Investment required in urban infrastructure is estimated at Rs 60 lac Crores over the next 20 years. There is a need to develop and propagate innovative ways of municipal financing, through Public-Private Partnerships (PPPs). Land management strategies are the key to good urban development as well as financing urban infrastructure development. There is a need for training and capacity building for urban planning and urban services management – for corporators and municipal officials.

Extracts from 11<sup>th</sup> FYP document, Mid-term appraisal and issues for approach to the 12th five year plan are listed in **Annexure B**.

## 2 THE PRESENT URBAN TRANSPORT SCENARIO

### 2.1 INTRODUCTION

The urban transport scenario in Indian cities, today, is headed in the wrong direction. All categories of road users are facing problems in commuting. The pedestrians do not get a safe, conflict-free and obstruction-free path to walk. The cyclists have to fight for the right-of-way with fast moving motorized modes of transport, many a times risking their lives. The user of public transport faces long waiting periods, uncertainty in travel time and difficult conditions of travel. Personal motorized modes of transport are slowed down by the slow moving traffic and face significant delays at traffic signals and road junctions. Road users get restless leading to road rage, rash driving and accidents.

Because of lack of good quality public transport options, last mile connectivity as well as lack of safe infrastructure for non motorized transport (NMT) – pedestrianisation & cycling. The use of sustainable modes i.e. mass rapid transit (MRT) and NMT i.e. walk; bicycle and cycle rickshaw is on a decline. Instead the use of low-capacity and unsustainable modes, i.e. personal car and 2-wheelers is rising. These modes are uneconomic and socially wasteful in the use of road space and are grossly polluting. The resulting imbalance in the use of road space is leading to increasing road congestion, falling journey speed, increasing air and noise pollution and reducing road safety. Fuel, of which a large part is imported, is wasted despite the fact the import prices of petroleum products persist at a level high enough the hurt Indian economy. GHG emissions are also a global concern. There is a general degradation in the quality of life, city efficiency and its economic potential.

The report (May 2008) on **'Study on traffic and transportation policies and strategies in urban areas in India'** commissioned by MOUD (hereafter referred to as MOUD study) shows that the

share of personal modes especially of two wheelers has gone up at 12% per annum in the past two decades, while the public transport share has generally dwindled. The table below compares the share of mass transport in cities of various sizes as observed in 1994 and 2007. A general decline in public transport trips is noticeable in cities of all sizes.

Table 2-1: Public Transport share Comparison 1994 to 2007

| City Category | City Population Range in lac | WSA, 2007 (%) | RITES, 1994 (%) |
|---------------|------------------------------|---------------|-----------------|
| 1             | < 5.0                        | 0.0 – 15.6    | 14.9 – 22.7     |
| 2             | 5.0 – 10.0                   | 0.0 – 22.5    | 22.7 – 29.1     |
| 3             | 10.9 – 20.0                  | 0.0 – 50.8    | 28.1 – 5.6      |
| 4             | 20.0 – 40.0                  | 0.2 – 22.2    | 35.6 – 45.8     |
| 5             | 40.0 – 80.0                  | 11.2 – 32.1   | 45.8 – 59.7     |
| 6             | Above 80.0                   | 35.2 – 54.0   | 59.7 – 78.7     |

**Source:** MOUD study (2008)

Use of NMT has also declined, especially that of cycling and cycle-rickshaws. Road congestion, increase in trip length due to urban sprawl, increase in purchase power of people and totally inadequate facilities for cycling have all contributed to reducing cycling to less than 11% of the mode share which is down from nearly 30% in 1994. Pedestrians continue to be neglected.

## 2.2 PRESENT STATUS OF URBAN TRANSPORT IN CITIES

**The present status of urban transport in our cities can be summarized as follows:**

- The cities are sprawling and there is hardly any credible effort for land use and transport integration at the stage of master planning;
- Investments in quality public transport, NMT are very low. The present paradigm of the Governments is to treat public transport as revenue earning service rather than social service. Role of Government is, therefore, mostly confined to "Permits" and "Challans",



- The investment focus is on supply side alone without any serious efforts towards transport demand management.
- Whenever investments are being made in huge capital intensive projects of Metro rails, the approach is more of a corridor approach rather than "networked connectivity" approach based on a Comprehensive Mobility Plan for the city.
- More and more provisioning for cars and 2 wheelers is being done at the cost of public transport & NMT. As a result trip rates are high (1.2/capita) and increasing to 2/capita. The motorization rates are high and rapidly growing. In fact, on account of lack of availability of credible and quality public transport options coupled with increased affordability of people to own private vehicles, the 2-wheeler ownership rate in Class I cities at all India level is expected to increase from 102 per 1000 population at present to 393 per thousand population by 2021 and for car from 14 to 48 per 1000 population by the same year. Thus the number of cars and scooters/motor cycles in India is expected to grow by more than 3 times by 2021. The vehicle growth rate is expected to be faster than the urban population growth.
- Trip lengths and trip time are increasing because of sprawl, congestion, and non-integration of land use with transport planning.
- The road network in cities is not complete and there is no defined hierarchy of roads leading to congestion on the arterial roads.
- In smaller cities even the basic facilities i.e. proper roads with drainage are missing. Three wheelers, bicycles and walking are major modes of travel but use of private vehicles is exponentially increasing.

All the above issues are further getting compounded on account of multiplicity of institutions for urban transport often working in isolation, lack of capacity at all levels to understand various nuances relating to urban transport, lack of adequate number of transport professionals in the country and lack of adequate and suitable employable opportunities for these transport professionals. The urban transport industry, as a whole, is quite unorganised and inefficient.

### 3 URBANISATION CHALLENGE AND FUTURE GROWTH SCENARIO

#### 3.1 URBANIZATION

Empirical projections of urban growth in India, based on a declining population growth rate and regular decadal increase in migration from rural to urban areas are available. The one billion populations of 2001 is estimated to grow to 1.5 billion by 2031. This estimate is considered conservative. Simultaneously pace of urbanization has accelerated. The decadal percentage increase of urban population that was 2.26 in 2001 is expected to rise to 4 by 2031. By then, the urban population is estimated to double to about 600 million. Very few new settlements, however, are being added. Existing settlements are getting larger, some as urban agglomerations. Cities with population of 1 to 10 million totaled 32 in 2001 and this number is estimated to increase to 85 by 2051. Cities with population in excess of 10 million will increase from 3 to 15 and in terms of million plus cities or 10 million plus cities India will be next only to China which has been investing heavily in public transport for last one decade. Suburbs and satellite towns will be growing around large cities of the country and themselves becoming agglomerations.

#### 3.2 CITIES AND URBAN TRANSPORT

Cities are important as the engines of economic growth. Cities contribute the most to the 'gross domestic product' of a country. This figure today is about 60%. By 2030 this figure is estimated to grow to about 70% further increasing importance of town and cities to economic development of the country. Effective, comfortable, safe, fast and affordable urban transport systems not only increase the commercial and labour market efficiency of cities, but also increase access to amenities, improve general mobility and add to quality of life there by making cities liveable and workable.

“India is poised for rapid economic growth. Such future growth will largely come from the secondary and tertiary sectors of the economy, i.e., the industrial and service sectors. Since economic activities in these sectors primarily take place in urban areas, the state of our towns and cities is crucial to India’s future growth”.  
NUTP 2006

### 3.3 THE CHALLENGE

The biggest challenge that cities will face in the coming decades is urbanization on account of massive migration from rural to urban areas and from small cities to big cities. This, in a way is welcome, as growth in economic activity will require manpower. It will, however, require urban services to be scaled up substantially including facilities and infrastructure for urban mobility. The challenge is made doubly difficult because there is an existing deficit in urban services, housing and urban transport facilities both in quality and quantity. This deficit has to be first wiped out before augmentation and upgrade of facilities to keep pace with growing demand becomes possible. Additionally there is a need to protect the environment which in itself is becoming a serious reason asking for change. Another glaring problem pertaining to urban transport is the fact that persistently the cost of imported fuels the main engine for personalized vehicles is at a level which has continued to bite the Indian economy necessitating faster movement to less fuel consuming modes of public transport.

Mckinsey Global Institute (MGI) has estimated a capital outlay of USD 1182 billion (About Rs 53 lac Crores) for the next 20 years to build up services in cities to enable them to play their role in the desired economic growth of the country. Urban transport and roads together require a major share of the projected investment – half the estimated capex i.e. USD 591 billion (About

Rs 26 lac Crores).

The recent report (March 2011) of the 'High powered expert committee' commissioned by Ministry of Urban Development Government of India estimates a total expenditure of Rs 39 lac Crores on 'Indian urban infrastructure and services' by 2031. The expenditure on urban transport and roads together is more than half the total expenditure at Rs 23 lac Crores.

The total expenditure projected up to 2030 on urban services and the share for urban transport and roads together are massive in both studies. This suggests the importance of urban transport in raising the economic potential of cities.

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### 3.3.1 BUSINESS AS USUAL GROWTH SCENARIO

The MOUD study has projected a business-as-usual (BAU) growth scenario. A representative sample of 87 cities (all State capital cities and with population above 0.5 million) was taken for the study. Out of this thirty representative cities were selected for detailed study. Data was collected through primary and secondary surveys for the 30 sample cities to understand the existing urban transport scene. Household interview survey, cordon survey, terminal survey, speed and delay studies, parking studies, etc, were undertaken to collect primary data. The BAU scenario projected from 2007 to 2030 reads as follows:

- The per capita trip rate for all modes including NMT is estimated to increase from 0.8-1.5 to 1-2 for cities of various sizes;
- The future Public Transport share will decrease from 5-46% to 2-26%;
- Expected average journey speeds on major corridors in future for various city categories will fall from 26-17 kmph to 8-6 kmph;
- The daily trips in the 87 urban centers are anticipated to double from 2286 to 4819 lacs.

“Business-as-usual” will significantly enlarge use of personal vehicles and their costs to society. The Energy and Resources Institute (TERI), a Delhi-based non-governmental organization (NGO), has forecast that India’s commercial energy demand and emissions will increase by

more than seven times under business as usual scenario (if nothing is done to curb the emissions) from the existing levels by 2031/32. A MORTH committee on road safety and traffic management (February, 2007) estimated about 50% increase in road accidents over a 10 year period (2005-15).

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### 3.3.2 DESIRED SCENARIO

The vision for 2030 is that commuting in cities, urban agglomerations as well as suburbs and satellite towns, is safe, seamless, user friendly, reliable and provides good ambience with well behaved drivers and conductors. It should provide access to all citizens to jobs, education and recreation at affordable costs and within reasonable time and minimize overall consumption of fossil fuels, production of green house gases and pollution. The present modal share of public transport and NMT should not be allowed to decline in the 12<sup>th</sup> plan. The cities must be compact instead of present sprawl.

Public Transport Share needs to be improved to 60% of all motorized trips by 2030 and fatalities need to be reduced by 50% in the 12<sup>th</sup> plan.

## 4 GOALS AND INVESTMENT PROPOSALS

### 4.1 APPROACH TO THE 12TH FIVE YEAR PLAN BY PLANNING COMMISSION

The aim of the 12<sup>th</sup> FYP as stated by The Planning commission is to achieve “Faster, More Inclusive, and Sustainable Growth”. The emphasis on augmentation of infrastructure continues and total investment outlay on Infrastructure is projected to be close to US \$ one trillion, double of that of 11<sup>th</sup> FYP.

For the 12<sup>th</sup> Plan the Planning Commission has launched a very wide consultative process on the challenges. The feedback suggests ‘a strong demand from all sectors of society to improve implementation, accountability and service delivery. Total Quality Management needs to be introduced at all levels. Professionally managed delivery organizations are needed with clear mandates and accountability. Mechanisms need to be created at all levels to understand the needs of vulnerable sections of the society and inform policy-makers.

The need for training and capacity building for urban planning and urban services management – for corporations and municipal officials – has also been identified. More specifically the goals set out for transport infrastructure are;

- Ensure sufficient provision for maintenance of the already-built roads;
- Invest in unified tolling and better safety on highways;
- Improve bus services/PT in smaller cities, towns and districts;
- Metros in urban areas through PPPs wherever feasible.

## 4.2 GOALS FOR THE 12<sup>TH</sup> FYP

In the view of the discussions highlighted above, 10 goals have been identified for the 12<sup>th</sup> FYP. These are as follows:

1. To create an effective institutional and Implementation framework that will manage the huge investments envisaged (average of about Rs 1 lac Crores per year) in the urban transport sector – today there is no single agency in the State or the city to manage the multi-component urban transport sector in an integrated and coordinated fashion;
2. To build capacity of State and city officials and other stakeholders including civil society and media –today hardly any state or city has an urban transport professional on its rolls;
3. To create facilities for walking and cycling in all 2 lac+ cities and State capitals – these are non-polluting modes that do not use fossil fuels and provide social equity;
4. To develop an upgraded cycle rickshaw as an integral part of the city wide public transport network to provide the last mile connectivity – this is a non-polluting mode that does not use fuel and provides employment;
5. To augment public transport (population figures as per 2011 Census):
  - a. Introduce organized city Bus service as per Urban bus specifications issued by MOUD in all 2 lac+ cities and State capitals;
  - b. Add BRTS @ 20 km/1 Million population in 51 cities with population > 1 Million;
  - c. Add rail transit at 10 km/ Million. population, start planning rail transit projects in Cities with population in excess of 2 Million, start construction in cities with population in excess of 3 Million. The estimated financial progress during the 12<sup>th</sup> plan period is envisaged at 25% of total cost;
  - d. Expand rail transit In existing mega cities, @ 10 km per/yr. i.e 50 km/yr in 12<sup>th</sup> FYP;
  - e. Provide Suburban rail services in urban agglomerations with population > 4 Million;
  - f. Improve and upgrade Intermediate public transport vehicles.

6. To improve accessibility and mobility in cities through:
  - a. Developing hierarchical road network in newly developing areas
  - b. To complete 25% of major road network in all 2 lac\* + cities with missing links including opening up of dead end roads for better utilization.
  - c. To improve and maintain road surface to the highest standards with good drainage. To regulate and coordinate Work of utility agencies. Today utility agencies do not hesitate in cutting up the road for their work as and when they like and leave it unrepaired or badly repaired.
7. To provide grade separated entries and bye-passes for through traffic
8. To improve road safety which is constantly deteriorating and is claiming an increasing number of lives; Also to improve security against vandalism, crime and terrorism which is becoming an increasing concern; to undertake Safety audits on a regular basis and to plan for security as a part of urban transport planning;
9. To use technology for multimodal integration, enforcement and traffic management;
10. To promote innovation, research and development in guided rail transit, pilot projects with 100% funding from GOI.

#### 4.3 ESTIMATE OF INVESTMENTS NEEDED IN THE 12<sup>TH</sup> FYP

The projected investments with respect of the 11 goals for the 12<sup>th</sup> FYP listed above for street network, both in new areas and for upgrade of existing network and facilities for walk and bicycle and other associated features are summarized below. The estimated investment in the street network is Rs1, 67,218 Crores.



**Table 4-1: Investments in Street Infrastructure**

| S.No  | Component                           | Investment (Rs in Crores) |
|-------|-------------------------------------|---------------------------|
| 1.0   | <b>Street Network - New Areas</b>   | <b>1,01,159</b>           |
| 1.1.1 | Pedestrian, NMV, Streetscape..      | 15,451                    |
| 1.1.2 | Road                                | 85,985                    |
| 2.0   | <b>Street Network - Upgradation</b> | <b>66,059</b>             |
| 2.1.1 | Pedestrian, NMV, Streetscape.       | 27,335                    |
| 2.1.2 | Road                                | 38,724                    |
| 3.0   | <b>TOTAL STREET INFRASTRUCTURE</b>  | <b>1,67,218</b>           |

The projected investment in public transport, bus infrastructure and other associated features is estimated as Rs **2, 02,628** Crores as per the table below.

**Table 4-2: Investments in Public Transport and other associated Features**

| S.No  | Component   | Investment (Rs Crores) |
|-------|---|------------------------|
| 4.0   | <b>PUBLIC TRANSPORT</b>   |                        |
| 4.1   | Buses   | <b>13,759</b>          |
| 4.2   | BRTS  | <b>29,603</b>          |
| 4.3   | Metro Rail  | <b>1,30,726</b>        |
| 4.4   | Commuter / Regional Rail  | <b>19,780</b>          |
| 4.5   | <b>Bus Infrastructure</b>   | <b>8,760</b>           |
| 4.5.1 | Depots  | <b>5,220</b>           |
| 4.5.2 | Terminals   | <b>1,280</b>           |
| 4.5.3 | Workshops   | <b>2,260</b>           |
| 5.1   | ITS and ATC   | <b>8,520</b>           |
| 5.2   | Parking   | <b>1,943</b>           |
| 6.0   | Public bicycle scheme and improving paratransit with ITS scheme   | <b>2000</b>            |
| 7.0   | Innovation, Development of indigenous low cost technologies in guided rail transit, pilot projects scheme | <b>1000</b>            |
| 8.0   | Institutions and Capacity Building  | <b>5,000</b>           |

[Recommendations of Working Group on Urban Transport for 12th Five Year Plan]

| S.No | Component    | Investment (Rs Crores) |
|------|--------------|------------------------|
|      | <b>TOTAL</b> | <b>2,21,090</b>        |

Details of calculations and assumptions made may be seen in the **annexure C**.

A total investment of Rs3,88,308 cr is estimated to achieve the goals laid down for the 12<sup>th</sup> FYP

## 5 FINANCING

Traditionally the financing of urban transport projects in the country has largely been confined to gross budgetary support from the government and the user charges. Due to relative lack of appreciation of heavy investment needs of urban transport and conflicting demands on the general exchequer, the investment in urban transport in past has not kept pace with the rapidly increasing requirement of the sector. With the current level of user charges of limited urban transport facilities, even the operational and maintenance costs are not fully met in most of the circumstances. At the same time providing safe, comfortable, speedy and affordable public urban transport to all has to be a necessary goal of the governance. And if this has to materialize innovative financing mechanism has to be used arrived at and used extensively if the principle of provisioning has to be with a clear eye on “planning for the future” rather than always trying to “catch up with the backlog” - a dictum which has become self fulfilling prophesy in the realm of urban transport. The key funding sources besides GBS and fare box can be dedicated levies, land monetization, recovery from non user beneficiaries, debt and private investments. The paradigm of financing has to clearly move towards non-users pay principle and the polluters pay principle. There is a need for long term sustainable dedicating financing mechanism to address fast worsening scenario in the field of urban transport.

All the various components in which the investment would be required in the 12<sup>th</sup> Five Year Plan would need to be funded through a combination of funding from Govt. of India, State Govt./urban local body, development agencies, property development, loan from domestic and financial institutions as well as PPP. The financing model proposed for each mode/component is tabulated below:

**Table 5-1: Financing Model**

| Mode/ component                     | Proposal   |
|-------------------------------------|--|
| Urban Rail Transit                  | Primarily Government funded except in case of high density and above ground construction where PPP may be feasible |
| Bus Rapid Transit System            | Infrastructure provisioning by Govt. Bus provisioning, O&M preferably on PPP with revenue risk with Government     |
| City Bus Service                    | Bus provisioning, O&M preferably on PPP with revenue risk with Government  |
| Public Bicycle Scheme               | Cycle stations and Control centre by Government, Cycles , O&M by PPP   |
| Bus depots/ Terminal and work shops | Land by Government, Development preferably on PPP  |
| Roads and NMT facilities            | New roads as part of Urban Development through self-financing. Existing roads up gradation by Govt.                |

Since the major investment in public transport is required in urban rail transit – metro rail and commuter/regional rail – metro rail systems in 132 cities of the world were studied to get an insight into the ownership and financing experience as well as use of PPP in metro rail development. Of the 113 cities, which already have metro rail operational, 88% have been developed and are presently being operated and maintained in public sector mode whereas only 12% cities have some form of public private partnership. Even in 19 cities where new metro rail projects have been taken up, only 7 projects have private ownership. The public private partnership in metro rail development, as per the experience of London, Bangkok, Manila, Malaysia, etc. has not been encouraging even though PPP in other modes of transport has been an important financing mechanism. However, limited application of PPP has been noticed in the operation and maintenance phase. Accordingly, on the basis of the global experience and the need for rapid expansion of urban rail transit projects, it has been proposed to take up such projects with largely on Govt. funding pattern with only about 30% of such projects being taken up on public private partnership, especially when the entire section is elevated and the ridership is very high.

In order to work out funding requirement from each agency, for each component the funding has been assumed/envisaged as under:

**Table 5-2: Funding Agency**

| S.No | Component   | Investment  |
|------|---|---|
| 1.   | <b>Street Network - New Areas</b>                 | Contribution from private party as the cost of development itself i.e. self financing   |
| 2.   | <b>Street Network - Upgradation</b>               |   |
| a.   | Pedestrian, NMV, Streetscaping                    | 50% by Gol and 50% by State Govt./ ULB/ Parastatal  |
| b.   | Road  | 20% by Gol, 80% by State Govt./ULB/Parastatal   |
| 3.   | <b>Public Transport</b>                           |   |
| a.   | Buses   | 50% by Gol, 30% by State Govt./ULB/Parastatal, 20% by private investment  |
| b.   | BRTS  | 50% by Gol and 50% by State Govt./ULB/Parastatal  |
| c.   | Metro Rail, Commuter / Regional Rail              | <p>About 30% projects are envisaged on PPP with 20% Viability Gap Funding from Gol and 20% Viability Gap Funding from State Govt.</p> <p>For the remaining 70% of projects, funding envisaged is 20%(30% in exceptional cases) from Gol as equity/subordinate debt/grant (as a suitable combination), 20% from State Govt./Parastatal, 5% from property development,5% from Developmental agencies, 50% as loan from international and domestic financial institutions.</p> |
| 4.   | Bus Infrastructure (Depots, Terminals, Workshops) | 50% by State Govt. and 50% by PPP   |
| 5.   | ITS and ATC                                       | 50% by Gol and 50% by State Govt./ULB/ Parastatal. The operation and maintenance is envisaged on PPP  |
| 6.   | Parking   | 20% from Viability Gap Funding support by   |

| S.No | Component   | Investment          |
|------|---|---------------------|
|      |   | Gol and rest on PPP |
| 7.   | Scheme for modernization of autorickshaws and taxis management system and public bicycle scheme | 100% funding by Gol |
| 8.   | Innovations, research and development for guided transit projects and pilot project scheme      | 100% by Gol         |
| 9.   | Institutions and Capacity Building  | 100% by Gol         |
| 10   | Introduction of Public Bicycle Scheme and upgradation of cycle rickshaws                        | 100% funding by Gol |

In order to facilitate highly capital-intensive projects like Metro Railway etc. It is essential to provide cheaper and long tenure finance. Accordingly, the domestic debt is to be facilitated by the Government with Government guarantee and also interest subsidy to the SPV. The Government of India portion is to be met out of the gross budgetary support and/or a dedicated non-lapsable and non-fungible statutory National Urban Transport Fund.

Most of the development authorities, through land monetization, are flush with funds. Since urban transport development is the most important component of the city development, each of the rail based mass rapid transit project should be part funded by such development authorities which may vary from 5% to even 100% - as these development agencies are one of the main beneficiaries of the provisioning of metro rail in a city. In case of metro extension to Noida and Gurgaon, Gurgaon and Vaishali-Ghaziabad, 100% portion of funding from the State Government has been provided by the respective development authorities. Even in Delhi, DDA has provided considerable financial support for Phase-I and Phase-II of Delhi Metro and is expected to provide 5% of the cost of Phase-III of Delhi Metro.

## 5.1 BUS FINANCING

Till 2009, Central Government had not contributed for financing of buses for city transport, treating it as entirely as responsibility of the state governments. However, considering the

importance of bus transport as the major transport provider in all cities and also the tremendous impact of the Central financing for city bus transport under JnNURM in the 11<sup>th</sup> Five Year Plan wherein the complete city transport bus scene was transformed across the country, it is essential for the Central Government to part finance the modern intelligent transport systems enabled city buses in the 12<sup>th</sup> Five Year Plan also to the extent of 50% of the cost of the bus and ITS infrastructure.

Furthermore, the bus based transport projects would need to be given infrastructure status as is available to railway projects so that these projects can take advantage of priority financing, lower rate of interest, financing for working capital, longer tenure of financing, and other fiscal incentives.

## 5.2 FINANCING FOR PUBLIC BICYCLE SCHEME AND MODERNISATION OF AUTORICKSHAWS' AND TAXIS' MANAGEMENT SYSTEM

Autorickshaws and taxis are important modes of intermediate public transport. At present, majority of these are owned by individual owners who own only one or two each. If all these autorickshaws and taxis are fitted with GPS and GPRS and made to subscribe to the common control centre, their operation can be scientifically managed by assigning trips to them from the common control centre. This would avoid about 20% of empty running of these vehicles and also clogging of bus stations and other major areas of origin of passengers. By having a computerized management system, on the lines of what exists in Singapore or Sharjah, the passengers can call a common control centre and can get an autorickshaw or taxi to his/her destination. Such transformation would not happen without the required financial support from Government of India. Accordingly, it is proposed that incentive to the autorickshaws and taxis to the extent of about 20% of the cost of GPS/GPRS may be provided entirely by the Central Government while the remaining cost may be facilitated by the State Government through loans from banks. The State Government should set up the common control centre through private investors who can get return on their investment through the subscription charges to be paid by the autorickshaws and taxis.

Similarly, cycling is an important mode for the last mile connectivity and is a zero-pollution mode. If cycling is to be made popular urgent pro-active steps are required. Presently, on account of excess motorization as well as total focus on provisioning for private vehicles, the share of cycling is declining rapidly. As such, it is proposed that ITS enabled public bicycle schemes with modern cycles are introduced in all the 5 lac plus population cities with a complete infrastructure cost of cycles and cycle stands as well as control centre being borne by Government of India whereas the operation and maintenance to be done through public private partnership.

### 5.3 INNOVATIONS, RESEARCH AND DEVELOPMENT FOR GUIDED TRANSIT PROJECTS AND PILOT PROJECTS FUNDING:

It is important to fund innovations so as to develop new cost effective technologies. Presently the research and development of indigenous low cost technologies in the field of metro rail projects is just not available in the country. As a result, we are largely dependent upon imported technologies, especially for metro rail coaches, signaling, automatic fare collection, as well as overhead electric traction and track structure. It is important to take up research and development in these sectors by supporting research in Indian firms which can help in development of low cost indigenous technologies and thereby reducing the cost of these items of the order of 50% or so. This small investment of few hundred Crores in R&D through developmental orders will go a long way in saving thousands of Crores of the project cost, beside making India as the manufacturing hub in these areas. Since, these are absolutely new areas and there is no assured market for these projects, it is absolutely unlikely that any of the company would venture into the risk of R&D without Government support.

Similarly, certain pilot projects for these new technologies also need to be taken up with 100% funding from the Government to promote demonstration projects.



**It is important that the entire developmental risk as well as the cost is borne by Government of India and accordingly, it is proposed to launch a new scheme for the same during the 12<sup>th</sup> FYP with 100% financing from GOI to the extent of 1000 crores**

Based on the above financing pattern, the detailed financing plan from different sources for the total investment required for urban transport required in 12th Five Year Plan works out as follows:

**Table 5-3: Financing Plan**

| Source  | Rs in Cr |
|---|----------|
| Central Government                              | 85,843   |
| State Government / Development Authorities      | 1,07,585 |
| Property Development                            | 5,268    |
| Private Sector                                  | 1,35,560 |
| Debt from Multilateral / Bilateral institutions | 31,606   |
| Debt from domestic financial institutions       | 22,447   |

#### 5.4 NATIONAL URBAN TRANSPORT FUND

Since the huge investment needs at Central Government level cannot be met from traditional budgetary sources alone, innovative financing mechanisms will, therefore, require to be tapped if we have to not only catch up with the backlog but also provide for future. With the traditional methods we shall continue to move from one crisis to another rather than being in control of the situation. Learning from the global examples, on the "polluter pays principle", and the Central Road Fund, a dedicated (non lapsable and non fungible) Urban Transport fund should be set up at National level as envisaged in NUTP-2006. Funds at National level should be generated as follows:

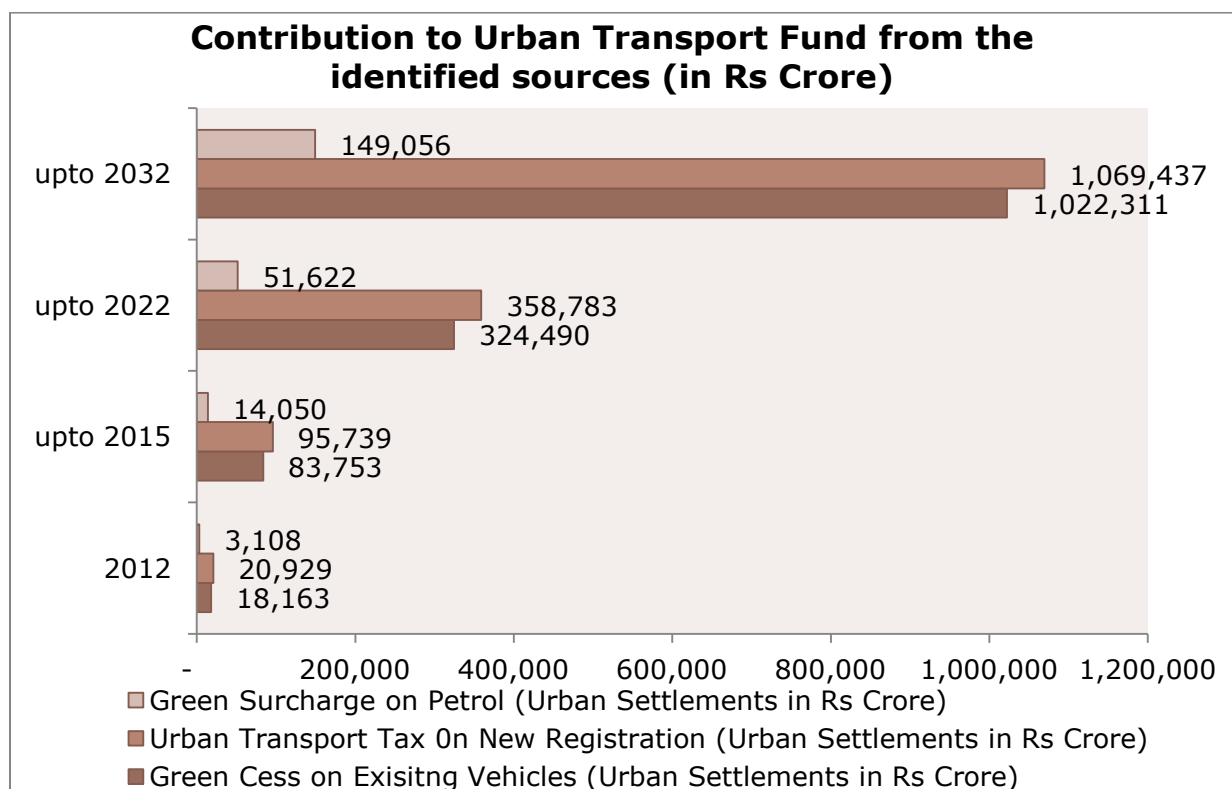
- A Green Surcharge of Rs. 2 on petrol sold across the country- the rationale behind the fact that petrol is consumed exclusively by the personalized vehicles. A Green Surcharge on Diesel is not recommended because of multiple uses of diesel and the problems anticipated in segregated diesels sold to personalized vehicles. The green surcharge from petrol in the base year is Rs. 3108 Crore and over the period of first four years of 12th Five Year Plan is 14,050 Crore;
- A Green Cess on existing Personalised Vehicles: at the rate of 3 percent of the annual insured value both for car and two wheelers. It is estimated that during first year will be Rs. 18,163 Crore and the amount over first four years will total to Rs. 83, 753 Crore. For the ease of collection the annual cess will be collected through insurance companies. Insurance companies presently collect approx 4% of the insured value as insurance premium now they will collect 7% of the insured value and would return 3% of insured value to the government to be put in the dedicated fund;
- Urban Transport Tax on Purchase of New Cars and Two Wheelers: at 7.5% of the total cost of the petrol vehicles and 20% in case personalised diesel cars.=This will be Rs 20,929 Crore in the first year and Rs. 95,739 Crore over first four years. Diesel cars have been assumed to be 30% of the total cars as against 35% of the present annual sales;
- **The total annual yield from the three sources will be Rs 42, 199 Crore in the first year, and Rs 1, 93, 542 Crore in four years of 12th Five Year Plan period.**

The above levies will not only help in generating dedicated pool of resources for taking up urban transport projects but would also serve as a great disincentive for use of personalized vehicles. This will serve the twin purpose of providing quality public transport infrastructure and services at affordable cost but also reducing congestion and curtailing travel demand on account of use of personalized vehicles. All the above sources have high impact and high feasibility in terms of actual annual accrual to the national urban transport fund.

