



# Smart Urban Mobility, including taxis as part of the public transport chain

FULL REPORT

Institute of Urban Transport

**Indian cities** are currently overwhelmed by a growing urban population, a massive motorisation and reduced share of public transport, thus leading to severe congestion on roads, deteriorating air quality and road fatalities. Collective passenger transport, including buses, coaches and taxis, is the closest complement, competitor, and substitute of the private car.

**The objective and mandate** of the group is to establish a representative ad-hoc public-private High Level Group (HLG) of leading public and private stakeholders. Together they will work out a joint vision, as well as policy and business recommendations, and a short-, medium-, and long-term Action Plan ("road map") on removing existing barriers and facilitating bus and coach transport and taxis in India, with the objective to increase substantially the number of users of collective passenger transport modes by 2030.

**Composed** of representatives of urban development, transport and tourism authorities at national and state level, interested governmental and non-governmental organisations active in mobility and travel, relevant bus and coach and taxi trade associations and/or leading companies, with a possibility to invite ad hoc specific stakeholders for specific topics.

The All India Smart Move High Level Group is focusing its work in three areas, which are crucial to address in order to effectively and substantially increase the use of buses and coaches within the next 10-15 years: smart urban mobility including taxis, Interstate and long distance regular lines by bus and coach and Group tourism by coach.

## Members





## 1. Existing Issues in India

### 1.1 URBAN MOBILITY IN INDIA

India is the second fastest growing major economy in the world and the highest populated country in the world after China. In India motorization is growing at a rapid pace with urbanisation. 63% of India's GDP is contributed by the urban population (Census 2011) which is 31% of India's total population. Based on current trends, it is expected that by 2030 urban areas to house 40% of India's population and contribute 75% of India's GDP.

As a result of the rapid increase in urban population and economic activity, India has experienced a tremendous growth of motor vehicles in the last decade. The total number of motor vehicles in India increased from 52.37 million in 2000 to 121.63 million in 2011 i.e. an average growth rate of 9 % per year. In fact, the growth rate in the number of vehicles has been much faster than that of population.

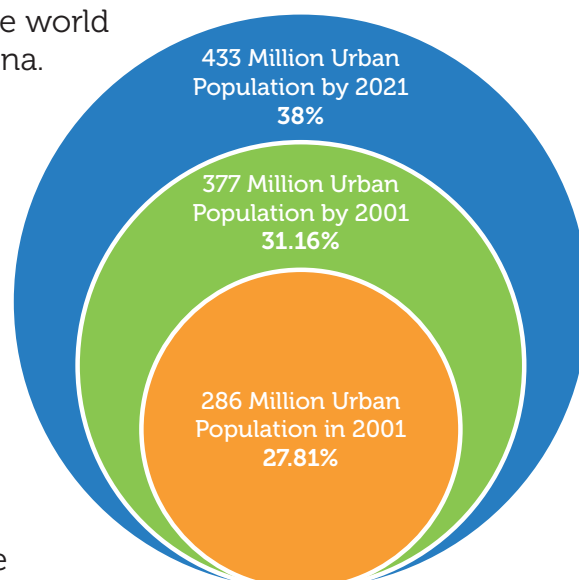


Figure 1: Urbanisation in India

The total number of registered motor vehicles in India increased from about 0.3 million in 1951 to nearly 142 million in 2011 (MoRTH, GoI, 2013), registering an increase of 7.7% p.a. as against population increase of 3.8% p.a. during the same period. During 2001-2011 the growth was even faster at 10% per annum.

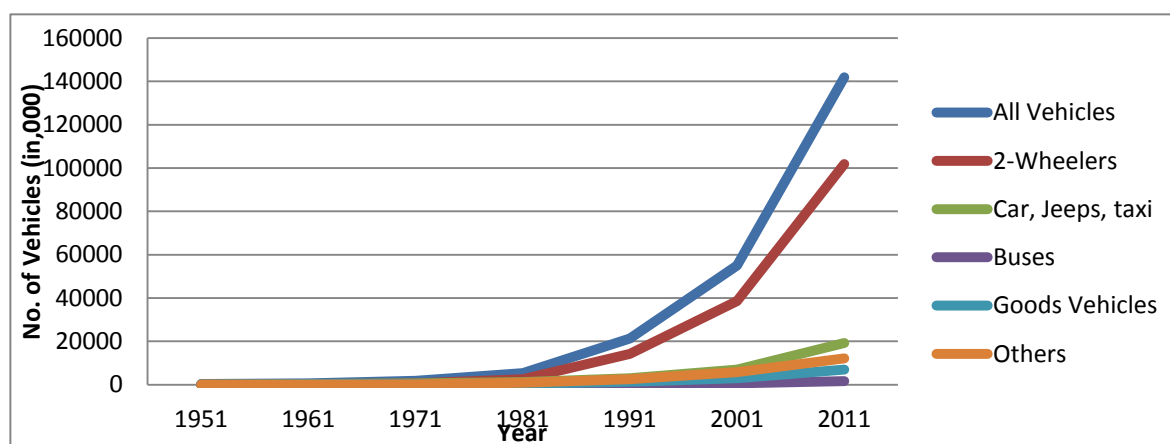


Figure 2: Category-wise trend in registered Vehicles in India

Like the population growth, motorization growth has also not been uniform across cities, with some having grown faster than others. The mega cities like Mumbai and Kolkata seem to have had a slower growth in motorisation as compared to tier II and tier III cities, as seen from Figure 3 below. This could be partly attributed to the higher population growth rate but mainly it is due to the urban sprawl witnessed in these cities over the years. Studies reveal that cities with pre-existing mass transit systems, like Mumbai and Kolkata, showed lower vehicular growth.

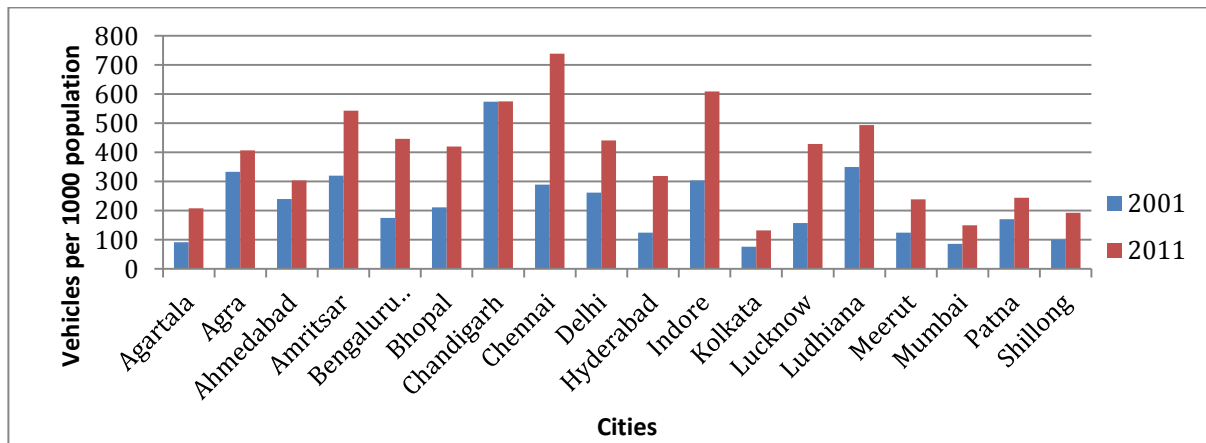


Figure 3: Trends in Vehicles/1000 population in Select Indian Cities

Source: Road Transport Year Book, 2012 (MoRTH, GoI, 2013) and Census of India

Thus, the smaller cities, which do not have a good public transport system are witnessing very rapid motor vehicle growth specially in two-wheelers (2W) as shown in figure 2 above. It is essential to arrest this trend quickly before it becomes unmanageable.

Rapid motorization has also resulted in increased air pollution. Statistics show that about 70% of the air pollution is caused by road transport. Uncontrolled air pollution has adversely affected the health of the people and the quality of life of city inhabitants. For example, with about 9.0 million registered vehicles, Delhi has acquired the dubious distinction of being the fourth most polluted city in the world.

World Bank statistics show that on an average India has 18 cars per 1000 people (2009), yet Indian cities are congested with vehicular traffic and polluted. The conventional ways to solve transport problems such as construction of flyovers and widening of roads have only fueled the growth of motorised vehicles reducing non-motorised transport & public transport use. The increase in private car usage is a major contributor to the growth in Green House Gas (GHG) emissions, and is detrimental to the environment both in India and globally. Most of the nations have already realised that road capacity cannot be provided to cater for the predicted increase in private cars.

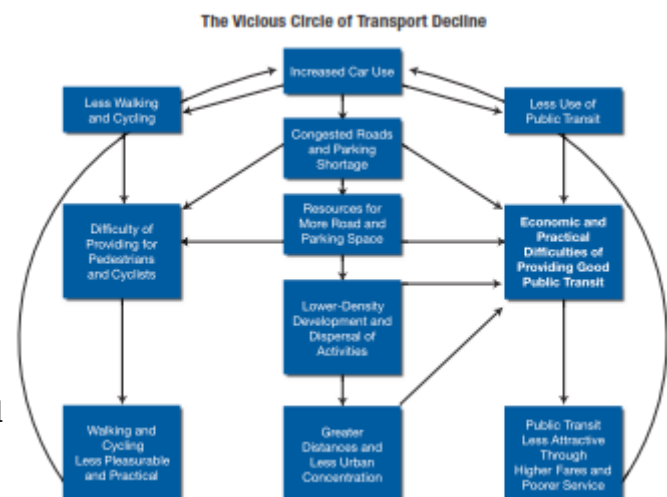


Figure 4: Vicious Cycle Transport Decline, Source: Changing Course in Urban Transport by GIZ & ADB

Based on above, the present scene of urban transport across India is categorized by sprawling cities; declining share of public transport and non-motorized 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 a multiplicity of authorities/departments involved in urban transport that often have conflicting agendas, as well as a lack of understanding of the authorities and 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 an urgent basis.

Acknowledging these issues, the Ministry of Urban Development (MoUD), Government of India (GoI), has taken up some initiatives to improve & formalize the urban transport scenario in the country - in the form of formulating an urban transport policy (i.e. National Urban Transport Policy, 2006), Working Group Report on Urban Transport of National Transport Development Policy Committee (NTDPC), a chapter on urban transport in the 12th Five Year Plan of the Country, setting up of Service Level Benchmarks (Urban Transport), National mission on Sustainable Habitat, etc.

Also, as part of its Intended Nationally Determined Contribution (INDC), India has committed "to reduce the emission intensity of its GDP by 33 to 35 percent by 2030 from 2005 levels". This is not possible without improving urban transport in the country.

## 1.2 ADMINISTRATIVE AND LEGISLATIVE FRAMEWORKS

### 1.2.1 ADMINISTRATIVE FRAMEWORK

In the federal system adopted in India, governance is shared by Central Government, State Government and to some extent the City Governments. The Constitution of India has allocated specific subjects to the Central government and to the State Governments. The 7th Schedule to the Constitution contains specific lists for the Central government and the state government to perform. It also contains a list of concurrent subjects that can be discharged by both. While none of the lists contain urban transport as a specific item, specific components of urban transport such as Railways, Ports, Airways, and National Highways etc have been designated to fall under the Central Government list. This was done so because it was assumed that these components would have interstate impacts hence ideal if controlled by the Central Government. On the other hand subjects like municipal tramways and ferries fell under the State Government list.

Going further, each level of Government is organized into Ministries/Departments, each of which has been assigned specific responsibilities under the "Allocation of Business Rules" Till 1986, the Central Government's Allocation of Business Rules did not include Urban Transport as a separate subject.

In all this, the responsibility for urban transport in the State and City Governments has remained unclear. Generally, road transport systems, like bus based public transport, are being dealt with by the Department of Transport whereas Metro Rail systems, wherever they have been initiated, are being dealt with by the respective Departments of Urban Development. The role of the City Government is largely limited to road maintenance, street lighting and furniture, maintenance of footpaths and parking management. Despite recommendations made in the 74 Constitution Amendment to give city governments greater authority, little has been implemented in most states except for Gujarat and Maharashtra.

This has resulted in a relatively large share of control and authority in the hands of the state in terms of urban transport planning for the respective cities. Decisions are generally taken at the state capital level for all urban areas. These decisions taking departments are either

the Transport or the Urban Development Departments. With no clear mandate for ensuring people and environment friendly mobility solutions at either the State or City Government level, the results of poor planning reflect in increasing problems motorization and rising congestion in all cities.

There is a need to strengthen urban institutions where most Indian cities have failed to address transportation problem mainly because they are not equipped with the appropriate institutional capacity and required financial resources. This is because functional responsibilities for urban transport are fragmented among central, state and local level governments where no one seems to be in charge of overall coordination.

### 1.2.2 LEGISLATIVE FRAMEWORK

Some of the acts and laws followed in the country are listed as under

- a) Tramways Act: This act has been formulated for operation of trams in the road surface within the Municipal limits that permits free access across the tracks.
- b) The Delhi Metro Railway (Operation and Maintenance) Act, 2002: It provides for operation and maintenance and to regulate the working of the metro railway in the metropolitan city of Delhi. Earlier Kolkata Metro had enacted a similar act for operation and maintenance of Kolkata Metro as an adjunct to the Indian Railway Act.
- c) The Metro Railways (Construction of Works) Act, 1978: This covers the needs of construction of metro railways in the metropolitan cities and for matters connected therewith.  
*"The Tramways act and the Metro railway construction act do not cover the requirements of other modes of mass rapid transport such as the 'Bus rapid transit', 'Light Rail transit, Monorails, and several other guided modes. Similarly Metro Railway operation and maintenance act will be needed by all other cities currently building Metro rail. There are a few other aspects such as coordination of transport planning and services, multi-modal integration, safety, tariff and financing that are not covered in any act".*
- d) The Railways Act, 1989: This act is for operation and management of Indian Railways. Indian Railways is operating suburban rail services under the Indian Railways act. These provide substantial UT services today.
- e) The Carriers Act, 1865: Whereas it is expedient not only to enable common carriers to limit their liability for loss of or damage to property delivered to them to be carried but also to declare their liability for loss of or damage to such property occasioned by the negligence or criminal acts of themselves, their servants or agents.
- f) Motor Vehicles Act 1988 and Central Motor Vehicle Rules 1989: This mainly relates to licensing issues and Management of traffic.
- g) Road Transport Act, 1956: An act to amend the road transport act, 1933, in relation to the carriage of merchandise in hired vehicles

- h) The Road Transport Corporations Act, 1950: An Act to provide for the incorporation and regulation of Road Transport Corporations.  
 “These 8 transport related acts deal with requirements not limited to urban transport. Any change to suit the specific needs of urban transport could have repercussions on other requirements covered under these acts and hence not desirable. Any changes considered necessary on a closer scrutiny of these acts may have to be dealt with on a case by case basis. The need for an independent comprehensive act for UT is again indicated”.
- i) Town and Country Planning Act: Subject to the provisions of this Act and the rules framed thereunder, the functions of the Board shall be to advise the Government in matters relating to policy formulations for planning, development and implementation of state programmes and use of rural and urban land in the State.
- the manner in which the land in the region shall be used and in particular, the
  - general locations of land and the extent to which the land may be used for
  - residential, industrial, commercial, agricultural and recreational purposes or as
  - forest or for mineral exploitation;
  - the identification of urban and rural growth center and new town sites;
  - transport and communication, such as roads, highways, railways, waterways, canals
  - and air-ports including their development
- Physical Planning has to precede economic planning as otherwise cities, towns and villages of our country will grow to unmanageable sizes without proper planning resulting in unhealthy surroundings.
- j) Development Authority Act, 1985: An Act to provide for the establishment of an authority for the purpose of planning, co-ordinating and supervising the proper and orderly development of the areas

### 1.3 INFRASTRUCTURE AND SEAMLESS INTER-MODALITY

A modern transportation infrastructure network is necessary for our economy to function, and is a prerequisite for future growth. Transport infrastructure facilitates the transportation of people and goods and provides them access to markets, employment and investment opportunities. An efficient transportation system can have a multiplier effect on the economy whereas a deficient transportation system can result in economic loss. For efficient transport system, an adequate infrastructure is very important. With growing population there is a need to provide matching transport infrastructure to avoid overcrowding, overloading and poor maintenance of the available infrastructure. Transportation can be provided by various modes depending on the surface over which one has to travel – land (road, rail, and pipelines), water (shipping) and air.

Road transportation is large consumer of space and has high maintenance costs, both for vehicles and infrastructures. The road transport infrastructure in India has expanded manifold during more than six decades after independence, both in terms of spread (total road length



& road density) and capacity (number of registered vehicles on road and the volume of passenger and freight traffic handled). Indian road network consists of National Highways, Expressways, state highways, major district roads, village roads etc.

Moreover, availability of transport infrastructure is not only inadequate but also used suboptimally in Indian cities. The area occupied by roads and streets in Class – I cities (population more than 100,000) in India is only 16.1% of the total developed area while the corresponding figure for the United States of America is 28.19% (Singh, 2005). In general, the road space in Indian cities is grossly insufficient. To make the situation worse, most of the major roads and junctions are heavily encroached by parked vehicles, roadside hawkers, and pavement dwellers. As a consequence of these factors, already deficient space for movement of vehicles is further reduced. The present urban rail services in India are extremely limited. Only four major cities - Mumbai, Delhi, Kolkata and Chennai are served by suburban rail systems. The rail services in these four main cities together carry more than 7 million trips per day. Interestingly, the Mumbai Suburban Rail System alone carries about 5.5 million trips per day. A few other cities also have limited suburban rail systems but they hardly meet the large transport demand existing in these cities.<sup>1</sup>

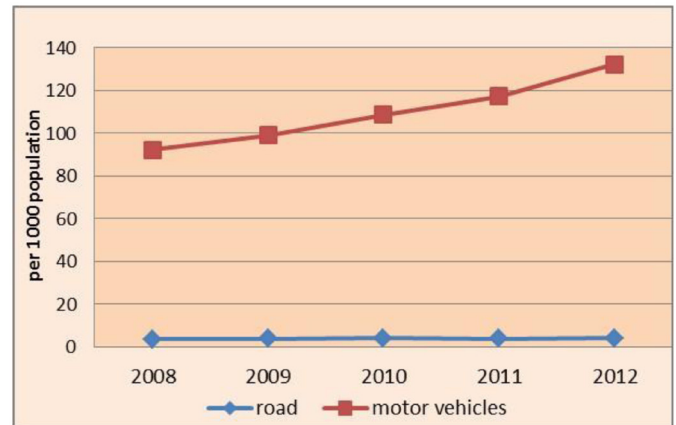


Figure 5: Road Density vs. Motor Vehicle Density

Source: Infrastructure Statistics 2014 (3rd issue, Vol 1), MOSPI

Although, few years back, bus transport services were available mainly in the cities located in southern and western regions of India and mostly run by publicly owned State Transport Undertakings (STUs) or Municipal Transport Undertakings (MTUs). Most of the passenger buses use the standard truck engine and chassis and hence are not economical for city use. There are very few buses in India specifically designed for urban conditions. Qualitatively, the available urban mass transport services are overcrowded, unreliable, and involve long waiting periods. Over-crowding in the public transport system is more pronounced in large cities where buses, which are designed to carry 40-50 passengers generally, carry double the capacity during peak hours. As a result, there is a massive shift towards personalized transport, specially two-wheelers and proliferation of various types of intermediate public transport modes such as autorickshaws, tempos, and taxis.

Cities today face the major challenge of growing urbanization and therefore require augmentation and up-gradation of all kinds of urban infrastructure and services including urban transportation. The current situation in Indian cities along with major issues has been outlined below:

- i. Different transport entities, in India, are planned, managed and operated by independent agencies. These agencies have no accountability to each other and are lacking the requisite coordination amongst them. None of the agencies have been assigned the role for integrating different transit services and private modes.

<sup>1</sup> Urban Transport in India: Issues, Challenges, and the Way Forward, Sanjay Kumar Singh 1, Associate Professor of Economics, Indian Institute of Management Lucknow, Lucknow – 226013, India.



- ii. Lack of city wide coverage by public transport system increases the automobile dependency for commuters in cities. There is also a gap in the first and last mile connectivity. The extra time and hassle that the commuters face when they are going from home to a transit station and then from the station to a final destination becomes a major deterrent for commuters to use public transport.
- iii. The infrastructure built for different modes private and public is hardly in sync with each other. Stations, stops, roads, parking for different modes, footpaths, cycle tracks etc. are mostly planned in isolation without much effort at integration. Lack of physical integration amongst terminal points for different modes leads to accessibility issues and creates a mental block against usage of public transport.
- iv. Lack of information regarding availability of parking slots, traffic signage, public transport scheduling also acts as a deterrent for commuters to use public transport.

Given this backdrop and within the wider context of promoting sustainable urban transportation, GOI, on 03.01.2009 announced stimulus package, funding for buses for urban transport under JnNURM implement bus based public transport systems. It was decided to fund 15000 city buses for 65 mission cities at a total cost of about Rs 5000 cr. After the successful implementation of this scheme, Central Government had sanctioned 10,000 more city buses irrespective of their size and population with special focus on the hill states on 16 August 2013. This time the following components were eligible for funding of ACA:

- a. All types of buses including mini, midi, hybrid electric buses, electric buses, premium segment buses and articulated buses, as per Urban Bus Specifications-II (UBS-II) released on 6.5.2013 and uploaded on MoUD website: [www.moud.gov.in](http://www.moud.gov.in).
- b. Depots and workshops, proportionate to the number of buses sanctioned.
- c. Central Control Room including equipment's.
- d. Driver facilities at terminals/ inter-changes.
- e. Bus priority measures through intelligent transport systems (ITS).
- f. ITS on bus like passenger information system, vehicle tracking system, automatic fare collection system, or electronic ticketing system.
- g. ITS on bus stops/ terminals.

The ACA for ancillary infrastructure under this scheme was limited to rupees one crore for smaller cities and maximum of rupees twenty crore for the million plus cities. Land cost was not to be financed except for acquisition of private land for projects in the North Eastern States and hill States, namely, Himachal Pradesh, Uttarakhand, and Jammu & Kashmir. The financing for buses under JnNURM was exclusively for urban transport i.e. city bus service and/ or bus rapid transit system for the city for which buses were being procured.

## 1.4 SAFETY

Road Safety is a multi-sectoral and multidimensional issue. It incorporates the development and management of road infrastructure, provision of safer vehicles, legislation and law enforcement, mobility planning, provision of health and hospital services, child safety, urban land use planning etc.

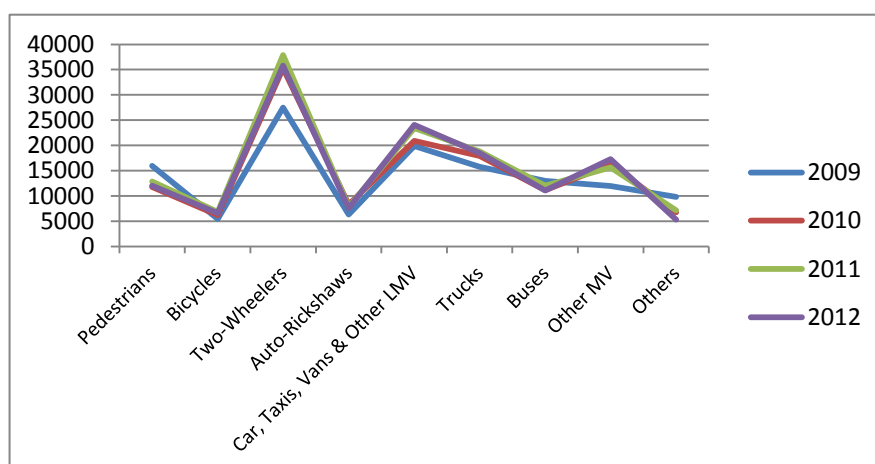


Figure 6: Mode wise accident data

Source: National Crime Record Bureau Data Portal, 2012

The nature of road accident problem in Indian cities is different in many ways

from that in their counterparts in the developed countries. In India the most vulnerable to accidents are pedestrians, bicyclists, motorcyclists, and non-motorized vehicle occupants, unlike cities of developed countries where car and public transport users are the most vulnerable.

Since pedestrians, cyclists, and non-motorized transport users are often from the lower socio-economic groups, road accidents in Indian cities have a disproportionate impact on the poor and vulnerable in society (Singh, 2009).

Sixteen Indians dies in road accidents every hour in 2014, most of them on two-wheelers, and a majority of them as a result of over speeding and careless driving, according to the latest data by National Crime Records Bureau. According to the NCRB, a total of 4,50,898 accidents led to 1,41,526 deaths and 4,77,731 injuries across the country in 2014.

- Two-wheelers caused the most deaths - 26.4% - in the country, followed by trucks and lorries at 20.1%, cars at 12.1% and buses at 8.8%.
- The national highways, which share only 1.58% of total road length, accounted for 32.6% of fatal road accidents, followed by state highways at 27.8%, expressways at 1.27% and the rest of them happened on regular roads.
- Most of the road accident deaths or 47.9% was due to over speeding, followed by dangerous or careless driving at 41.5%, poor weather at 5.3%, drink driving at 2.6% and defect in vehicle at 2.8%.
- As compared to 2010, in 2014 the number of road accidents have gone up from around 4,30,600 to 4,50,898, marking a 4.7% increase. The number of vehicles has also increased, from around 1,14,953 to 1,59,490, which is a 38.7% increase.

But when it comes to the number of persons killed, rate of deaths per thousand vehicles has decreased from 1.2 in 2010 to 0.9 in 2014.

The main reason for this appears to be the prevailing imbalance in modal split, inadequate transport infrastructure and its sub-optimal use, and the lack of effective road-safety policies. Very few cities of India have an adequate public transport system. People rely primarily

on personalized modes such as cars and two-wheelers, para-transit modes such as auto rickshaws and tempos, and non-motorized transport modes such as tricycles, bicycles, and walking. In most of the cities, two-wheelers and cars account for over 90% of the motorized vehicle population whereas the share of buses is negligible in comparison to personalized vehicles. The share of buses in all registered motorized vehicles in India is estimated to have stood at merely 0.9% in 2011, way down from 11.1% in 1951.

## 1.5 TRAINING

One of the biggest challenges in improving urban service delivery and Governance is capacity constraint. Building adequate capacity in this sector requires immense efforts as there are constraints on both supply side and demand side. The capacity building programmes must address the elected leadership and should fully cover all the Mayors, Chairpersons, Municipal Councillors and Urban Development Ministers at the State level. These programmes should be tailor made to suit the requirements and should equip these functionaries to discharge their functions.

The High Powered Expert Committee constituted by Government of India for assessing investment requirement has projected the capital investment requirement for Urban Infrastructure, Renewal and Redevelopment (including slums), and Capacity Building for the 20-year period from 2012-13 to 2031-32 at Rs. 35.75 lakh crore. It has further projected a requirement of nearly Rs.15 lakh crore for operation and maintenance.