A green cess on existing personalized vehicles has been proposed on the insured value of the vehicle so as to link it to the paying capacity.

In case of diesel cars, the urban transport tax has been recommended at 20% in order take care of the fact that diesel is available at substantially subsidized price and will continue to be so in near future.

At a time when the exchequer faces the dilemma of meeting ever growing demand from various sectors amidst constrained government sources of finances and in an environment where PPP can only very partially meet the financing needs of urban transport, the proposed National Urban Transport Fund presents itself as an effective means for funding the urban transport need during the 12th Five Year Plan and beyond. In fact the actual potential of this source is much higher than what even the calculations project. **The total annual yield from the three sources is starting from a total collection of Rs 42,199 Crore in the first year, the sources can collect Rs 1, 93, 542 Crore in first four years of 12th Five Year Plan period and a whopping Rs. 22, 40, 804 Crore in twenty years timeframe . Detailed calculations and assumptions made are listed in annexure C.**



#### 5.5 DEDICATED URBAN TRANSPORT FUND AT THE STATE AND CITY LEVEL:

A dedicated urban transport fund would also need to be created at the State level and city level through other sources, especially land monetization, betterment levy, land value tax, enhanced property tax or grant of development rights, advertisement, employment tax, congestion, a cess on the sales tax, parking charges reflecting a true value of the land, traffic challans etc. Pimpri-Chinchwad Municipal Corporation has already set up a dedicated urban transport fund through land monetization and advertisement rights. Similarly, Karnataka has set up a dedicated urban transport fund through MRTS cess on petrol and diesel sold in Bangalore which is being used to fund the metro rail projects.

#### 5.6 WAIVING OF TAXES, SUBSIDY IN THE FORM OF CHEAPER ELECTRICITY, ETC.

The present paradigm is to treat public transport and intermediate public transport as commercial activities and accordingly, revenue generating activities. However, the fact is that these are social services and accordingly required to be viewed differently with the appreciation that all sections of the population are to be provided with safe, speedy, comfortable modes of public transport at affordable prices. Presently, taxes and duties at Central and State Government level constitute to about 25% of the total project cost. Accordingly, it is in the interest of the nation and the concerned State that public transport is exempted from all taxes both for metro rail as well as for buses so as to make provisioning of quality public transport cost effective. This exemption needs to be extended for at least the next 10 to 15 years so that quality public transport is provided in all the cities and this becomes a preferred mode of transport. These exemptions should extend to private sector as well so long as they are providing public transport.

## 5.7 FINANCING FOR URBAN TRANSPORT IN NEXT PHASE OF JNNURM

In the current phase of JnNURM a total of about 21% cost of sanctioned projects consisted of urban transport projects?

**“It is recommended that this should be doubled in the next phase of JnNURM till such time the dedicated urban transport at National level is established and sufficient inflows are generated to finance the urban transport projects”**

## 6 PPP IN URBAN TRANSPORT

In view of the shortage of funds from budgetary source and the need of fast tracking the investments in infrastructure, one of the possible options is resorting to PPP. Accordingly, as a matter of policy, it is being promoted so that the infrastructure development can keep pace with the requirement for economic development. However PPP is not a panacea for all situations. The arguments for PPP approach as well as implementation by Government agency for MRTS projects (Rail) are listed in the following sections.

### 6.1 IN FAVOUR OF PPP

Broadly, following arguments have been given in favour of the PPP approach in procuring a construction cum operation/maintenance contract:

- It brings in private capital, hence the pace of developing infrastructure can be ramped up to meet the urbanization challenge;
- It brings in efficiency;
- Suitably structured, the financing, project and traffic related risks are transferred to the concessionaire thereby saving the exchequer from avoidable exposure;
- There may be lobbying for sanctioning of the cost intensive projects like rail transit projects on popular consideration which are neither justified on the ground of present traffic nor has the scope for significant Transit Oriented Development. Under PPP model, since the traffic risk is to be borne by the concessionaire, the justification for the project is decided by the market;
- PPP in construction phase also leads to PPP in O&M phase with ease. A private concessionaire, if awarded the responsibility of both construction and later running of the project, is likely to take a long-term perspective in design, quality and standard and would bring in cost saving innovations. On the other hand if a project is developed and

operated / maintained by different entities, risk and reward are not properly aligned. An O&M concessionaire may attribute any disruption in service to the design fault and hence such arrangement may lead to disputes;

- Unlike Government owned SPV projects, the liability of Government of India in a PPP project is limited to paying VGF which is alone time expenditure, determined by market and hence not open ended.

## 6.2 IN FAVOUR OF GOVERNMENT COMPANY AS THE IMPLEMENTING AGENCY

While prima facie, these arguments seem to settle the case in favour of PPP projects, the alternative of constructing rail transit by Government agencies has equally valid arguments. The important ones are listed below for easy reference:

- If international experience is any indication, the evidence is overwhelmingly in favour of rail transit projects being developed in the Government sector. The Global experience of PPP in rail transit on BOT basis has not been very encouraging. Even in India, the experience so far is not very promising - it is still very early stage for Hyderabad Metro after years of delay in concessioning, mere 12 kilometre Line I of Mumbai Metro is still far from completion and even after nearly year and half of award of the Mumbai Line II execution is still to commence;
- Since these projects are capital intensive and are unlikely to be viable on the basis of fare box revenue alone, especially in India where there is obvious limitation in raising the fare, for taking up the project under PPP, the contract needs to be suitably “sweetened”. Normally this comes as real estate development rights. The enhancement in the value of the real estate is potentially substantial. Since optimal utilization of expensive infrastructure like rail transit would require densification, higher FAR and removal of land use restriction, all these measures would lead to a substantial appreciation in value of real estate in due course. As development rights under a PPP contract, which has to be specified upfront at the time of floating of bid, it implies that any rise in value of real estate which takes place subsequent to operation of project is

captured by the private concessionaire. It is akin to distress sale of family silver for finding capital for the project. Seen from this perspective, development of capital intensive MRTS projects should be preferably done by Government agencies;

- Besides, the ridership in rail transit generally rises as the network gets larger and larger. Under PPP, the concessionaire of the initial segment of the project is likely to benefit from the extension of the network without contributing anything for new segment;
- In addition, broadly, there are following implementation issues against adoption of PPP route because:
  - The execution of project involves series of permissions, acquisition of land etc. A government agency is better placed to assume all these risks as compared to a private entity. Considering the sensitivity in acquisition of land, a government entity is better placed in doing so especially if the concerned land is for creation of a public service;
  - It has been argued that relatively speaking, a lack of capacity to execute projects like rail transit is likely to be more acutely felt by a private concessionaire;
  - Standardization of specification and technology in a rail transit like project is of immense value and a pre-requisite for innovation. This can be achieved more easily if the projects in different part of the countries are built by Government agencies;
  - Integration of various corridors/phases of project, in case of PPP is extremely difficult;
  - A private party works on upfront its returns. As such in case of failure of PPP, Govt. will be left with huge liabilities as has been the case with most of the metro rail projects attempted on PPP in Asia- Kuala Lumpur, Bangkok and Metro Manila;
  - Since these projects are highly capital intensive, the cost of capital is a critical issue. Government can raise capital at a much cheaper cost as compared to a private party thus bringing down the cost of the project.



Some of the concerns expressed as justification against going for the Government controlled SPV route for MRTS projects may be addressed as follows:

| Sl. No | Concern   | Remedy  |
|--------|---|---|
| 1      | Under SPV route, Government of India is exposed to open ended and uncertain liability | In case the project is developed in central sector through SPV having participation of GoI and the State Government, a shareholder agreement limiting the liability of one of the shareholders (GoI) may be entered into. (as in case of Chennai Metro Rail project, Bangalore and Kolkata metro)   |
| 2      | Lobbying for frivolous project on popular consideration                               | Can be addressed, if guidelines for developing a rail transit project are specified.  |
| 3      | Difficulty in awarding O&M contract to a private entity in case he is not a developer | Can be addressed if the components of the projects are standardized during construction.  |
| 4      | PPP brings in private capital whereas Government funding is limited                   | Appropriation of enhancement in value of land by Government agency and formation of a dedicated urban transport fund may address the issue. Non availability of money with government in itself cannot be sufficient justification for trying to force PPP over a sector- which is not as contestable as some other sectors of transport- there by limiting its appetite for PPP. |

### 6.3 INTERNATIONAL EXPERIENCE

International experience in urban rail concessions is given in table below:

**Table 6-1: International Experience in Urban rail concessions**

|                                     | BTS<br>Bangkok   | KL                            | Buenos<br>Aires  | Rio-<br>deJeniro            | Stockho<br>lm                  | Melbo<br>urne                      | Blue line<br>BTS<br>Bangkok | Manila<br>Line 3  |
|-------------------------------------|------------------|-------------------------------|------------------|-----------------------------|--------------------------------|------------------------------------|-----------------------------|-------------------|
| Finance                             | Non-<br>Recourse | Privat<br>e<br>owne<br>r-ship | Public<br>sector | Public<br>sector            |                                |                                    |                             |                   |
| Commercial<br>Risk                  |                  | Govt.                         | Private          | Private                     |                                |                                    |                             | Govt.             |
| Concessionaire                      |                  |                               | 6                | 2                           | Services<br>provisio<br>n only | Service<br>s<br>provisi<br>on only |                             | Operati<br>on     |
| Operating &<br>capital<br>subsidies |                  |                               | Yes              | Large initial<br>investment |                                |                                    |                             |                   |
| Infrastructure                      |                  |                               |                  |                             | Public<br>sector               | Public<br>sector                   |                             |                   |
| Construction<br>cost risk           |                  |                               |                  |                             |                                |                                    |                             | Private<br>sector |
| Financial<br>restructuring          | Yes              | Yes                           |                  |                             |                                | Failed<br>comple<br>tely           |                             |                   |
| Performance                         | No               | No                            | Successf<br>ul   |                             |                                |                                    | No                          | No                |

#### 6.4 A CONCLUSION ON PRIVATE FINANCE OF URBAN INFRASTRUCTURE IN ASIA

ADB (2007) summarizes the constraints on private finance of transport infrastructure in Asia as follows.

“Even as progress has been made in ADB's developing member countries to increase the presence of the private sector in urban infrastructure, investments have not matched needs. There are major gaps that can be reduced only through robust and persistent efforts to improve:

- the legal, regulatory, and institutional frameworks within which private sector participation via PPPs is enabled and the authorization, treatment, and use of debt is allowed to operate;
- local variables (e.g., the size, tax base, accounting and debt management) which, in their current form, severely limit local governments ability to tap financial markets;
- the facilitative arrangements (credit enhancement mechanisms, credit rating systems) that enhance the borrowing and repayment capacities of local governments;
- The technical and managerial capacity of cities to become financially credible and accountable.

It also requires better coordination among international agencies, and newer and improved modalities in their financing support for urban infrastructure in order to catalyze private sector finance in scale.

In total, attracting funds requires great improvements in accountability by all participants. That accountability, and the greater trust it can engender, comes from better information flows and the freeing up of incentive mechanisms that lower costs and improve performance. As long as there are alternatives that the private sector perceives as having lower political and operating risk and as easy to arrange, then it will ration funds to infrastructure projects by raising the financial cost. Therefore, in order to improve local governments' effectiveness in their use of funds and to increase the amount of funds raised from markets, incentives (both positive and negative) need to be clear. If useful incentives are clear and distinct, they can motivate better use of resources and the search for better ways to serve the public interest. Likewise, a balance must be kept between the interests of infrastructure users and its ultimate providers, individual savers, and taxpayers.”

## 6.5 SUGGESTED APPROACH AND ROLE OF PPP FOR RAIL TRANSIT PROJECTS:

The following PPP approach is recommended:

- PPP in MRTS projects should be permitted if a project is found to be fit and viable for this approach on account of ridership. This, however, should not be linked with providing land for property development beyond what is needed for the operation of rail transit;
- The decision of using PPP for O&M should be left to the project owner;
- Different models of PPP should be allowed to develop and flourish;
- This should be done in the overall ambit of realization that very few Metro Rail projects are amenable to PPP

## 6.6 PPP IN BUS TRANSPORT

Presently the following forms of PPP in bus transport are being followed in most cases:

1. Route permits for a fee;
2. Wet lease and dry lease;
3. Net cost contracts/concessions;
4. Gross cost contracts/concessions in limited cases e.g., Janmarg in Ahmedabad, and cluster scheme in Delhi.

The first three models have failed to usher in quality public transport at affordable cost as the revenue risk in case of permit system as well as net cost contract lies entirely with the private party. Since fares cannot be high as a matter of public policy, the fare box revenue can only sustain a poor quality bus and service. In such systems the government completely absolves itself of any responsibility in majority of the cases. As a result the ultimate sufferer is the public and this itself has been one of the major causes for proliferation of personalized transport.

**It is recommended to have a complete paradigm shift in treating city bus transport as a public service and not just a revenue earning service. PPP in bus transport is recommended on “Gross cost” model with the revenue risk being taken by the Government**

Other areas of urban transport where PPP can be adopted are:

1. Intelligent transport system provisioning, operation and maintenance;
2. Automatic fare collection system;
3. Scientific management of cycle rickshaws and auto-rickshaws/taxis with all ITS features;
4. Public bicycle system;
5. Maintenance of arterial roads and street furniture on annuity basis;
6. Development and maintenance of bus stations, depots, terminals , and workshops with property development;

Development, operation and maintenance of multistory/underground parking along with the responsibility of park and ride facility as well as removal of unauthorized parking on the streets in 500m radius circle around the multistory/underground parking lot.

## 7 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION

### 7.1 INSTITUTIONAL FRAMEWORK

Our record in implementation is generally poor. Inaction today in urban transport stems from two main factors; Urban Transport is the responsibility of no organization and a general lack of planning skills. Urban transport professionals, as a rule are not employed by cities. Keeping in view the investments projected, the institutional framework for urban transport has to be extensive and more importantly effective. It can be described as follows:

- Urban Transport to be listed in Concurrent list (List III of Schedule VII) of the Constitution of India;
- A new department of Urban transport in the Central Government headed by Secretary
- A new department of urban transport in each state and union territory headed by Principal Secretary;
- Urban Transport to be listed in Concurrent list in the constitution;
- A new department of Urban transport in the Central Government;
- A new department of urban transport in each state and union territory;
- Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination;
- A dedicated Urban transport authority in million plus cities or for a group of small cities
- Existing city agencies engaged in implementation and operation of UT related projects to continue with their roles.

The cities should be empowered to take care of their needs including urban transport. The Central Government will take care of issues such as financing, PPP, capacity building, developing a data base and R&D. State Government should support the city with an

organizational set-up, legislation, a resource generation policy and professional staff. A Road Transport Safety Board should be set up at State level in each State to deal with safety issues in a comprehensive, scientific and a systematic manner. It should be supported by relevant R&D. Rescue services should be organized for fast relief. The organizational set up in the city needs to be 3-tier as follows:

- Metropolitan/District planning committee for inter-sectoral coordination;
- Dedicated Unified Metropolitan transport authority for intra-sectoral coordination;
- Other existing city agencies for implementation and operation.

A dedicated Unified Metropolitan Transport Authority (UMTA) should be set up for million plus population cities or a group of small cities and report to the State Government. It should be a full time professional body working under a city council with representation from all city agencies and stakeholders including the surrounding region. It should undertake integration and approval of proposals by city agencies such as the Municipality, Development Authority, Regional development authority and traffic police; strategy and policy functions; regulatory functions; transport demand management; organizing urban transport services; providing common services; resolution of day to day matters and monitor the work assigned to implementing agencies both for the city and the surrounding region. For UMTA to be effective it should be backed by legislation and the entire funding for urban transport should be routed through UMTA.

## 7.2 LEGISLATION

There is no legislation at present that covers the requirements of urban transport comprehensively. The Motor Vehicles Act deals with the licensing of vehicles, Railway Act covers inter-city traffic, Metro Construction Act deals with the specific issues related to construction of the metro rail, Tramways Act deals with tramways within the road surface with free access across it. Other modes of mass rapid transit such as the bus rapid transit, the light rail transit the mono rail and several other guided modes of transport and issues of transport

planning, multi-modal integration, safety, tariff and financing are not covered under any act.

Urban transport affects all aspects of city life and the working of nearly all other city agencies. It affects the safety of people traveling in the city. Its fare structure has socio-economic implications. A quality transport quality infrastructure provides stimulus to inclusive economic growth in its catchment area. Its modal share composition affects the environment. Its economics depends on the effectiveness of multimodal integration. UT plans have to be implemented over a period of time and hence require continuity. To take care of these and several other aspects, an agency needs to be made responsible for providing UT needs legislative support. A comprehensive UT act to cover all aspects of urban transport is essential. Contents of such an act are listed in **annexure E**. The act should be enacted by the Central Government and States may draft rules under it as per its needs as in the case of Motor vehicles act.

### 7.3 IMPLEMENTATION OF METRO RAIL PROJECTS

Since metro rail projects are relatively of recent origin for implementation in India, there are number of issues relating to their implementation. The following are the major issues:

- 1) Whether the Central or State subject;
- 2) Under what legislation these are to be implemented;
- 3) The formation of Joint Ventures and issue of efficient governance,
- 4) Innovation, capacity building and general supervision
- 5) Safety certification.

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#### 7.3.1 METRO RAILWAY AS A CENTRAL VS STATE SUBJECT

“Metro railway” is a “railway” as per List I Entry 22 of the Constitution and is distinctly different from “Tramway” which is a State subject as per entry 13 of list II of the Constitution. Technologically Metro Railway and Tramway are two different rail guided technologies and hence mere a geographical area cannot turn the metro railway into tramway and vice-versa.



Accordingly, the Metro Railway projects are to be implemented as Central sector projects. However, since there are 30 cities in India with more than 2 million populations which might be implementing Metro rail at some stage or the other, it will be important to design the implementation structure in a manner such that the metro rail development can happen unhindered in the country. Various types of models for taking up of these projects can be adopted as detailed below-

**Table 7-1: Financing Models for Metro**

| Financing Model                                      | Funding from Gol                            | Funding from State Govt./para-statal            | Funding from Pvt. Party | Procedure of sanction   | Institutional mechanism  | Remarks   |
|--|---|---|-------------------------|---|--|---|
| 100% Govt. funding by Gol                            | 100% by MoR                                 | Nil   | Nil                     | Union Cabinet sanction  | Zonal Railway/SPV by MoR   | Kolkata Metro North South corridor and other metro projects in Kolkata taken up by MoR. State Govt. may also contribute part funding as grant to MOR as is done in case of Kolkata Metro. |
| 100% funding by State Govt.                          | Nil   | 100% by State Govt.                             | Nil                     | Appraisal by MoUD and sanction by UDM under the Central Acts on receipt of proposal from State Government | State Govt. SPV  | Stage-I of Jaipur Metro sanctioned on this model  |
| Central Govt. and State Govt owned SPV as 100% Govt. | Equity 10-15%.<br>Subordinate debt to cover | Equity 10-15%.<br>Subordinate debt to cover 50% | Nil                     | Union Cabinet sanction for new projects in new cities and thereafter                                      | Joint ownership SPV of Central Govt. (MoUD) and concerned State Govt. This is the preferred mode for taking up Metro | Delhi Metro, Bangalore Metro, Chennai Metro and Kolkata Metro (East West corridor) taken up on this model. Loan from  |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Financing Model             | Funding from Gol   | Funding from State Govt./para-statals                                | Funding from Pvt. Party | Procedure of sanction   | Institutional mechanism  | Remarks  |
|-----------------------------|--|--|-------------------------|---|--|--|
| Company (DMRC model)        | 50% of Central taxes.<br><br>Senior term debt from Financial Institution | of Central taxes.<br><br>Senior term debt from Financial Institution |                         | by Empowered Group of Ministers on MRTS                                       | projects. In case of 7 mega cities mega cities.<br><br>Secy. (UD), Gol as ex-officio Chairman and the nominee of the State Govt. as full time MD. However, for smaller cities full time MD can be the nominee of the Central Govt. and ex-officio Chairman can be the Chief Secretary of concerned State Govt. | multilateral and domestic financial institution to be facilitated through Govt. guarantee.   |
| Complete Private initiative | Nil  | Nil  | 100%                    | Appraisal by MoUD and sanction by UDM on receipt of proposal from State Govt. | State/parastatal to be the concessioning authority. However, Oversight Committee of the project is at the level of Secy. (UD), Gol   | Rapid Metro Rail, Gurgaon has been taken up on this model. However, as per the legal opinion of the Ministry of Law under the Central Metro Acts the concessioning authority has to be the Central Government acting through Secy., Ministry of Urban Development and the State Govt. has to give State Govt. Support Agreement. |

However, even though Metro Rail is a Union List Subject, participation of the State Government is considered very crucial for the implementation of the project and also its multimodal integration with other modes.

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### 7.3.2 LEGISLATION

All the metro rail projects are to be covered under the Metro Railways (Construction of Works) Act, 1978 and the Metro Railways (Operations and Maintenance) Act, 2002. However, the present Acts need some amendments to bring more specific provisions regarding PPP projects and also to empower State Governments within the ambit of the Constitution.

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### 7.3.3 FORMATION OF JVS AND ISSUE OF EFFICIENT GOVERNANCE STRUCTURE

Delhi Metro railway project was the first project implemented on a 50:50 Joint ownership pattern of the Central Government and the Government of Delhi and it is proved highly assessable in delivering the highly complex and capital intensive project of Delhi Metro Phase-I and Phase-II within time and cost. Some concerns have been raised whether this 50:50 JV is having any accountability. In this connection it is mentioned that it has dual accountability as it is accountable not only to Parliament but also to the State legislature. It is governed by the CVC guidelines and audit by CAG. Another concern which is raised is that in such case Central Government is exposed to share unlimited liability. This concern can be addressed by a share holders' agreement from the operational losses as is being done in case of Bangalore Metro, Chennai Metro and Kolkata Metro (East West) corridor. Furthermore the Committee of Secretaries, while discussing the Metro Rail Policy in July 2009, has clearly decided that the cities cannot be left to fend for themselves in this important area of development and hence the Central Government should be in the equity holder in the entire process.

#### 7.4 INNOVATION, CAPACITY BUILDING AND GENERAL SUPERVISION - FORMATION OF NATIONAL URBAN RAIL TRANSIT CORPORATION (NURTC)

Lack of capacity in different states in conceptualizing and executing the projects can pose a serious constraint in faster expansion of MRTS network in Indian cities. At national level there is no expert body which can suggest choice of technology, thrust of the innovation effort, best international practices and safety measures.

As per the Allocation of Business Rules of the Government of India in regard to rail based urban transport, the Ministry of Urban Development is the nodal agency for policy and planning at the national level while the technical planning and safety for rail based urban transport systems is the responsibility of the Ministry of Railways. The Metro Railway (Operation and Maintenance) Act'2002 also provides that the Central Government in respect of technical planning and safety for Metro Railway is Ministry in Government of India dealing with Railways. The technical expertise of Rail based systems basically lies with Ministry of Railways and RDSO. However the focus of Ministry of Railways is on long distance travel of passengers and goods; and accordingly it does not have adequate experience about planning, constructing or operating a metro system except that of Kolkata Metro. Modern metro technology has advanced considerably from the Kolkata days. To keep abreast with all the new and emerging metro technologies, which sometimes may not be in use in Railways, it is, therefore, proposed that a special body be set up which would be the repository of metro technology.

It is suggested the Central Government should form NURTC to assist the State Governments in realizing their MRTS schemes. NURTC could take over such projects on a turnkey basis on deposit terms or function as General Consultants to the Special Purpose Vehicles which will be set up by the State Government for implementing and operating the MRTS project. Wherever the State Governments wish to employ International Consultants, NURTC should be engaged as Prime Consultants to safeguard the interest of the State Government and the Central Government.

NURTC could be a Joint Venture of DMRC and the Ministry of Urban Development with equal share participation. NURTC will also help the State Government to train persons for the operation of metro system or monitor the safety and quality of services of the operator in case O&M is outsourced. NURTC should be manned by experienced engineers drawn from Delhi Metro, Railways, CPWD and other Government Organizations and it should be headed by a very experienced and competent professional. The functions of NURTC may inter alia include:

- Careful examination of a MRTS proposal in accordance with the guidelines specified;
- Periodic review and modification in the guidelines for choosing a mode;
- Encourage and supervise research for indigenization and cost saving innovations in MRTS projects, especially rail transit;
- To disseminate best practice documents;
- Creation of a pool of trained personnel for implementation and operation of metro projects. For this, NURTC may collaborate with Ministry of Railways and Centres of Excellence to use their existing facilities and create its own facilities wherever shortfall emerges;
- To function as a nodal agency to ensure that metro projects across the country have access to professional project and transaction adviser;
- To function as a body for technical evaluation of DPR of a MRTS Project;
- To examine and evaluate the City Mobility Plans;
- To recommend optimal utilization of Urban dedicated MRTS Fund;
- To aid MoUD, MoR and State urban Planning bodies to integrate land use pattern with transport Planning;
- To address all other strategic issue on which States and Cities lack capability and look for guidance;
- To provide capacity building of State and City governments for effective development, operations, maintenance and management of MRTS projects.

**To enable NURTC to have lateral technical support, it is suggested a special wing in RDSO should be set up fully funded by the Ministry of Urban Development solely for the technical**

assistance to NURTC. This Cell will be fully under the administrative and technical control of the Ministry of Urban Development.

It is also recommended that the Ministry of Urban Development, GOI should launch a new scheme to fund Innovation, development of Indigenous low cost technologies through placement of developmental orders on Indian firms (preferably PSUs) and also taking up pilot projects for testing of these technologies.

#### 7.5 SAFETY CERTIFICATION

Safety certification for the metro rail projects is a very critical issue. Today, the Commissioner of Railway Safety also performs the duty of Commissioner of Metro Rail Safety. He is under the administrative control of the Ministry of Civil Aviation through the Chief Commissioner of Railway Safety. As many aspects of the metro technology are highly complex and much advanced compared to conventional railway technology, it will be necessary to have a Commission exclusively for Metro Rail Safety. The engineers of such a Commission can be specially exposed and trained in metro technology and metro working. Such a Commissioner of Metro Rail Safety need not be under the Ministry of Civil Aviation as the safety standards and philosophy of metro rail safety has nothing to do with the Civil Aviation safety. **In that case the Commissioner of Metro Rail Safety should be under the administrative control of the Ministry of Urban Development on similar lines as DGCA is under Ministry of Civil Aviation.**

#### 7.6 IMPLEMENTATION OF CITY BUSES/BRTS:

Buses are and will continue to be the major mode of public transport irrespective size of the city. At present, in most of the states, buses for urban transport are provided by private parties through a system of permits and the management of these services is done through the system of *challans*. Since bus service is treated as a commercial and revenue earning service, normally

the practice is to follow a 'net cost contract' and the private party is supposed to pay the Government in lieu of the permit being given by the Government. By this method, though the states and cities have shielded themselves from so-called direct operational risks and losses, it has miserably failed in providing quality public transport. As a result, the share of public transport is constantly declining in general. Multiplicity of permits on the same route also leads to penny wars on the streets. The permits are usually given to single or two bus owners with no depot facilities. As a result, neither the buses are maintained nor the drivers and conductors are well trained and behaved. Following this practice, though the states and cities have saved them from upfront expenditure as well as risk of operational losses apparently, but are paying heavily in terms of the additional costly road infrastructure to be provided for taking care of personalized modes, increased fuel consumption, congestion, accidents and loss of productivity in terms of massive man hours losses stuck in traffic.

The above paradigm needs to be completely changed and the cities/states have to move towards the gross cost model treating city bus transport has a social service. The gross cost model, in which the private party is paid on per kilometre basis, will enable provisioning of quality public transport with key performance indicators and avoid penny war in the roads. The fare collection may be done by the third party preferably based on the Common Mobility Card across all operators of all modes across all cities in India (the Common Mobility card is being piloted by Ministry of Urban Development, Government of India). The gross cost model would need to be suitably drafted so as to reduce the payment to the private party suitably in case the buses are not run while also building in certain incentives for increased ridership and disincentives for not achieving the desired key performance indicators. In such systems, the corporatization of city bus services is possible with professional approach. However, the depots and civil infrastructure facilities in the depots in all such cases would have to be provided by the Government as a private operator cannot be expected to pay for the cost of land in urban area which a 100 year asset for his 5 to 7 years concession agreement.

The city buses and BRTS would need to be brought under a city specific SPV instead of the present system of their management being done by State Transport Undertakings.

## 8 URBAN TRANSPORT PLANNING

### 8.1 INTEGRATED LAND USE TRANSPORT PLANNING

Urban transport is a derived demand, closely linked to urban growth policies. Therefore integrated land-use transport planning to minimize transport demand is essential. Some types of land use patterns increase the use of car, while others are more multi-modal and accessible, reducing the amount of vehicle travel needed to access goods, services and activities. Some transport practices such as maximum roadway capacity and speed, generous parking supply, low road user charges and fuel taxes, poor walking and cycling conditions, inferior public transit service, and high public transit fares, tend to encourage city sprawl. On the other hand, transit service improvements, more affordable public transit fares, pedestrian and cycling infrastructure improvements, reduced parking supply with parking management, road and parking pricing, traffic calming and traffic speed reductions, tend to encourage smart and compact growth. Thus rather than an urban sprawl, smart city growth should be the objective. The present trend is unbridled expansion of the city as an urban sprawl. This increases trip length and discourages the use of the desirable green modes i.e. NMT and MRT.