There are various capacity building programs by the government of India for improvement of different levels of organisations of Central, State and City. Some of them are as follows:

- As part of the SUTP program, the following activities have been initiated:
  - **Strengthening the Institute of Urban Transport** to develop it as a national level body in the field of urban transport for providing support and guidance to state and cities on the subject of sustainable urban transport
  - Setting up of a **Knowledge Management Centre** which would act as a storehouse of knowledge and a national level database on urban transport.
  - Development of a set of training material associated with sustainable urban transport planning. In total 10 modules have been developed. These ten modules are structured in such a way that they fulfil the end objective of creating the desired capacity amongst the practitioners, city officials, etc. These modules would prepare the city officials to address the challenges in the field of urban transport and enhance skills of the officials in finding solutions to the problems.
  - Organizing national level training programs based on the training material developed to enhance the skill of senior and middle level officials working in the states and ULBs. Till date nearly 1000 officials have been trained
  - Development of Toolkits to provide step by step guidance to cities and other concerned authorities to enable them to plan and implement projects related to urban transport, and also facilitating public decision makers and transport planners/engineers in overseeing urban transport projects. A total of 14 toolkits have been developed.

In addition to these initiatives a number of toolkits, guidelines, manuals etc have been developed for assisting cities for implementing sustainable urban transport projects in the country. Though the capacity building initiative does not have any direct impact, it significantly improves the skills and knowledge base of the concerned officials to address the issues of urban transport and improve mobility in cities.

- NIUA-CIDCO Smart City Lab is open to requests from training/research/academic/consultant organizations to publish their training programmes relevant to CIDCO functional areas, and also customized short term courses in town planning, engineering, finance, and administration.
- In Amrut Mission, Capacity Building has two components- individual and institutional capacity building. ii. The capacity building will not be limited to the Mission Cities, but will be extended to other ULBs as well. iii. Continuation of the Comprehensive Capacity Building Programme (CCBP) after its realignment towards the new Missions.
- Under the Smart city mission, 2% allocated for Mission Directorate and connected activities/structures, Research, Pilot studies, Capacity Building, and concurrent evaluation

## 1.6 ACCESSIBILITY

The most comprehensive approach evaluates transportation in terms of accessibility the ability to reach desired goods, services and activities. It recognises the value of more accessible land use patterns and mobility substitutes as ways to improve transportation while reducing total physical travel. Two types of Accessibility indices have been developed as part of this study . They are (1) Public Transport Accessibility Index and (2) Service Accessibility Index.<sup>2</sup>

Public Transport Accessibility Index is formulated as the inverse of the average distance (in km) to the nearest bus stop/railway station (suburban/metro). Higher the index, better is the public transport accessibility.

Service accessibility index is computed as the percentage of work trips accessible within 15 minute time and 30 minute time for each city. Higher the index, better is the Service accessibility.

As per the MoUD study (2008), data was collected from 30 cities and divided into following categories:

*Table 1 Categorisation of cities (WilburSmith, May 2008)*

City Category	Population
Category-1 a	<5 lakhs with plain terrain
Category-1b	<5 lakhs with hilly terrain
Category-2	5-10 lakhs
Category-3	10-20 lakhs
Category-4	20-40 lakhs
Category-5	40-80 lakhs
Category-6	> 80 lakhs

<sup>2</sup> Source: MoUD- Traffic & Transportation Policies and Strategies in Urban Areas in India. May 2008



The Public Transport Accessibility Index is presented in Figure below. It is found that medium category cities have better index compared with low and high categories, indicate that medium cities are more accessible to public transport. The average index for the study cities is found to be about 1.05.

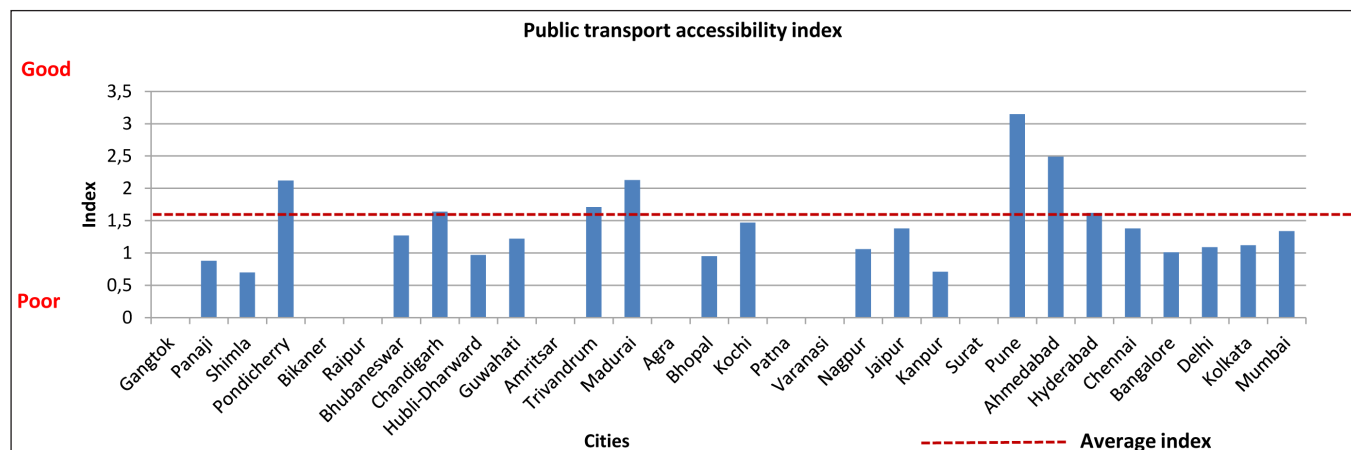


Figure 7 Public Transport Accessibility Index (WilburSmith, May 2008)

The service accessibility index developed for the selected cities is presented in Figure below. In general, smaller cities have a higher index value for both the 15 minute duration and the 30 minute duration indices. This is obviously as a result of lower trip lengths due to small city size. But then again congestion is also less in smaller cities.

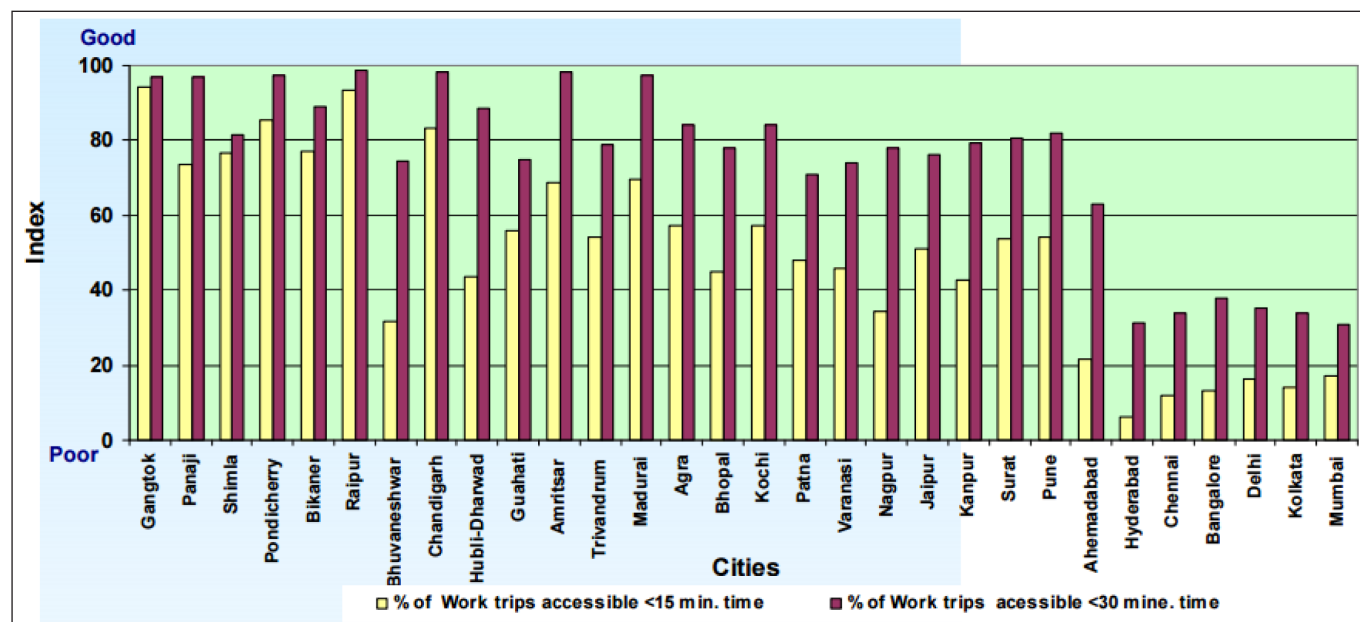


Figure 8 Service Accessibility Index (WilburSmith, May 2008)

## 1.7 USERS' NEEDS

Transportation is a derived demand which arises in order to access certain opportunities or services. Hence user needs are of paramount importance. For a given transportation system the user needs usually include the following factors:

### 1.7.1 SAFETY

Safety is the prime concern for all transport systems. User's choice of mode largely depends upon the how safe user feels while using a mode of transport. As per Wilbur Smith Associates report "Traffic & Transportation Policies and Strategies in Urban Areas in India" May 2008 the average national safety index is 0.010

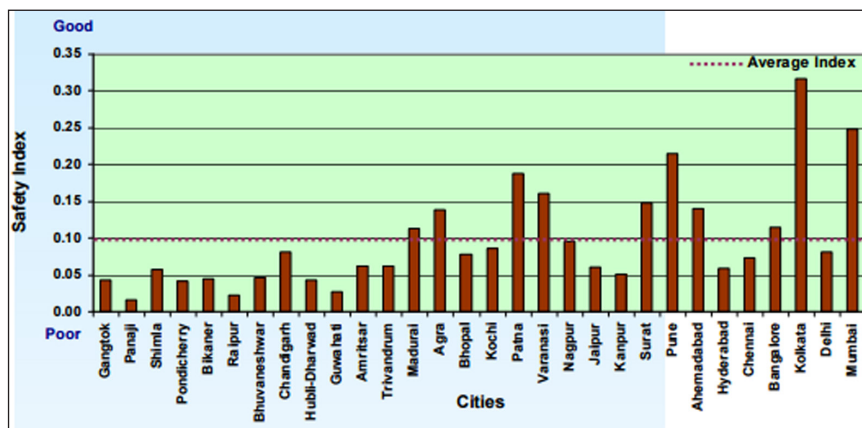


Figure 9 Safety Index developed for various cities

As per the study the following inferences were made:

- Cities with higher slow moving vehicles in the traffic stream have a poor safety index and hence unsafe.
- Larger cities are safer than smaller and medium cities, as it is observed that the city size/population increases the index value also increase.
- Larger cities have lesser speeds, public transport, better traffic management measures, etc than smaller cities.
- Cities 'with public transport' has a better safety index than cities 'without public transport'.

Hence it can be said that in India small and medium cities without public transport are most unsafe for the users.

### 1.7.2 COMFORT

Comfort in transportation stands for how useable a transportation system is, hence comfort is affected by various factors such as proper pedestrian facilities, good congestion free network and ease of mobility.

Wilbur Smith Associates report "Traffic & Transportation Policies and Strategies in Urban Areas in India" May 2008 gives a study of congestion index, walkability index, slow moving vehicle index and on-street parking interference index which plays a huge role in determining user comfort.

Congestion index	Walk ability index	Slow- moving vehicle index	On-street parking interference index
0.26	0.54	0.06	1.28

From the report following inferences can be made:

- Small and medium cities generally have lower index indicating less congestion. Cities with higher slow moving traffic interference have higher congestion index
- Cities with good public transport and having higher congestion index perform
- Cities located in hilly terrain have very poor pedestrian index.
- Cities with hilly terrain have negligible cycle trips and hence very low index due to difficulties in riding slow moving vehicle in hilly areas
- Smaller cities have higher share of cycle trips. As city size increase, the index decreases.
- Among thirty cities, Patna has the highest SMV index.
- Index value is low in small and medium size cities, while larger cities have higher index

### 1.7.3 ACCESSIBILITY

In case of public transport accessibility includes the ease with which people are able to access a particular mode of transport such as bus services, metro etc. People tend to choose easily accessible transport services. Hence in case of public transport first mile and last mile connectivity plays a huge role in choice of the mode.

Wilbur Smith Associates report "Traffic & Transportation Policies and Strategies in Urban Areas in India" May 2008 gives a study of Public transport accessibility index, Service accessibility index and City bus transport supply index.

Public transport accessibility index	Service accessibility index (per cent of work trips accessible in 15 minutes)	City bus transport supply index
1.05	49.92	13.61

From the report following inferences can be made:

- Medium cities have better Public transport accessibility index as compared with small and large cities, indicate that medium cities are more accessible to public transport.
- Service accessibility index smaller cities have a higher index.

### 1.7.4 AFFORDABILITY

Ensure affordability of public transportation fares to encourage usage and maximise consumer welfare each city has its own local network of buses. These services are usually provided by state government owned transport corporations. (Source: indiatransportportal)

Except in the mega cities, the modal split in favour of public transport is generally less than 20%. The poor sections of the community bear a disproportionately higher impact of inefficient public transport. Not only do they have to spend more time travelling to their work place, but they also may have to forgo lucrative employment opportunities due to lack of

public transport. Thus, improving public transport will also improve social welfare. Bringing a shift in commuter preference from private transport vehicles to use of public transport is at the core of sustainable urban transport.<sup>3</sup>

A case study of Mumbai transport system states that the middle class is more likely to use public transport for travel than the poor. For the poor, a larger share of their income than it does for the middle class. Therefore the poorest 27 percent of the population receives only 19 percent of bus subsidies and 15.5 percent of rail subsidies. Indeed, 26 percent of the lowest income households surveyed do not use rail, while 10 percent do not use bus, implying that they receive no transit subsidies. Expenditure on transport accounts for 16 percent of income in the lowest income category (<5000 Rs./month), with 10 percent of income, on average, spent on bus and rail fares. This percentage, however, is not evenly distributed: it is much higher than 10 percent for households in which workers take the bus or train to work, and lower for households in which the main earner walks to work. Even in these households, however, 12.5 percent of income is spent on transportation. Expenditure on public transport would be even higher if bus fares in Mumbai were not subsidized.<sup>4</sup>

### 1.7.5 USER INFORMATION

The quality of information provided to transport users largely affects the practical availability and attractiveness of transport options. The availability and accuracy of user information affects usability of the mode. People tend to avoid public transport since it doesn't provide timely services and increases waiting time. Information regarding transit facilities are available but in many cases users are unaware of availability and use of such information.

## 1.8 INTERNATIONAL DIMENSION

### 1.8.1 COORDINATION OF TRANSPORTATION AND LAND USE PLANNING IN CURITIBA, BRAZIL

Widely acknowledged to have pioneered bus rapid transit (BRT) this is as an affordable solution to transport problems in developing and transition cities. It also demonstrates best practice in informed transport planning principles.

In 1974, as part of a package of reforms to transport and land-use planning, replacing a chaotic system of unregulated paratransit routes a bus rapid transit system was introduced in Curitiba. It resulted in a 2.36 % annual increase in bus patronage, and a drop in road traffic of 30% over its first 30 years of operation. Of particular note is that the system is financially self-sufficient: routes are competitively tendered and require no operating subsidies. This was possible by an early decision made to reject an underground metro or tramway in favour of a more extensive high capacity BRT network. policymaking, with a high degree of political awareness of, and commitment to, non car-oriented

A total of five dedicated expressways were constructed, which is at least 100-fold cheaper than an underground metro. The key corridors are served by distinctive red bi-articulated vehicles, offering a maximum crush-loaded capacity of 270 passengers. These are complemented by a number of feeder and orbital bus routes. The system's speed and simplicity has contributed to its commuter trip modal share of 75%. Private companies own

<sup>3</sup> (Source: Urban transportation financing - PricewaterhouseCoopers)

<sup>4</sup> <http://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-4395>



the vehicles and are paid a route-specific fee per kilometre, with the municipality taking revenue risk. Fares are kept low, such that inhabitants spend only 10% of their income on transport. As mentioned above, the system requires no operating subsidy. High density development has been permitted along the key bus corridors, providing the volume of passengers required for economic self-sustainability of a dense network of high frequency services.

### 1.8.2 THE CAR-FREE MEDINA OF FES, MOROCCO

Fes, the second largest city in Morocco, demonstrates the importance of preserving existing car-free and heavily car-reduced areas. This is the primary alternative to opening up such areas to general traffic then subsequently (re-) introducing vehicle restrictions, by which time it is politically challenging to reverse habitual car-use.

Fes is home to two car-free medinas, one of which is the largest such area in the world. Indeed, cars have never been permitted in the streets of these medinas. The larger of the two areas is the old, walled district of Fes el Bali, which has the following key characteristics:

Size (ha)	Population (2002)	Number of businesses	Average density (persons/ha)	Access restrictions
300	156000	10539	520	Filtered permeability: no through routes for cars, limited access from periphery

The medina's urban design is typical of those found in North Africa, with street widths of no more than three metres serving to restrict motorised traffic, eventually narrowing to less than two metres. This filtered permeability prevents cars from passing through the medinas. Although motorised two wheelers can access these streets, their progress is hampered by large numbers of pedestrians present at all times of day. A dense mix of shops, markets and residential buildings characterises the area, with the largest markets located on a central square and numerous informal gathering places in and around the smaller squares at junctions. Goods are transported by donkey and hard carts.

A co-benefit of this dense development, together with numerous arcades and overhanging upper storeys, is the cooling effect of shade, vitally important in locations with extremely high midday temperatures. Notably Fes al Bali became a UNESCO World Heritage Site in 1981, such is its importance as the largest car-free medina still in existence, safeguarding it from the threat of redevelopment.

### 1.8.3 RESTRICTIONS ON CAR-USE IN SINGAPORE

The compact island city state of Singapore represents best practice in the use of economic instruments to manage the demand for car-use through pricing, coupled with investment in public transport to encourage modal shift and coordination with land-use planning to reduce the need to travel.

Road pricing is at the heart of Singapore's transport policy - With successful transport demand management measures complemented by significant investment in public transport

& planned decentralisation from the city centre to new districts served by an expanding metro system. The 'Area Licensing Scheme' of 1975–1998 which required car drivers to pay a toll to enter a 600 ha area at the heart of the central business district and its distributor road, with higher parking fee reduced traffic by 44%.

With the introduction of dynamic electronic road pricing (ERP) Users were charged for each trip Vehicles are fitted with mandatory on-board units that communicate with roadside beacons to calculate the fee payable, which is then debited from a user smartcard inserted into the on-board unit. Traffic fell by a further 10–15% upon introduction of the comprehensive ERP system, thought to be a result of the higher charges faced by multipletrip makers compared with the previous flat-rate system. Photographs are taken of all vehicles registration plates those of cars without on-board units are automatically retained, allowing the authority to trace owners and issue fines.

#### 1.8.4 NON-MOTORISED TRANSPORT IN GUANGZHOU, CHINA

Guangzhou, a rapidly expanding city in the south of China, was awarded the 2011 Sustainable Transport Award (ITDP, 2011) for its achievement in implementing and integrating the first phase of a BRT network. Integration with bicycle infrastructure and bikesharing together helped in creating and improving car-free public spaces.

Bicycle infrastructure with Hundreds of kilometres of completely segregated 'greenways' were built in 2010, complementing a mixture of on- and off-road bicycle routes across the city along part of Guangzhou's first BRT route, 22.5 km long with 26 stations (2010). These provide a safe route for all cyclists, facilitating fast, convenient access to the BRT stations, which are spaced at approximately 880 metre intervals.

Guangzhou's bikesharing system started with 5 000 bikes at 113 docking stations with RMB & operating costs were met by the Government. Terminals are open 15 hours per day (three remain open all night), with the first hour of use provided free.

The system has been a success, with 26 000 registered users and an average of 3 hires per bike per day reducing travel time and congestion. A recent survey revealed that 50% of bike-sharing users previously made the same trip by a motorised mode (Fjellström 2011). The bike-sharing scheme also provides employment for 230 people.

A large number of public squares and traffic-free paths have been created around revitalised waterways in the city, serving the dual function of pleasant commuting routes for pedestrians and attractions for leisure walkers.

Other sustainable transport measures: Motorcycles are prohibited from using bicycle infrastructure to reduce conflicts through the use of physical barriers, such as bollards, and police patrols. Since the BRT route provide direct services operate onto it from several parts of the city, reducing the need for feeder services and interchange stations. Since February 2010 it has recorded patronage figures of 800 000 passengers a day and 27 000 passengers per hour carried in a single direction. Journey times have been cut by 50– 75% as a result of the dedicated infrastructure and ease of interchange with the metro (Fjellström 2011).

## 1.9 ENVIRONMENT

World Bank Study (2012) on Urban transport and Climate Change<sup>5</sup> has indicated that transportation produces roughly 23 percent of the global CO<sub>2</sub> emissions from fuel combustion and with rapid urbanization in developing countries, energy consumption and CO<sub>2</sub> emissions by urban transport are increasing rapidly.

Uncontrolled air pollution has adversely affected the health of the people and their quality of life. For example, with about 4.5 million registered vehicles, Delhi has acquired the dubious distinction of being the fourth most polluted city in the world. The data on air quality as given in Table 8 shows that although SO<sub>2</sub> and NO<sub>2</sub> levels are below the National Ambient Air Quality Standard (NAAQS) in most cities, the Suspended Particulate Matter (both respirable and non-respirable) is disturbingly high in most cities. Similarly the annual average SPM levels in other smaller and medium sized cities are also given in the Table below.

Table 2: Annual Average Air quality Level for Various Cities, 2010

Class	City Name	SO <sub>2</sub>		NO <sub>2</sub>		PM <sub>10</sub>	
		Annual Average (µg./m <sup>3</sup> )	NAAQS	Annual Average (µg./m <sup>3</sup> )	NAAQS	Annual Average (µg./m <sup>3</sup> )	NAAQS
1a	Mumbai	4	20 - 50	19	30 - 40	97	60
	Delhi	5		55		261	
	Bangalore	14		31		89	
	Hyderabad	5		24		79	
	Ahmedabad	15		21		95	
	Chennai	9		15		59	
	Kolkata UA	11		62		99	
1b	Pune	29		39		82	
	Jaipur	6		37		164	
	Lucknow	8		34		204	
	Kanpur	7		34		203	
	Indore	14		18		120	
	Patna	7		40		181	
	Vadodara	17		29		93	
	Ghaziabad	30		37		290	
	Nashik	21		26		76	
	Faridabad	18		29		164	
	Guwahati	7		15		94	
1c	Chandigarh	2		16		92	
	Hubli and Dharwad	5		13		92	
	Tiruchirappalli	9		24		56	
	Jamnagar	12		27		104	

Source: <http://www.cpcb.nic.in/as> accessed on 19th September, 2014

<sup>5</sup> <http://www.worldbank.org/en/news/feature/2012/08/14/urban-transport-and-climate-change>

The data reveals that high pollution levels are not just a concern for megacities, but are fast becoming a concern for all cities. With increased vehicular use, these pollutants will become as much a concern in the smaller cities as they have been in the large ones. The consumption of petroleum fuels in India went up from 6.6 million tonnes in 1981 to 56.32 million in 2011. Since India is a net importer of petroleum fuels, the steep increase in fuel consumption has resulted in a huge drain on the country's foreign exchange reserves, the import bill having gone up from Rs. 53 Billion (USD 883 Million) in 1980-81 to almost Rs. 7,400 Billion (USD 123 Billion) in 2011-12, i.e. nearly 140 times (Ministry of Petroleum, 2011-12).

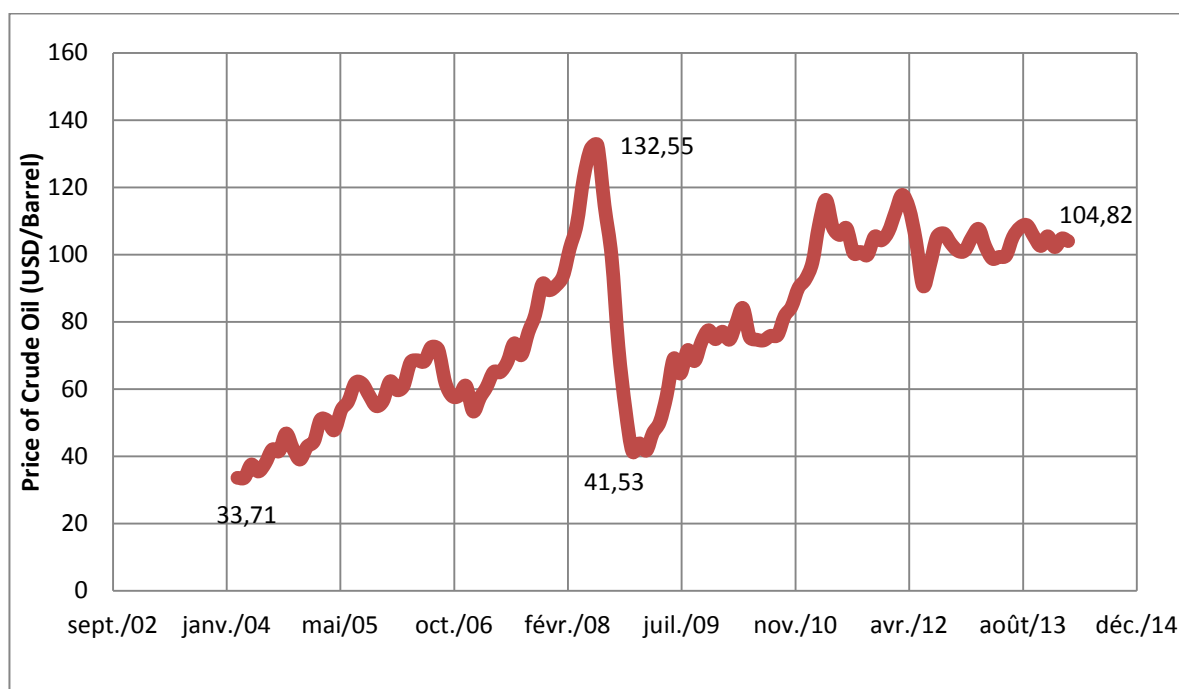


Figure 10: Price of Crude Oil (USD/Barrel)

Source: Ministry of Petroleum, 2011-12

This huge oil import bill is also highly vulnerable to fluctuations in the international oil prices. The average growth rate in the price of crude oil has been a staggering 67.63% over the last decade (2004-2014) as can be seen from Figure 9. It has witnessed many periods of negative and positive growth as seen in Figure 10 but the decadal trend has been on increasing prices. With this trend likely to continue, the rapid motorisation in our cities presents a serious threat to our energy security

## 1.10 INNOVATION AND BEST PRACTICES

Four developments, spread over a period of 20 years from 1986 to 2006, have helped initiate and accelerate efforts to deal with the rapidly emerging problems of urban transport in India. These are the following:

- First, in 1986, was the recognition of urban transport as a separate subject in the allocation of responsibilities within the Central Government and its assignment to the Ministry of Urban Development.