Most Indian cities have **mixed land-use** patterns, high residential densities and low income people living close to place of work by occupying public land. All three attributes contribute to short trip lengths and less dependence on motorized travel. Therefore, future land-use policies should legally encourage mixed land-use patterns.

NUTP 2006 highlights the intrinsic linkage of transport demand and land use planning and the need to develop an integrated master plan for each city. Accordingly, each city should develop comprehensive mobility plan during the 12<sup>th</sup> five year plan with focus on accessibility, mobility and traffic flow (in that order). Rather than the present approach of “predict and provide” it



has to be “Planning for the desirables”. The service level benchmarks issued by MOUD specify parameters to measure the effectiveness of land use-transport planning. It should be mandatory for cities to restrict the expansion of the city area. If necessary, fiscal disincentives should be imposed on cities that do not grow as smart cities to restrict demand and hence pollution and green house gas emissions.

## 8.2 SUSTAINABLE PLANNING

The transport modes to be used and the modal mix will depend on the city population, the city form and size, availability of road surface and the trip length. Share of public transport on the average should be aimed at 60% of motorized trips and 35% of total trips including walk. The objective should be to maximize the road utilization capacity with equitable allocation of road space. Needs of all category of users should be catered to. Priority in planning to modes should be as follows in descending order:

- Walk and Non- motorised transport (NMT);
- Other motorized public transport;
- Mass rapid transit; road, rail and waterways;
- Personal vehicle transport.

## 8.3 TRANSPORT DEMAND MANAGEMENT

It is not enough to improve traffic flow and augment urban transport facilities. There is a limit to augmentation of services and infrastructure in a city. . Hence a transport demand management (TDM) program should be an essential part of planning.

TDM is a wide range of policies, programs, services and products that influence why, when, where and how people travel to make travel behaviors more sustainable. There is a need to proactively shape travel demands so they can be served - efficiently, effectively, equitably and sustainably. TDM has four main components that provide an integrated approach to transport demand management.

- Education, promotion and outreach;
- Travel incentives and disincentives;
- Sustainable travel options;
- Supportive land-use practices;

**Education, promotion and outreach** create awareness that everybody can contribute to the cause in some way or the other. Everybody has to be made to realize that there are more sustainable ways of commuting. Such awareness programs should be formulated and implemented. It maximizes personal mobility choices by ensuring that individuals are aware of their travel options, understand how to use them, and are willing to do so.

**Travel incentives and disincentives:** These TDM measures offer individuals a tangible benefit or dis-benefit related to the use of one or more travel modes, such as congestion pricing, parking fee and transit tariff.

**Sustainable travel options** complement TDM by strengthening the supply of sustainable travel options (e.g. walking, cycling, and public transit). They can make travel by those modes faster and more comfortable, secure and enjoyable.

**Supportive land-use practices** minimize need to travel.

#### 8.4 INSTITUTIONAL RESPONSIBILITY

All the State Governments/UT Administrations have to be sensitized to appreciate integration of landuse and transport. This is necessary as many State Governments have been proactive in terms of developing new townships in form of Hi-Tech Cities, Satellite Town, SEZ, Growth Centers etc. Hence, right at the inception, it would be desirable that the Master Plan should allocate uses around the transit corridor so as to achieve the integration of landuse and transport and also encourage transit oriented development. Further, this kind of development

incorporates pedestrian oriented design features, will use less personalized modes and shall rely on public transit and walk to destination through the bus/metro stations.

The most important step in achieving integration in planning is to improve the institutional set up with necessary skills such that both functions become the responsibility of the same city agency. The existing legal enactments that directly affect planning for urban transport are the 'Town and Country Planning acts' enacted by various States. The 'Town and Country planning acts' enacted by Maharashtra and Tamil Nadu are required to prepare regional plans including transport requirements. Karnataka Town Planning Act- 1961 specifies planned growth of land use and development and for the making and executing of town planning schemes. There is no mention of including transport planning in it.

Similarly four UD Authority acts i.e. Delhi Development Authority, Lucknow development Authority,, Indore Development Authority and Bangalore Development Authority and The Karnataka Municipal Act do not mention specifically both land use planning and transport as its functions. DDA act requires preparation of land use plan based upon such survey of the present use of land as may be necessary for estimated future needs and includes transportation.

**The responsibilities of LDA include transport.** The main function of Indore Development Authority (IDA) stated in the act is to implement the master plan made by Town and Country Planning Office (TCPO), Bhopal. Bangalore Development Authority is constituted as Planning Authority under the Karnataka Town and Country Planning Act. It is the agency for drawing up development plan and Town Planning schemes in Bangalore Metropolitan Area. The Karnataka Municipal act states 'town planning and improvement' as one of its functions.

It will be seen that there is a variation in the provisions of various acts in respect of land use and transport planning. It appears that the function of land use planning including transport (in some cases) legally rests with the TCPO in the state. The TCPO may itself prepare the land use plan of a city or may ask the city to prepare the plan and submit for its approval. In practice the requirements of transport are rarely included.

**The requirement of integrated land use transport planning is not stated in any of the existing State ‘town and country planning acts’ or the Municipality or the Urban Development acts.**

This exercise is traditionally undertaken by urban transport planners based on inputs on land use provided by the urban development authorities. If this responsibility is left with the urban development authority or the TCPO, then all acts in states would have to be amended which will be an uphill task.

It is therefore proposed that the responsibility for integrated land use transport planning is assigned to UMTA, the proposed dedicated agency in each city. It will be provided with inputs on land use plans by the UD authority and work in close cooperation with it. This requirement should be included in the proposed comprehensive urban transport act.

## 9 NON-MOTORIZED TRANSPORT (NMT)

### 9.1 INTRODUCTION

NMT i.e. walk, bicycle and cycle rickshaw modes are green modes of transport that are low carbon (or mostly zero-carbon) emitting, do not consume energy or cause pollution and in addition provide social equity and employment. Facilities for walk and bicycle should be citywide to assure the commuter that he can complete his journey all the way by walk or bicycle if he so chooses. Cycle rickshaw is a public mode of transport and best suited to provide the last mile connectivity as a part of an integrated citywide multimodal public transport network. NMT should get first priority in infrastructure development and funding. Funds allocation for major transport infrastructure should be linked to achieving targets for creating facilities for NMT.

Walk facilities should be designed and managed to accommodate a wide range of uses. People walk alone and in groups, walk with pets, push strollers and carts, run, skate, stop to gaze and talk, play and eat on sidewalks and paths. Footpaths serve as both travel-ways and public spaces.

Proponents of non-motorized transport sometimes propose [Car-Free](#) streets or districts. To be successful these require careful planning, and are unsuited to many locations. It is generally better to improve overall walking and cycling conditions by improving non-motorized facilities and [traffic calming](#) streets throughout a community, than to try to ban car traffic in a few selected areas. However a combination of both strategies needs to explore by the cities.

## 9.2 PLANNING TO PROMOTE WALK AND CYCLE

A number of guides and resources including ADONIS (1998), Litman, et al. (2000), NYBC (2002), GDOT (2003) provide information on best practices for improving non-motorized travel conditions and encouraging non-motorized transport. These include:

- Integrate non-motorized planning into all transport and land use planning activities;
- Educate all transportation professionals in non-motorized transport planning principles;
- Fund non-motorized planning at a comparable rate as other travel modes;
- Ensure that all roads are suitable for walking and cycling unless these modes are specifically prohibited and suitable alternatives are available;
- Use current planning practices and design standards, including Universally Accessible Design;
- Include non-motorized travel in transport surveys and models;
- Create pedestrian-oriented commercial centers and neighbourhoods;
- Perform user surveys to identify problems and barriers to non-motorized travel.

## 9.3 OTHER STEPS TO PROMOTE WALK AND BICYCLE

- Improve sidewalks, crosswalks, paths and bike lanes;
- Correct specific roadway hazards to non-motorized transport (sometimes called “spot improvement” programs);
- Improve non-motorized facility management and maintenance, including reducing conflicts between users, and maintain cleanliness;
- Develop pedestrian oriented land use and building design (New Urbanism);
- Increase road and path connectivity, with special non-motorized shortcuts, such as paths between cul-de-sac heads and mid-block pedestrian links;
- Street furniture (e.g., benches) and design features (e.g., human-scale street lights);
- traffic calming, streetscape improvements, traffic speed reductions, vehicle restrictions and road space reallocation;

- Safety education, law enforcement and encouragement programs;
- Integrate with transit (Bike/Transit Integration and Transit Oriented Development);
- Provide bicycle parking;
- Address security concerns of pedestrians and cyclists;
- Public Bike Systems (PBS), which are automated bicycle rental systems designed to provide efficient mobility for short, utilitarian urban trips;
- Pedestrians-ways, which are indoor urban walking networks that connect buildings and transportation terminals;
- Create a Multi-Modal Access Guide, which includes maps and other information on how to walk and cycle to a particular destination;
- Provision of multi-storey car parks for residents in order to gain public space on the road and gradually reducing parking space on the streets in order to promote cycle and walking;
- Monitoring of the public parking space with a special control task force;
- Additional park and ride facilities at the periphery of the city.

Non-motorized improvements are provided primarily by regional and local governments, sometimes with federal and state/provincial support. Businesses can provide sidewalks, bicycle parking, and shower facilities.

**Cycle rickshaw** is an intermediate public mode of transport and best suited to provide the last mile connectivity in an integrated citywide multimodal public transport network. This mode has not received any attention from planners so far. The technology is outdated. Several American and European manufacturers of cycle rickshaws, often incorporate features not found in developing world vehicles, such as hydraulic disc brakes, and lightweight fibre-glass bodies, multispeed gears to lessen the effort for the rickshaw puller. Similar upgrades are needed in India.



Moscow



Dhaka, Bangladesh



Hamburg, Germany



Beijing, China



Phnom Penh, Cambodia



Trishaws Kuala Lumpur

There are other issues too. Most drivers do not own their rickshaws; instead, they rent them from their owners, some of whom own many rickshaws and exploit rickshaw pullers. No driver license is required. Some cities have banned or restricted use of cycle rickshaws. They are often prohibited in inner/old city areas of major cities for causing congestion. In view of its usefulness in several ways, it is important that cycle rickshaw is assigned a role in the multi-modal public transport system.

To make cycling a fashion statement in India and to provide safe pedestrian and cycle infrastructure, it is recommended to have a dedicated NMT cell in each municipality/municipal corporation. Also, the Government of India should fund launch of public bike sharing scheme in all cities in India with a population of more than 5 lacs.



## 10 PUBLIC TRANSPORT

### 10.1 INTRODUCTION

Public transport consists of;

- Mass rapid transit (Rail based/Bus based);
- City bus services in mixed traffic;
- Intermediate public transport.

Mass rapid transit is the backbone of city transport as it is the only mode that carries a very large number of commuters using minimum space. Intermediate public transport i.e tempos and mini buses is the main mode of public transport in nearly all medium and small size cities. Personalized public transport i.e. autos and taxis and cycle rickshaw cater to the demand of commuters seeking a substitute for personal transport.

### 10.2 MASS RAPID TRANSIT MODES

The main modes of mass rapid transit are:

- High capacity; Metro rail, Commuter rail;
- Medium capacity; BRT, LRT, Monorail, HSST (Mag lev), Linear Metro, Automated guide-way transit (AGT), Automated people mover (APM) and several other modes.

High capacity Metro rail and Commuter rail (Suburban Rail) are already in use in India; so are buses of various sizes. From amongst medium capacity modes, BRT has started operating in Ahmedabad, Delhi, Pune and Jaipur. An increasing number of cities in India are constructing or planning facilities to operate BRT. Use of Modern Tram (Also called Light Rail Transit) may be

possible in many cities. The Modern Tram, being at grade, offers convenience to commuters. It will not cause any local pollution when compared with BRT. It may be possible to operate both Trams and Buses in the same lanes.

Monorail, HSST (Mag lev), Linear Metro, Automated guide-way transit (AGT), automated people mover (APM) and several other modes are currently in use in other countries. Planning should be flexible so that these new resource-efficient technologies, already available globally, and those that have a high probability of being available in the future, such as hybrid buses among others, can be accommodated. The table below compares salient features of these modes.

**Table 10-1: Mass Rapid Transit Modes**

| MODE                 | USED AS    | GRADE SEPARATION            | CURVES | GRADIENT |
|----------------------|------------|-----------------------------|--------|----------|
| <b>METRO RAIL</b>    | Intra-city | Grade separated             | 300m   | 3%       |
| <b>COMMUTER RAIL</b> | Suburbs    | At-grade                    | 300m   | 1-2%     |
| <b>LRT</b>           | Intra-city | At-grade or Grade separated | 25m    | 6%       |
| <b>BRT</b>           | Intra-city | At-grade generally          | 25m    | 3%       |
| <b>MONORAIL</b>      | Intra-city | Grade separated             | 70m    | 6%       |

### 10.3 CHOICE OF MODE

Choice of mode depends mainly on demand level on a corridor, available ROW and the capacity of the mode. Other considerations are land-use along the corridor, the location of building lines, and the potential for increasing the ROW. The chosen mode should be adequate for the future demand level on a corridor, both in quantity and quality of service such as journey time. Other features such as speed, cost, safety, eco-friendliness, energy and land conservation, aesthetics and local technology maturity from consideration of maintaining the system should be given due weightage.

While, ideally, the choice of technology is a multi- determinant variant, including population, per capita disposable income, densification in city, availability and opportunity cost of land, morphology of the city and importantly, aspiration of people revealed through political demand, the comprehensive mobility plan with networked connectivity, as a general guideline, the following criteria may be followed:

**Table 10-2: Selection Criteria of Mass Rapid Transit Modes**

| Mode choices               | PHPDT in 2021                              | Population as per 2011 census (Million) | Average Trip length for motorized trips in km |
|----------------------------|--|---|---|
| Metro Rail                 | >=15000 for at least 5km continuous length | >=2                                     | >7-8  |
| LRT primarily at grade     | =<10,000                                   | >1                                      | > 7-8   |
| Monorail                   | =<10,000                                   | >2                                      | About 5-6                                     |
| Bus Rapid Transit System   | >=4,000 and Upto 20,000                    | > 1                                     | > 5   |
| Organised City Bus Service |  | >1 lac hilly towns (50,000)             | >2 to 3                                       |

**NOTES:**

- **Metro Rail:** *The detailed feasibility can be examined and DPR can be prepared even for 2 million plus cities as it would take a total of about 5 years for the DPR preparation and project sanction and another 5 years for project implementation. A city with smaller population may also require Metro if its shape is linear, ridership on the projected corridor is high and Metro is justified as per Comprehensive Mobility Plan and Alternatives analysis. **However before metro rail can be sanctioned, it would be desirable for the city to have at least 1 million ridership per day on organized public transport(any mode).***
- **LRT:** *Would depend upon availability of land on the Right of Way.*
- **Monorail:** *Suitable for narrow right of way with high rise buildings on the sides as well as sharp curves. Has almost same cost of construction as elevated metro with less than half the carrying capacity and high maintenance cost. Can at best used as a feeder network.*
- **BRT:** *Can be provided for higher PHPDT also with overtaking lanes. For smaller cities also, BRTS may be provided if the ridership on certain corridors is high and transit oriented development is planned.*
- **City Bus:** *The buses should be provided as per urban bus specifications only with all ITS and Passenger information features under a city specific SPV. Fuel and emission standards to be conforming to auto fuel policy of Govt of India. In order to promote introduction of new technology, Hybrid and Electric trolley buses should also be introduced in selected cities.*

### **At-grade vs. grade-separated construction**

An important issue is at-grade or grade-separated construction. At-grade MRTS is the most convenient facility for commuter. Grade-separated systems increase trip time by 10 to 15 minutes to account for the need to go up and down. At-grade construction should therefore be the default choice. A decision on this aspect would however depend on local conditions including availability of land and road space.

In the metro rail projects undertaken so far, the concern to keep the cost within manageable limits has seemingly resulted in a preference towards elevated corridors. MRTS projects have a very long project life. Hence, cost calculation as above, may be skewed, as they do not take into account the long term opportunity cost of the land as elevated structures are more land intensive. The underground metro rail has the advantage in keeping the city landscape more aesthetic. Hence when at-grade or elevated construction is not feasible and when aesthetic considerations demand such as passing through heritage areas, underground construction should be adopted.

## **10.4 INDIAN RAILWAY INITIATIVES**

The Ministry of Railways (MoR) is involved in the sub-urban rail transportation field only in select cities where it runs sub-urban and regional rail services on a regular basis. Mumbai, Chennai, Kolkata, Hyderabad, Delhi are examples of cities where MoR runs their sub-urban services, and also certain regional services to nearby outlying towns and cities. MoR is also operating 25 Km. of partly elevated and part underground metro in Kolkata. Additionally, about 90 Km. of metro lines are under various stages of execution in Kolkata. Details are given in annexure E and F.

In the past few years, MoR has been entering into partnership with State Governments for development of sub-urban rail transportation systems in major cities mentioned above. The partnership ranges from sharing of capital cost to the tune of 1/3<sup>rd</sup> of the cost (in the recently completed extension to Kolkata Metro) to 2/3<sup>rd</sup> of the cost (for example in Chennai and

Hyderabad). After the necessary infrastructure is built or upgraded by such cost sharing partnership, the assets are taken over by MoR who then operates these services. However, this is a loss making operation for the MoR.

Few other State Governments like Gujarat and Karnataka have shown interest in partnering sub-urban and regional rail services in their states by sharing costs of the projects. These are still under discussion. However, such cost sharing partnership already exists between the MoR and several State Governments for funding part of the cost of the other new line projects as well as the State Governments bearing the entire cost of the land required for the project. As such, there is no reason why such partnership cannot be extended successfully in the area of urban transportation also by other State Governments.

There is a need for setting up of a separate dedicated PSU by MoR and other stake holders as partners, for looking after the urban transportation services being provided by MoR in partnership with the State Governments. The State Governments concerned can be partners in this PSU to the extent their interests require.

## 10.5 MULTIMODAL INTEGRATED AND CITY WIDE PUBLIC TRANSPORT NETWORK

A good and sustainable Urban Transport has to be inherently multimodal in nature. Transport demand varies from corridor to corridor and so does the capacity of various modes. For an economic public transport network the mode for a corridor should suit the demand level on that corridor. NUTP requires that public transport system is coordinated and well integrated with efficient inter-change infrastructure and should offer a seamless journey to the users. The aim therefore is to provide integrated multimodal transport to the city. The public transport network should be city-wide so that the commuter is assured that he can complete his journey all the way by using public transport. Interchange points should avoid conflicting movements and impose minimum time penalty.

Every city, as a matter of principle, should organize the existing public transport into an integrated network in a grid pattern to cover the whole city. These services can be operated by

buses of various sizes as appropriate to demand level. Actual ridership will guide adjustments in the capacity needed and to be provided on each route. When the demand level exceeds the capacity of bus services, other guided MRT modes should be introduced.

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#### 10.5.1 MULTIMODAL INTEGRATION

General measures for integrating transport services include Network integration, Fare integration, Information integration and Institutional integration. Network integration is an operations issue to be taken care while scheduling services. Fare integration requires the introduction of automatic fare collection system compatible for all modes in the city including bus services. This can be easily achieved through the Common mobility card across India envisaged by Ministry of Urban Development, Govt. of India through m/s UTIITSL, a wholly owned PSU of Ministry of Finance, GOI. Information integration requires vehicle tracking systems to be installed on all vehicles. Institutional integration is the weakest link in the whole chain and needs to be strengthened.

The most critical requirement is the creation of multimodal interchange facilities where commuters can change modes or routes without much time penalty and in safety without coming in conflict with other vehicular modes. Such locations occur at the point where two public transport services cross and at various road junctions where commuters may need to change direction or to take a feeder service. In addition commuters will need to interchange at inter-state bus terminals, railway terminals and airport. All these interchange points will also need to cater to interchange with personal modes, from the surrounding areas, such as car, 2-W and bicycle and public modes i.e. para-transit, autos, taxis and cycle rickshaw etc., by providing 'Park and Ride' and 'Pick up and drop off' facilities.

These interchange points bring together two or more than two mass rapid transit corridors, many a times, using different modes and hence do not get due attention while individual corridor is being designed. It is therefore necessary to give this aspect special attention particularly in view of the critical role it plays in attractiveness of the transport network. The work involves review of the alignment and the station sites of each corridor to assess the

suitability of these locations as multi-modal interchange points. In case it is felt that these locations cannot be designed as convenient interchange points, the possibility to relocate these points including relocation of alignment and or stations where feasible will need to be examined and developed.

Efficient interchange points, helps promote public transport, raise the financial sustainability of the mass rapid transit network and ensure its growth to keep pace with growing demand.

## 10.6 REGIONAL AND SUBURBAN TRANSPORT

The influence of urban centers extends to towns both in the immediate neighborhood and those at some distance. These requirements should be met by suburban and regional services respectively. An important criterion in suburban and regional transport planning is the trip time and the level of comfort during travel. Average trip time for such travel should be about one hour from origin to destination. It is essential that all commuters travel in comfort and are provided with a seat. Regional/suburban transport services should be integrated with the city network for easy dispersal. This is achieved by;

- Developing Interchange at locations where there is lot of interstate commutation.
- Feeder services at Metro Stations/Inter-State Bus Stations/Railway Stations

## 10.7 INTERMEDIATE PUBLIC TRANSPORT

Use of intermediate public transport in Indian cities is extensive. In small cities it is the main mode of transport. In large cities it is used both as a feeder service to mass rapid transit and on its own as a mode of public transport when organized mass rapid transit is not available substituting for inadequate MRT in most large cities. Intermediate public transport vehicles operating in small and medium size cities and even in large cities are playing an important role in providing mobility at a very low cost to a large section of the population. They have a potential of providing clean mobility, low emissions and improved safety. Manufacturers should be encouraged to invest in improving the technology of these vehicles by:



- Setting up emission and safety standards under the Motor vehicles act;
- SIAM, MORTH, Ministry of Industry providing low interest loans for small scale industry producing these vehicles, and attractive replacement schemes for operators;
- Dedicating 10% of the cess money available with the Ministry of Industry from the transfer of technology for vehicle manufacturing for the improvement of intermediate public transport vehicles.

Presently the auto rickshaws and taxi's are totally in unorganized sector except for a few radio taxis. With fitment of GPS and GPRS and monitoring as well as planning, trip assignment through a common control center, these para transit modes can be completely transformed on the pattern of computerized taxi management system as is available in Singapore or Sharjah. Even the fare can be set directly from the control center. This will avoid about 20% of the empty trips which these vehicles make to get riders, besides avoiding clogging of all major bus stops and other trip generation points. This scientific management system with the help of ITS would lead to reliability, passenger safety, comfort, security besides avoiding passenger complaints of refusal and overcharging. With these modernizations, autorickshaws and taxis can become the preferred mode of private travel instead of private vehicles and they can also effectively become the first mile and last mile connectivity options.

However, to kick-start the process, certain subsidy shall have to be provided to the owners of these vehicles to part meet the cost of GPS/GPRS while the balance can be facilitated by govt. through loan from the bank. The control centre can be set up on PPP basis where the private party can recover its cost on monthly basis as a subscription fee from the vehicle owners. As such it is recommended that govt. of India brings out a new scheme to fund modernization of para-transit modes in all cities with population of 1 mil.

## 10.8 INCENTIVIZING SHIFT FROM PRIVATE TO PUBLIC TRANSPORT

A commuter survey conducted along the BRT corridor in Delhi showed that the commuter expects a convenient, comfortable, seamless, reliable, on time service with well-behaved

drivers and conductors in reasonable time, cost and speed. Thus public transport service has to be upgraded both in quality and quantity in order to increase the attractiveness of the public transport system. Measures to improve quality of service are:

- punctual and regular service by the creation of separate lanes and preferential traffic signals for public transport;
- shorter intervals between services in low-demand hours, improved scheduling and longer service hours during the night;
- increasing frequency of service on the basic mass rapid transit network
- extending routes to connect urban extensions;
- improvements in passenger coaches;
- multimodal operating modes using capacity to suit demand;
- improving security and social safety;
- Improving the public image of the public service.

Secondly, commuter is concerned with '**Door to door**' journey in terms of speed, time, cost and convenience. Introduction of network stations/stops alters the traffic flow pattern in the area. The traffic that used to flow directly towards origins/destinations will now flow towards the station/stop in the area. Thus station/stop accessibility has to be looked at and improved as necessary. This involves safe pedestrian facilities within 500 m of station/stop, adequate road access from the surrounding catchment, introduction of feeder services and land-use control in the area around bus stops and stations.

Thirdly several **user-friendly features** need to be added for convenience of the commuter. The network will be convenient with single ticket for all modes, real time Passenger information system, adequate Safety & Security on the system and Facilities for Handicapped, aged, children and women. Bus ride should be a pleasant experience. Finally the network has to be sustainable so that it grows with growth in demand. All road users should benefit.

**Fare Integration:** The National Urban Transport Policy 2006 envisages seam less ticketing across all modes of transport. Presently ticketing for almost all modes is cash based paper ticket

which is very inefficient way of ticketing. The global trend is to move towards smart card based ticketing which obviates the need for small change and paper ticketing. The smart card based automatic fare collection system provides seamless ticketing across various modes and greatly enhances the convenience of passengers, operators as well as the image of public transport system. Accordingly the ministry of urban development, GOI, has envisaged Pan India roll-out of a common mobility card (CMC) across all operators of all modes including parking through M/s UTIITSL, a wholly owned PSU of ministry of finance, GOI as the technology aggregator. To start with it is envisaged that the CMC shall follow the fare rules of each operator and after sufficient data of travel pattern has been developed, UMTA can decide on the second level of fare integration so as to have one fare for one distance irrespective of the mode of travel or combination there off.

**It is recommended that all the operators of all the cities in India move on to this common mobility card in 12<sup>th</sup> five year plan. In order to catalyse the whole process, it is recommended that Government of India may provide some financial support as well**

**Information integration:** At present the information about public transport/intermediate public transport is totally compartmentalized, often non-existent or even if it is existing in any form in some of the cities. This is a major deterrent for the networked connectivity concept. Each public transport/intermediate public transport operator of each city has different call center or helpline number which is a nightmare for anybody to remember. Accordingly ministry of urban development has got two short codes of category-I (with universal access from all telecom operators) allotted from Ministry of telecommunications. They are 155220 and 155221. MOUD has already written to all states/UTs, cities, STUs, metro rail corporations to have only 155220 and 155221 as the helpline numbers for public transport on similar lines as that of '100' for police control room in each city.

It is recommended that all the cities move on to these common helpline numbers within one year and make people aware of this critical user friendly feature. This would require all vehicles to be fitted with GPS & GPRS for which Central Government may provide some financial assistance. It may also set up a central server system connected to all cities/ states for compilation of this useful data at national level for analysis, planning and policy making as well as updation of national database on urban transport

Lastly Public transport can be promoted by giving it priority and fiscal benefits as follows;

- Levy of a high parking fee, that truly represents the value of the land occupied
- Preference in the allocation of parking space for public transport vehicles and non-motorized modes as well as easier access of work places to and from such spaces
- Park and ride facilities for bicycles users, with convenient inter-change
- Improving the quality of service and by providing different types of public transport services for different segments of commuters
- seamless travel between one mode and the other as also between systems managed by different operators with proper inter-change infrastructure, single ticket over all such systems.
- The segregation of vehicles moving at different speeds would help improve traffic flow, increase the average speed of traffic and reduce emission resulting from sub-optimal speeds.

## 10.9 VEHICLE AND FUEL TECHNOLOGIES

Use of new fuels and vehicle technologies should be supported by suitable tax concessions. Inspection and certification of old vehicles should be made mandatory. Regular maintenance of vehicles should be enforced.

## 10.10 ROAD SAFETY

The need to improve safety in cities in India does not need any justification. Fatalities in India per million of population has increased: from 79 in 2001 to 101 in 2007. The actual situation may be much worse as a number of accidents are not even reported. With growing traffic, lack of driver discipline, and inadequacy of the existing road infrastructure to handle the ever increasing traffic, road safety is deteriorating rapidly and requires urgent attention. An MORTH Committee on Road Safety and Traffic Management (February, 2007) estimated about 50% increase in road accidents over a 10 year period (2005-15).

Some of the major concerns regarding road traffic safety are (Mohan et al., 2009):

- Traffic fatality rates have been increasing in most cities.
- Pedestrians, bicyclists and two wheeler riders comprise of 60-90% of the total fatalities.
- Motorcyclists represent a large portion of urban fatalities (about 25%).
- Several studies indicate that the involvement of trucks in fatal crashes is greater than expected.
- Nighttime driving in India is substantially riskier than daytime driving.

Some factors that contribute to declining safety are;

- Quality of Infrastructure
- Driver training, testing and licensing
- Registration, Testing and Certification of Vehicles
- Road Accidents Data Collection and Analysis

- Enforcement of Traffic Rules and Regulations
- Improving Institutional Arrangements and Accountability

The following Program to improve safety is recommended;

- All road design standards to be reviewed ( 2yrs)
- All traffic management standards to be reviewed(2yrs)
- RSA for hazardous location(yrs 1-10)
- Crash data base on standard format 1 yr)
- Segregated NMV lanes to be constructed on all arterial roads ( 10% road length every year, 100% to be covered in 10 yrs)
- Capacity building city engineers, town planners, safety auditor, traffic police(every year)

#### 10.11 URBAN ROAD STANDARDS, AND URBAN TRAFFIC MANAGEMENT POLICIES

Ministry of Urban development has established 4 centres of excellence. In the first two years these centres should be asked to review all urban road standards, and urban traffic management policies in the context of Vulnerable Road Users (VRU) safety. This would require an investment of Rs. 5 crores in the first two years.

#### 10.12 CRASH DATA BASE

City level crash data is being collected by the police (1 yr). Safety cell can assist police to computerize crash data base in a standard format. Safety cell should also conduct detailed crash investigation of sample crashes and measure effectiveness of various measures implemented by traffic police.

**Segregated NMV Lanes** to be constructed on all arterial roads (10% road length every year, 100% to be covered in 10 yrs). This should become mandatory especially for availing any central assistance. This can be monitored by safety cell

### 10.13 TRAINING IN SAFETY

Capacity building city engineers, town planners, safety auditor, traffic police (every year: Minimum 5 officers must be trained for road safety in each million plus city. Training programs initiated by the MOUD must include special programs for traffic safety.

### 10.14 SAFETY AUDIT

Road Safety Audit (RSA) is an examination of an existing or planned road network by an independent and well qualified auditor who reports on any deficiencies in safety aspects and prepares recommendations on improvements that may be necessary. Cities should undertake safety audit for hazardous location (yr 1-10) to reduce accidents, fatalities and injuries. The program for safety audits shall be as follows;

- Select some 5 or 10 most hazardous roads / locations / intersections every year on the basis of accident records in each city / state / district.
- Get road safety audit done for these locations
- Apply recommendations as provided by safety auditors
- Monitor the effectiveness of countermeasures

Today no single agency or department is responsible for improving safety in a comprehensive, scientific and a systematic manner in a city. The organizational framework to deal with all road safety related issues shall be provided by creating safety cells with dedicated personnel and budget (at least Rs. 10 Crores/year). Relevant R&D shall be a part of the research program to minimize injury and the consequences in the event of an accident. Rescue services shall be organized to provide relief in the fastest time possible.

### 10.15 SECURITY

The need for Security against vandalism, crime and terrorism is increasing by the day. Security is needed for commuters, particularly women, operators against vandalism and graffiti and staff

on duty. It needs to be dealt with in a systematic manner. Personal security covers all parts of the journey: stations, stops, shelters and on-vehicle. It covers both Passengers and Operators.

The presence of young people and people who have been drinking tends to make other passengers more uneasy. Young people are more likely to be bullied or intimidated by other young people than by adults. People with learning disabilities are particularly subject to harassment and bullying. Majority of incidents of harassment or intimidation on bus travel go unreported. Developing an Effective Strategy will include:

- *Design solutions* such as use of robust materials, good lighting, clear sightlines;
- *Management solutions* such as the presence of trained staff, effective surveillance, procedures for reporting incidents;
- *Partnership initiatives* such as effective liaison with the police, work with schools, and sponsoring initiatives which promote public transport to young people;
- Planning for security should become a part of urban transport planning;
- Apart from above depending upon the cities specific security measures will need to be incorporated at the very planning stage of public transport systems to tackle growing menace of terrorism.



## 11 INFRASTRUCTURE

### 11.1 ROADS INFRASTRUCTURE

The main infrastructure for most modes of transport is the road and associated facilities. This includes road network, quality of road surface, street furniture, intersections, traffic signals, round-about, grade-separators, bridges on rivers, drains and railway tracks, road bye-passes, and bus terminals. Facilities also need to be provided for inter-modal transfer, parking of vehicles, pedestrians, bicycles and bus priority schemes.

As a first step, it is important to put the existing road infrastructure to best use. Road cross-section should be organized for equitable allocation of space to various modes including NMT. Measures to maximize the use of existing transport infrastructure will provide immediate relief to mobility in the city. Surveys in Indian cities have shown that on the average 1/3<sup>rd</sup> of the carriageway and ½ of the right of way of a road could be encroached by parked vehicles, hawkers and roadside businesses. The pedestrians are forced to walk on the road carriageway and obstruct vehicular traffic and at the same time endangering themselves. Facilities should be planned for Off-street Parking and Hawkers, and other road right-of-way encroachments removed. These are low cost and affordable measures that can be quickly implemented with minimum planning time.

The other commonly noted feature that inhibits free traffic flow is the poor quality of road surface. Road surface is frequently cut by utility agencies and left un-repaired or badly repaired. Road shoulders/berms are generally in poor condition. All these deficiencies slow down traffic, reduce road capacity and increase road congestion. Maintenance and upkeep of the road surface at all times should receive higher priority than even augmentation of infrastructure. The main reason for deterioration in the quality of road surface is poor drainage. Priority should be

given to improve drainage of the road cross-section.

Roads in a city may be owned by Central Government, State PWD and local bodies. Planning of the city road network and linked infrastructure should be coordinated to get best value for money. Construction of missing road links, Grade separated entries for regional traffic and by-passes are most effective in improving traffic flow.

However, a word of caution is necessary. Expansion of roads and linked infrastructure is, at best, a temporary solution because the capacity created is soon filled up by generated and induced transport demand.

## 11.2 PARKING

With growing purchases of motor cars and two wheelers the parking demand even at the present level of relatively low vehicular penetration is insatiable, creation of parking facilities entails enormous cost and uncontrolled parking supply encourages car dependency. Conventional policy plans only for more parking supply. Parking spaces are created on road and off road. In the absence of proper parking management both create pressure on the pedestrian space. The existing practice perpetrates hidden subsidy to rich car owners as the cost of using up scarce and valuable urban space for parking are not recovered through proper pricing and taxes.

The National Urban Transport Policy (NUTP) has recognized an important principle for guiding the parking policy. These include:

- Land is valuable in all urban areas. Parking places occupy a large part of such land. This should be recognized in determining the principle of parking space.
- Levy high parking fee that represents value of land occupied
- This should be used as a means to make use of public transport and make it more attractive. Graded parking fee should recover the cost of the land.
- Allocate parking space to public transport and non-motorized transport

These principles have thus codified the travel demand management principles that should guide the parking management in cities. It has put a strong emphasis on the pricing strategy to influence the travel decision and make public transport more attractive.

However, NUTP also encourages increased supply of parking spaces to meet the demand. It has specifically recommended that the state governments require to amend building byelaws in all million plus cities so that adequate parking space is available for all residents. It has also proposed that the FAR laws should be made more liberal. Multi level parking should be made mandatory in cities. As a result, the JNNURM funding is also tied to building parking infrastructure. Thus, it treats parking as an essential infrastructure that must service all buildings and ties public infrastructure funding with it.

Therefore, under the on-going reform process in India cities are expected to make the transition from the conventional approach to using parking as a demand management tool.

But if a city must have such requirements then it should be created – as far as possible -- as common neighbor-hood parking spaces. The strategy should be to minimize and avoid serving each building with its own parking. Most Indian cities have dense urban neighbor-hoods with mixed land use. It is more judicious to build parking for the neighbor-hood and not for each building separately. If the policy can be reoriented to provide parking for each development area instead of each building then the parking requirement will also be modest. This is being done in Tokyo, Taipei etc.

The parking requirements thus can be met in a flexible way instead of through building-wide rigid standards. This may include neighbor-hood common parking, off-site parking anywhere near the vicinity. Thus, standards can vary from zone to zone or city to sub-urban areas within the city. Standards may be reviewed periodically and revised if necessary. The key message is that parking should be shared, common and not individually owned, and it should be priced.

Parking demand is insatiable; entails enormous cost and uncontrolled parking supply encourages car dependency. Conventional policy making takes this as the yardstick and plans

only for more parking supply.

The National Urban Transport Policy (NUTP) has advocated levy high parking fee that represents value of land occupied and to allocate parking space to public transport and non-motorized transport. It treats parking as an essential infrastructure that must service all buildings and ties public infrastructure funding with it. Therefore, under the on-going reform process in India cities are expected to make the transition from the conventional approach to using parking as a demand management tool.

The strategy should be to minimize and avoid serving each building with its own parking. It is more judicious to build parking for the neighborhood. If the policy can be reoriented to provide parking for each development area instead of each building then the parking requirement will also be modest. Thus, standards can vary from zone to zone or city to sub-urban areas within the city. Standards may be reviewed periodically and revised if necessary.

**GoI should fund upto 20% for parking facilities as VGF, which are shared, common and not individually owned, and priced suitably**

## 12 MANAGEMENT AND USE OF TECHNOLOGY

### 12.1 CONGESTION MANAGEMENT

Dynamic, affordable, livable and attractive urban regions will never be free of congestion. Road users generally accept a degree of road congestion but attach a high value to the reliability and predictability of road travel conditions. Reliability needs to be given greater weight in assessing options and prioritizing congestion mitigation measures. An increase in the reliability and predictability of travel time can rapidly reduce the cost associated with excessive congestion levels.

Most traditional congestion relief measures either free up existing capacity or deliver new road capacity through improved traffic operations, shift of urban traffic to public transport or otherwise to reduce the demand, modification to existing infrastructure so as to increase its capacity, and creation of new infrastructure. This additional capacity will be rapidly filled up in most dynamic urban areas unless these strategies are paired with pricing, parking or access management policies. Typical measures to manage road congestion include planning and coordination of road works, speedy response to defective traffic signals and to disruptions caused by accidents and debris. Adding lanes, re-allocating road space, modifying intersections, modifying the geometric design of roads or creating one-way streets will also help.

Typically, congestion cuts across jurisdictional boundaries and therefore the design and implementation of congestion management policies will require collaboration between different authorities. At the National level, it is important that policies make coordination between regional transport and urban planning bodies legally possible, and encouraged.

NCR Plan-2021 and Metropolitan Development Plans (Mumbai, Chennai, Kolkata and Bengaluru) have suggested measures for decongesting the cities by developing Satellite Towns and by creating infrastructure at par with mother cities (Creating high order facilities). This should be backed by several measures to promote the growth of these towns such as;

- A seamless integrated transport system
- Integrated ticketing and passenger information system (Common mobility card common public transport helpline numbers 155220&155221).
- Treating the Metropolitan Region as Common Economic Zone by introducing uniformity/rationalization in taxation.
- Incentives in terms of concession in Property Taxes/Registration Charges.
- Incentives for shifting non-compatible/non-conforming uses to the conforming uses in Satellite towns/Regional Towns in Metropolitan Region.

## 12.2 CONTROL OF PERSONAL MOTORIZED VEHICLES

Use of personal motorized vehicles and its adverse effects on air pollution, green house gas emissions, fossil fuel consumption and road rage are well accepted. Main reason for increasing use of personal vehicles is the gross deficiency of the public transport facilities both in terms of quality and quantity. Thus the most important long term means of controlling the use of personal transport is to augment public transport so that the commuter has a choice. However, certain economic instruments should be used to control the use of personal vehicles as follows. Pilot schemes to reduce the use of personal motorized vehicles should be taken up by MoUD/IUT.

### 12.3 ECONOMIC INSTRUMENTS

**Table 12-1: Survey of Economic Instruments for control in the use of cars**

| Type of Incentive or Disincentive   | Possible Economic Instruments  | Selected Economic Measures   |
|---|--|--|
| Discourage motorized vehicle ownership  | Tax/ charge on vehicle purchase/ ownership/ scrappage  | <ul style="list-style-type: none"> <li>• Annual vehicle tax</li> <li>• Registration tax/ charge</li> <li>• (re)sales tax/ charge</li> <li>• Scrappage tax/ charge</li> </ul>   |
|   | Restricting the number of vehicles and/or new registrations  | Auction schemes/ competitive bidding for new licenses<br><br>Licensing car ownership   |
| Discourage motorize vehicle use and encourage switch to public or non-motorized transport | Tax/ charge on vehicle use   | <ul style="list-style-type: none"> <li>• Fuel tax</li> <li>• Pay-at-the-pump (sur)charges</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Tax/ charge on road and/or infrastructure use;</li> <li>• Restricting access to urban centers or special areas</li> </ul> | <ul style="list-style-type: none"> <li>• Parking fees</li> <li>• City tolls</li> <li>• Road pricing</li> <li>• Bridge tolls</li> <li>• Cordon/ area pricing</li> <li>• Congestion pricing</li> </ul>                                 |
|   | Subsidies for public transport and/or multi-modal transport (modal subsidies)  | <ul style="list-style-type: none"> <li>• Subsidized public transport fees</li> <li>• Subsidies for public transport networks and operation</li> <li>• Tax-deductable public transport expenses</li> <li>• P&amp;R schemes</li> </ul> |
| Encourage lower   | • Taxes/ charges on  | • Tax differentiations based on  |

| Type of Incentive or Disincentive      | Possible Economic Instruments   | Selected Economic Measures  |
|--|---|---|
| emission technology use and innovation | vehicle purchase/ ownership/ scrappage;<br>• Taxes/ charges on vehicle use;<br>• Taxes/ charges on road and/or infrastructure use | emissions<br>• Carbon/ energy taxes<br>• Emission fees<br>• Emission-based surcharges<br>• Subsidies, tax rebates for lower emission vehicles/ technologies |

#### 12.4 FREIGHT TRAFFIC

Freight traffic and movement of goods within the city and ‘*passing through*’ intercity traffic affects overall city mobility. Passenger movements are concentrated in the morning and evening peak hours; freight movements are spread over a 24 hour period. While goods vehicles and their size, low manoeuvrability, noisiness, and high pollution output make their presence particularly objectionable. Goods pick-up and delivery in city centres is particularly problematic because of limited parking. At the same time goods vehicles are vital to the economy and well-being of society. Commerce is dominated by goods vehicles, and the logistics industry in particular is dependent on road transport for pick up and delivery. Garbage picks up and fire protection are among many essential services that are vehicle oriented.

As a largely private sector activity it is difficult to control, and many of the decisions that affect goods vehicles are made by the industry itself. Several cities are seeking to limit goods vehicles as pressures keep mounting. In many jurisdictions limits on heavy goods vehicles in urban areas are in place, and there are restrictions on the times of delivery and pick up, which in some cities extend to the exclusion of all trucks in the urban core during daytime hours. There needs to be a much greater focus on planning for movement of goods overall, since it is almost universally recognized that transport of goods is important and will grow with economic growth. The subject needs to be studied in depth to evolve planning norms that permit goods movement without affecting passenger movement. Indiscriminate curtailment of movement of freight traffic in city in itself is inimical to city economic growth and the solution of this vexed problem



has to be arrived at after very careful scrutiny. This aspect of urban transport problem has received scant or no attention in planning for urban transport in any city of the country so far.

## 12.5 TRAFFIC ENGINEERING AND MANAGEMENT

Traffic engineering and Management is a relatively low cost solution and can be applied at the right time to keep the city moving for a long time. A traffic management unit is therefore essential in each city. Typical Functions and Responsibilities of a Traffic Management Unit are tabulated below:

**Table 12-2: Typical Functions and Responsibilities of a Traffic Management Unit**

| Division                                  | Functions and Responsibilities  |
|---|---|
| Traffic Management Policy                 | Formulate and Implement city wide “Traffic Management Policy” to comply with objectives defined by the UMTA which would include, at least such areas as determination of (i) a functional road hierarchy; (ii) the appropriate balance between transport system users (private transport/public transport/NMT/pedestrians; (iv) priority programs for action and, (iv) a “5 year” investment plan”.   |
| Traffic Research                          | Assemble/survey, monitor, analyze and evaluate all traffic and accident data to enable trends to be identified, problems quantified and traffic management plans and improvements to be prepared.   |
| Traffic Management Plans and Improvements | Plan, design, implement, monitor, evaluate, fine-tune and continuously up-date traffic schemes and policies to realize the agreed Traffic Management Policy. The program would cover all motorized road based modes (cars, public transport, trucks, etc.) and all non-motorized modes (pedestrians, cycles). Plans and improvements would range from simple junction improvements or marking and signing programs through to far reaching city wide strategies such as extensive bus priority or pricing. Safety considerations are part of any scheme planning and design process but specific safety programs and accident counter measures would be a responsibility. |
| Traffic Control Devices                   | Plan, design, install, operate, and maintain all traffic control devices including (i) traffic signal systems including computer controlled systems; (ii) road markings; (iii) road signs and, (iv) enforcement devices (cameras etc.)  |

| Division                    | Functions and Responsibilities  |
|-----------------------------|---|
| Traffic Regulations         | Formulate traffic regulations to realize the proposed Traffic Management Plans and Improvements, for enactment by city government and for enforcement by the traffic police.  |
| Parking Management          | Prepare off and on street parking policies and programs including approval for the location of and access to parking areas proposed by others. Parking enforcement and administration (for example, where paid parking applies) would be carried out by a separate parking authority” or equivalent.  |
| Approvals and Co-ordination | Evaluate and advise city government on all schemes (e.g., new roads) and developments (developed both by public and private sector agencies and including major new land or building developments) which have a significant traffic impact to ensure that they are consistent with agreed traffic policy. In effect carry out traffic impact studies for all major development proposals. |
| Consultation                | Consultation with the public and stakeholders on traffic policy and on the impacts of specific schemes and measures.  |
| Budget                      | Preparation of an annual budget for submission to city government for (i) implementation of Traffic Plans and Improvement Schemes; (ii) traffic operations and maintenance of control devices; and, (iii) the continuous work of the traffic management agency itself.  |

**Source:** “Cities on the Move – An Urban transport Strategy Review” World Bank, Washington DC 2002

## 12.6 TECHNOLOGY FOR ENFORCEMENT

The enforcement effort needs to be strengthened. This is achieved by the use of technology. A traffic enforcement camera system, consisting of a camera and a vehicle-monitoring device, is used to detect and identify vehicles disobeying a speed limit or some other legal requirement and automatically ticket offenders based on the license plate number. Traffic tickets are sent by mail. Applications include:

- Speed cameras that identify vehicles traveling over the legal speed limit. Many such devices use radar to detect a vehicle's speed or electromagnetic loops buried in each lane of the road.

- Red light cameras that detect vehicles that cross a stop line or designated stopping place while a red traffic light is showing.
- Bus lane cameras that identify vehicles traveling in lanes reserved for buses. In some jurisdictions, bus lanes can also be used by taxis or vehicles engaged in car pooling.
- Level crossing cameras that identify vehicles crossing railways at grade illegally.
- Double white line cameras that identify vehicles crossing these lines.
- High-occupancy vehicle lane cameras for that identify vehicles violating HOV requirements.
- Turn cameras at intersections where specific turns are prohibited on red. This type of camera is mostly used in cities or heavy populated areas.

Video recording of public transport vehicles is increasingly used both to protect passengers and to allow bus companies to prosecute offenders. The installation of equipment is often sufficient to deter delinquents even if it is not in operation. Some 20 years ago one British regional bus company installed boxes on all of its vehicles, but only had working equipment on 10% of them. Taken with a vigorous attitude to prosecution of offenders and appropriate severity in the courts a wave of vandalism was rapidly eliminated. That has already been introduced in India. Jaipur City's low floor buses will soon be equipped with high definition cameras and global positioning system (GPS). Security cameras and GPS will be installed in 246 low floor buses.

## 12.7 VEHICLE INSPECTION AND MAINTENANCE

Ensuring proper maintenance of road vehicles is essential to reduction of vehicle emissions. Most countries therefore require regular maintenance and certification of vehicles. In many, however, the system does not work effectively because of the corruption of testing officials. This has largely been overcome in Mexico City, which, as part of a wider reform program used modern computer possibilities to automatize the testing process.

The key elements of the system are as follows:

- Within the test-only centers, there is centralized operation. The staff in a central room sees the emission test results while the employee in the test lane conducting the test is “blind” to the results, thus discouraging any tampering with the test equipment or vehicle or otherwise manipulating the test.
- Tests are computer controlled, and all data are recorded electronically. There is no paper record keeping that invites fraud or inadvertent error.
- Test centers relay data to a central authority in real time, as generated. Elaborate electronic security measures discourage data tampering.
- The data allows remote electronic auditing of test centers and even of individual employees.
- Remote video surveillance and recording provides an additional check on performance.
- Independent and frequent calibration audits of test centers ensures that test equipment is properly maintained and provides accurate emission measurements (Walsh, 2004)

## 12.8 INTELLIGENT TRANSPORT SYSTEM

The existing urban transport infrastructure will require a major overhaul in order to meet the increasing demand for mobility. The expectations and demands have changed significantly; people are demanding high level of service quality and value for money. The easy availability of real time information such as maps, GPS systems and other travel related information, people want to plan their routes based on distance, time and cost.

By 2030, there should be extensive use of technology to manage mobility in the cities. Various forms of road pricing such as electronic road pricing, road tolls and congestion pricing which are in use around the World should be used particularly in large cities in the next 20 years.

Therefore along with investment in transport infrastructure, investment should be made in adapting new technology and ICT enabled transport management systems. Implementation of ICT systems will optimise operational efficiency through improved data collection and analytics leading to better decision making in urban transport planning and management. New vehicle

technology will be required to achieve significant reduction in pollution. ICT can help in managing a Public Bicycle System, from registration, payments, tracking to maintenance.

The information technology infrastructure will be managed separately from the application software and the data, recognizing that each component—application software, data, infrastructure—has a distinct life cycle. ICT systems will be implemented in a phased manner taking into account capability and technology maturity of the transport organisation, investment requirement and prioritize the ICT intervention based on the operational requirement and passenger preferences. Implementing a comprehensive ICT system may be disruptive for organisations with low level of Technology maturity.

ICT systems can offer the following benefits: Help in planning and visualization through simulation and modeling, improve passenger experience through PIS and fare integration, Improve transport agency's efficiency through better vehicle tracking and asset management, improve passenger safety and security, reduce fuel consumption and emissions, aid in better traffic and congestion management, support policy making and infrastructure planning and increasing accessibility and quality of life.

ICT systems comprises of devices in the transport system supported by Data Centers, Hardware, Software, Networks, Analytical Tools, etc. IT is a Part of a larger plan to drive the expected changes and is not a magic-wand. ICT in urban transport comprises of the following key systems:

**Information Collection Systems:** These systems help in collection of various types of data, including data related to infrastructure, transport activity levels, emissions, energy use, accidents, vehicles etc. Data collection is done using a variety of technologies, including sensors, induction loops, GPS, cameras and information from police or road users.

**Analytics & Decision Support Systems:** DSS is a specific class of computerized information system that supports business and organizational decision-making activities. Data from the above system is presented in such a way, that the decision makers can view the data to make

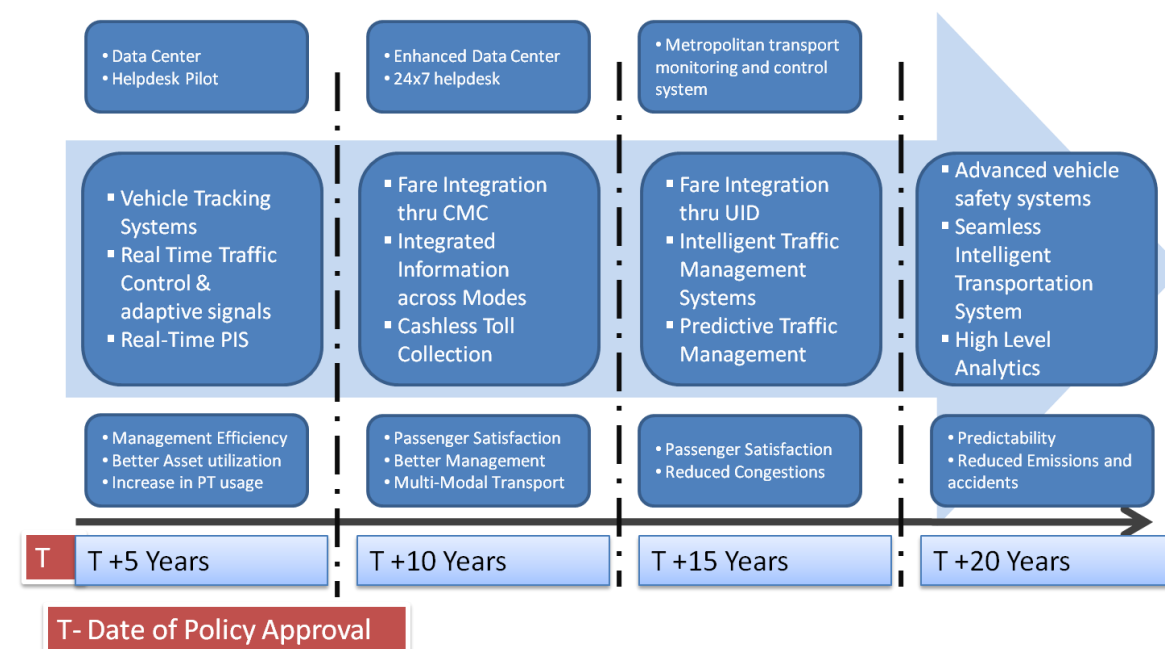
meaningful policy decisions. For e.g Data on road congestion or average speed in a particular area will help the authorities to plan the required infrastructure or add more public transport to de-congest the area.

**Communication Systems:** Communication systems ensure reliable and secure delivery of all information throughout the transport network. Communication systems include vehicle to vehicle, vehicle to infrastructure, infrastructure to people, vehicle to people, etc. The communication system can be through satellite, mobile, broadband, fibre optic, etc.

**Automation and Control Systems:** These systems include Intelligent Electronic Devices (IED) and other control devices in the field deployed on the vehicles, traffic signals, road infrastructure, etc. These components automatically control the flow of traffic on the roads and intersections based on the traffic volume, automated toll collection, automated lane control, automated speed control within the vehicle, etc.

The following ICT solutions would help address the needs of the current and future urban transport requirements.

### 12.9 PROPOSED ICT IMPLEMENTATION PLAN

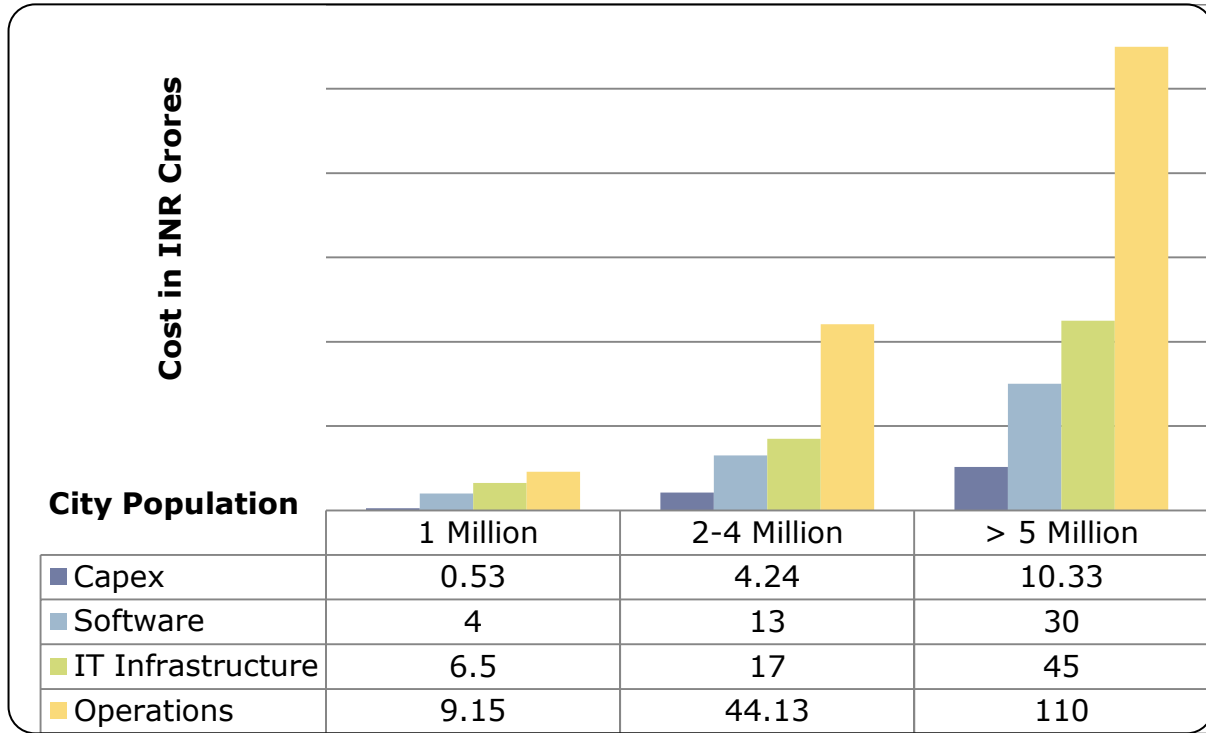


**ICT is also to be used for project monitoring for all the projects taken up with central govt. funding. It should be made mandatory to adopt project monitoring and planning softwares like primavera for project monitoring and planning at implementing agency, state and central govt. level**

The Government needs to devise transport policy to include mechanism to Incentivize technology adoption through innovative funding mechanism; Enable common payment gateway mechanism in transport; Protection of passengers' personal information and discontinue paper based tickets

The funding from GOI for public transport projects should make it mandatory for the Transport operators to establish a Central Command center to monitor and manage the system with 24x7 Help Desk; Training to drivers on use of new technology; GPS (or similar) devices, Speed Governors along with Driver Feedback systems; Internet hotspots and kiosks at bus and train stations; Surveillance and security systems; Contact less smart card system for payment and to provide service related updates thru electronic means.

The graph below shows the estimates of cost for implementing ICT systems in Cities with population of 1, 2 to 4 and above 5 million. The expenditure consists of capital and operating expenditure and also expenditure required for IT infrastructure and for implementing software systems.



|                |            |              |              |               |
|----------------|------------|--------------|--------------|---------------|
| <b>Total</b>   | <b>(Rs</b> | <b>20.18</b> | <b>78.37</b> | <b>195.33</b> |
| <b>Crores)</b> |            |              |              |               |



## 13 CAPACITY BUILDING

Rapid urbanization and motorization have fuelled urban mobility demand, threatening long term sustainability of urban areas. Motorisation rates continue to rise. Public transport supply is at low levels and have shown declining trends both in quality and quantity. Some 20 cities have some form of organised public transport operations. The deficiencies in transport infrastructure are enormous. Traffic management is still at a basic level. Technology use is limited. Compliance to rules is far from satisfactory. Traffic congestion is clearly visible in most towns. The road fatalities are on the rise and the air quality decline is visible.

The institutional response to growing urban transport problems has been lopsided. The focus has been on technology choice. The effort has focused on developing big capital intensive investment projects. The approach has not met with any success. The matter got further complicated as the sector management is constrained by multiplicity of agencies with overlapping responsibilities.

The Ministry of Urban Development, Government of India responded through three specific areas to address the sector development issue.

- I. Pronouncement of the National Urban Transport Policy (NUTP);
- II. Announcement of JnNURM programme, a reform linked urban infrastructure investment;
- III. Human Resources and Capacity Enhancement.

The MOUD effectively utilized JnNURM to direct urban transport investments in accordance with the pronouncements of NUTP. The Investments funded under JnNURM largely focused on pedestrian, NMV and bus based system developments. The reform agenda included:

- Reforms like abolition of Rent Act, Urban Land Ceiling Act & reduction of Stamp Duty etc to enable residential mobility within urban areas which will have a bearing on the trip lengths,,

- Reforms to better urban transport planning and management-made conditional to the sanction of Urban transport Projects are:
  1. Preparation of Comprehensive Mobility Plan (CMP)
  2. Setting up of Unified Mass Transit Authority (UMTA).
  3. Setting up of Dedicated Urban Transport Fund at state and city level.
  4. Transit Oriented Development Policy, Parking Policy and Advertisement Policy.
  5. Setting up of city specific Special Purpose Vehicle for managing public transport.
  6. Setting up of Traffic Information and Management Control Centre etc.
  7. Mechanism for periodic revision of public transport fares

About 22% of the projects sanctioned under JnNURM for Urban transport (NUTP compliant). More specific initiatives are listed below.

**Urban Bus Specifications:** For the first time, the concept of urban transport was introduced and made it mandatory to for all purchases under JnNURM. These also had to be equipped with ITS features such as LED sign boards, audio visual passenger information, multiplexing, On board diagnostics, Cameras, integrated controller, GPS, GPRS, Smart card ticketing machines and such other facilities. Over 15000 buses have been inducted into urban areas. Waiver of taxes by state and local bodies was promoted to bring the costs down further. In all 61 cities and towns augmented/established organised public transit through this programme.

**Promoting Better Practices:** To promote sound technical practices in planning and project development, a set of tool kits have been developed.