- The second was the decision taken in 1996 to build a metro rail system in Delhi as a partnership between the national government and the concerned state government..
- The third was the launching of the National Urban Renewal Mission, in 2005, which offered significant financial support from the national government to the cities for investments in urban infrastructure, subject to the acceptance of a series of conditions..
- The fourth was the adoption of a National Urban Transport Policy, in 2006, which primarily emphasised investments in public transport and non-motorized modes as against road widening and construction of flyovers.

The last two developments have been explained in greater detail in the sections that follow.

### 1.10.1 NATIONAL URBAN TRANSPORT POLICY OF INDIA

One of the major initiatives that triggered increased attention to sustainable transport in the cities was the formulation and adoption, in April 2006 ("NUTP," 2006), of a National Urban Transport Policy. The major elements of the National Urban Transport Policy are the following:

- Incorporating Urban Transport as an important parameter at the planning stage rather than being a consequential requirement
- Reduced travel demand by bringing about better integration of land use and transport planning to improve access to jobs, education, etc.
- Equitable allocation of road space
- Encourage investments in public transport and non-motorized transport so that the dependence on personal motor vehicles is reduced.
- Improved public transport-Offer the Central Government's financial support to all the State capitals and other cities with a population of over one million, for setting up Mass Transit Systems
- Introduction of Intelligent Transport Systems (ITS)
- Support the principle that the Government provides the capital infrastructure, but the direct and indirect beneficiaries pay for the operating costs.
- Innovative financing mechanisms, with greater involvement of private sector
- Encourage a coordinated approach to the management of urban transport through the establishment of Unified Metropolitan Transport Authorities in all million plus cities
- Offer support for better awareness and capacity building and knowledge enhancement in urban transport planning at the State level- individual and institutional
- Encourage incentives that will facilitate the use of cleaner fuel and vehicle technologies, so that the pollution caused by motor vehicles gets reduced.

### 1.10.2 NATIONAL URBAN RENEWAL MISSION

Government of India (GOI) launched the "JawaharLal Nehru National Urban Renewal Mission (NURM)" ("JnNURM," 2005) in December 2005 committing substantial funds for investments in urban infrastructure. Speaking at the formal launch event of this Mission, the Minister for

Urban Development said that this manifested recognition of the fact that urbanisation was irreversible and here to stay. This mission had the following features:

- The requirement that a city first prepares, after extensive public consultation, an overall City Development Plan (CDP), presenting a strategic vision of what the city wanted to be;
- A priority list of investments was required to be incorporated in the CDP so that investments are made with a clear priority in mind and not in an ad-hoc manner
- Central Government's support by way of financial grants for investments in urban infrastructure ranging from 35% of the project cost for the large cities which have the ability to raise resources on their own, to 50% for medium sized cities and going up to 90% for smaller, disadvantaged cities;
- Substantial funds earmarked for this purpose - the National Government committed an amount of Rs. 50,000 crore (approximately \$10 billion) to be spent over a period of 7 years, with the expectation that this would leverage at least a similar amount from State Governments, the private sector and financial institutions;
- Reforms in urban governance to enable financial sustainability of the physical assets created and their operation – essentially to ensure that the assets created would not need financial support on a continuous basis and would be able to recover their operating costs;
- Establishment of a Central Sanctioning and Monitoring Committee (CSMC) that would first scrutinize the CDPs and only thereafter approve individual project proposals for the Central Government's financial support.

### 1.10.3 CITY BUS SERVICE

To improve the trend in cities, the Ministry of Urban Development provided financial assistance to cities for purchase of buses. A total of more than 25,000 buses were sanctioned to more than 170 cities, many of which were small and medium size cities that did not have a formal public transport system. Of these about 17,000 have been procured till date. These buses benefited the cities in the following manner:

- 1) More number of passengers can be carried per unit road space implying less congestion on road. As per figure 5 below, a bus carries 4.5 times more passengers as compared to a car.
- 2) Buses are safe modes of transport because they have large size and mass than most other road vehicles which reduces the probability of fatality inside a bus.
- 3) Improved air quality because they pollute less per person mile. As per figure 5 below, emissions by car are nearly 4 times as compared to buses.

### 1.10.4 IMPLEMENTATION OF BRTS

The Bus Rapid Transit System (BRTS) also known as the High Capacity Bus System (HCBS) is increasingly being adopted by cities in India. As per MoUD statistics, approx.. 580 km of BRT is under various stages of development across 16 cities (Ahmedabad, Bhopal, Delhi, Indore, Jaipur, Pune, Vishakapatnam, Kolkata, Surat, Rajkot, Raipur, Amritsar, Bhubaneswar, Ludhiana, Hubli Dharwad and Pimpri Chinchwad) of which 200 km are under operations.

### 1.10.5 IMPLEMENTATION OF METRO

The Indian Railways, as the traditional provider of rail based system, built and operates the Kolkata metro, and does the same with a small metro system in Chennai. Apart from this it operates all suburban rail systems. However, as the railways found their intra-city rail systems to be loss making, they wanted to focus on the national network. Accordingly a pattern of joint ownership of metro rail systems emerged, with the national and state governments forming joint ventures to build and operate such systems. Delhi was the first in this direction with the setting up of the Delhi Metro Rail Corporation that runs the Delhi metro. This company has now expanding its network to connect the satellite cities of Noida, Gurgaon, Ghaziabad and Faridabad with a total network of 185 km. The system has a ridership of 2.6 million passengers per day, which has increased by 156% during the last 5 years. This amounts to reduction of 1.7 million cars from the roads each day. Metro systems are one of the most efficient systems. As per the TERI report, it consumes 3 times less energy than buses 21 times less energy than car

Learning from the success story of Delhi metro, many cities have initiated similar systems. New metro systems are coming up in 11 cities such as Bangalore, Chennai, Kolkata, Mumbai, Cochin, Nagpur, etc. on a joint ownership model. Some lines in Mumbai and a metro system in Hyderabad are coming up under public-private partnership arrangements. A system in Gurgaon is operating as purely a private initiative. Some sections of Bangalore, Mumbai and Gurgaon have already been commissioned and the others are in various stages of planning and construction.

The metro networks are expanding fast across the country and many new cities like Lucknow, Pune, Guwahati, Patna, Agra, Kanpur etc are also planning to adopt it as a mass transit mode in their cities.

### 1.10.6 IMPLEMENTATION OF NMT

The energy consumption share of transport sector is one third of the total consumption and within that the road transport consumes around 80%. Compared to bicycle, the energy consumption per passenger per mile is found to be 2–2.5 times higher for public transport and 3–6 times higher for motorized modes in India. It is 3–4 times higher for public transport and 5–10 times higher for motorized vehicles when compared with walking. The National Mission on Sustainable Habitat (NMSH) 2009, one of the eight missions approved under the National Climate Change Action Plan, focuses on the greater use of non-motorised transport as an important strategy for reducing GHG emissions.

### 1.10.7 CHENNAI STREET DESIGN PROJECT

The Corporation of Chennai is introducing a host of initiatives by prioritising pedestrians and cyclists—giving these social heroes their due. From adopting a progressive policy that makes walking and cycling—or non-motorised transport (NMT)—its priority, to rigorously implementing the policy through its Chennai Street Design Project, the city is transforming itself from a car-centric to a people-friendly city.

Recognising the urgent need to transform the scenario, the Corporation initiated the Street Design Project to build high quality footpaths on all 471 Bus Route Roads in the city in 2012. For the first time, the Corporation has begun reimagining the city's arterial roads as "complete streets," taking into account the needs of all the street users.



### 1.10.8 FAZILKA ECO CABS

In 2008, Fazilka, a small Indian border town with a population of less than 100,000, has initiated a revolutionary system that reinvents the way we travel by rickshaw. The system is called Ecocabs- traditional Indian cycle rickshaws that have been reimagined with an exciting new capability: the organization of an entire rickshaw network through telephones, where passengers "dial-a-rickshaw" each time they want a ride. Fazilka is the first city in the world to implement such a system.

Daily about 10,000 passengers use the ecocabs in the city of Fazilka. Assuming that these passengers were initially users of IPT vehicles and two wheelers (50% each), the estimated reduction in CO<sub>2</sub> per cab is 760kg per annum, which amounts to 230 tones per annum for 300 vehicles.

Concept of Ecocabs is now working successfully in 22 cities of Punjab. If on an average 500 eco cabs are operating in each city, the total CO<sub>2</sub> reduction across these cities is to the tune of 8,300 tones.

### 1.10.9 IMPLEMENTATION OF ITS

ITS has been implemented across various cities in the country including Mumbai, Delhi, Ahmedabad, Mysore, Bangalore, Pune, Kolkata, Chennai and Hyderabad. Some of the key projects implemented are:

- ITS on City bus service, Mysore
- Mumbai Area Traffic Control System
- Bangalore Traffic Improvement Project(BTRAC), Bangalore
- CGRAPs, Pune



- Integrated Transport Management System through Common Mobility Card for Automated Fare Collection, Jaipur
- BEST e-ticketing project, Mumbai, etc.

### 1.10.10 CAPACITY BUILDING PROGRAM

The Ministry of Urban Development has initiated a National Level Scheme for Capacity Building in Urban Transport Planning. The scheme aimed at enhancing the understanding of urban transport problems & their appropriate solutions, thereby significantly addressing the issues of congestion, air pollution and safety. The scheme targeted 4 major areas – training, education, annual conference and journal, institutional development . As part of the program, the following initiatives were taken:

- Identification and strengthening of 4 centres of excellence.
- Institutionalization of the Urban Mobility India Conference cum Exhibition. Till date 7 conferences have been held from 2008 onwards
- Development and strengthening of national level institute for coordinating research and dissemination of new information at the Institute of Urban Transport (India).

## 2. Recommendation

### 2.1 LEGISLATIVE AND ADMINISTRATIVE FRAMEWORKS:

#### 2.1.1 INSTITUTIONAL FRAMEWORK<sup>6</sup>

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:

- 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;
- Setting up MPC/DPC as envisaged in the 74th 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

<sup>6</sup> Source: Working group report of 12th Five Year Plan

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.

### 2.1.2 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. 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.

## 2.2 INFRASTRUCTURE AND SEAMLESS INTER-MODALITY

Transport is inherently multimodal. Transport demand varies from corridor to corridor and so does the capacity of various modes. 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.

An essential adjunct of multimodal transport is the interchange points where commuters shift from one mode to the other. Efficient interchange points that avoid conflicting movements and impose minimum time penalty have a very important role in providing seamless travel to the commuter. This will make the commuter decide to use the public transport network as a matter of choice.

The most important aspect is multimodal integration; Physical integration, Network integration, Fare integration, Information integration and Institutional integration. This should include all Component and Sub-component <sup>7</sup>of Integration (Table 3).

<sup>7</sup> Source: City Wide Multimodal Transport Plan-Toolkit

Table 3: Component and Sub component of Integration

Components	Institutional Integration	Physical Integration	Operation Integration	Fare Integration	Information Integration
Public Transport	Setting up of UMTA	Bus Stop	Route network Planning	One ticket for all means of transport	Inter-modal real time passenger information systems
		Bus terminal			
		Metro Station	Service Plan		
		Intermediate Public Transport (IPT) Stop			
		Multi-Modal Hub			
Transport Network		Road Network	Not Applicable		
		Intersection			
		Parking			
Non-Motorized transport		Cycle Track and Parking Station	Not Applicable		
		Footpath			

Besides the Passenger information display system, integrated ticketing for all modes (Common mobility card) and interchange facilities, Use of Intelligent Transport System, Facilities for handicapped, Safety and security against hooliganism, vandalism and terrorism are critical to promote public transport and should be a part of planning.

A city wide public transport network including feeder services and easy availability of information about available services will help promote public transport. A Few immediate options are:

- Metros operating their own mini buses as feeder services
- Making these feeder services free for the commuters.
- Better passenger information systems (via several media)
- Advertising of these services (for public awareness).
- Expanding the metro network to cover wider areas, and ultimately the whole metro region (this may be a long term goal) with linear or limited metro networks, the personal vehicle trips are hard to contain.
- Convincing the bus companies to play the role as feeder system

As per working group report of 12<sup>th</sup> Five Year Plan, the goals identified to improve the infrastructure are as follows:

1. 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;
2. 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.

3. 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>8</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.
4. 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.
5. To provide grade separated entries and bye-passes for through traffic;
6. To use technology for multimodal integration, enforcement and traffic management;

## 2.3 SAFETY<sup>9</sup>

The need to improve safety in cities in India does not need any justification. 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. 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
- Institutional Arrangements and Accountability

Program to improve safety involves the following steps;

- All road design standards to be reviewed ( 2 years)
- All traffic management standards to be reviewed( 2yrs)
- RSA for hazardous location(year 1-10)
- Crash data base on standard format( 1 year)

<sup>8</sup> \*Population figures are as per 2011 census

<sup>9</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport



- Segregated NMV lanes to be constructed on all arterial roads ( 10% road length every year, 100% to be covered in 10 years)
- Capacity building for city engineers, town planners, safety auditor, traffic police(every year)

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 will 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 should be provided by creating a Safety Board at State level with safety cells in cities 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. Also, a National Road Safety Commission at the central level needs to be set up to set standards and parameters for Road Safety in the country.