**Institutional Development:** At central level, as envisaged in the NUTP-2006, Institute of Urban Transport needs to be adequately strengthened with grant funding from Government of India to serve as the premier research body and repository of knowledge and national level database for urban transport. Similar institutes may be required at the state Government level as well. IUT has been providing technical support to MOUD and conducts periodic training for officers from state, local government and private sector.

With a view to augment urban land-use and transport planning & management capacities in the country, the Ministry of Urban Development, Government of India, has established four Centres of Excellence in Urban Transport (COEs) within the existing planning/technology institutions. CEPT University, IIT-Delhi, IIT-Chennai and NIT-Warangal are the four institutions which received the recognition and support from the Ministry. In addition to further strengthening of these, six more are required to be set up in 12<sup>th</sup> plan with financial support from GOI. The focus has to be on developing sector through creation of a pool of urban transport professionals.

Training of city and state officials needs to be taken up to develop awareness and skills. Leaders and change agents to be developed in this field through leaders program for in service officers and young leaders program for the post graduates and other young professionals. State Government and city Government / parastatals need to create job for these professionals with common state cadre. 1.5% of the cost of each project to be earmarked for capacity building efforts.

In order to achieve the goals set out for the 12<sup>th</sup> Five Year Plan and also to take up and manage various urban transport projects, it is important that proper institutional and implementation framework is urgently created. Presently urban transport is no body's baby and there is general lack of planning skills. Urban transport professionals are generally not employed by city agencies or the State Government. Accordingly, the following institutional and implementation framework is recommended as follows:

- Set up a new department of Urban transport in the Central Government
- Set up a new department of urban transport in each state and union territory.
- Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination
- A dedicated Urban transport authority in million plus cities or for a group of small cities to work very closely with land use planning authorities

- Existing city agencies engaged in implementation and operation of UT related projects to continue with their roles

The cities should be empowered to take care of its needs including urban transport. The Central Government will take care of issues such as financing, PPP, capacity building, developing a data base and R&D. State Government should support the city with an organizational set up, legislation, a resource generation policy and professional staff. An urban Road Transport Safety Board should be set up at the state level also in each State to deal with safety issues in a comprehensive, scientific and a systematic manner. It should be supported by relevant R&D. Rescue services should be organized for fast relief.

The Capacity building activities includes several activities. The four key activities – Education, training, knowledge creation and dissemination – in the field of land use transport would have to be introduced in several institutions across the nation. More specifically, the following are proposed.

- Encouraging educational programmes in the field of urban transport. In order to meet the technical requirements of various upcoming MRT projects, it is recommended that a special M.Tech. Course in MRT Technology should be started in IIT, Delhi with an annual intake of 50 candidates drawn from Civil, Electrical, Tele-communication disciplines;
- Institutional capacity building at the Central/State Govt. level through Imparting training programs for city officials and other stakeholders to enable them to undertake small planning assignments and to supervise and monitor the work of the consultant;
- Creating a data base and knowledge management center;
- Development of manuals, codes and standards;
- Enable creation of knowledge through a Research and Development Programme funded through national government.

## 14 A SUMMARY OF RECOMMENDATIONS

The document concludes that:

- Urban transport scene in Indian cities, today, is headed in the wrong direction;
- The 'Business As Usual' Growth Scenario will be worse;
- Successful urban transport systems not only increase commercial and labour market efficiency, but also increase access to amenities, improve general mobility and add to quality of life;
- Massive investments are needed to build up services country in cities to enable them to play their role in the desired economic growth of the.

### 14.1 A SUMMARY

#### 14.1.1 GOALS:

The following goals should be met in the 12<sup>th</sup> FYP:

- To create an effective institutional and Implementation framework that will manage the huge investments envisaged;
- To build capacity of state and city officials in planning and managing various aspects of urban transport on ongoing basis;
- To create facilities for Walk and cycle lanes in all 2 lac+ cities and state capitals. These are non-polluting modes that do not use fossil fuels and provide social equity;
- To develop an upgraded cycle rickshaw as an integral part of the last mile connectivity for city wide public transport network;
- To provide organized public transport in all 2 lac+ population cities;

- To complete 25% of hierarchical road network in all 2 lac + cities with missing links including opening up of dead end roads for better utilization;
- To upgrade existing roads network in all million plus population cities;
- To provide grade separated entries and bye-passes for through traffic for all million plus cities;
- To improve Road Safety and security against vandalism, crime and terrorism in all million plus population cities;
- To use technology for Multimodal integration, Enforcement and traffic management in all million plus population cities;
- To promote innovation, research and development in guided transport, pilot projects with 100% funding from Government of India.

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#### 14.1.2 FINANCING

- Financing should be through a combination of funding from Govt. of India, State Govt./urban local body, development agencies, property development, loan from domestic and financial institutions as well as PPP;
- Domestic debt should be facilitated by the Government with Government guarantee and also interest subsidy to the SPV;
- The Government of India portion should be met out of the gross budgetary support and/or a dedicated non-lapsable and non-fungible statutory National Urban Transport Fund by levies on vehicles and fuel;
- A dedicated urban transport fund should be created at the State level and city level through other sources, especially land monetization, betterment levy, land value tax, enhanced property tax or grant of development rights, advertisement, employment tax, congestion, a cess on the sales tax, parking charges reflecting a true value of the land, traffic *challans* etc;
- Public transport should be exempted from all taxes both for metro rail and buses.

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#### 14.1.3 PUBLIC PRIVATE PARTNERSHIP

- PPP in MRTS projects should be permitted if a project is found to be fit and viable for this approach on account of ridership. This, however, should not be linked with providing land for property development beyond what is needed for the operation of rail transit;
- The decision of using PPP for O&M should be left to the project owner;
- Different models of PPP should be allowed to be developed and to flourish;
- PPP in bus transport is recommended on “Gross cost” model with the revenue risk being taken by the govt.

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#### 14.1.4 INSTITUTIONAL FRAMEWORK

- A new department of urban transport to be set up in the Ministry of Urban Development at Government of India level and in Municipal Administration and Urban Development Ministry in each state / union territory within full time Secretary as in-charge;
- Setting up of a Commission for Urban Transport Safety to cover safety certification and audit of Metro Railways as well as road vehicles and road infrastructure in urban areas;
- Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination;
- Setting up Unified Metropolitan Transport Authority (UMTA) in all million plus cities or a group of small cities including a traffic management and engineering Cell, all manned by trained Urban Transport professionals;
- Existing city agencies engaged in implementation and operation of UT related projects to continue with their roles;
- Setting up of the National Urban Rail Transit Corporation and corporatization of suburban rail services;

- Setting up of a research, design and standardization authority for rail transit;
- Cities should be empowered to take care of its needs including urban transport;
- State Government will empower and support the city with an organizational set up, legislation, a resource generation policy and professional staff.

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#### 14.1.5 URBAN TRANSPORT PLANNING

- **Planning should** prevent urban sprawl, promote integrated land use transport planning and include steps for 'transport demand management;
- Most Indian cities have **mixed land-use** patterns. These contribute to short trip lengths and less dependence on motorized travel and hence should be legally encouraged;
- Fiscal disincentives should be imposed on cities that grow as urban sprawls.

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#### 14.1.6 NON-MOTORIZED TRANSPORT

- Citywide footpaths for **walk** and dedicated lanes for **bicycle** should be provided to promote these green modes of transport. Funds allocation for major transport infrastructure should be linked to achieving targets for creating facilities for NMT;
- An **upgraded cycle rickshaw** should be assigned a role in an integrated citywide multimodal public transport network.

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#### 14.1.7 PUBLIC TRANSPORT

**To provide organized public transport in all 2 lac+ population cities**

- Introduce organized city Bus service as per Urban bus specifications issued by MOUD in all 2lac+ population cities\* and state capitals;
- Add BRTS @ 20 km/1 Mn population in 51 cities with population > 1 Mn\*<sup>2</sup>;

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<sup>2</sup> \*Population figures are as per 2011 census.



- Add rail transit @ 10 km/Mn. population. Start planning rail transit projects in Cities with population in excess of 2 Mn\*. Start construction in cities with population in excess of 3 Mn\*. Estimated financial progress during the 12<sup>th</sup> plan period - 25% of total cost
- Expand rail transit In existing mega cities @ 10 km per/yr. i.e 50 km in 5 cities/yr;
- Provide Suburban rail services in urban agglomerations with population > 4 Mn\*
- Improve and upgrade Intermediate public transport vehicles and services;
- Promote public transport by incorporating all features necessary to make it user-friendly;
- **Public transport** network should be multimodal, integrated and citywide and should include, the road network, Road and rail based modes, Intermediate Public Transport, suburban rail and road based transport;
- Planning should permit entry of new technology at a later date;
- **Improved accessibility of stations/stops** for the last mile connectivity should be a vital feature of public transport planning.

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#### 14.1.8 SAFETY AND SECURITY

Program to improve **safety** should include a review of all road design and traffic management standards. Cities should undertake **safety audit** for hazardous location to reduce accidents, fatalities and injuries. An effective Strategy to improve **security** should include; Design solutions Management solutions and Partnership initiatives.

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#### 14.1.9 ROAD NETWORK

- Road network in a city should be planned in an integrated manner along with the public transport network;
- All encroachment of existing roads by parking, hawkers, roadside businesses and pedestrians (who walk on roads for lack of unobstructed footpaths) should be removed and available road capacity freed;

- Road cross-section should be reorganized for equitable allocation of road space;
- Missing links and opening up of dead end roads should be given priority;
- A hierarchical road network should be developed for the city;
- Improve and maintain road surface to the highest standards;
- Improve drainage of roads;
- Regulate and coordinate the work of utility agencies.

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14.1.10 CONGESTION MANAGEMENT

- Economic instruments should be used to discourage motorized vehicle ownership; discourage motorized vehicle use and encourage use of lower emission technology;
- Movement of goods should be studied to evolve planning norms that permit goods movement without affecting passenger movement;
- Technology should be used to manage traffic, enforce traffic rules and for multimodal integration;
- Vehicle inspection and maintenance should be automated;
- Intelligent transport systems should be implemented in a phased manner taking into account capability and technology maturity of the transport organization and operational requirement.

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14.1.11 CAPACITY BUILDING

A **Capacity building** program including a knowledge management cum data base center, and organized R&D has been initiated by the Ministry of Urban Development, Government of India. These are ongoing activities and should be institutionalized.

## 15 GOALS, RECCOMENDATIONS AND POLICY INTERVENTIONS

### 15.1 GOAL-1

#### 1. To create an effective institutional and Implementation framework that will manage the huge investments

##### 15.1.1 RECOMMENDATIONS

- *A new department of urban transport to be set up in the Ministry of Urban Development at Government of India level and in Municipal Administration and Urban Development Ministry in each state / union territory with full time Secretary as in-charge.*
- *Setting up of a Commission for Urban Transport Safety to cover safety certification and audit of Rail transit and a separate commission for road vehicles and road infrastructure in urban areas.*
- *Setting up MPC/DPC as envisaged in the 74<sup>th</sup> constitutional amendment for inter-sectoral coordination*
- *Setting up Unified Metropolitan Transport Authority (UMTA) in all million plus cities or a group of small cities including a traffic management and engineering Cell, all manned by trained Urban Transport professionals*
- *Setting up of the National Urban Rail Transit Corporation and corporatization of suburban rail services*
- *Setting up of a research, design and standardization authority for rail transit.*

### 15.1.2 POLICY INTERVENTIONS NEEDED

- *Urban transport, which is presently a constitutional and institutional orphan, has to be properly recognized in the constitution as well as in the institutional mechanism.*
- *Cities should be made responsible to meet its own and the regional needs of urban and suburban transport and should be duly empowered.*
- *The funds flow for urban transport projects and operations to various implementing agencies to be routed through UMTA.*
- *Resource Generation policy to be given to the city*
- *A comprehensive UT act to be enacted to give legislative support to the city*

## 15.2 GOAL-2

**2. To build capacity of state and city officials in planning and managing various aspects of urban transport on ongoing basis**

### 15.2.1 RECOMMENDATIONS

*Following steps initiated by MOUD for Institutional and Individual Strengthening, setting up a Knowledge Management and data base Center and research should continue*

- *IUT is being strengthened at the institutional level in the Central Government*
- *4 Centers of Excellence have been set up, 6 more are required with financial support*
- *To Create a pool of skilled manpower at these and other academic institutions*
- *Training of city officials to develop skills has started with the support of GEF and UNDP under SUTP at IUT.*

- *The SUTP Includes development of 10 manuals with training material, 11 toolkits and training of 1000 City/ State/Central officials.*
- *Another 1500 city and state officials are to be trained under a sanctioned MOUD project over the next 5 years*
- *Young leaders and Leader program*
- *An annual research symposium to encourage research in urban transport*
- *Dissemination of information - Conferences and Journals*
- *Development of legal and administrative frameworks,*
- *Development of manuals, codes and standards,*
- *Promotion of National level consultancy organizations to provide a pool of professional manpower to assist State/city Governments,*
- *Existing schemes of MOUD for support to Urban Transport Planning*

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#### 15.2.2 FOLLOWING FURTHER STEPS ARE NEEDED

- *Similar Knowledge Management and data base Center should be set up at State level and in large cities*
- *State Governments to create jobs to absorb professionals generated by academic institutions*

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#### 15.2.3 POLICY INTERVENTION

*The Centre, State and cities should take up skills upgrade and Capacity building activities including setting up and keeping up-to-date a Knowledge Management and data base Center and research activity and institutionalize them as these are ongoing needs*

### 15.3 GOAL-3

**3. To create facilities for Walk and cycle lanes in all 2 lac+ cities and state capitals**

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#### 15.3.1 RECOMMENDATIONS

*Plan and create citywide footpaths etc. for pedestrians and dedicated lanes for bicycles.*

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#### 15.3.2 POLICY INTERVENTION

*Cities should grow as compact cities to promote walk and bicycle.*

### 15.4 GOAL-4

**4. To develop an upgraded cycle rickshaw as an integral part of the last mile connectivity for city wide public transport network**

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#### 15.4.1 RECOMMENDATIONS

*Cycle rickshaw should be upgraded technologically to reduce effort and its operation regulated*

#### 15.4.2 POLICY INTERVENTION

*A role should be defined for cycle rickshaw*

#### 15.5 GOAL-5

**5. To provide organized public transport in all 2 lac\*+ population cities**

#### 15.5.1 RECOMMENDATIONS

- *Introduce organized city Bus service as per Urban bus specifications issued by MOUD in all 2lac+ population cities\* and state capitals*
- *Add BRTS @ 20 km/1 Mn population in 51 cities with population > 1 Mn\**
- *Add rail transit @ 10 km/Mn. population. Start planning rail transit projects in Cities with population in excess of 2 Mn\*. Start construction in cities with population in excess of 3 Mn\*. Estimated financial progress during the 12<sup>th</sup> plan period - 25% of total cost*
- *Expand rail transit In existing mega cities @ 10 km per/yr. i.e 50 km in 5 cities/yr.*
- *Provide Suburban rail services in urban agglomerations with population > 4 Mn\**
- *Improve and upgrade Intermediate public transport vehicles and services.*
- *Promote public transport by incorporating all features necessary to make it user-friendly*

\*Population figures are as per 2011 census.

#### 15.5.2 POLICY INTERVENTIONS

- *Government should participate in the financing of public transport*

## 15.6 GOAL-6

**6. To complete 25% of hierarchical road network in all 2 lac\* + cities with missing links including opening up of dead end roads for better utilization.**

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### 15.6.1 RECOMMENDATIONS

- *Road network in a city should be planned in an integrated manner along with the public transport network*
- *All encroachments of existing roads by parking, hawkers, roadside businesses and pedestrians (who walk on roads for lack of unobstructed footpaths) should be removed and available road capacity freed*
- *Road cross-section should be reorganized for equitable allocation of road space*
- *Missing links and opening up of dead end roads should be given priority*
- *A hierarchical road network should be developed for the city*

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### 15.6.2 POLICY INTERVENTION

*Expansion of road network in a city should be minimal, and primarily for providing access to urban areas, in order to avoid attracting vehicular traffic and resulting congestion*



## 15.7 GOAL-7

### 7. To upgrade existing roads network in all million plus population cities

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#### 15.7.1 RECOMMENDATIONS

- *Improve and maintain road surface to the highest standards*
- *Improve drainage of roads*
- *Regulate and coordinate the work of utility agencies.*
- *Temporary road diversions to facilitate construction work should be built and maintained to the highest road standards*
- *Street furniture, signages and street lighting should be upto date at all times*
- *Traffic signals phasing cycle should be reviewed continuously to meet the changing traffic pattern*

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#### 15.7.2 POLICY INTERVENTION

*Priority should be given to maintain the existing roads network before taking up its expansion*

## 15.8 GOAL-8

**8. To provide grade separated entries and bye-passes for through traffic for all million plus cities**

### 15.8.1 RECOMMENDATIONS

- *Goods terminals should be planned and provided at the periphery of the city*
- *Bye-passes to the urban areas should be planned and provided for passenger and goods traffic not destined for the city*
- *For traffic destined for the city grade-separated entries should be planned and provided*

### 15.8.2 POLICY INTERVENTIONS

- *Traffic not destined for the city should not enter the city*
- *Inter-city Goods traffic should terminate outside the city*

## 15.9 GOAL-9

**9. To improve Road Safety and security against vandalism, crime and terrorism in all million plus population cities**

#### 15.9.1 RECOMMENDATIONS

- *All road design and traffic management standards to be reviewed ( 2yrs)*
- *Safety audit for 5 or 10 most hazardous roads / locations / intersections every year*
- *Planning for security should include Design solutions, Management solutions and Partnership initiatives*

#### 15.9.2 POLICY INTERVENTIONS

- *Coordinated Multi-departmental action that includes Quality of Infrastructure, Driver training, testing and licensing, Registration, Testing and Certification of Vehicles, Road Accidents Data Collection and Analysis, Enforcement of Traffic Rules and Regulations etc. should be taken to improve safety*
- *Security for commuters, particularly women, operators against vandalism and graffiti and for staff on duty to cover all parts of the journey: stations, stops, shelters and on-vehicle should be an essential part of planning.*

#### 15.10 GOAL-10

**10. To use technology for Multimodal integration, Enforcement and traffic management in all million plus population cities**

15.10.1 RECOMMENDATIONS

- *A traffic enforcement camera system, consisting of a camera and a vehicle-monitoring device, should be used to detect and identify vehicles disobeying a speed limit or some other legal requirement and automatically ticket offenders based on the license plate number.*
- *Video recording of public transport vehicles should be used both to protect passengers and to allow bus companies to prosecute offenders.*
- *Various forms of road pricing such as electronic road pricing, road tolls and congestion pricing should be used.*
- *Vehicle inspection and maintenance should be enforced by automatizing the testing process by using modern computer possibilities*

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15.10.2 POLICY INTERVENTIONS

1. *Enforcement should be strengthened by the use of technology.*
2. *Intelligent transport systems should be implemented in a phased manner taking into account capability and technology maturity of the transport organization and operational requirement.*
3. *Mechanisms to incentivize technology adoption; Enable common payment gateway mechanism in transport; Protection of passengers' personal information and discontinuing paper based tickets are needed*

15.11 GOAL-11

**11. To promote innovation, research and development in guided transport, pilot projects with 100% funding from Government of India.**

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15.11.1 RECOMMENDATIONS

*Take up new Central Sector schemes for innovation, research and development in guided transit to promote indigenization and development of low cost technologies, pilot projects, public bicycle scheme, and improvement of para-transit through Intelligent Transport Systems etc.*

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15.11.2 POLICY INTERVENTION

*A window should be kept open to promote and adopt new technology*

## 16 IMPLEMENTATION STRATEGY AND AGENDA

### POLICY IMPLEMENTATION STRATEGY

| SN | POLICY  | VISIBLE AND TANGIBLE ACTION              | INSTITUTION RESPONSIBLE FOR IMPLEMENTATION | REMARKS  |
|----|---|--|--|--|
| 1  | UT should be recognized in the constitution   | Constitutional amendment                 | Central Government                         | To be put in Concurrent List                                     |
| 2  | Cities in complete charge of its UT needs and to be empowered to deliver  | Administrative order                     | State Government                           | 74 <sup>th</sup> Amendment needs to be implemented               |
| 3  | UT Authority in city to control all funds related to capital cost of UT projects as well as operational subsidies, if any | Administrative order                     | State Government                           | Resource generation policy to be formulated after detailed study |
| 5  | A comprehensive UT act to be enacted to give legislative support  | Drafting the act and enacting            | Center/state Government                    | Study and consultation required                                  |
| 6  | Institutionalize capacity building  | New improved scheme of capacity building | Center/state Government                    | Institutional, Individuals and Academics                         |
| 7  | Cities should grow as compact cities to promote walk and bicycle.   | Administrative order                     | State Government                           | Fiscal steps to control sprawl                                   |
| 8  | A role should be defined for cycle rickshaw   | Administrative order                     | State Government                           | Should be part of planning                                       |
| 9  | Government should participate in financing quality public transport   | Launch of appropriate scheme             | Center/state Government                    | Pre-determined basis   |
| 10 | Expansion of road network should be minimal, and  | Administrative                           | State Government                           | Should be part   |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| SN | POLICY   | VISIBLE AND TANGIBLE ACTION | INSTITUTION RESPONSIBLE FOR IMPLEMENTATION | REMARKS                        |
|----|--|-----------------------------|--|--------------------------------|
|    | primarily for access   | order                       |  | of planning                    |
| 11 | Priority to maintain the existing roads network  | Administrative order        | State Government                           | Targets should be fixed        |
| 12 | Traffic not destined for the city should bye-pass; Goods traffic should terminate outside the city | Administrative order        | Center/state Government                    | Should be part of planning     |
| 13 | Coordinated Multi-departmental action to improve safety /security                                  | Administrative order        | State Government                           | -do-                           |
| 14 | Technology for Multimodal integration, Enforcement and traffic management                          | Administrative order        | State Government                           | Standardization should be done |
| 15 | A window should be kept open to promote and adopt new technology                                   | Administrative order        | Center/state Government                    | Promote proactively            |
| 16 | Planning for UT to be integrated & to include all components                                       | Administrative order        | Center/state Government                    | -do-                           |
| 17 | Innovation in UT should be encouraged  | New Scheme                  | New scheme                                 | -do-                           |

**DETAILED IMPLEMENTATION AGENDA**

| RECOMMENDATION   | PRESENT STATUS           | INSTITUTIONAL responsibility | BUDGET REQUIREMENT<br>Rs Crores | NEED FOR CONSULTATION WITH OTHERS |
|--|--------------------------|------------------------------|---------------------------------|-----------------------------------|
| Create an effective Institutional framework in all states and cities | None                     | Center/State                 | 3000                            | Nil                               |
| Capacity building for skills upgrade in cities/states                | MOUD has started action  | MOUD                         | 2000                            | Academic Institutions             |
| Promote walk & bicycle facilities citywide                           | Not being done           | State/ city                  | 50,000                          | -                                 |
| Plan role for upgraded cycle rickshaw                                | Not being done           | State/ city                  |                                 | -                                 |
| Augment Public Transport in quality & quantity                       | Some cities are doing it | State /city                  | 1,90,000                        | -                                 |
| Integrated planning of road network, parking etc.                    | Each agency does its own | State/ city                  | 1,35,000                        | -                                 |
| Road maintenance   | Each agency does its own | State/ city                  | Included                        | -                                 |
| Bye-pass thru traffic  | Some cities have done it | State/city                   |                                 | -                                 |
| Safety & Security  | Largely neglected        | State/city                   |                                 | -                                 |
| Technology for enforcement   | Use has started          | State/city                   | 8000                            | -                                 |
| Innovation and R&D   | Not being done           | State/city                   |                                 | -                                 |



# Annexures

ANNEXURE A: MEETING NOTICE

**TWELFTH FIVE YEAR PLAN  
WORKING GROUP ON URBAN TRANSPORT**

K-14011/3/2011-UT  
Government of India  
Ministry of Urban Development  
(Urban Transport)

Nirman Bhawan, New Delhi  
Dated: 10<sup>th</sup> May, 2011

**Meeting Notice**

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**Sub:** First meeting of the Working Group on Urban Transport for twelfth Five Year Plan.

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The first meeting of the Working Group on Urban Transport for twelfth Five Year Plan is scheduled to be held under the Chairmanship of Dr. E Sreedharan, MD, Delhi Metro Rail Corporation Ltd. (DMRC) on 19.05.2011 at 11.00 AM in Board Room of DMRC, Metro Bhawan, Fire Brigade Lane, Barakhambha Road, New Delhi. The Terms of References (ToRs) of the working group are attached.

2. Kindly make it convenient to attend the meeting.

(Jeewan Kumar)

DO (UT)

Tel: 011- 2306133698

Fax. 011-23063304

Encl.: As above

To,

1. Chairman, Railway Board, Rail Bhawan with request for nominating an officer not below the rank of Executive Director, dealing with sub-urban Passenger Traffic and Perspective Planning.
2. Shri S. Sunder, The Energy and Resource Institute (TERI), Darbari Seth Block, India Habitat Centre Complex, Lodhi Road, New Delhi-3.
3. Prof. H.M. Shivanand Swamy, Professor and Associate Director, Centre for Environmental Planning & Technology, CEPT University, Ahmedabad-380009.
4. Chief Planner, Town & Country Planning Organisation(TCPO), New Delhi
5. Prof. R. Sivanandan, Civil Engineering Department, IIT-Madras, Chennai.
6. Prof. CSRK Prasad, Head, Transport Division, NIT-Warangal-506004, Andhra Pradesh.
7. Prof. Geetam Tiwari, Transportation Research & Injury Prevention Programme (TRIPP), Indian Institute of Technology Delhi, Room No. MS 808, HauzKhas, New Delhi – 110 016.
8. Shri A K Saroha, Director(UT), Ministry of Urban Development, New Delhi
9. Shri B I Singal, DG, Institute of Urban Transport (IUT), Nirman Bhawan, New Delhi.
10. Prof Srikant Gupta, Ex- Director, NIUA, New Delhi & Prof., Delhi School of Economics, University of Delhi, Delhi-110007.-
11. Dr. Ashwin Mahesh, IIM- Bangalore, Bennerghatta Road, Bengaluru-560076.
12. Shri R N Joshi, Director (Finance) DMRC Ltd., New Delhi.
13. Director, National Institute of Urban Affairs (NIUA), Core-IV B India Habitat Center, New Delhi.
14. Principal Secretary, Urban Development Department, Government of Maharashtra, Mantralaya, Mumbai.
15. Additional Chief Secretary, Urban Development Department, Government of Karnataka, Bengaluru.
16. Principal Secretary, Urban Development Department, Government of Andhra Pradesh, Hyderabad.
17. Principal Secretary, Transport Department, Government of West Bengal, Kolkata.

18. Principal Secretary, Urban Development Department, Government of Gujarat, Ahmadabad.
19. Principal Secretary, Urban Development Department, Government of Tamil Nadu, Chennai.
20. Principal Secretary cum Commissioner (Transport), GNCT of Delhi.
21. Shri S K Lohia, OSD(UT) and ex-officio Joint Secretary, Ministry of Urban Development, New Delhi - Member Secretary.

**Copy to:-**

- (i) PS to MD, DMRC
- (ii) Sr. PPS to Secretary (UD)
- (iii) Sh. Rakesh Ranjan, Director (HUD), Planning Commission, Yojna Bhawan, New Delhi

(Jeewan Kumar)

## ANNEXURE B: EXTRACT FROM 11TH FIVE YEAR PLAN DOCUMENT AND MID TERM APPRAISAL AND ISSUES FOR APPROACH TO THE 12TH FIVE YEAR PLAN

### **Urban Infrastructure**

The rate of urbanization in India has been relatively slow so far, but faster growth is likely to change this in future leading to a faster pace of urbanization in the years ahead. Urbanization is a natural outcome of the process of development and we must gear up to the challenge to meet the need for providing infrastructure and utilities in the cities. It will be necessary to upgrade the quality of infrastructure in existing cities to provide improved municipal services and also to develop new cities and suburban townships in the vicinity of existing cities as satellites/counter magnets to redistribute the influx of population. Urban infrastructure is expensive to construct and, the financial condition of most of our cities is such that they will not be able to finance the scale of investment for quite some time. Accordingly, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) seeks to provide Central assistance for urban infrastructure development linked to a process of reforms at the city and urban local body level which would make these bodies more financially viable, and ultimately capable of financing the investment we need in urban areas. The JNNURM has got off to a good start, but close monitoring will be necessary in the Eleventh Plan to ensure successful implementation of individual projects and also the larger reforms agenda.

### **Extracts from Mid Term Appraisal by Planning Commission**

The Eleventh Plan laid emphasis on developing physical infrastructure, including transport to support the accelerated growth of the country's economy. The thrust in the transport sector has been on augmenting capacity through technology upgrade and modernization. The Eleventh Plan also stressed the need for improving productivity and efficiency and fostering the development of various transport modes in an integrated manner. In this regard, improving accessibility to remote and rural areas and enhancing mobility through various programmes with an enlarged participation of the private sector have been the two other important

objectives under the Eleventh Plan.

A number of steps have been taken to achieve these objectives, but it will take time to see their full effect because infrastructure development involves long time lags. The aggregate picture emerging from the Mid-Term Appraisal (MTA) is that both physical and financial achievements are better than they were in the past, but they fall short of targets set for the Eleventh Plan.

The MTA suggests that it is necessary to take concerted measures, including close monitoring of programmes and projects, to come as close as possible to achieving the objectives of the Eleventh Plan. This is also necessary to set the stage for faster development of this crucial sector in the Twelfth Plan.

As the economy transitions into a higher growth phase, it is necessary to move beyond setting targets for individual transport sectors to evolving an integrated view of transport development and policy over a longer-term framework. To this end, the Planning

Commission has established a high level Committee on Integrated Transport Policy under the chairmanship of Dr Rakesh Mohan. The recommendations of the committee are expected to provide key inputs in formulating the Twelfth Plan.

### **NHDP Phase-Vii: Construction of Ring Roads, Flyovers, And Bypasses**

The government approved the construction of stand-alone ring roads, bypasses, grade separators, flyovers, elevated roads, tunnels, road over bridges, underpasses, and service roads on a BOT (Toll) mode under NHDP Phase-VII in December 2007 at an estimated cost of Rs 16,680 Crore. Thirty-six stretches in different states have been proposed to be taken up. The entire project is scheduled to be completed by December 2014. As on 31 July 2009, a length of 19 km was under implementation while the remaining 681 km was yet to be awarded.

### **ROAD TRANSPORT**

Road transport plays an important role in the movement of goods and passengers in the country mainly because of its accessibility, flexibility, door-to door service, and reliability. Of

late, there has been an unprecedented growth in vehicular traffic on the roads, which has led the Department of Road Transport to accord priority to improving road safety to prevent accidents, save precious lives, and improve safety of all road users.

During the first three years of the Eleventh Plan, the central road transport sector is likely to spend Rs 372.92 Crore, against the approved outlay of Rs 1,000 Crore at constant prices, which in percentage terms works out to about 37 per cent.

In the central sector, road safety programmes are implemented through the Road Safety and National Data Base Network and Studies schemes. However, to address road safety issues with vigour and zeal, some new schemes, such as the setting up of the National Road Safety and Traffic Management Board and setting up of Inspection & Certification (I&C) Centers in the country are being introduced during the Eleventh Plan.

Operation of passenger services by State Road Transport Undertakings (SRTUs) and regulation of transport services are the important programmes covered under the state sector. Recognizing the criticality of the role of public transport in the movement of passengers, it has been proposed to strengthen the public transport system in the country. To begin with, it is proposed to provide financial assistance for latest technologies such as GPS/GSM based vehicle tracking system, computerized reservation system, automatic fare collection system, and electronic ticket vending system, inter-modal fare integration, and passenger information as well as for preparation of total mobility plan for the entire state. This is bound to improve productivity and efficiency in the public transport system.

There are certain critical issues, such as motor vehicle taxation, overloading, and barrier free movement of freight and passengers, which need to be addressed during the remaining part of the Plan.

**Extracts from Issues for Approach to the 12th Five Year Plan' Presentation by planning commission, 21 April 2011 (<http://planningcommission.gov.in>)**

We have commenced a very wide consultative process on the challenges for the 12th Plan

- Over 900 CSOs across the country have participated, as well as many industry associations and 'think tanks'
- Internet being used for first time to reach out to broader community including several hundred sectoral experts
- Planning Commission has launched a dedicated website <http://12thplan.gov.in> this site is also linked to Facebook. 32,000 citizens have visited these two sites and have left many insightful comments
- A series of regional consultations with States are planned in May
- Dialogue with other stakeholders continues

### **11th Plan experience**

GDP growth likely to average 8.2% over 11th Plan: short of the 9% target, but remarkable given the global crisis and drought

- In the 10th Plan GDP growth averaged 7.7 %
- We have also seen progress on inclusiveness: Agricultural growth, Poverty Reduction, Education, Health, Up liftment of SCs/STs, Minorities etc.
- However progress on inclusiveness less than expected. We are likely to miss Millennium Development Goals (MDG), except perhaps on poverty

There is a strong demand from all sectors of society to improve Implementation, Accountability and Service Delivery.

### **12th plan: Basic Objective**

Faster, More Inclusive, and Sustainable Growth **Is 10% growth feasible?** Realistically, even 9% will need strong policy action. **Could aim at 9.0 to 9.5 percent**

### **Transport infrastructure**

- Ensure sufficient provision for maintenance of the already-built roads
- Invest in unified tolling and better safety on highways



- Improve bus services/public transport in smaller cities, towns and districts.
- Metros in urban areas through PPPs wherever feasible

### **Managing Urbanization**

India's urban population is expected to increase from 400 million in 2011 to about 600 million or more by 2030

- Critical challenges are basic urban services especially for the poor: water, sewerage, sanitation, solid waste management, affordable housing, public transport
- Investment required in urban infrastructure is estimated at `60 lac Crore over the next 20 years
- We need to develop and propagate innovative ways of municipal financing, through Public-Private Partnerships (PPPs)
- Land management strategies key for good urban development as well as financing urban infrastructure development
- Need training and capacity building for urban planning and urban services management; for corporators and municipal officials
- Reform of JNNRUM for the next phase, and convergence with RAY for an integrated approach

### **Governance and Empowerment**

Citizen feedback reveals general dissatisfaction with state of public service delivery. Total Quality Management needs to be introduced at all levels. Delivery and policy functions need to be separated in Government Ministries

- Professionally managed delivery organisations are needed with clear mandates and accountability. We need much better mechanisms for convergence of government departments on systemic issues
- Devolution can be effective only if the autonomy of PRIs/ULBs is increased and their human resource capabilities improved. How can the Centre help?

- Mechanisms need to be created at all levels to understand the needs of vulnerable sections of the society and inform policy-makers
- Diagnostics of Failure and Mainstreaming of Success: horizontal linkages need to be created for exchange of information and best practices
- Institutional mechanisms for conflict resolution, particularly for land and water

## ANNEXURE C: CALCULATIONS AND ASSUMPTIONS FOR INVESTMENTS NEEDED

### Urban Transport Requirement - 12th Plan - Network Lengths, No. of Buses, Facilities

| SIZE CLASS  |                              | >100L | 40-100L | 30-40L | 10-30L | 5-10L | <5L+State Cap | Total        |
|---|------------------------------|-------|---------|--------|--------|-------|---------------|--------------|
| <b>1. Street Infrastructure (Kms)</b>   |                              | 11627 | 11125   | 3104   | 16553  | 5691  | 22891         | <b>70991</b> |
| 1.1   | Street Network - New Areas   | 6478  | 6031    | 1907   | 10095  | 4344  | 8864          | <b>37720</b> |
| 1.2   | Street Network –Up-gradation | 5149  | 5094    | 1197   | 6458   | 1347  | 14027         | <b>33271</b> |
| <b>2. Public Transport</b>  |                              |       |         |        |        |       |               |              |
| 2.1   | Buses                        | 10883 | 8015    | 2377   | 6784   | 6712  | 4685          | <b>39456</b> |
| 2.2   | BRTS Network-KMS             | 568   | 300     | 80     | 531    | 0     | 0             | <b>1480</b>  |
| 2.3   | METRO Network-KMS            | 492   | 205     | 30     | 20     | 0     | 0             | <b>747</b>   |
| 2.4   | Sub-Urban rail               | 579   | 410     | 0      | 0      | 0     | 0             | <b>989</b>   |
| 2.5   | Bus Infrastructure           |       |         |        |        |       |               |              |
| 2.5.1   | Depot                        | 1635  | 1200    | 360    | 1020   | 1005  | 0             | <b>5220</b>  |
| 2.5.2   | Terminals No.                | 880   | 640     | 200    | 540    | 0     | 0             | <b>2260</b>  |
| 2.5.3   | Workshops No.                | 16    | 15      | 4      | 20     | 9     | 0             | <b>64</b>    |
| <b>3. Support Infrastructure includes ITS, ATC &amp; Parking. On lump sum basis</b>                     |                              |       |         |        |        |       |               |              |
| <b>4. Institutional Development/Capacity Building on Lum-sum bases for 5 years@ 500 crores per year</b> |                              |       |         |        |        |       |               |              |

Note: For up-gradation of street network, 25% of the network is selected for the plan period. The requirements for pedestrian & Bicycle facilities 100% has been taken.

### Urban Transport Requirement - 12th Plan – Assumptions and Rates

| Sr. No.   | Category  | Assumption  | Rate  |
|-----------|---|---|---|
| <b>1</b>  | <b>Rapid Transit Systems</b>  |   |   |
| a         | MRTS in Top 3 cities (Mumbai, Delhi, Kolkata)                             | Requirement is estimate at 10km/million population.   | @ INR 175 Crore per km (85% disbursement of finance during period of 12 <sup>th</sup> FYP)                    |
| b         | MRTS- Mega Cities (Bangalore, Chennai, Hyderabad, Ahmadabad, Pune, Surat) | To build 10 km/million population of METRO RAIL in all cities with population >40 lakh as per 2011 estimate (other Mega cities)       | @ INR 175crore per km (50% disbursement of finance during period of 12 <sup>th</sup> FYP)                     |
| c         | MRTS  | To build 10 km/million population of METRO RAIL in all cities with population > 25 lakh as per 2011 estimate (other than Mega-cities) | @ INR 175 Crore per km (20% or equal to 10kms disbursement of finance during period of 12 <sup>th</sup> FYP)  |
| D         | BRTS  | To build 20 km of BRTS per million population in all the cities with population > 1 million as per 2011 estimate                      | @ INR 20 Crore per km   |
| E         | Reg. Rail   | To build 10 km of regional rail per million population as per 2011 estimate (In mega cities-9)  | @ INR 20 Crore per kms  |
| <b>2.</b> | <b>Transit Infrastructure</b>   |   |   |
|           | DEPOTS  | One depot per 50buses   | @ 8 Crore per unit  |
|           | WORKSHOPS   | One workshop per 250buses   | @ 20 Crore per unit   |
|           | TERMINALS   | 2 terminals per million added population  | @ 20 Crore per unit   |
| <b>3.</b> | <b>Investments in Bus</b>   |   |   |
| a         |   | Requirement 50 buses per lakh population for cities population > 4million<br>Current gap: 33%   | @ Average cost of INR 38.8 lakh per bus   |
| b         |   | 40 buses per lakh population for cities population between3million to 4million<br>Current Gap:50%                                     | @ Average cost of INR 38.8 lakh per bus   |
| c         |   | 20 buses per lakh population for cities population between 0.5million to 3million<br>Current Gap:50%                                  | @ Average cost of INR 38.8 lakh per bus for cities above 1million<br>&@ Average cost of INR 25.2 lakh per bus |
| d         |   | 20 buses per lakh population for cities   | @ Average cost of INR 25.2 lakh   |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Sr. No.   | Category                             | Assumption  | Rate   |
|-----------|--------------------------------------|---|--|
|           |                                      | population below 0.5million<br>Current Gap:100%                             | per bus  |
| <b>4.</b> | <b>Street Infrastructure</b>         |   |  |
| a.        | Population                           | 2011 Estimate   |  |
| b.        | Total Area Developable               | Mega Cities<br>Other Metro Cities<br>5-10 lakh population cities<br><5 lakh | 125 persons/hact<br>100 persons/hact<br>75 persons/hact<br>50 persons/hact                                 |
| c.        | Area Under Roads (%)                 | Mega Cities<br>Other Metro Cities<br>5-10 lakh population cities<br><5 lakh | 15%<br>15%<br>7.5%<br>7.5%   |
| d.        | Area Under Roads (%)                 | Mega Cities<br>Other Metro Cities<br>5-10 lakh population cities<br><5 lakh | 15%<br>15%<br>7.5%<br>7.5%   |
| e.        | Cost of roads (New -Crores/km & Upg) | Mega Cities<br>Other Metro Cities<br>5-10 lakh population cities<br><5 lakh | 4 Crores/km 2crores/km<br>4 Crores/km 2crores/km<br>2 Crores/km 1crore/km<br>0.6 Crore/km<br>0.6 Crores/km |

Notes:

1. About 30-40% trips are expected to be performed on NMV.
2. Smaller cities will have IPTS performing significant role as public transport
3. 25% of existing roads are to be upgraded during the plan period
4. 100% of network to be covered with pedestrian /NMT facilities
5. Metro requirement is higher in large cities. Major expenditures covered upfront in this plan.

**Urban Transport Requirement - 12th Plan – Investments (in Rs Crores)**

| SIZE CLASS                            | >100L        | 40-100L      | 30-40L       | 10-30L       | 5-10L       | <5L+ State Cap | Total         |
|---------------------------------------|--------------|--------------|--------------|--------------|-------------|----------------|---------------|
| <b>1. Street Infrastructure</b>       | <b>40843</b> | <b>38896</b> | <b>11101</b> | <b>49014</b> | <b>6297</b> | <b>21067</b>   | <b>167218</b> |
| <b>1.1 Street Network - New Areas</b> | <b>25911</b> | <b>24125</b> | <b>7629</b>  | <b>30286</b> | <b>4344</b> | <b>8864</b>    | <b>101159</b> |
| 1.1.1 Pedestrian, NMV,                | 3887         | 3619         | 1144         | 4543         | 652         | 1330           | <b>15174</b>  |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| SIZE CLASS         |   | >100L         | 40-100L      | 30-40L       | 10-30L       | 5-10L       | <5L+ State Cap | Total         |
|--------------------|---|---------------|--------------|--------------|--------------|-------------|----------------|---------------|
|                    | Street Scope                                |               |              |              |              |             |                |               |
| 1.1.2              | Road  | 22024         | 20506        | 6485         | 25743        | 3692        | 7534           | <b>85985</b>  |
| <b>1.2</b>         | <b>Street Network –Up-gradation</b>         | <b>14932</b>  | <b>14771</b> | <b>3472</b>  | <b>18727</b> | <b>1953</b> | <b>12203</b>   | <b>66059</b>  |
| 1.2.1              | Pedestrian, NMV, Street Scope               | 6179          | 6112         | 1437         | 7749         | 808         | 5050           | <b>27335</b>  |
| 1.2.2              | Road  | 8753          | 8659         | 2035         | 10978        | 1145        | 7154           | <b>38724</b>  |
| <b>2.</b>          | <b>Public Transport</b>                     | <b>116063</b> | <b>55375</b> | <b>8417</b>  | <b>18715</b> | <b>2876</b> | <b>1181</b>    | <b>202628</b> |
| 2.1                | Buses                                       | 4223          | 3110         | 922          | 2632         | 1691        | 1181           | <b>13759</b>  |
| 2.2                | BRTS Network-KMS                            | 11367         | 6008         | 1605         | 10622        | 0           | 0              | <b>29603</b>  |
| 2.3                | METRO Network-KMS                           | 86067         | 35909        | 5250         | 3500         | 0           | 0              | <b>130726</b> |
| 2.4                | Su-Urban rail                               | 11572         | 8208         | 0            | 0            | 0           | 0              | <b>19780</b>  |
| 2.5                | Bus Infrastructure                          | 2835          | 2140         | 640          | 1960         | 1185        | 0              | <b>8760</b>   |
| 2.5.1              | Depot                                       | 1635          | 1200         | 360          | 1020         | 1005        | 0              | <b>5220</b>   |
| 2.5.2              | Terminals No.                               | 320           | 300          | 80           | 400          | 180         | 0              | <b>1280</b>   |
| 2.5.3              | Workshops No.                               | 880           | 640          | 200          | 540          | 0           | 0              | <b>2260</b>   |
| <b>3.</b>          | <b>Support Infrastructure</b>               | <b>3298</b>   | <b>2429</b>  | <b>594</b>   | <b>3392</b>  | <b>750</b>  | <b>0</b>       | <b>10463</b>  |
| 3.1                | ITS &ATC                                    | 2638          | 1943         | 475          | 2714         | 750         | 0              | <b>8520</b>   |
| 3.2                | Parking                                     | 660           | 486          | 119          | 678          | 0           | 0              | <b>1943</b>   |
| <b>4.</b>          | <b>Institutions &amp; Capacity Building</b> |               |              |              |              |             |                | <b>5000</b>   |
| <b>5.</b>          | <b>Innovations &amp;Pilot Projects</b>      |               |              |              |              |             |                | <b>1000</b>   |
| <b>6.</b>          | <b>NMT &amp; IPTS-Pilots</b>                |               |              |              |              |             |                | <b>2000</b>   |
| <b>Grand Total</b> |   | <b>160204</b> | <b>96700</b> | <b>20112</b> | <b>71120</b> | <b>9924</b> | <b>22248</b>   | <b>388308</b> |

**Urban Transport Requirement - 12th Plan – Fund Resource Allocation (Rs in Cr)**

| Sources of Funding                             |                                | Total         | GOI          | State Govt/<br>ULB/<br>Dev Authority | Prop Dev    | Multilateral/<br>Bilateral<br>Loan | Domestic Loan | PVT.          |
|--|--------------------------------|---------------|--------------|--------------------------------------|-------------|------------------------------------|---------------|---------------|
| <b>1. Street Infrastructure</b>                |                                | <b>167218</b> | <b>21412</b> | <b>44647</b>                         | <b>0</b>    | <b>0</b>                           | <b>0</b>      | <b>101159</b> |
| 1.1  | Street Network - New Areas     | 101159        | 0            | 0                                    | 0           | 0                                  | 0             | 101159        |
| 1.1.1  | Pedestrian, NMV, Street Scape. | 15174         | 0            | 0                                    | 0           | 0                                  | 0             | 15174         |
| 1.1.2  | Road                           | 85985         | 0            | 0                                    | 0           | 0                                  | 0             | 85985         |
| 1.2  | Street Network - Upgradation   | 66059         | 21412        | 44647                                | 0           | 0                                  | 0             | 0             |
| 1.2.1  | Pedestrian, NMV, Street Scape  | 27335         | 13667        | 13667                                | 0           | 0                                  | 0             | 0             |
| 1.2.2  | Road                           | 38724         | 7745         | 30979                                | 0           | 0                                  | 0             | 0             |
| <b>2. Public Transport</b>                     |                                | <b>202628</b> | <b>51782</b> | <b>58678</b>                         | <b>5268</b> | <b>31606</b>                       | <b>22447</b>  | <b>32847</b>  |
| 2.1  | Buses                          | 13759         | 6879         | 4128                                 | 0           | 0                                  | 1376          | 1376          |
| 2.2  | BRTS                           | 29603         | 14801        | 14801                                | 0           | 0                                  | 0             | 0             |
| 2.3  | METRO Rail                     | 130726        | 26145        | 30721                                | 4575        | 27452                              | 18302         | 23531         |
| 2.4  | Suburban rail                  | 19780         | 3956         | 4648                                 | 692         | 4154                               | 2769          | 3560          |
| 2.5  | Bus Infrastructure             | 8760          | 0            | 4380                                 | 0           | 0                                  | 0             | 4380          |
| 2.5.1  | Depot                          | 5220          | 0            | 2610                                 | 0           | 0                                  | 0             | 2610          |
| 2.5.2  | Terminals No.                  | 1280          | 0            | 640                                  | 0           | 0                                  | 0             | 640           |
| 2.5.3  | Workshops No.                  | 2260          | 0            | 1130                                 | 0           | 0                                  | 0             | 1130          |
| <b>3. Support Infrastructure</b>               |                                | <b>10463</b>  | <b>4649</b>  | <b>4260</b>                          | <b>0</b>    | <b>0</b>                           | <b>0</b>      | <b>1554</b>   |
| 3.1  | ITS &ATC                       | 8520          | 4260         | 4260                                 | 0           | 0                                  | 0             | 0             |
| 3.2  | Parking                        | 1943          | 389          | 0                                    |             |                                    |               | 1554          |
| <b>4. Institutions &amp; Capacity Building</b> |                                | <b>5000</b>   | <b>5000</b>  | <b>0</b>                             |             |                                    |               | <b>0</b>      |
| 5.   | Innovations & Pilot Projects   | <b>1000</b>   | <b>1000</b>  | <b>0</b>                             |             |                                    |               | <b>0</b>      |
| 6.   | NMT & IPTS-Pilots              | <b>2000</b>   | <b>2000</b>  | <b>0</b>                             |             |                                    |               | <b>0</b>      |
| <b>Grand Total</b>                             |                                | <b>388308</b> | <b>85843</b> | <b>107585</b>                        | <b>5268</b> | <b>31606</b>                       | <b>22447</b>  | <b>135560</b> |

## ANNEXURE D: FINANCING FOR URBAN TRANSPORT FOR TWELFTH FIVE YEAR PLAN

### **Financing Urban Transport: National Urban Transport Fund (NUTF)**

The subject of financing urban transport is vexed one-

- at the upper end of the hierarchy i.e. metro rail for metropolitan cities and cities for population above a particular threshold (say 3 million population) the sub-sector becomes by and large incontestable resulting in very limited applicability of financing through PPP as compared to other sectors
- For other forms of city transport – LRTS, BRTS, normal buses, Non-Motorised Transport, urban transport infrastructure and pedestrian facilities both institutional set up and financial structure of state governments and city governments do not provide much hope for generation of sufficient finances on their own

On the other hand total financing requirement for Urban Transport for 12<sup>th</sup> Five Year Plan is at the minimum placed anywhere between Rs 4,00,000 Crore- to Rs 5, 00,000 Crore and the total financing requirement over next two decades is pegged at around Rs. 20, 00,000 Crore.

Duly accounting for possible contribution from central and state exchequer and innovative approaches to PPP wherever applicable or possible, still both during the Twelfth Five Year innovatively.

### **Nature of NUTF**

It is in this connection that the choice falls on a statutory “Non-lapsable Non-fungible” National Urban Transport Fund” which has clearly earmarked sources of funding the fund at a sustainable level. It is very important that such a fund is long term fund where accruals of one year can be used in subsequent years (non-lapsable) and that the money accrued to the fund is not used for any other purposes (non-fungible). It is because of this critical requirement of non-



lapsable non-fungible nature of the fund that it is needed to be created and maintained as a special statute. Also interse allocation of the Fund over the 12<sup>th</sup> Plan Year period or perennially can be fixed either as part of the statute or rules made under it. The fund apart from capital creation needs also will have to cater for possible support to certain systems during the operations stage.

### **Sources of Financing the Fund**

Many countries have used various innovative sources to finance urban transport and one of the most successful cases in recent history has been the success of France using what is known as Versement Tax (Tax on Employers), which has approximately funded forty percent of total expenditure on urban transport. In the Indian context various such sources were examined and three items were selected based on certain criteria including but not limited to: (a) High Impact- in terms of actual annual contribution to the Fund (b) Polluters pay Principle (c) Reduce-Reduce- buy, and use of personalised vehicles- fully knowing the fact that given low per capita incidence of personalised vehicles, increasing income and aspiration level the purchase of personalised vehicles in future will grow at a rate much faster than in the past. An attempt is needed for purchase and use of personalised vehicles a tad more same difficult and costlier proposition while improving the public transport simultaneously. Certain items like- employers' tax have not been considered because they do not contribute much to the Fund and have serious difficulties of collection. Similarly certain demand management measures- like congestion charges though recommended to contain demand has not been included here because its annual contribution is not sufficient:

Following items have been considered for inclusion to Finance the Fund:

1. **A Green Surcharge of Rs. 2 on petrol sold in the country.** No cess has been proposed on diesel due to its multiple uses It is felt that in the case of petrol, the cess should be levied on the entire consumption of petrol because petrol is primarily used by personalised vehicles and where ever they are purchased essentially the personalised

vehicles (even if owned by nearby villagers) ultimately land up plying on cities and towns roads.

2. **A Green Cess on Existing Personalized Vehicles:** On all the existing vehicles an annual green cess has been proposed at the rate of three percent of the insured value of the personalized vehicles. A modest rate of growth of vehicles based on average of last five years has been assumed and it is also assumed that every two years. . It is proposed that for the ease of collection the annual cess will be collected through insurance companies along with the annual insurance premium.
3. **Urban Transport Tax on Purchase of New Cars and Two Wheelers:** Date of previous years car and two wheeler sales and the prior period annual growth rate has been used to arrive at the number of new cars and two wheeler purchases through extrapolation. However it is safe to assume that given the present low level of penetration of personalized vehicles future growth of personalized vehicle sales will be at much higher level. As such the annual car and two wheeler sales assumed here has been at conservative level. The Urban Transport Tax or Cess has been assumed at the level of 7.5% of the total cost of the vehicles. In case of diesel cars the differential rate of tax has been put at 20% on account of the substantially cheaper rate of diesel prices and inability to separately increase the green cess on sale of diesel There is a case for substantially higher percentage of Cess on diesel cars at least till such times the diesel is available at substantially subsidised price.

At a time when exchequer faces the dilemma of meeting ever growing demand from various sectors amidst constrained government sources of finances and in an environment where PPP can only very partially meet the financing needs of urban transport, the proposed National Urban Transport Fund presents itself as an effective means for funding the sectoral need during the 12<sup>th</sup> Five Year Plan and beyond. In fact the actual potential of this source is much higher than what even the calculations project. The total annual yield from the three sources is shown in table 1 and graph 1 below and starting from a total collection of Rs Rs. 42,199 Crore in the first year, the sources can collect Rs 1, 93, 542 Crore in first four years of 12<sup>th</sup> Five Year Plan period and a whopping Rs. Rs. 22, 40, 804 Crore in next twenty years.

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| Sources  | 2012          | upto<br>2015   | upto<br>2022   | upto 2032        |
|--|---------------|----------------|----------------|------------------|
| Green Cess on Existing Vehicles ( in Rs Crore)               | 18,163        | 83,753         | 324,490        | 1,022,311        |
| Urban Transport Tax On New Registration ( in Rs Crore)       | 20,929        | 95,739         | 358,783        | 1,069,437        |
| Green Surcharge on Petrol ( in Rs Crore)                     | 3,108         | 14,050         | 51,622         | 149,056          |
| <b>Total of three sources (urban settlement in Rs Crore)</b> | <b>42,199</b> | <b>193,542</b> | <b>734,895</b> | <b>2,240,804</b> |

Detailed calculations are summarized as follows:

**1. Vehicle Population**

**a. Motorized Vehicle Growth (%)**

| Year a on<br>31 <sup>st</sup> March | All Vehicles | Two<br>Wheelers | Cars, Jeeps<br>and Taxis | Buses | Goods<br>Vehicles | Others |
|-------------------------------------|--------------|-----------------|--------------------------|-------|-------------------|--------|
| 1956                                | 39           | 52              | 28                       | 38    | 45                | 300    |
| 1961                                | 56           | 115             | 53                       | 21    | 41                | 163    |
| 1966                                | 65           | 157             | 47                       | 28    | 54                | 102    |
| 1971                                | 70           | 155             | 50                       | 29    | 32                | 100    |
| 1976                                | 45           | 84              | 14                       | 2     | 2                 | 134    |
| 1981                                | 100          | 148             | 49                       | 41    | 58                | 125    |
| 1986                                | 96           | 139             | 53                       | 40    | 56                | 63     |
| 1991                                | 102          | 127             | 66                       | 46    | 57                | 73     |
| 1996                                | 58           | 64              | 42                       | 36    | 50                | 52     |
| 2001                                | 63           | 66              | 68                       | 41    | 45                | 51     |
| 2002                                | 7            | 8               | 8                        | 0     | 1                 | 6      |
| 2003                                | 14           | 14              | 13                       | 14    | 17                | 9      |
| 2004                                | 9            | 9               | 10                       | 7     | 7                 | 2      |
| 2005                                | 12           | 13              | 9                        | 16    | 8                 | 9      |
| 2006                                | 10           | 10              | 12                       | 11    | 10                | 6      |
| 2007                                | 8            | 7               | 10                       | 36    | 15                | 7      |
| 2008                                | 9            | 9               | 10                       | 6     | 9                 | 7      |
| 2009                                | 9            | 9               | 10                       | 4     | 8                 | 7      |
| <b>Average Last<br/>5 Years</b>     | 10           | 10              | 10                       | 15    | 10                | 7      |

**b. New vehicle Population Growth (%)**

| Year a on 31 <sup>st</sup><br>March | All Vehicles | Two<br>Wheelers | Cars, Jeeps<br>and Taxis | Buses | Goods<br>Vehicles | Others |
|-------------------------------------|--------------|-----------------|--------------------------|-------|-------------------|--------|
| 1956                                |              |                 |                          |       |                   |        |
| 1961                                | 99           | 236             | 143                      | -23   | 32                | 117    |
| 1966                                | 82           | 194             | 36                       | 60    | 86                | 65     |
| 1971                                | 76           | 154             | 55                       | 31    | -8                | 98     |
| 1976                                | 9            | 37              | -57                      | 0     | -90               | 168    |
| 1981                                | 222          | 225             | 293                      | 124   | 2438              | 119    |
| 1986                                | 93           | 132             | 63                       | 38    | 52                | 13     |
| 1991                                | 108          | 119             | 89                       | 60    | 60                | 90     |
| 1996                                | 15           | 14              | 6                        | 13    | 37                | 23     |
| 2001                                | 71           | 69              | 128                      | 57    | 36                | 48     |
| 2002                                | -81          | -80             | -81                      | -99   | -97               | -83    |
| 2003                                | 106          | 96              | 78                       | 8500  | 1892              | 70     |
| 2004                                | -29          | -26             | -14                      | -45   | -50               | -73    |
| 2005                                | 54           | 56              | 2                        | 164   | 10                | 315    |
| 2006                                | -8           | -14             | 39                       | -19   | 44                | -27    |
| 2007                                | -13          | -26             | -7                       | 258   | 69                | 17     |
| 2008                                | 22           | 42              | 16                       | -78   | -29               | 7      |
| 2009                                | 11           | 14              | 5                        | -23   | -9                | 16     |
| <b>Average Last<br/>5 Years</b>     | 13           | 14              | 11                       | 60    | 17                | 66     |

**c. Vehicular Composition (%)**

| Year a on 31 <sup>st</sup><br>March | All Vehicles | Two<br>Wheelers | Cars, Jeeps<br>and Taxis | Buses | Goods<br>Vehicles | Others |
|-------------------------------------|--------------|-----------------|--------------------------|-------|-------------------|--------|
| 1956                                | 100          | 10              | 48                       | 11    | 28                | 4      |
| 1961                                | 100          | 13              | 47                       | 9     | 25                | 6      |
| 1966                                | 100          | 21              | 41                       | 7     | 24                | 8      |
| 1971                                | 100          | 31              | 37                       | 5     | 18                | 9      |
| 1976                                | 100          | 39              | 29                       | 4     | 13                | 15     |
| 1981                                | 100          | 49              | 22                       | 3     | 10                | 17     |
| 1986                                | 100          | 59              | 17                       | 2     | 8                 | 14     |
| 1991                                | 100          | 66              | 14                       | 2     | 6                 | 12     |
| 1996                                | 100          | 69              | 12                       | 1     | 6                 | 11     |
| 2001                                | 100          | 70              | 13                       | 1     | 5                 | 11     |
| 2002                                | 100          | 71              | 13                       | 1     | 5                 | 10     |
| 2003                                | 100          | 71              | 13                       | 1     | 5                 | 10     |
| 2004                                | 100          | 71              | 13                       | 1     | 5                 | 9      |
| 2005                                | 100          | 72              | 13                       | 1     | 5                 | 9      |
| 2006                                | 100          | 72              | 13                       | 1     | 5                 | 9      |
| 2007                                | 100          | 71              | 13                       | 1     | 5                 | 9      |

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| Year a on 31 <sup>st</sup><br>March | All Vehicles | Two<br>Wheelers | Cars, Jeeps<br>and Taxis | Buses | Goods<br>Vehicles | Others |
|-------------------------------------|--------------|-----------------|--------------------------|-------|-------------------|--------|
| 2008                                | 100          | 72              | 13                       | 1     | 5                 | 9      |
| 2009                                | 100          | 72              | 13                       | 1     | 5                 | 8      |
| <b>Average Last<br/>5 Years</b>     | 100          | 72              | 13                       | 1     | 5                 | 9      |

## 2. Fuel Consumption

|                                  | 2004  | 2005  | 2006  | 2007  | 2008   | 2009   | 2010   | Average |
|----------------------------------|-------|-------|-------|-------|--------|--------|--------|---------|
| Motor Spirit (in '000 tonnes)    | 7,897 | 8,251 | 8,647 | 9,285 | 10,332 | 11,258 | 12,731 |         |
| Motor Spirit (in million liters) | 8,213 | 8,581 | 8,993 | 9,656 | 10,745 | 11,708 | 13,240 |         |
| Growth Rates                     |       |       |       |       |        |        |        |         |
| Motor Spirit                     |       | 4.48% | 4.80% | 7.38% | 11.28% | 8.96%  | 13.08% | 8.33%   |