## 2.4 TRAINING

The important requirement in meeting the challenge is to provide skills to the city/state. Urban transport is made up of several components such as several private and public modes of transport, roads network and all associated infrastructure and other related activities such as multi-modal integration. Unfortunately the capability for undertaking a coordinated approach and a complete understanding of issues involved is lacking at the State Government and City level. There is an urgent need for capacity building; both at institutional and individual level.

For institutional strengthening NUTP has identified Institute of Urban Transport (IUT) at the Central Government level. Similar institutional strengthening should be undertaken by State Governments.

Individual capacity building should be in two parts; city officials and university educated professionals. The focus of training for existing city officials should be to develop awareness, skills and a deeper understanding of the requisite issues in urban transport. The focus of the education component should be to create a pool of skilled manpower to be available in the country for recruitment by various organizations engaged in urban transport. Alumni from such programs would be potential recruits for State Transport Corporations, State Transport Departments, Municipal bodies etc. Simultaneously State Governments should be encouraged to create jobs for such professionals.

The Ministry of Urban development, Government of India has already established four centers of excellence one each at IIT Delhi, IIT Chennai, CEPT Ahmedabad and NIT Warangal. Perhaps there is a need to set up more centers of excellence. These should be aided by incentives from the Ministry of Human Resources Development along with financial outlays from the Ministry of Urban Development for creation of new faculty positions and provision of research scholarships, in order to ensure healthy growth of these centers. The curriculum in universities should be reviewed so that the professionals coming out have skills in tasks needed today such as planning and design of Bus rapid transit, facilities for NMT etc.

A concerted effort is needed to upgrade skills all round. With regard to skills, most planning is done by consulting agencies appointed by cities. It now appears that neither the consultants always have the desired level of skill in the assigned task nor do the cities have the necessary skills to supervise and monitor the work of the consultant. A compulsory system of certifying experts to handle specific tasks perhaps needs to be introduced. Capacity building is an ongoing need and hence should be institutionalized.

Accordingly MOUD has launched a comprehensive scheme for capacity building for urban transport. It involves the following 10 activities:

- Training
- Education; Development of curriculum and faculty development of academic Institutes
- Dissemination of information - Conferences and Journals
- Development of legal and administrative frameworks,
- Development of manuals, codes and standards,
- Development and strengthening of Institute of Urban Transport (India), a national level institute for, training, coordinating research and dissemination of information,
- Development of a National database,
- Promotion of National level consultancy organizations to provide a pool of professional manpower to assist State/city Governments,
- Setting up of institutions for the Research and Design; and safety certification of externally guided rail based transit systems and other new systems that may be developed for urban transport,
- Setting up of Unified Metropolitan Transport Authority (UMTA) and Urban Transport Cell in various mission cities.

For the training and skill building program to be beneficial, states should be mandated to immediately constitute a dedicated agency for urban transport in each city and at the state level, identify officials to be appointed to these agencies, send them for training and on return post them to these agencies/departments.

## 2.5 ACCESSIBILITY

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. 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.

The Constitution of India ensures equality, freedom, justice and dignity of all individuals and implicitly mandates an inclusive society for all including persons with disabilities. In the recent years, there have been vast and positive changes in the perception of the society towards persons with disabilities.

Also, Universal accessibility needs to be provided, by the urban transport systems, both at the systemic level and the Infrastructure level.

- Accessibility at systemic level implies that components of public transit systems like trains and buses, their stations and stops, the ticketing and any other user interfaces should be within reach of people with different types of impairments.
- At the infrastructure level, pedestrian paths and crossings, parking facilities and access to public land uses should be inclusive in their design for differently-abled persons.

*It has been realized that a majority of persons with disabilities can lead a better quality of life if they have equal opportunities and effective access to rehabilitation measures.*

Accessibility and mobility in cities can be improved through:

- Developing hierarchical road network in newly developing areas
- Completion of missing links including opening up of dead end roads for better utilization.
- To improve and maintain road surface to the highest standards with good drainage. To regulate and coordinate Work of utility agencies, since 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.

Accessibility should also include door to door planning for last mile connectivity as the norm. It should be done in terms of time, cost and convenience to commuter. Improved accessibility of stations/stops or the last mile connectivity should be a vital feature of public transport planning. It involves six main steps:<sup>10</sup>

- Footpaths for Walk and cycle lanes within about 500 m of stations/stops
- Road access for vehicles within about 3 km of stations/stops
- Feeder service within about 5 km of stations/stops
- Drop off & pick up facilities at stations/stops
- Park and ride facilities at stations/stops
- Land use control around stations/stops to avoid congestion at entry/exit

<sup>10</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport

## 2.6 USERS' NEEDS

The four major factors for designing access to pedestrian and public transport systems for all users are as follows:

- **Safety:** A Safety Board should be set up in each State to deal with safety issues in a comprehensive, scientific and a systematic manner. To establish an effective regulatory and enforcement mechanism will allow a level playing field for all operators of transport services and enhanced safety for the transport system users. It should be supported by relevant R&D. Rescue services should be organized for fast relief.
- **Comfort:** To improve the commuter travel time and comfort, provisions such as giving buses priority at the junctions, mandatory give way at bus ways, creating full day bus lanes, and using more energy efficient buses and trains should be enacted. Like in case of Singapore, 60% of the total motorized trips are made on the greener public transport; the government could not have achieved this share without providing a quality public transport as an alternate to the private vehicle. The government of Singapore provided choices of public transport, bus, including MRTS and light rail.
- **Accessibility:** The better transport provision is a key to improving accessibility to jobs, services, education and training opportunities and social networks. A standard measure of accessibility essential in determining areas most in need of improvement. Like in London the public transport accessibility level (PTAL) is calculated using the range, proximity and frequency of public transport services for any given location to score accessibility to the transport system at peak times. The provision of a more accessible transport system and improved transport connectivity and capacity is an important part of meeting this commitment. Fares have an important role to play in ensuring they make an adequate contribution towards the provision of services.
- **Affordability:** Affordability is clearly an extremely important consideration in most of the developing countries. The impression is that public transport users are well aware of all the various ticket prices and the ticket differentials between the different services and operators. They are also clear about how it would impinge on their household budget. Those who are having the most difficulty are working people on low incomes who have to travel to work. Their travel costs can be a significant part of their take-home pay and they have no choice but to pay it. They are also financially penalized by restricted hours of service operation, which means that they may sometimes have to take a taxi or walk (Affordability of Public Transport in Developing Countries, World Bank, 2005)<sup>11</sup>. Talking about affordability passes and concessions are often important. Passes (often monthly) give significant savings to purchasers over purchasing single tickets, but may require up-front payment of the equivalent of some two-thirds to three-quarters of one month's supply of single tickets. Personal mobility grows with income worldwide, but is accommodated in a variety of ways. If the availability of rapid transit (and basic bus services) is low, more growth in mobility will be handled by people buying and using cars or motorized 2-wheelers. If public transport services are more widely available and

<sup>11</sup> Affordability of Public Transport in Developing Countries by Robin Carruthers, Malise Dick and Anuja Saurkar, The World Bank Group, January 2005.

are of higher quality, with safe and attractive conditions for walking and cycling, fewer people will buy and use motor vehicles. Adapting the International Energy Agency (IEA) Mobility Model (MoMo), it was estimated these effects across 33 countries and regions covering the world<sup>12</sup>.

## 2.7 ENVIRONMENT

India is a large country with diversities across the region. Cities across the country have different characteristics and hence diverse problems of urban transport. There are no single set of solutions, which can be applied across the country. The demonstration projects implemented as part of the SUTP program of the Ministry of Urban Development has indicated that a same type of project can have varying impact on reducing CO<sub>2</sub> in the country. A study on “Review of Urban Transport in India” conducted by the Institute of Urban transport has revealed that the motorization rate is increasing rapidly and that any single initiative like public transport improvement, NMT improvement or ITS alone would reduce emissions, but would not give the desired results, therefore a combination of interventions are needed to bring about significant impact (refer Figure 11).

Note: Scenario 1 – Business as Usual Scenario, Scenario 2 - Promoting NMT, Scenario 3 - Promoting Public Transit Ridership, Scenario 4 - Clean Technology-focus on personal vehicles, Scenario 5 - Clean Technology- focus on electric traction for public transit (buses), Scenario 6 - Improving Urban Structure, Scenario 6A - Aggressive Urban Structure and Form Control and Scenario 7 - A multi-pronged approach (combination of scenarios 2, 3, 4,5 and 6A)

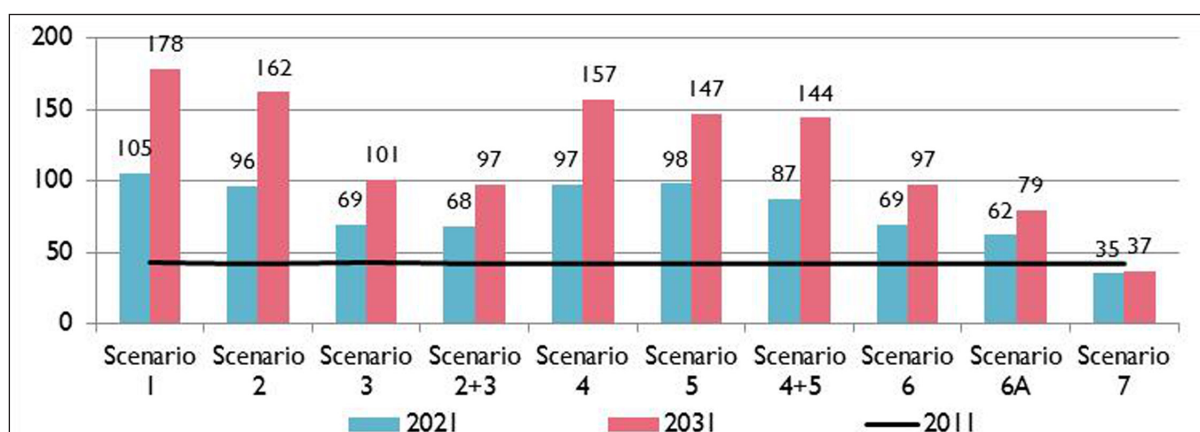


Figure 11: Annual Emissions –CO<sub>2</sub> (Million Metric Tonnes)

Source: Review of Urban Transport in India, institute of Urban Transport (India), 2014

Non Motorized Transport (NMT) i.e. walk, bicycle and cycle rickshaw modes are green modes of transport that belong to the low carbon path, do not consume energy or cause pollution and in addition provide social equity besides employment. Presently these modes are neglected in the planning process. Facilities for NMT i.e. footpaths and dedicated cycle lanes should be developed on priority. These should be citywide to assure the commuter that he can complete his journey all the way by walk or bicycle if he so chooses. Funds allocation for

<sup>12</sup> A Global High Shift to Public Transport, Walking, and Cycling: New Roadmap for Low Carbon Inclusive Urban Transportation, ITDP, 2014



major transport infrastructure should be linked to achieving targets for creating facilities for NMT.

Vehicle efficiency improvements, regulation of fuel and vehicles, Vehicle emission standards, and the modernization of taxi, truck, bus and other commercial fleets generates exceptional economic returns. 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.

## 2.8 NEW BUSINESS MODELS AND AGGREGATORS

CMV Act 1988 was drafted when the technological advancement had not happened; due to which the Act had not considered the changes, which might be taking place in Passenger Transport sector in future. Today due to Technological advancement Business Models and their operating methods are changing at a very fast pace making a divide in Regulated traditional operators and Techno Transport companies. On one hand you have traditional Taxi and Bus Operators working under highly regulated environment and on the other hand you have new technology players like Ola and Uber flaunting all operating rules under the pretext of calling themselves as Technology providers. Globally this rift is widening, now it is high time that Governments take cognizance of these changes and make changes in their operating rules accordingly. Following are few of the suggestions.

- **Different Business Models** - A clear-cut differentiation needs to be made between "Transport Aggregator" and "Technology Aggregator". A company which aggregates Transporters and sells products under its own Brand should be called Transport Aggregator for e.g Ola and Uber ( Taxi aggregator) and A Company which sells services under the Brand of service providers by using technology should be called as Technology Aggregators for e.g Makemytrip, Redbus( Booking engines or OTA).
- **Different operating rules**- Transport Aggregator and Technology Aggregators shall be subjected to different operating rules as their roles & responsibilities are different. Transport Aggregator should be made equally responsible to follow CMV Rules along with vendors whereas in case of Technology Aggregator responsibility of following CMV Rules lies with actual service provider and responsibility of Technology Aggregator will be limited or restricted to deficiency in booking systems.
- **Shared responsibility**- In case of Transport Aggregators, passengers book services on their faith in the Company (brand) hence responsibility of deficiency in services has to be shared equally between the Company and Vendor.
- **Changing relationships**- Relationship between Servant and Master or Employee and Employer (Company) is slowly being replaced by a new relationship; that of a Company (Brand) and Vendor (Service provider). In such a scenario it is important to define their roles more clearly and then make commensurate operating rules.
- **Social benefit**- In Transport Aggregation Model; role of Employee is being replaced by Vendor, hence responsibility of providing social benefits to them should be given to the Company (Brand).
- **Safety issues** - In a Transport Aggregation Model where Vendor is individual owner, it is very much likely that in an over enthusiasm or out of sheer greed, he is

likely to work more number of hours and get exhausted, which might cause safety hazard to not only his own life but even to other travellers. To avoid it this issues needs to be tackled very carefully.