## 3. Cess Calculations

### a. Green Cess on Existing Vehicles (Pan India)

| Year | Vehicular<br>Growth<br>Assumed | Ratio of<br>Cars/jeeps/taxis | Ratio of Two<br>Wheelers | Total<br>Vehicles<br>(‘000) | Cars/jeeps/taxis (‘000) | Two<br>Wheelers<br>(‘000) |
|------|--------------------------------|------------------------------|--------------------------|-----------------------------|-------------------------|---------------------------|
| 2009 | 9.6%                           | 13.0%                        | 71.8%                    | 114,951                     | 15,313                  | 82,402                    |
| 2010 | 9.6%                           | 13.0%                        | 71.8%                    | 125,986                     | 16,420                  | 90,474                    |
| 2011 | 9.6%                           | 13.0%                        | 71.8%                    | 138,080                     | 17,996                  | 99,159                    |
| 2012 | 9.6%                           | 13.0%                        | 71.8%                    | 151,336                     | 19,724                  | 108,678                   |
| 2013 | 9.6%                           | 13.0%                        | 71.8%                    | 165,863                     | 21,617                  | 119,111                   |
| 2014 | 9.4%                           | 13.0%                        | 71.8%                    | 181,454                     | 23,649                  | 130,307                   |
| 2015 | 9.4%                           | 13.0%                        | 71.8%                    | 198,510                     | 25,872                  | 142,556                   |
| 2016 | 9.2%                           | 13.0%                        | 71.8%                    | 216,772                     | 28,252                  | 155,670                   |
| 2017 | 9.2%                           | 13.0%                        | 71.8%                    | 236,715                     | 30,851                  | 169,992                   |
| 2018 | 9.0%                           | 13.0%                        | 71.8%                    | 258,019                     | 33,628                  | 185,290                   |
| 2019 | 9.0%                           | 13.0%                        | 71.8%                    | 281,239                     | 36,654                  | 201,966                   |
| 2020 | 8.8%                           | 13.0%                        | 71.8%                    | 305,988                     | 39,880                  | 219,738                   |
| 2021 | 8.8%                           | 13.0%                        | 71.8%                    | 332,914                     | 43,389                  | 239,075                   |
| 2022 | 8.6%                           | 13.0%                        | 71.8%                    | 361,543                     | 47,121                  | 259,634                   |
| 2023 | 8.6%                           | 13.0%                        | 71.8%                    | 392,635                     | 51,173                  | 281,962                   |
| 2024 | 8.4%                           | 13.0%                        | 71.8%                    | 425,615                     | 55,471                  | 305,646                   |
| 2025 | 8.4%                           | 13.0%                        | 71.8%                    | 461,365                     | 60,131                  | 331,319                   |
| 2026 | 8.2%                           | 13.0%                        | 71.8%                    | 499,196                     | 65,061                  | 358,487                   |
| 2027 | 8.2%                           | 13.0%                        | 71.8%                    | 540,129                     | 70,396                  | 387,882                   |
| 2028 | 8.0%                           | 13.0%                        | 71.8%                    | 583,337                     | 76,027                  | 418,911                   |

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| Year | Vehicular Growth Assumed | Ratio of Cars/jeeps/taxis | Ratio of Two Wheelers | Total Vehicles ('000) | Cars/jeeps/taxis ('000) | Two Wheelers ('000) |
|------|--------------------------|---------------------------|-----------------------|-----------------------|-------------------------|---------------------|
| 2029 | 8.0%                     | 13.0%                     | 71.8%                 | 630,003               | 82,109                  | 452,423             |
| 2030 | 7.8%                     | 13.0%                     | 71.8%                 | 679,141               | 88,514                  | 487,710             |
| 2031 | 7.8%                     | 13.0%                     | 71.8%                 | 732,112               | 95,418                  | 525,750             |
| 2032 | 7.6%                     | 13.0%                     | 71.8%                 | 787,750               | 102,669                 | 565,706             |

**b. Urban Transport Tax On New Registration (Pan India)**

**New Vehicle Registrations**

| Year | Cars (in '000) - assuming 1% scrap | below 3 lakh (average Rs 2.5 Lakh) | 3 - 7 lakh (average Rs 5 lakh) | 7 - 12 lakh (average Rs 9.5 lakh) | 12 - 20 lakh (average Rs 16 lakh) | above 20 lakh (average Rs 30 lakh) | Two Wheelers (in '000) - assuming 2% scrap |
|------|------------------------------------|------------------------------------|--------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--|
| 2009 |                                    |                                    |                                |                                   |                                   |                                    |  |
| 2010 | 1,260                              | 252                                | 567                            | 252                               | 126                               | 63                                 | 9,720                                      |
| 2011 | 1,740                              | 348                                | 783                            | 348                               | 174                               | 87                                 | 10,495                                     |
| 2012 | 1,908                              | 382                                | 859                            | 382                               | 191                               | 95                                 | 11,502                                     |
| 2013 | 2,091                              | 418                                | 941                            | 418                               | 209                               | 105                                | 12,606                                     |
| 2014 | 2,248                              | 450                                | 1,012                          | 450                               | 225                               | 112                                | 13,578                                     |
| 2015 | 2,459                              | 492                                | 1,107                          | 492                               | 246                               | 123                                | 14,855                                     |
| 2016 | 2,639                              | 528                                | 1,188                          | 528                               | 264                               | 132                                | 15,966                                     |
| 2017 | 2,882                              | 576                                | 1,297                          | 576                               | 288                               | 144                                | 17,435                                     |
| 2018 | 3,085                              | 617                                | 1,388                          | 617                               | 309                               | 154                                | 18,699                                     |
| 2019 | 3,363                              | 673                                | 1,513                          | 673                               | 336                               | 168                                | 20,381                                     |
| 2020 | 3,592                              | 718                                | 1,616                          | 718                               | 359                               | 180                                | 21,812                                     |
| 2021 | 3,908                              | 782                                | 1,759                          | 782                               | 391                               | 195                                | 23,731                                     |
| 2022 | 4,165                              | 833                                | 1,874                          | 833                               | 417                               | 208                                | 25,341                                     |
| 2023 | 4,523                              | 905                                | 2,035                          | 905                               | 452                               | 226                                | 27,520                                     |
| 2024 | 4,810                              | 962                                | 2,165                          | 962                               | 481                               | 241                                | 29,323                                     |
| 2025 | 5,214                              | 1,043                              | 2,346                          | 1,043                             | 521                               | 261                                | 31,786                                     |
| 2026 | 5,532                              | 1,106                              | 2,489                          | 1,106                             | 553                               | 277                                | 33,794                                     |
| 2027 | 5,985                              | 1,197                              | 2,693                          | 1,197                             | 599                               | 299                                | 36,565                                     |
| 2028 | 6,335                              | 1,267                              | 2,851                          | 1,267                             | 634                               | 317                                | 38,787                                     |
| 2029 | 6,842                              | 1,368                              | 3,079                          | 1,368                             | 684                               | 342                                | 41,890                                     |
| 2030 | 7,225                              | 1,445                              | 3,251                          | 1,445                             | 723                               | 361                                | 44,336                                     |
| 2031 | 7,789                              | 1,558                              | 3,505                          | 1,558                             | 779                               | 389                                | 47,794                                     |
| 2032 | 8,206                              | 1,641                              | 3,693                          | 1,641                             | 821                               | 410                                | 50,470                                     |

**Urban Transport Tax rate**

| Year | Petrol Cars (@ 7.5% of the car value) | Two Wheelers @ Rs 1500 (in Rs) | Escalation in UT Tax on TW every 2 yr |
|------|---------------------------------------|--------------------------------|---------------------------------------|
| 2009 |                                       |                                |                                       |
| 2010 |                                       |                                |                                       |
| 2011 |                                       |                                |                                       |
| 2012 | 7.5%                                  | 1500                           | 0.0%                                  |
| 2013 | 7.5%                                  | 1500                           | 0.0%                                  |
| 2014 | 7.5%                                  | 1580                           | 5.0%                                  |
| 2015 | 7.5%                                  | 1580                           | 0.0%                                  |
| 2016 | 7.5%                                  | 1660                           | 5.0%                                  |
| 2017 | 7.5%                                  | 1660                           | 0.0%                                  |
| 2018 | 7.5%                                  | 1740                           | 5.0%                                  |
| 2019 | 7.5%                                  | 1740                           | 0.0%                                  |
| 2020 | 7.5%                                  | 1830                           | 5.0%                                  |
| 2021 | 7.5%                                  | 1830                           | 0.0%                                  |
| 2022 | 7.5%                                  | 1920                           | 5.0%                                  |
| 2023 | 7.5%                                  | 1920                           | 0.0%                                  |
| 2024 | 7.5%                                  | 2020                           | 5.0%                                  |
| 2025 | 7.5%                                  | 2020                           | 0.0%                                  |
| 2026 | 7.5%                                  | 2120                           | 5.0%                                  |
| 2027 | 7.5%                                  | 2120                           | 0.0%                                  |
| 2028 | 7.5%                                  | 2230                           | 5.0%                                  |
| 2029 | 7.5%                                  | 2230                           | 0.0%                                  |
| 2030 | 7.5%                                  | 2340                           | 5.0%                                  |
| 2031 | 7.5%                                  | 2340                           | 0.0%                                  |
| 2032 | 7.5%                                  | 2460                           | 5.0%                                  |

**Collections - Urban Transport Tax**

| Year | Petrol Cars (in Rs Crore) | Two Wheelers (in Rs Crore) | Green Cess on New Two Wheelers | Green Cess on New Car |
|------|---------------------------|----------------------------|--------------------------------|-----------------------|
| 2009 |                           |                            |                                |                       |
| 2010 |                           |                            |                                |                       |
| 2011 |                           |                            |                                |                       |
| 2012 | 7,762                     | 1,725                      | 460                            | 4,436                 |
| 2013 | 8,513                     | 1,891                      | 504                            | 4,865                 |
| 2014 | 9,146                     | 2,145                      | 543                            | 5,226                 |
| 2015 | 10,009                    | 2,347                      | 594                            | 5,720                 |
| 2016 | 10,742                    | 2,650                      | 639                            | 6,138                 |
| 2017 | 11,721                    | 2,894                      | 697                            | 6,698                 |
| 2018 | 12,552                    | 3,254                      | 748                            | 7,172                 |
| 2019 | 13,680                    | 3,546                      | 815                            | 7,817                 |
| 2020 | 14,616                    | 3,992                      | 872                            | 8,352                 |

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| Year | Petrol Cars<br>(in Rs Crore) | Two Wheelers (in Rs<br>Crore) | Green Cess on New Two<br>Wheelers | Green Cess on<br>New Car |
|------|------------------------------|-------------------------------|-----------------------------------|--------------------------|
| 2021 | 15,900                       | 4,343                         | 949                               | 9,086                    |
| 2022 | 16,946                       | 4,866                         | 1,014                             | 9,683                    |
| 2023 | 18,400                       | 5,284                         | 1,101                             | 10,514                   |
| 2024 | 19,580                       | 5,923                         | 1,173                             | 11,189                   |
| 2025 | 21,216                       | 6,421                         | 1,271                             | 12,124                   |
| 2026 | 22,509                       | 7,164                         | 1,352                             | 12,863                   |
| 2027 | 24,351                       | 7,752                         | 1,463                             | 13,915                   |
| 2028 | 25,784                       | 8,650                         | 1,551                             | 14,734                   |
| 2029 | 27,833                       | 9,341                         | 1,676                             | 15,905                   |
| 2030 | 29,396                       | 10,375                        | 1,773                             | 16,798                   |
| 2031 | 31,686                       | 11,184                        | 1,912                             | 18,107                   |
| 2032 | 33,386                       | 12,416                        | 2,019                             | 19,078                   |

**Number of Cars (Old Cars requiring Insurance)**

| Year | below 3<br>lakh<br>(average<br>Rs 2.5<br>Lakh) | 3 - 7 lakh<br>(average Rs 5<br>lakh) | 7 - 12 lakh<br>(average Rs 9.5<br>lakh) | 12 - 20 lakh<br>(average Rs 16<br>lakh) | above 20<br>lakh<br>(average Rs<br>30 lakh) | total  |
|------|--|--------------------------------------|---|---|---|--------|
| 2009 |  |                                      |   |   |   |        |
| 2010 |  |                                      |   |   |   |        |
| 2011 |  |                                      |   |   |   |        |
| 2012 | 3,563  | 8,017                                | 3,563                                   | 1,781                                   | 891   | 17,815 |
| 2013 | 3,905  | 8,787                                | 3,905                                   | 1,953                                   | 976   | 19,526 |
| 2014 | 4,280  | 9,630                                | 4,280                                   | 2,140                                   | 1,070                                       | 21,400 |
| 2015 | 4,682  | 10,535                               | 4,682                                   | 2,341                                   | 1,171                                       | 23,412 |
| 2016 | 5,122  | 11,526                               | 5,122                                   | 2,561                                   | 1,281                                       | 25,612 |
| 2017 | 5,594  | 12,586                               | 5,594                                   | 2,797                                   | 1,399                                       | 27,970 |
| 2018 | 6,109  | 13,745                               | 6,109                                   | 3,054                                   | 1,527                                       | 30,543 |
| 2019 | 6,658  | 14,982                               | 6,658                                   | 3,329                                   | 1,665                                       | 33,291 |
| 2020 | 7,258  | 16,330                               | 7,258                                   | 3,629                                   | 1,814                                       | 36,289 |
| 2021 | 7,896  | 17,766                               | 7,896                                   | 3,948                                   | 1,974                                       | 39,480 |
| 2022 | 8,591  | 19,330                               | 8,591                                   | 4,295                                   | 2,148                                       | 42,956 |
| 2023 | 9,330  | 20,993                               | 9,330                                   | 4,665                                   | 2,333                                       | 46,650 |
| 2024 | 10,132   | 22,797                               | 10,132                                  | 5,066                                   | 2,533                                       | 50,660 |
| 2025 | 10,983   | 24,713                               | 10,983                                  | 5,492                                   | 2,746                                       | 54,917 |
| 2026 | 11,906   | 26,789                               | 11,906                                  | 5,953                                   | 2,976                                       | 59,530 |
| 2027 | 12,882   | 28,985                               | 12,882                                  | 6,441                                   | 3,221                                       | 64,411 |
| 2028 | 13,938   | 31,361                               | 13,938                                  | 6,969                                   | 3,484                                       | 69,691 |
| 2029 | 15,054   | 33,870                               | 15,054                                  | 7,527                                   | 3,763                                       | 75,268 |
| 2030 | 16,258   | 36,580                               | 16,258                                  | 8,128                                   | 4,065                                       | 81,289 |
| 2031 | 17,526   | 39,433                               | 17,526                                  | 8,763                                   | 4,382                                       | 87,629 |



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| Year | below 3 lakh<br>(average Rs 2.5 Lakh) | 3 - 7 lakh<br>(average Rs 5 lakh) | 7 - 12 lakh<br>(average Rs 9.5 lakh) | 12 - 20 lakh<br>(average Rs 16 lakh) | above 20 lakh<br>(average Rs 30 lakh) | total  |
|------|---------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------|
| 2032 | 18,893                                | 42,508                            | 18,893                               | 9,446                                | 4,723                                 | 94,463 |

**Insured Value of the New Cars (@ current rate of 4%)**

| Year | below 3 lakh<br>(average Rs 2.5 Lakh) | 3 - 7 lakh<br>(average Rs 5 lakh) | 7 - 12 lakh<br>(average Rs 9.5 lakh) | 12 - 20 lakh<br>(average Rs 16 lakh) | above 20 lakh<br>(average Rs 30 lakh) | Total  |
|------|---------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------|
| 2009 |                                       |                                   |                                      |                                      |                                       |        |
| 2010 |                                       |                                   |                                      |                                      |                                       |        |
| 2011 |                                       |                                   |                                      |                                      |                                       |        |
| 2012 | 382                                   | 1,718                             | 1,452                                | 1,222                                | 1,140                                 | 5,914  |
| 2013 | 418                                   | 1,882                             | 1,588                                | 1,338                                | 1,260                                 | 6,486  |
| 2014 | 450                                   | 2,024                             | 1,710                                | 1,440                                | 1,344                                 | 6,968  |
| 2015 | 492                                   | 2,214                             | 1,870                                | 1,574                                | 1,476                                 | 7,626  |
| 2016 | 528                                   | 2,376                             | 2,006                                | 1,690                                | 1,584                                 | 8,184  |
| 2017 | 576                                   | 2,594                             | 2,189                                | 1,843                                | 1,728                                 | 8,930  |
| 2018 | 617                                   | 2,776                             | 2,345                                | 1,978                                | 1,848                                 | 9,563  |
| 2019 | 673                                   | 3,026                             | 2,557                                | 2,150                                | 2,016                                 | 10,423 |
| 2020 | 718                                   | 3,232                             | 2,728                                | 2,298                                | 2,160                                 | 11,136 |
| 2021 | 782                                   | 3,518                             | 2,972                                | 2,502                                | 2,340                                 | 12,114 |
| 2022 | 833                                   | 3,748                             | 3,165                                | 2,669                                | 2,496                                 | 12,911 |
| 2023 | 905                                   | 4,070                             | 3,439                                | 2,893                                | 2,712                                 | 14,019 |
| 2024 | 962                                   | 4,330                             | 3,656                                | 3,078                                | 2,892                                 | 14,918 |
| 2025 | 1,043                                 | 4,692                             | 3,963                                | 3,334                                | 3,132                                 | 16,165 |
| 2026 | 1,106                                 | 4,978                             | 4,203                                | 3,539                                | 3,324                                 | 17,150 |
| 2027 | 1,197                                 | 5,386                             | 4,549                                | 3,834                                | 3,588                                 | 18,553 |
| 2028 | 1,267                                 | 5,702                             | 4,815                                | 4,058                                | 3,804                                 | 19,645 |
| 2029 | 1,368                                 | 6,158                             | 5,198                                | 4,378                                | 4,104                                 | 21,206 |
| 2030 | 1,445                                 | 6,502                             | 5,491                                | 4,627                                | 4,332                                 | 22,397 |
| 2031 | 1,558                                 | 7,010                             | 5,920                                | 4,986                                | 4,668                                 | 24,142 |
| 2032 | 1,641                                 | 7,386                             | 6,236                                | 5,254                                | 4,920                                 | 25,437 |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Year | Insured Value of the Two Wheelers (@ current rate of 2%) | Insured Value of the Two Wheelers (@ Proposed rate of 3%) | Green Cess on New Two Wheelers |
|------|--|---|--------------------------------|
| 2009 |  |   |                                |
| 2010 |  |   |                                |
| 2011 |  |   |                                |
| 2012 | 920  | 1,380   | 460                            |
| 2013 | 1,009  | 1,513   | 504                            |
| 2014 | 1,086  | 1,629   | 543                            |
| 2015 | 1,188  | 1,783   | 594                            |
| 2016 | 1,277  | 1,916   | 639                            |
| 2017 | 1,395  | 2,092   | 697                            |
| 2018 | 1,496  | 2,244   | 748                            |
| 2019 | 1,631  | 2,446   | 815                            |
| 2020 | 1,745  | 2,617   | 872                            |
| 2021 | 1,898  | 2,848   | 949                            |
| 2022 | 2,027  | 3,041   | 1,014                          |
| 2023 | 2,202  | 3,302   | 1,101                          |
| 2024 | 2,346  | 3,519   | 1,173                          |
| 2025 | 2,543  | 3,814   | 1,271                          |
| 2026 | 2,703  | 4,055   | 1,352                          |
| 2027 | 2,925  | 4,388   | 1,463                          |
| 2028 | 3,103  | 4,654   | 1,551                          |
| 2029 | 3,351  | 5,027   | 1,676                          |
| 2030 | 3,547  | 5,320   | 1,773                          |
| 2031 | 3,824  | 5,735   | 1,912                          |
| 2032 | 4,038  | 6,056   | 2,019                          |

**Insured Value of the New Cars (@ Proposed rate of 7%)**

| Year | below 3 lakh (average Rs 2.5 Lakh) | 3 - 7 lakh (average Rs 5 lakh) | 7 - 12 lakh (average Rs 9.5 lakh) | 12 - 20 lakh (average Rs 16 lakh) | above 20 lakh (average Rs 30 lakh) | Total  | Green Cess on New Car |
|------|------------------------------------|--------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--------|-----------------------|
| 2009 |                                    |                                |                                   |                                   |                                    |        |                       |
| 2010 |                                    |                                |                                   |                                   |                                    |        |                       |
| 2011 |                                    |                                |                                   |                                   |                                    |        |                       |
| 2012 | 669                                | 3,007                          | 2,540                             | 2,139                             | 1,995                              | 10,350 | 4,436                 |
| 2013 | 732                                | 3,294                          | 2,780                             | 2,341                             | 2,205                              | 11,351 | 4,865                 |
| 2014 | 788                                | 3,542                          | 2,993                             | 2,520                             | 2,352                              | 12,194 | 5,226                 |
| 2015 | 861                                | 3,875                          | 3,272                             | 2,755                             | 2,583                              | 13,346 | 5,720                 |
| 2016 | 924                                | 4,158                          | 3,511                             | 2,957                             | 2,772                              | 14,322 | 6,138                 |

[Recommendations of Working Group on Urban Transport for 12th Five Year Plan]

| Year | below 3 lakh<br>(average Rs 2.5 Lakh) | 3 - 7 lakh<br>(average Rs 5 lakh) | 7 - 12 lakh<br>(average Rs 9.5 lakh) | 12 - 20 lakh<br>(average Rs 16 lakh) | above 20 lakh<br>(average Rs 30 lakh) | Total  | Green Cess on New Car |
|------|---------------------------------------|-----------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------|-----------------------|
| 2017 | 1,008                                 | 4,540                             | 3,830                                | 3,226                                | 3,024                                 | 15,628 | 6,698                 |
| 2018 | 1,080                                 | 4,858                             | 4,103                                | 3,461                                | 3,234                                 | 16,736 | 7,172                 |
| 2019 | 1,178                                 | 5,296                             | 4,475                                | 3,763                                | 3,528                                 | 18,240 | 7,817                 |
| 2020 | 1,257                                 | 5,656                             | 4,775                                | 4,021                                | 3,780                                 | 19,488 | 8,352                 |
| 2021 | 1,369                                 | 6,157                             | 5,200                                | 4,379                                | 4,095                                 | 21,200 | 9,086                 |
| 2022 | 1,458                                 | 6,559                             | 5,539                                | 4,670                                | 4,368                                 | 22,595 | 9,683                 |
| 2023 | 1,584                                 | 7,123                             | 6,018                                | 5,062                                | 4,746                                 | 24,533 | 10,514                |
| 2024 | 1,684                                 | 7,578                             | 6,397                                | 5,387                                | 5,061                                 | 26,107 | 11,189                |
| 2025 | 1,825                                 | 8,211                             | 6,936                                | 5,835                                | 5,481                                 | 28,288 | 12,124                |
| 2026 | 1,936                                 | 8,712                             | 7,355                                | 6,194                                | 5,817                                 | 30,013 | 12,863                |
| 2027 | 2,095                                 | 9,426                             | 7,960                                | 6,709                                | 6,279                                 | 32,468 | 13,915                |
| 2028 | 2,217                                 | 9,979                             | 8,426                                | 7,101                                | 6,657                                 | 34,379 | 14,734                |
| 2029 | 2,394                                 | 10,777                            | 9,097                                | 7,661                                | 7,182                                 | 37,111 | 15,905                |
| 2030 | 2,529                                 | 11,379                            | 9,609                                | 8,098                                | 7,581                                 | 39,195 | 16,798                |
| 2031 | 2,727                                 | 12,268                            | 10,361                               | 8,725                                | 8,169                                 | 42,249 | 18,107                |
| 2032 | 2,872                                 | 12,926                            | 10,913                               | 9,195                                | 8,610                                 | 44,515 | 19,078                |

**Insured Value of the Old Cars (@ Existing rate of 4%)**

| Year | below 3 lakh<br>(average IDV Rs 1 Lakh) | 3 - 7 lakh<br>(average IDV Rs 2.5 lakh) | 7 - 12 lakh<br>(average IDV Rs 5 lakh) | 12 - 20 lakh<br>(average IDV Rs 9 lakh) | above 20 lakh<br>(average IDV Rs 15 lakh) | Total  |
|------|---|---|--|---|---|--------|
| 2009 |   |   |  |   |   |        |
| 2010 |   |   |  |   |   |        |
| 2011 |   |   |  |   |   |        |
| 2012 | 1,425                                   | 8,017                                   | 7,126                                  | 6,413                                   | 5,347                                     | 28,328 |
| 2013 | 1,562                                   | 8,787                                   | 7,811                                  | 7,030                                   | 5,855                                     | 31,045 |
| 2014 | 1,712                                   | 9,630                                   | 8,560                                  | 7,704                                   | 6,423                                     | 34,028 |
| 2015 | 1,873                                   | 10,535                                  | 9,365                                  | 8,428                                   | 7,024                                     | 37,225 |
| 2016 | 2,049                                   | 11,526                                  | 10,245                                 | 9,220                                   | 7,684                                     | 40,724 |
| 2017 | 2,238                                   | 12,586                                  | 11,189                                 | 10,070                                  | 8,391                                     | 44,474 |
| 2018 | 2,443                                   | 13,745                                  | 12,217                                 | 10,994                                  | 9,164                                     | 48,563 |
| 2019 | 2,663                                   | 14,982                                  | 13,316                                 | 11,986                                  | 9,988                                     | 52,935 |
| 2020 | 2,903                                   | 16,330                                  | 14,516                                 | 13,064                                  | 10,884                                    | 57,697 |
| 2021 | 3,158                                   | 17,766                                  | 15,792                                 | 14,213                                  | 11,847                                    | 62,776 |
| 2022 | 3,436                                   | 19,330                                  | 17,182                                 | 15,462                                  | 12,888                                    | 68,299 |
| 2023 | 3,732                                   | 20,993                                  | 18,659                                 | 16,795                                  | 13,996                                    | 74,175 |
| 2024 | 4,053                                   | 22,797                                  | 20,264                                 | 18,238                                  | 15,195                                    | 80,548 |

[Recommendations of Working Group on Urban Transport for 12th Five Year Plan]

| Year | below 3 lakh<br>(average IDV Rs 1 Lakh) | 3 - 7 lakh<br>(average IDV Rs 2.5 lakh) | 7 - 12 lakh<br>(average IDV Rs 5 lakh) | 12 - 20 lakh<br>(average IDV Rs 9 lakh) | above 20 lakh<br>(average IDV Rs 15 lakh) | Total   |
|------|---|---|--|---|---|---------|
| 2025 | 4,393                                   | 24,713                                  | 21,966                                 | 19,771                                  | 16,473                                    | 87,317  |
| 2026 | 4,762                                   | 26,789                                  | 23,812                                 | 21,431                                  | 17,856                                    | 94,651  |
| 2027 | 5,153                                   | 28,985                                  | 25,764                                 | 23,186                                  | 19,325                                    | 102,413 |
| 2028 | 5,575                                   | 31,361                                  | 27,877                                 | 25,087                                  | 20,906                                    | 110,807 |
| 2029 | 6,022                                   | 33,870                                  | 30,108                                 | 27,097                                  | 22,581                                    | 119,677 |
| 2030 | 6,503                                   | 36,580                                  | 32,515                                 | 29,262                                  | 24,388                                    | 129,249 |
| 2031 | 7,010                                   | 39,433                                  | 35,051                                 | 31,546                                  | 26,291                                    | 139,331 |
| 2032 | 7,557                                   | 42,508                                  | 37,786                                 | 34,005                                  | 28,341                                    | 150,197 |

**Insured Value of the Old Cars (@ Proposed rate of 7%)**

| Year | below 3 lakh<br>(average IDV Rs 1 Lakh) | 3 - 7 lakh<br>(average IDV Rs 2.5 lakh) | 7 - 12 lakh<br>(average IDV Rs 5 lakh) | 12 - 20 lakh<br>(average IDV Rs 9 lakh) | above 20 lakh<br>(average IDV Rs 15 lakh) | Total          |
|------|---|---|--|---|---|----------------|
| 2009 |   |   |  |   |   |                |
| 2010 |   |   |  |   |   |                |
| 2011 |   |   |  |   |   |                |
| 2012 | 2,494                                   | 14,029                                  | 12,470                                 | 11,223                                  | 9,358                                     | <b>49,573</b>  |
| 2013 | 2,734                                   | 15,377                                  | 13,669                                 | 12,302                                  | 10,247                                    | <b>54,328</b>  |
| 2014 | 2,996                                   | 16,853                                  | 14,979                                 | 13,482                                  | 11,240                                    | <b>59,549</b>  |
| 2015 | 3,278                                   | 18,437                                  | 16,389                                 | 14,750                                  | 12,291                                    | <b>65,144</b>  |
| 2016 | 3,586                                   | 20,170                                  | 17,929                                 | 16,136                                  | 13,446                                    | <b>71,266</b>  |
| 2017 | 3,916                                   | 22,026                                  | 19,580                                 | 17,622                                  | 14,685                                    | <b>77,829</b>  |
| 2018 | 4,276                                   | 24,053                                  | 21,380                                 | 19,239                                  | 16,038                                    | <b>84,986</b>  |
| 2019 | 4,661                                   | 26,218                                  | 23,303                                 | 20,976                                  | 17,480                                    | <b>92,636</b>  |
| 2020 | 5,081                                   | 28,577                                  | 25,403                                 | 22,863                                  | 19,047                                    | <b>100,971</b> |
| 2021 | 5,527                                   | 31,091                                  | 27,635                                 | 24,872                                  | 20,732                                    | <b>109,857</b> |
| 2022 | 6,014                                   | 33,828                                  | 30,069                                 | 27,059                                  | 22,554                                    | <b>119,524</b> |
| 2023 | 6,531                                   | 36,737                                  | 32,653                                 | 29,391                                  | 24,493                                    | <b>129,806</b> |
| 2024 | 7,093                                   | 39,895                                  | 35,463                                 | 31,917                                  | 26,592                                    | <b>140,959</b> |
| 2025 | 7,688                                   | 43,247                                  | 38,441                                 | 34,600                                  | 28,828                                    | <b>152,805</b> |
| 2026 | 8,334                                   | 46,880                                  | 41,672                                 | 37,505                                  | 31,249                                    | <b>165,639</b> |
| 2027 | 9,018                                   | 50,724                                  | 45,088                                 | 40,576                                  | 33,818                                    | <b>179,223</b> |
| 2028 | 9,757                                   | 54,882                                  | 48,785                                 | 43,903                                  | 36,586                                    | <b>193,913</b> |
| 2029 | 10,538                                  | 59,273                                  | 52,689                                 | 47,420                                  | 39,516                                    | <b>209,435</b> |
| 2030 | 11,380                                  | 64,015                                  | 56,902                                 | 51,209                                  | 42,679                                    | <b>226,186</b> |
| 2031 | 12,268                                  | 69,008                                  | 61,339                                 | 55,205                                  | 46,010                                    | <b>243,830</b> |
| 2032 | 13,225                                  | 74,389                                  | 66,125                                 | 59,509                                  | 49,596                                    | <b>262,844</b> |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Year | Green Cess on Existing Cars | Insured Value of the Old Two Wheelers (@ current rate of 2%) | Insured Value of the Old Two Wheelers (@ Proposed rate of 3%) | Green Cess on Existing Two Wheelers | Total Urban Transport Cess (in Rs Crore) | Cumulative Urban Transport Cess (in Rs Crore) |
|------|-----------------------------|--|---|-------------------------------------|--|---|
| 2009 |                             |  |   |                                     |  |   |
| 2010 |                             |  |   |                                     |  |   |
| 2011 |                             |  |   |                                     |  |   |
| 2012 | 21,246                      | 2,915  | 4,373   | 1,458                               | 23,254                                   | 23,254  |
| 2013 | 23,284                      | 3,195  | 4,793   | 1,598                               | 25,502                                   | 48,756  |
| 2014 | 25,521                      | 3,502  | 5,253   | 1,751                               | 27,512                                   | 76,268  |
| 2015 | 27,919                      | 3,831  | 5,747   | 1,916                               | 30,109                                   | 106,376                                       |
| 2016 | 30,543                      | 4,191  | 6,287   | 2,096                               | 32,444                                   | 138,821                                       |
| 2017 | 33,355                      | 4,577  | 6,865   | 2,288                               | 35,405                                   | 174,226                                       |
| 2018 | 36,423                      | 4,998  | 7,497   | 2,499                               | 38,070                                   | 212,296                                       |
| 2019 | 39,701                      | 5,448  | 8,171   | 2,724                               | 41,493                                   | 253,789                                       |
| 2020 | 43,273                      | 5,938  | 8,907   | 2,969                               | 44,536                                   | 298,325                                       |
| 2021 | 47,082                      | 6,460  | 9,690   | 3,230                               | 48,448                                   | 346,773                                       |
| 2022 | 51,225                      | 7,029  | 10,543  | 3,514                               | 51,875                                   | 398,648                                       |
| 2023 | 55,631                      | 7,633  | 11,450  | 3,817                               | 56,327                                   | 454,975                                       |
| 2024 | 60,411                      | 8,290  | 12,435  | 4,145                               | 60,242                                   | 515,217                                       |
| 2025 | 65,488                      | 8,986  | 13,479  | 4,493                               | 65,279                                   | 580,496                                       |
| 2026 | 70,988                      | 9,741  | 14,611  | 4,870                               | 69,613                                   | 650,109                                       |
| 2027 | 76,810                      | 10,540   | 15,809  | 5,270                               | 75,310                                   | 725,419                                       |
| 2028 | 83,106                      | 11,404   | 17,106  | 5,702                               | 80,187                                   | 805,606                                       |
| 2029 | 89,758                      | 12,316   | 18,474  | 6,158                               | 86,563                                   | 892,169                                       |
| 2030 | 96,937                      | 13,301   | 19,952  | 6,651                               | 91,938                                   | 984,107                                       |
| 2031 | 104,498                     | 14,339   | 21,508  | 7,169                               | 99,101                                   | 1,083,209                                     |
| 2032 | 112,647                     | 15,457   | 23,186  | 7,729                               | 105,055                                  | 1,188,263                                     |

**c. Green Surcharge on Petrol (Pan India)**

| Year | Growth in Motor Spirit Consumption | Consumption of Motor Spirit (in million liters) | Green Surcharge on Motor Spirit (in Rs Crore @ Rs 2) | Total Green Cess on Petrol (in Rs Crore) | Cumulative Green Cess on Petrol (in Rs Crore) |
|------|------------------------------------|---|--|--|---|
| 2009 |                                    |   |  |  |   |
| 2010 | 8.3%                               | 13,240  | -  | -  | -   |
| 2011 | 8.3%                               | 14,343  | -  | -  | -   |
| 2012 | 8.3%                               | 15,538  | 3,108  | 16,386                                   | 16,386  |
| 2013 | 8.3%                               | 16,832  | 3,366  | 17,583                                   | 33,969  |
| 2014 | 8.1%                               | 18,200  | 3,640  | 18,832                                   | 52,801  |
| 2015 | 8.1%                               | 19,680  | 3,936  | 20,170                                   | 72,971  |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Year | Growth in Motor Spirit Consumption | Consumption of Motor Spirit (in million liters) | Green Surcharge on Motor Spirit (in Rs Crore @ Rs 2) | Total Green Cess on Petrol (in Rs Crore) | Cumulative Green Cess on Petrol (in Rs Crore) |
|------|------------------------------------|---|--|--|---|
| 2016 | 7.9%                               | 21,241  | 4,248  | 21,563                                   | 94,534  |
| 2017 | 7.9%                               | 22,925  | 4,585  | 23,053                                   | 117,587                                       |
| 2018 | 7.7%                               | 24,697  | 4,939  | 24,601                                   | 142,188                                       |
| 2019 | 7.7%                               | 26,606  | 5,321  | 26,253                                   | 168,441                                       |
| 2020 | 7.5%                               | 28,610  | 5,722  | 27,964                                   | 196,405                                       |
| 2021 | 7.5%                               | 30,764  | 6,153  | 29,787                                   | 226,192                                       |
| 2022 | 7.3%                               | 33,019  | 6,604  | 31,670                                   | 257,862                                       |
| 2023 | 7.3%                               | 35,439  | 7,088  | 33,673                                   | 291,536                                       |
| 2024 | 7.1%                               | 37,966  | 7,593  | 35,737                                   | 327,273                                       |
| 2025 | 7.1%                               | 40,673  | 8,135  | 37,927                                   | 365,200                                       |
| 2026 | 6.9%                               | 43,492  | 8,698  | 40,177                                   | 405,377                                       |
| 2027 | 6.9%                               | 46,506  | 9,301  | 42,562                                   | 447,939                                       |
| 2028 | 6.7%                               | 49,635  | 9,927  | 45,004                                   | 492,944                                       |
| 2029 | 6.7%                               | 52,976  | 10,595   | 47,587                                   | 540,531                                       |
| 2030 | 6.5%                               | 56,435  | 11,287   | 50,225                                   | 590,756                                       |
| 2031 | 6.5%                               | 60,121  | 12,024   | 53,010                                   | 643,767                                       |
| 2032 | 6.3%                               | 63,926  | 12,785   | 55,846                                   | 699,612                                       |

#### 4. Summary of UTF

| Present Values (@ discount Rate)  | 10%            |
|---|----------------|
| Green Cess on Existing Vehicles (Urban Settlements in Rs Crore)               | 349,475        |
| Urban Transport Tax On New Registration (Urban Settlements in Rs Crore)       | 375,465        |
| Green Surcharge on Petrol (Urban Settlements in Rs Crore)                     | 53,156         |
| <b>Total accruals to Urban Transport Fund (Urban Settlements in Rs Crore)</b> | <b>778,095</b> |

| Year | Green Surcharge on Motor Spirit (in Rs Crore @ Rs 2) | Total accruals to Urban Transport Fund (pan India) | Total Cumulative Accruals to Urban Transport Fund (pan India) | Urban Transport Fund for the Urban Settlements (in Rs Crore) |  |                           |   | Total accruals to Urban Transport Fund (urban settlements) | Total Cumulative Accruals to Urban Transport Fund (urban settlements) |
|------|--|--|---|--|--|---------------------------|---|--|---|
|      |  |  |   | Green Cess on Existing Vehicles (80% in Urban Settlements)   | Urban Transport Tax On New Registration (90% in Urban Settlements) | Green Surcharge on Petrol | Green Surcharge on Motor Spirit (100% in Urban Settlements) |  |   |
| 2012 | 3,108  | 62,344   | 62,344  | 18,163   | 20,929   | 3,108                     | 3,108   | 42,199   | 42,199  |
| 2013 | 3,366  | 67,966   | 130,309   | 19,905   | 22,951   | 3,366                     | 3,366   | 46,223   | 88,422  |
| 2014 | 3,640  | 73,616   | 203,925   | 21,818   | 24,761   | 3,640                     | 3,640   | 50,219   | 138,640   |
| 2015 | 3,936  | 80,113   | 284,039   | 23,868   | 27,098   | 3,936                     | 3,936   | 54,902   | 193,542   |
| 2016 | 4,248  | 86,646   | 370,685   | 26,111   | 29,200   | 4,248                     | 4,248   | 59,559   | 253,100   |
| 2017 | 4,585  | 94,102   | 464,786   | 28,515   | 31,864   | 4,585                     | 4,585   | 64,964   | 318,064   |
| 2018 | 4,939  | 101,593  | 566,379   | 31,137   | 34,263   | 4,939                     | 4,939   | 70,340   | 388,404   |
| 2019 | 5,321  | 110,170  | 676,549   | 33,940   | 37,344   | 5,321                     | 5,321   | 76,605   | 465,009   |
| 2020 | 5,722  | 118,742  | 795,291   | 36,994   | 40,082   | 5,722                     | 5,722   | 82,798   | 547,807   |
| 2021 | 6,153  | 128,547  | 923,838   | 40,249   | 43,603   | 6,153                     | 6,153   | 90,006   | 637,813   |
| 2022 | 6,604  | 138,285  | 1,062,123   | 43,791   | 46,688   | 6,604                     | 6,604   | 97,083   | 734,895   |
| 2023 | 7,088  | 149,448  | 1,211,570   | 47,558   | 50,694   | 7,088                     | 7,088   | 105,340  | 840,235   |

[ Recommendations of Working Group on Urban Transport for 12th Five Year Plan ]

| Year | Green Surcharge on Motor Spirit (in Rs Crore @ Rs 2) | Total accruals to Urban Transport Fund (pan India) | Total Cumulative Accruals to Urban Transport Fund (pan India) | Urban Transport Fund for the Urban Settlements (in Rs Crore) |  |                           |   | Total accruals to Urban Transport Fund (urban settlements) | Total Cumulative Accruals to Urban Transport Fund (urban settlements) |
|------|--|--|---|--|--|---------------------------|---|--|---|
|      |  |  |   | Green Cess on Existing Vehicles (80% in Urban Settlements)   | Urban Transport Tax On New Registration (90% in Urban Settlements) | Green Surcharge on Petrol | Green Surcharge on Motor Spirit (100% in Urban Settlements) |  |   |
| 2024 | 7,593  | 160,534  | 1,372,104   | 51,645   | 54,217   | 7,593                     | 7,593   | 113,455  | 953,690   |
| 2025 | 8,135  | 173,187  | 1,545,292   | 55,985   | 58,751   | 8,135                     | 8,135   | 122,871  | 1,076,561   |
| 2026 | 8,698  | 185,649  | 1,730,941   | 60,687   | 62,652   | 8,698                     | 8,698   | 132,037  | 1,208,598   |
| 2027 | 9,301  | 199,952  | 1,930,893   | 65,664   | 67,779   | 9,301                     | 9,301   | 142,744  | 1,351,342   |
| 2028 | 9,927  | 213,999  | 2,144,891   | 71,046   | 72,168   | 9,927                     | 9,927   | 153,141  | 1,504,483   |
| 2029 | 10,595   | 230,067  | 2,374,958   | 76,733   | 77,907   | 10,595                    | 10,595  | 165,235  | 1,669,718   |
| 2030 | 11,287   | 245,751  | 2,620,709   | 82,870   | 82,744   | 11,287                    | 11,287  | 176,901  | 1,846,619   |
| 2031 | 12,024   | 263,780  | 2,884,488   | 89,334   | 89,191   | 12,024                    | 12,024  | 190,550  | 2,037,169   |
| 2032 | 12,785   | 281,276  | 3,165,765   | 96,301   | 94,549   | 12,785                    | 12,785  | 203,635  | 2,240,804   |



## ANNEXURE E: PROPOSED SCOPE OF URBAN TRANSPORT ACT

The proposed urban transport act should facilitate the following;

### **Setting up a Dedicated Authority (UMTA)/Cells for Urban Transport**

- An autonomous authority; 'Unified Metropolitan Transport Authority' in cities with population in excess of one million and an UMTA for a group of smaller cities. When a city is too small to support a professional team by itself, the State Government should provide such a cell either at its HQ or region wise when the State is large.
- UMTA should be an executive body governed by a Board made up of heads of various departments in the city, local elected leaders and eminent citizens. It should be supported by a team of professionals with a Chief Executive. UMTA should be based in the city and should report to the MPC/DPC envisaged under the 74<sup>th</sup> amendment to the constitution for inter-sectoral coordination. Until MPC/DPC is constituted, this authority should report to the relevant department at the State HQ.
- The cells for small cities should be located in the Municipality or the Urban development authority depending on who carries the responsibility for UT.
- UMTA should be empowered to set up 'Special Purpose Vehicles' for various functions or components of urban transport.

UMTA/CELLS shall be empowered to undertake the following tasks;

- **Policy functions such as** formulation of Policy, Strategy and financing for the city
- **Regulatory Functions** excluding those currently assigned to RTOs under the Motor Vehicles act such as Setting Standards, adherence to safety standards, adherence to environmental standards, Fixation of fares/tariffs. Registration, Licensing, Inspection and Testing of

vehicles and drivers and Enforcement of rules and regulations (Including removal of Encroachments) is presently the job of the transport department and will continue to be so.

- **Integrated and holistic planning for urban transport such as** comprehensive integrated transport planning of all components of Urban Transport on a city/agglomeration wide basis for implementation including Integrated land-use transport planning with inputs from the urban development authority. This will include planning for an integrated city wide multimodal public transport system for the city, mass rapid transit, planning of bus routes, terminals and interchange points, intermediate public transport, NMT and Transport Demand Management. It will also plan goods movement in the city.
- **Planning of road network and associated infrastructure** in conjunction with planning of city wide public transport system. Infrastructure includes roads and associated facilities such as road furniture, Traffic Signals, Road Intersections, Flyovers, Grade Separators, Bridges, Bye Passes and facilities for Pedestrians, Bicycles, and Terminals for Inter-modal Transfers and Parking.
- **Organizing and coordinating services i.e.** franchising/route allocation, Contract Monitoring, coordination of services, Ensuring supply of services to meet demand, Provisioning of new supplies, Monitor the work assigned to implementing agencies. All service providers including rail transit and BRT will be controlled by UMTA. Transport department and Municipality should issue permits to buses, Para transit and personalized transports advised by UMTA. (**Note:** Construction, operation and maintenance of mass rapid transit modes, bus services and all other infrastructure will continue through existing city agencies.)
- **Common Services such as** Inter- modal coordination and integration, Resolution of day to day matters, Dispute resolution, Public relations, Security services, Management of revenue sharing arrangement. Provision and management of common facilities i.e. depots and terminals, 'Passenger Information System', integrated ticketing, data management, Management of multimodal Interchanges, Last mile connectivity, planning movements around MRT stations, co-ordination with other agencies, and planning of future extensions.
- **Traffic Engineering and Management;** traffic police should be responsible for enforcement. The planning of traffic engineering and management measures should be with UMTA/cells.

The road markings and installation of traffic signs should continue with the Municipal Corporation and the Public Works Department.

- **Safety, security, environment, education and training** and the need to conserve energy are important and crucial issues that need coordinated and dedicated attention.
- **Miscellaneous such as** Capacity building to upgrade skills of city officials, Creating a Data base for the city, Participating in country wide Research, Technology upgrade and use of Technology to manage urban transport.

### **Financial Matters**

UMTA shall be empowered to undertake the following tasks;

- Receive all funds for providing urban transport services and infrastructure and allocating them to various city agencies to implement/operate all UT related activities as per a phased plan and prioritization of projects
- Raise capital; acquire, hold and develop land; utilize the space on its land for commercial purpose; lease the properties developed by it; carry out all incidental and ancillary activities
- Fix its fare tariff and revise it from time to time.
- Receive loans and grants by Central/State Government, maintain the necessary reserve funds and publish its accounts that will be audited by the appropriate authority.
- Determine Liability of the Authority in cases of death and injury to passengers, and the procedure of determination of compensation.
- Impose penalties for offences and irregularities concerning travel without proper ticket, drunkenness, smoking, making nuisance, obstructing UT services, attempting to cause hurt to the traveling public, endangering their safety, carrying of dangerous and offensive goods and destroying properties of the Authority.
- Setting up co-ordination committees,
- The act should exempt the Authority from electricity tax, income tax, and stamp duty, taxes by local bodies and introduction of dedicated levies (through governmental action) on non-user beneficiaries.

### **Safety Issues**

Act should specify appointment of commissioners of safety who would inspect the fitness of the UT system and recommend sanctioning their opening for public carriage

- Act should detail the powers of Government to sanction opening of MRT system, closing an opened section of MRT and its re-opening after fulfillment of conditions laid down for the purpose.
- Act should specify the requirement to keep accident records in a specific format and to carry out enquires into accidents

ANNEXURE F: IR INVESTMENTS DURING 11<sup>TH</sup> FIVE YEAR PLAN

Rs in Crores

| SNo              | Name of projects   | Year of inclusion | Total Cost | Tot-al Kms. | 2007-08   |              | 2008-09   |              | 2009-10   |              | 2010-11   |              | 2011-12   |              | Date of Completion |
|------------------|--|-------------------|------------|-------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|--------------------|
|                  |  |                   |            |             | Km. compl | Expen diture | Km. compl | Expen diture | Km. compl | Expen diture | Km. compl | Expen diture | Km. compl | Expen diture |                    |
| <b>KOLKATA :</b> |  |                   |            |             |           |              |           |              |           |              |           |              |           |              |                    |
| 1                | <b>Circular Railway:</b><br>Remount Road to Santoshpur             | 2010-11           | 268.52     | 8.8         | 0         | 0            | 0         | 0            | 0         | 0            | 0         | 0            | 0         | 5            |                    |
| 2                | Tollygunge to New Garia  | 1999-00           | 728.05     | 8.5         |           | 125.65       |           | 76.85        | 0         | 100          | 8.5       | 218.05       | 0         | 195          | 07.10.2010         |
| 3                | Noaparaf - NSCB Airport & Dum Dum-Noapara                          | 2009-10           | 367.07     | 9           | 0         |              | 0         |              | 0         |              |           |              | 0         |              |                    |
| 4                | Noapara - Barasat via Bimanbandar - Const. of Metro Railway        | 2010-11           | 2397.72    | 18          | 0         | 0            | 0         | 0            | 0         | 0            | 0         | 100          | 0         | 1000         |                    |
| 5                | Baranagar - Barrackpore and Dakshineswar - Const. of Metro Railway | 2010-11           | 2298.42    | 17.1        | 0         | 0            | 0         | 0            | 0         | 0            | 0         | 5.16         | 0         | 1600         |                    |
| 6                | Dum Dum Airport to New Garia via                                   | 2010-11           | 3951.98    | 32          | 0         | 0            | 0         | 0            | 0         | 0            | 0         | 0.98         | 0         | 1600         |                    |

[Recommendations of Working Group on Urban Transport for 12th Five Year Plan]

| SNo             | Name of projects  | Year of inclusion | Total Cost      | Tot-al Kms.   | 2007-08   |               | 2008-09   |              | 2009-10   |              | 2010-11    |               | 2011-12   |               | Date of Completion |
|-----------------|---|-------------------|-----------------|---------------|-----------|---------------|-----------|--------------|-----------|--------------|------------|---------------|-----------|---------------|--------------------|
|                 |   |                   |                 |               | Km. compl | Expen diture  | Km. compl | Expen diture | Km. compl | Expen diture | Km. compl  | Expen diture  | Km. compl | Expen diture  |                    |
|                 | Rajarhat Const. of Metro Railway  |                   |                 |               |           |               |           |              |           |              |            |               |           |               |                    |
| 7               | Joka - BinoyBandal Dinesh Bagh via Majerhat - Const. of Metro Railway   | 2010-11           | 2619.02         | 16.72         | 0         | 0             | 0         | 0            | 0         | 0            | 0          | 41.05         | 0         | 1625.81       |                    |
| 8               | Ranaghat-Bongaon Electrification  | 1997-98           | 17.98           | 54.16         | 0         | 0.5           | 0         | -1.07        | 0         | 0.66         | 0          | 0.3           | 0         | 1.37          | 23.3.2001          |
| 9               | Barasat-Hasnabad- Electrification                                       | 1998-99           | 37.7            | 51.3          | 0         | 2.72          | 0         | -0.9         | 0         | -6.93        | 0          | 0.55          | 0         | 12.76         | 22.12.2002         |
| 10              | Ranaghat-Gede Electrification   | 1997-98           | 32.35           | 44            | 0         | 1.36          | 0         | -0.11        | 0         | -2.12        | 0          | -0.54         | 0         | 3.16          | 29.12.2001         |
| <b>A:</b>       |   |                   | <b>12718.81</b> | <b>259.58</b> | <b>0</b>  | <b>130.23</b> | <b>0</b>  | <b>74.77</b> | <b>0</b>  | <b>91.61</b> | <b>8.5</b> | <b>365.55</b> | <b>0</b>  | <b>6043.1</b> |                    |
| <b>TOTAL</b>    |   |                   |                 |               |           |               |           |              |           |              |            |               |           |               |                    |
| <b>MUMBAI :</b> |   |                   |                 |               |           |               |           |              |           |              |            |               |           |               |                    |
| 11              | Santacruz-Borivali 5th line   | 1995-96           | 82.86           | 16.37         | 0         | 0.5           | 0         | -0.67        | 0         | 3.21         | 0          | 0.47          | 0         | 2.82          | 31.3.2002          |
| 12              | Belapur-Panvel doubling of commuter line as part of East-West corridor. | 1995-96           | 92.5            | 10.9          | 0         | 0.08          | 0         | 1.19         | 0         | 1.48         | 0          | 6.92          | 0         | 10            | 14.4.2002          |
| 13              | Thane-Turbhe-Nerul-Vashi-Part of Corridor No.1 in New Mumbai .          | 1995-96           | 131.64          | 23.3          | 0         | 0.86          | 4.8       | 6.43         | 0         | 5.85         | 0          | 14.68         | 0         | 17.71         | 09.01.2009         |

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| SNo             | Name of projects   | Year of inclusion | Total Cost     | Total Kms.    | 2007-08      |               | 2008-09    |              | 2009-10   |               | 2010-11     |               | 2011-12   |               | Date of Completion   |
|-----------------|--|-------------------|----------------|---------------|--------------|---------------|------------|--------------|-----------|---------------|-------------|---------------|-----------|---------------|----------------------|
|                 |  |                   |                |               | Km. compl    | Expenditure   | Km. compl  | Expenditure  | Km. compl | Expenditure   | Km. compl   | Expenditure   | Km. compl | Expenditure   |                      |
| 14              | Belapur-Seawood-Uran-electrified double line.                        | 1996-97           | 163.49         | 27            | 0            | 14.77         | 0          | 3.28         | 0         | 1.45          | 0           | 30.27         | 0         | 55            |                      |
| 15              | Mumbai Urban Transport Project (MUTP) Phase-I                        | 2003-04           | 2250.9         | 111.24        | 25.84        | 298.5         | 0          | 406.86       | 0         | 326.42        | 68.4        | 348.96        | 17        | 85.16         | 111.24 Km. completed |
| 16              | Mumbai Urban Transport Project (MUTP) Phase-II                       | 2008-09           | 2650           | 59.4          | 0            | 0             | 0          | 0.01         | 0         | 43.46         | 0           | 31.95         | 0         | 233.88        |                      |
| <b>B: TOTAL</b> |  |                   | <b>5371.39</b> | <b>248.21</b> | <b>25.84</b> | <b>314.71</b> | <b>4.8</b> | <b>417.1</b> | <b>0</b>  | <b>381.87</b> | <b>68.4</b> | <b>433.25</b> | <b>17</b> | <b>404.57</b> |                      |
| <b>CHENNAI:</b> |  |                   |                |               |              |               |            |              |           |               |             |               |           |               |                      |
| 17              | Chennai Beach-Thirumailai, Mass Rapid Transit System (MRTS) Phase-I. | 1983-84           | 306.19         | 8.96          | 0            | 8.39          | 0          | 2.05         | 0         | 2.06          | 0           | 0.56          | 0         | 10.19         | 19.10.1997           |
| 18              | Thirumailai-Velachery Mass Rapid Transit System (MRTS) Phase - II    | 1996-97           | 288.94         | 11.17         | 4.17         | 8             | 0          | 25.97        | 0         | -4            | 0           | 13.06         | 0         | 11.89         | 19.11.2007           |
| 19              | Chennai Beach-Tambaram-Chengalpattu (G.C)                            | 1998-99           | 185.91         | 60            | 0            | -3.02         | 0          | 14.99        | 0         | 0             | 0           | -7.37         | 0         | 9.64          | 01.11.2004           |
| 20              | Extension of Mass Rapid Transit System (MRTS) Phase -                | 2006-07           | 165.25         | 5             | 0            | 9             | 0          | 10           | 0         | 20            | 0           | 10.2          | 0         | 23            |                      |

[Recommendations of Working Group on Urban Transport for 12th Five Year Plan]

| SNo                            | Name of projects                           | Year of inclusion | Total Cost      | Tot-al Kms.   | 2007-08      |               | 2008-09    |               | 2009-10   |               | 2010-11     |               | 2011-12   |                | Date of Completion |
|--------------------------------|--|-------------------|-----------------|---------------|--------------|---------------|------------|---------------|-----------|---------------|-------------|---------------|-----------|----------------|--------------------|
|                                |  |                   |                 |               | Km. compl    | Expen diture  | Km. compl  | Expen diture  | Km. compl | Expen diture  | Km. compl   | Expen diture  | Km. compl | Expen diture   |                    |
|                                | II from Velachery to St. Thomas Mount.     |                   |                 |               |              |               |            |               |           |               |             |               |           |                |                    |
| <b>C:<br/>TOTAL<br/>:</b>      |  |                   | <b>946.29</b>   | <b>85.13</b>  | <b>4.17</b>  | <b>22.37</b>  | <b>0</b>   | <b>53.01</b>  | <b>0</b>  | <b>18.06</b>  | <b>0</b>    | <b>16.45</b>  | <b>0</b>  | <b>54.72</b>   |                    |
| <b>SECUNDERABAD/HYD.</b>       |  |                   |                 |               |              |               |            |               |           |               |             |               |           |                |                    |
| 21                             | Multi Modal Transport System (MMS) Phase-I | 2001-02           | 53.4            | 42            | 0            | 0.4           | 0          | 0.05          | 0         | 0             | 0           | 0             | 0         | 0              | 14.2.2004          |
| <b>GRAND TOTAL (A+B+C+D) :</b> |  |                   | <b>19089.89</b> | <b>634.92</b> | <b>30.01</b> | <b>467.71</b> | <b>4.8</b> | <b>544.93</b> | <b>0</b>  | <b>491.54</b> | <b>76.9</b> | <b>815.25</b> | <b>17</b> | <b>6502.39</b> |                    |



ANNEXURE G: PROPOSED IR INVESTMENTS DURING 12<sup>TH</sup> FIVE YEAR PLAN

APPROXIMATE TARGETS FOR EXPENDITURE DURING XII PLAN (Rs in Crores)

| S.No                               | Name of projects  | Anticipated cost | Outlay proposed for 2011-12 | Review of allocation | Balance to complete work (1.4.2012) | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 |
|------------------------------------|---|------------------|-----------------------------|----------------------|-------------------------------------|---------|---------|---------|---------|---------|
| 1                                  |   | 3                | 4                           | 5                    | 6                                   | 7       | 8       | 9       | 10      | 11      |
| <b>A. METRO RAILWAY/ KOLKATA :</b> |   |                  |                             |                      |                                     |         |         |         |         |         |
| 1                                  | <b>Circular Railway</b> incl. Princepghat to Mejarhat, Dum Dum Cantt. to N.S.C.B. Airport &Ultadanga to Rajerhat (Ph.I) and Remount Road-Santoshpur via Garden Reach/Metiabruz. | 573.78           | 5                           | 5                    | 387.58                              | 116     | 97      | 78      | 58      | 38.58   |
| 2                                  | Dum Dum-Tollygunge - Design & construction of rapid transit system incl. extension between Tollygunge to New Garia, Dum Dum-Noapara / Baranagar & Noapara - NSCB Airport        | 3040.89          | 195                         | 195                  | 140.19                              | 42      | 35      | 28      | 21      | 14.19   |
| 3                                  | Noapara - Barasat via Bimanbandar - Const. of Metro Railway (18.00 km)  | 2397.72          | 1000                        | 500                  | 1797.72                             | 540     | 500     | 360     | 270     | 127.72  |
| 4                                  | Baranagar - Barrackpore and Dakshineswar - Const. of Metro Railway (14.50 km)   | 2069.6           | 1600                        | 1600                 | 464.44                              | 140     | 116     | 93      | 70      | 45.44   |

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| S.No                        | Name of projects   | Anticipated cost | Outlay proposed for 2011-12 | Review of allocation | Balance to complete work (1.4.2012) | 2012-13     | 2013-14     | 2014-15        | 2015-16     | 2016-17       |
|-----------------------------|--|------------------|-----------------------------|----------------------|-------------------------------------|-------------|-------------|----------------|-------------|---------------|
| 5                           | Dum Dum Airport to New Garia via Rajarhat Const. of Metro Railway (32.00 km)     | 3951.98          | 1600                        | 1600                 | 2351                                | 705         | 588         | 470            | 353         | 235           |
| 6                           | Joka - BinoyBandal Dinesh Bagh via Majerhat - Const. of Metro Railway (16.72 km) | 2619.02          | 1625.81                     | 1625.81              | 952.16                              | 286         | 238         | 190            | 143         | 95.16         |
| <b>TOTAL</b>                |  | <b>14653</b>     | <b>6025.81</b>              | <b>5525.81</b>       | <b>6093.09</b>                      | <b>1829</b> | <b>1574</b> | <b>1219</b>    | <b>915</b>  | <b>556.09</b> |
| <b>D. CENTRAL RAILWAY :</b> |  |                  |                             |                      |                                     |             |             |                |             |               |
| 1                           | Mumbai Urban Transport Project (MUTP) Phase-II                                   | 2723             | 233.88                      | 233.88               | 2384.21                             | 715         | 596         | 477            | 358         | 238.21        |
| 2                           | **Running of 12 Car trains on Harbour Line                                       | 714.1            | 0                           | 0                    | 714.1                               | 10          | 250         | 454.1          | 0           | 0             |
| <b>TOTAL</b>                |  | <b>3437.1</b>    | <b>233.88</b>               | <b>233.88</b>        | <b>3098.31</b>                      | <b>725</b>  | <b>846</b>  | <b>931.1</b>   | <b>358</b>  | <b>238.21</b> |
| <b>S.C. RAILWAY :</b>       |  |                  |                             |                      |                                     |             |             |                |             |               |
| 1                           | **Secunderabad/Hyderabad Multi Modal Transport System (MMTS) Phase-II            | 632.68           | 0                           | 0                    | 632.68                              | 150         | 200         | 282.68         | 0           | 0             |
| <b>GRAND TOTAL</b>          |  | <b>18722.8</b>   | <b>6259.69</b>              | <b>5759.69</b>       | <b>9824.08</b>                      | <b>2704</b> | <b>2620</b> | <b>2432.78</b> | <b>1273</b> | <b>794.3</b>  |