- **Flexibility to choose technology** - While defining rules to provide technology it is important to have flexibility to choose from variety of technology solutions rather than having binding rule defining around available technology. It is important to state what desired results are expected from that technology rather than naming a specific technology for e.g instead of saying GPS or GPRS technology shall be used, Rules should state that any technology which allows to locate vehicle and transmit required data to the central server( Vehicle Locator Device).
- **Planning & Permits**- In India transport sector is regulated, by Central Motor Vehicle Act and Rules formed there under. Additionally Road transport being a state subject, State Government has its own Rules on the lines with CMV Act& Rules under which road transport of that particular State is regulated. CMV Act does not prescribe planning as a mandatory provision before issuance of operating Permits (Licenses to operate Commercial vehicles). There are mainly two types of Permits issued to Passenger vehicles
  - **Stage carriage Permit** : - Stage carriage permits are issued to vehicles plying as per given schedule on defined routes at defined time and stops with regulated fare structure. In many state these permits are Nationalised and are given only to Government or Semi Government agencies.
  - **Contract carriage Permit** :- All other Permits fall under the category of Contract Carriage Permits. From Autorikshaw , Taxi to Buses are operated under these permits.

Due to ambiguous nature of the definitions in CMV Act, there are many grey area of operations because of which Passenger transport in India is at chaotic situation. No process is defined or followed while permits are issued. Throughout the country Permit conditions are almost the same barring few variations. It is important to understand regional requirement before issuing local permits. Operating rules needs to be clearly defined so as to remove ambiguity in the minds of authority and operator. Schemes need to be designed and declared well in advance so as to increase awareness and participation amongst the users and service providers. Consideration to follow strict process should be given. Following are few steps in that direction.

- a. **Mandatory Planning** -In absence of any planning permits are issued by Regional Transport Authority on random basis creating imbalance in services wherein you have multiple operators competing with each other for penny war on some routes and no or deficient service on other routes. In case of State Transport Undertaking though services are planned by STU; it is done in isolation and not integrated with other service providers, creating unhealthy competition.

**Solution:** Hence it is very important to Plan services well before issuing of Permits.

- b. **Diversity in Operating conditions** - India is very vast & diverse country in Climate, Geographical terrain, financial position & Culture of people. Since there are only two types of permits, most of the Operating rules are similar irrespective of situation of the region which may or may not suite particular type of operation required to fulfill transportation need of that region.

**Solution:** Hence it is very important to have specific operating rules applicable to specific region or geography to fulfill their local transportation requirement.

- c. **Different Class of Services** - Requirement of transportation for Urban and Rural are different, Long distance and Short distance services need to have different type of vehicles and operating rules; due to very high diversity in financial condition of people it is important to have variety of services starting from Ordinary to Super luxury which requires entirely different treatment and operating rules.

**Solution:** Hence it is important to have different Infrastructural development, Bus designs and operating rules catering to specific need of specific class of people.

- d. **Seamless Movement** - In a global economy it is very important that our country grows and becomes globally competent in attracting customers for India products. This will require industrialization to propel that growth and to facilitate this growth it is very important to have seamless movement of vehicles throughout the country. Transport being a State subject today it is challenging to have this seamless movement; as every state is looking after passenger transport as revenue generating source due to which interstate movement of vehicles is becoming cumbersome.

**Solution:** Hence to facilitate seamless Interstate Movement of vehicles, uniformity in taxation policy & operating rules is required.

- e. **Specific Operating Rules** - It is very important to have variety, clarity and uniformity in Operating rules for various class of services hence differentiation and classification of services on the basis of planning is required to ensure this Planning should be made mandatory similarly to achieve desired results making of schemes on the basis of variety and class of service requirement designing and declaration of Schemes must be made mandatory before issuing of permits.

## 2.9 CONCLUSION<sup>13</sup>

### 1. CONCLUSIONS DERIVED FROM THE DELIBERATION ON THE URBAN TRANSPORT SCENE ARE LISTED AS FOLLOWS:

- Urban transport scene in Indian cities, today, is headed in the wrong direction.
- The 'Business As Usual' Growth Scenario projected to 2030 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 (Rs 75000 to Rs 100,000 crores) are needed to build up urban transport infrastructure and services in cities to enable them to play their role in the desired economic growth of the country.

### 2. RECOMMENDATIONS OF THE DOCUMENT FOR THE GOALS TO ACHIEVE THE VISION 2030 AS LISTED BELOW.

For augmentation of public transport following **goals** should be adopted:

- Organised city Bus service as per Urban bus specifications i.e VTS and PIS in all 1 lakh+ cities and state capitals;
- Add BRTS @ 20 km/1 Mn population in cities with pop. > 1 Mn;
- Cities with population >2 Mn to start planning rail transit projects, with 3 Mn to start construction. Estimated requirement 10 km per Mn;
- In existing mega cities, Metro rail to be expanded @ minimum 10 km per/year
- Suburban rail to be provided in urban agglomeration with population > 4 Mn

**Other Goals are:**

- Walk and cycle lanes to be provided in all 2 lakh+ cities and state capitals
- Creation of an effective institutional and Implementation framework as well as capacity building to manage projected investments
- Road network in all 2 lakh + cities to be completed with missing links and with good surface and effective drainage.
- Work of utility agencies to be regulated
- Safety, safety audit and security to be upgraded
- Technology to be used for integration, Enforcement and traffic management

<sup>13</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport

### 3. ROLLING PROGRAM AND FINANCING STRATEGY NEEDS TO BE AS FOLLOWS:

- The rolling program should be adopted as per annexure D
- Financing strategy should be based on consortium approach with the participation of Central and State Govt. / City Development Authorities, Property Developers, Private Sector, Debt from Multilateral / Bilateral institutions and Debt from domestic financial institutions contribute
- All forms of public transport should be treated as infrastructure and tax concessions extended to them
- Urban development funds should be set up at the city and National level
- Transit oriented development should be promoted
- Financing of buses, both capital and revenue should be placed on a firm footing

### 4. INSTITUTIONAL FRAMEWORK FOR URBAN RAIL TRANSIT PROJECTS SHOULD BE:

- A National Urban Rail Transit Authority under the Ministry of Urban Development, Government of India to help urban Rail transit projects
- An R&D Cell to be set up under the control of Ministry of Urban Development, Government of India
- Suburban Rail systems to be corporatized to become a part of the city transport system
- Technical control of Rail Transit projects should remain with the Ministry of Railways as per the current allocation of business rules.

### 5. INSTITUTIONAL FRAMEWORK SHOULD BE CREATED AS FOLLOWS;

- A new department of Urban transport at the Centre under a full time secretary,
- A new department of urban transport in each state and union territory under a full time secretary including a 'Safety Board'
- Setting up MPC/DPC in cities as envisaged in the 74th constitutional amendment
- A dedicated unified metropolitan transport authority (UMTA) in million plus cities or for a group of small cities including traffic management and engineering cells
- Existing city agencies engaged in implementation and operation of UT related projects to continue with their present roles
- A Regulator



## 6. CITIES SHOULD BE EMPOWERED TO TAKE CARE OF ITS URBAN TRANSPORT NEEDS AS FOLLOWS

- State should create a new State cadre of urban transport professionals to be posted to various cities and managed by the proposed urban transport department at the State headquarters.
- A comprehensive UT act to cover all aspects of urban transport should be enacted by the Central Government and States may draft rules under it as per its needs
- A policy on budgetary allocations, user charges and tapping other source of funds based on taxation of non-user beneficiaries, land development and vehicle taxation on the 'polluter pays principle' should be provided to the city.

City should have a three level **organizational set up** as follows;

- Metropolitan/District planning committee
- Dedicated authority for urban transport (UMTA)
- Other existing city agencies

## 7. A CAPACITY BUILDING PROGRAM WITH THE FOLLOWING COMPONENTS SHOULD BE IMPLEMENTED;

- Training of city officials and other stakeholders to enable them to undertake small planning assignments and to supervise and monitor the work of the consultant,
- Institutional capacity building at the Central/State Govt. level
- A data base and knowledge management center
- Development of manuals, codes and standards for UT
- R & D to be organized and findings disseminated
- M techs and Ph.Ds should be generated by universities with appropriate curriculum. State Governments should create jobs to absorb these professionals

Steps initiated by the Ministry of Urban Development, Government of India for capacity building, setting up a knowledge management cum data base center, and organized R&D. are ongoing activities and should be institutionalized.

### 3. Recommendation

#### 3.1 LEGISLATIVE AND ADMINISTRATIVE FRAMEWORKS:

##### 3.1.1 INSTITUTIONAL FRAMEWORK<sup>14</sup>

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:

- 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;
- 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

14 Source: Working group report of 12<sup>th</sup> Five Year Plan

effective it should be backed by legislation and the entire funding for urban transport should be routed through UMTA.

### 3.1.2 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. 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.

## 3.2 INFRASTRUCTURE AND SEAMLESS INTER-MODALITY

Transport is inherently multimodal. Transport demand varies from corridor to corridor and so does the capacity of various modes. 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.

An essential adjunct of multimodal transport is the interchange points where commuters shift from one mode to the other. Efficient interchange points that avoid conflicting movements and impose minimum time penalty have a very important role in providing seamless travel to the commuter. This will make the commuter decide to use the public transport network as a matter of choice.

The most important aspect is multimodal integration; Physical integration, Network integration, Fare integration, Information integration and Institutional integration. This should include all Component and Sub-component <sup>15</sup>of Integration (Table 3).

<sup>15</sup> Source: City Wide Multimodal Transport Plan-Toolkit

Table 3: Component and Sub component of Integration

Components	Institutional Integration	Physical Integration	Operation Integration	Fare Integration	Information Integration
Public Transport	Setting up of UMTA	Bus Stop	Route network Planning	One ticket for all means of transport	Inter-modal real time passenger information systems
		Bus terminal			
		Metro Station	Service Plan		
		Intermediate Public Transport (IPT) Stop			
		Multi-Modal Hub			
Transport Network		Road Network	Not Applicable		
		Intersection			
		Parking			
Non-Motorized transport		Cycle Track and Parking Station	Not Applicable		
		Footpath			

Besides the Passenger information display system, integrated ticketing for all modes (Common mobility card) and interchange facilities, Use of Intelligent Transport System, Facilities for handicapped, Safety and security against hooliganism, vandalism and terrorism are critical to promote public transport and should be a part of planning.

A city wide public transport network including feeder services and easy availability of information about available services will help promote public transport. A Few immediate options are:

- Metros operating their own mini buses as feeder services
- Making these feeder services free for the commuters.
- Better passenger information systems (via several media)
- Advertising of these services (for public awareness).
- Expanding the metro network to cover wider areas, and ultimately the whole metro region (this may be a long term goal) with linear or limited metro networks, the personal vehicle trips are hard to contain.
- Convincing the bus companies to play the role as feeder system

As per working group report of 12<sup>th</sup> Five Year Plan, the goals identified to improve the infrastructure are as follows:

1. 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;
2. 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.
3. 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\* 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.
4. 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.
5. To provide grade separated entries and bye-passes for through traffic;
6. To use technology for multimodal integration, enforcement and traffic management;

### 3.3 SAFETY<sup>16</sup>

The need to improve safety in cities in India does not need any justification. 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. 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
- Institutional Arrangements and Accountability

Program to improve safety involves the following steps;

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

<sup>16</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport



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 will 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 should be provided by creating a Safety Board at State level with safety cells in cities 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. Also, a National Road Safety Commission at the central level needs to be set up to set standards and parameters for Road Safety in the country.

### 3.4 TRAINING

The important requirement in meeting the challenge is to provide skills to the city/state. Urban transport is made up of several components such as several private and public modes of transport, roads network and all associated infrastructure and other related activities such as multi-modal integration. Unfortunately the capability for undertaking a coordinated approach and a complete understanding of issues involved is lacking at the State Government and City level. There is an urgent need for capacity building; both at institutional and individual level.

For institutional strengthening NUTP has identified Institute of Urban Transport (IUT) at the Central Government level. Similar institutional strengthening should be undertaken by State Governments.

Individual capacity building should be in two parts; city officials and university educated professionals. The focus of training for existing city officials should be to develop awareness, skills and a deeper understanding of the requisite issues in urban transport. The focus of the education component should be to create a pool of skilled manpower to be available in the country for recruitment by various organizations engaged in urban transport. Alumni from such programs would be potential recruits for State Transport Corporations, State Transport Departments, Municipal bodies etc. Simultaneously State Governments should be encouraged to create jobs for such professionals.

The Ministry of Urban development, Government of India has already established four centers of excellence one each at IIT Delhi, IIT Chennai, CEPT Ahmedabad and NIT Warangal. Perhaps there is a need to set up more centers of excellence. These should be aided by incentives from the Ministry of Human Resources Development along with financial outlays from the Ministry of Urban Development for creation of new faculty positions and provision

of research scholarships, in order to ensure healthy growth of these centers. The curriculum in universities should be reviewed so that the professionals coming out have skills in tasks needed today such as planning and design of Bus rapid transit, facilities for NMT etc.

A concerted effort is needed to upgrade skills all round. With regard to skills, most planning is done by consulting agencies appointed by cities. It now appears that neither the consultants always have the desired level of skill in the assigned task nor do the cities have the necessary skills to supervise and monitor the work of the consultant. A compulsory system of certifying experts to handle specific tasks perhaps needs to be introduced. Capacity building is an ongoing need and hence should be institutionalized.

Accordingly MOUD has launched a comprehensive scheme for capacity building for urban transport. It involves the following 10 activities:

- Training
- Education; Development of curriculum and faculty development of academic Institutes
- Dissemination of information - Conferences and Journals
- Development of legal and administrative frameworks,
- Development of manuals, codes and standards,
- Development and strengthening of Institute of Urban Transport (India), a national level institute for, training, coordinating research and dissemination of information,
- Development of a National database,
- Promotion of National level consultancy organizations to provide a pool of professional manpower to assist State/city Governments,
- Setting up of institutions for the Research and Design; and safety certification of externally guided rail based transit systems and other new systems that may be developed for urban transport,
- Setting up of Unified Metropolitan Transport Authority (UMTA) and Urban Transport Cell in various mission cities.

For the training and skill building program to be beneficial, states should be mandated to immediately constitute a dedicated agency for urban transport in each city and at the state level, identify officials to be appointed to these agencies, send them for training and on return post them to these agencies/departments.

### 3.5 ACCESSIBILITY

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. 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.

The Constitution of India ensures equality, freedom, justice and dignity of all individuals and implicitly mandates an inclusive society for all including persons with disabilities. In the recent years, there have been vast and positive changes in the perception of the society towards persons with disabilities.

Also, Universal accessibility needs to be provided, by the urban transport systems, both at the systemic level and the Infrastructure level.

- Accessibility at systemic level implies that components of public transit systems like trains and buses, their stations and stops, the ticketing and any other user interfaces should be within reach of people with different types of impairments.
- At the infrastructure level, pedestrian paths and crossings, parking facilities and access to public land uses should be inclusive in their design for differently-abled persons.

*It has been realized that a majority of persons with disabilities can lead a better quality of life if they have equal opportunities and effective access to rehabilitation measures.*

Accessibility and mobility in cities can be improved through:

- Developing hierarchical road network in newly developing areas
- Completion of missing links including opening up of dead end roads for better utilization.
- To improve and maintain road surface to the highest standards with good drainage. To regulate and coordinate Work of utility agencies, since 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.

Accessibility should also include door to door planning for last mile connectivity as the norm. It should be done in terms of time, cost and convenience to commuter. Improved accessibility of stations/stops or the last mile connectivity should be a vital feature of public transport planning. It involves six main steps:<sup>17</sup>

- Footpaths for Walk and cycle lanes within about 500 m of stations/stops
- Road access for vehicles within about 3 km of stations/stops
- Feeder service within about 5 km of stations/stops
- Drop off & pick up facilities at stations/stops
- Park and ride facilities at stations/stops
- Land use control around stations/stops to avoid congestion at entry/exit

<sup>17</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport

### 3.6 USERS' NEEDS

The four major factors for designing access to pedestrian and public transport systems for all users are as follows:

- **Safety:** A Safety Board should be set up in each State to deal with safety issues in a comprehensive, scientific and a systematic manner. To establish an effective regulatory and enforcement mechanism will allow a level playing field for all operators of transport services and enhanced safety for the transport system users. It should be supported by relevant R&D. Rescue services should be organized for fast relief.
- **Comfort:** To improve the commuter travel time and comfort, provisions such as giving buses priority at the junctions, mandatory give way at bus ways, creating full day bus lanes, and using more energy efficient buses and trains should be enacted. Like in case of Singapore, 60% of the total motorized trips are made on the greener public transport; the government could not have achieved this share without providing a quality public transport as an alternate to the private vehicle. The government of Singapore provided choices of public transport, bus, including MRTS and light rail.
- **Accessibility:** The better transport provision is a key to improving accessibility to jobs, services, education and training opportunities and social networks. A standard measure of accessibility essential in determining areas most in need of improvement. Like in London the public transport accessibility level (PTAL) is calculated using the range, proximity and frequency of public transport services for any given location to score accessibility to the transport system at peak times.
- The provision of a more accessible transport system and improved transport connectivity and capacity is an important part of meeting this commitment. Fares have an important role to play in ensuring they make an adequate contribution towards the provision of services.

**Affordability:** Affordability is clearly an extremely important consideration in most of the developing countries. The impression is that public transport users are well aware of all the various ticket prices and the ticket differentials between the different services and operators. They are also clear about how it would impinge on their household budget. Those who are having the most difficulty are working people on low incomes who have to travel to work. Their travel costs can be a significant part of their take-home pay and they have no choice but to pay it. They are also financially penalized by restricted hours of service operation, which means that they may sometimes have to take a taxi or walk (Affordability of Public Transport in Developing Countries, World Bank, 2005)<sup>18</sup>

Talking about affordability passes and concessions are often important. Passes (often monthly) give significant savings to purchasers over purchasing single tickets, but may require up-front payment of the equivalent of some two-thirds to three-quarters of one month's supply of single tickets.

Personal mobility grows with income worldwide, but is accommodated in a variety of ways. If the availability of rapid transit (and basic bus services) is low, more growth in mobility will

<sup>18</sup> Affordability of Public Transport in Developing Countries by Robin Carruthers, Malise Dick and Anuja Saurkar, The World Bank Group, January 2005.

be handled by people buying and using cars or motorized 2-wheelers. If public transport services are more widely available and are of higher quality, with safe and attractive conditions for walking and cycling, fewer people will buy and use motor vehicles. Adapting the International Energy Agency (IEA) Mobility Model (MoMo), it was estimated these effects across 33 countries and regions covering the world

### 3.7 ENVIRONMENT

India is a large country with diversities across the region. Cities across the country have different characteristics and hence diverse problems of urban transport. There are no single set of solutions, which can be applied across the country. The demonstration projects implemented as part of the SUTP program of the Ministry of Urban Development has indicated that a same type of project can have varying impact on reducing CO<sub>2</sub> in the country. A study on “Review of Urban Transport in India” conducted by the Institute of Urban transport has revealed that the motorization rate is increasing rapidly and that any single initiative like public transport improvement, NMT improvement or ITS alone would reduce emissions, but would not give the desired results, therefore a combination of interventions are needed to bring about significant impact (refer Figure 11).

Note: Scenario 1 – Business as Usual Scenario, Scenario 2 - Promoting NMT, Scenario 3 - Promoting Public Transit Ridership, Scenario 4 - Clean Technology-focus on personal vehicles, Scenario 5 - Clean Technology- focus on electric traction for public transit (buses), Scenario 6 - Improving Urban Structure, Scenario 6A - Aggressive Urban Structure and Form Control and Scenario 7 - A multi-pronged approach (combination of scenarios 2, 3, 4,5 and 6A)

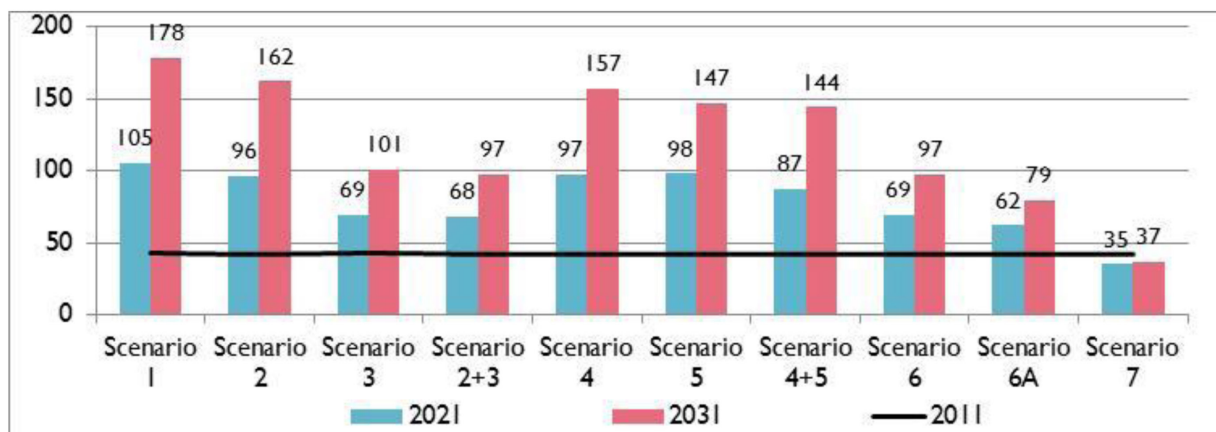


Figure 11: Annual Emissions –CO<sub>2</sub> (Million Metric Tonnes)

Source: Review of Urban Transport in India, institute of Urban Transport (India), 2014

Non Motorized Transport (NMT) i.e. walk, bicycle and cycle rickshaw modes are green modes of transport that belong to the low carbon path, do not consume energy or cause pollution and in addition provide social equity besides employment. Presently these modes are neglected in the planning process. Facilities for NMT i.e. footpaths and dedicated cycle lanes should be developed on priority. These should be citywide to assure the commuter that he can complete his journey all the way by walk or bicycle if he so chooses. Funds allocation for major transport infrastructure should be linked to achieving targets for creating facilities for NMT.



Vehicle efficiency improvements, regulation of fuel and vehicles, Vehicle emission standards, and the modernization of taxi, truck, bus and other commercial fleets generates exceptional economic returns. 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.

### 3.8 NEW BUSINESS MODELS AND AGGREGATORS

CMV Act 1988 was drafted when the technological advancement had not happened; due to which the Act had not considered the changes, which might be taking place in Passenger Transport sector in future. Today due to Technological advancement Business Models and their operating methods are changing at a very fast pace making a divide in Regulated traditional operators and Techno Transport companies. On one hand you have traditional Taxi and Bus Operators working under highly regulated environment and on the other hand you have new technology players like Ola and Uber flaunting all operating rules under the pretext of calling themselves as Technology providers. Globally this rift is widening, now it is high time that Governments take cognizance of these changes and make changes in their operating rules accordingly. Following are few of the suggestions.

- **Different Business Models** - A clear-cut differentiation needs to be made between "Transport Aggregator" and "Technology Aggregator". A company which aggregates Transporters and sells products under its own Brand should be called Transport Aggregator for e.g Ola and Uber ( Taxi aggregator) and A Company which sells services under the Brand of service providers by using technology should be called as Technology Aggregators for e.g Makemytrip, Redbus( Booking engines or OTA).
- **Different operating rules**- Transport Aggregator and Technology Aggregators shall be subjected to different operating rules as their roles & responsibilities are different. Transport Aggregator should be made equally responsible to follow CMV Rules along with vendors whereas in case of Technology Aggregator responsibility of following CMV Rules lies with actual service provider and responsibility of Technology Aggregator will be limited or restricted to deficiency in booking systems.
- **Shared responsibility**- In case of Transport Aggregators, passengers book services on their faith in the Company (brand) hence responsibility of deficiency in services has to be shared equally between the Company and Vendor.
- **Changing relationships**- Relationship between Servant and Master or Employee and Employer (Company) is slowly being replaced by a new relationship; that of a Company (Brand) and Vendor (Service provider). In such a scenario it is important to define their roles more clearly and then make commensurate operating rules.
- **Social benefit**- In Transport Aggregation Model; role of Employee is being replaced by Vendor, hence responsibility of providing social benefits to them should be given to the Company (Brand).
- **Safety issues** - In a Transport Aggregation Model where Vendor is individual owner, it is very much likely that in an over enthusiasm or out of sheer greed, he is likely to work more number of hours and get exhausted, which might cause safety hazard to not only his own life but even to other travellers. To avoid it this issues needs to be tackled very carefully.

- **Flexibility to choose technology** - While defining rules to provide technology it is important to have flexibility to choose from variety of technology solutions rather than having binding rule defining around available technology. It is important to state what desired results are expected from that technology rather than naming a specific technology for e.g instead of saying GPS or GPRS technology shall be used, Rules should state that any technology which allows to locate vehicle and transmit required data to the central server( Vehicle Locator Device).
- **Planning & Permits-** In India transport sector is regulated, by Central Motor Vehicle Act and Rules formed there under. Additionally Road transport being a state subject, State Government has its own Rules on the lines with CMV Act& Rules under which road transport of that particular State is regulated. CMV Act does not prescribe planning as a mandatory provision before issuance of operating Permits (Licenses to operate Commercial vehicles). There are mainly two types of Permits issued to Passenger vehicles
  - **Stage carriage Permit** : - Stage carriage permits are issued to vehicles plying as per given schedule on defined routes at defined time and stops with regulated fare structure. In many state these permits are Nationalised and are given only to Government or Semi Government agencies.
  - **Contract carriage Permit** :- All other Permits fall under the category of Contract Carriage Permits. From Autorikshaw , Taxi to Buses are operated under these permits.

Due to ambiguous nature of the definitions in CMV Act, there are many grey area of operations because of which Passenger transport in India is at chaotic situation. No process is defined or followed while permits are issued. Throughout the country Permit conditions are almost the same barring few variations. It is important to understand regional requirement before issuing local permits. Operating rules needs to be clearly defined so as to remove ambiguity in the minds of authority and operator. Schemes need to be designed and declared well in advance so as to increase awareness and participation amongst the users and service providers. Consideration to follow strict process should be given. Following are few steps in that direction.

- a. **Mandatory Planning** -In absence of any planning permits are issued by Regional Transport Authority on random basis creating imbalance in services wherein you have multiple operators competing with each other for penny war on some routes and no or deficient service on other routes. In case of State Transport Undertaking though services are planned by STU; it is done in isolation and not integrated with other service providers, creating unhealthy competition.  
**Solution:** Hence it is very important to Plan services well before issuing of Permits.
- b. **Diversity in Operating conditions** - India is very vast & diverse country in Climate, Geographical terrain, financial position & Culture of people. Since there are only two types of permits, most of the Operating rules are similar irrespective of situation of the region which may or may not suite particular type of operation required to fulfill transportation need of that region.  
**Solution:** Hence it is very important to have specific operating rules applicable to specific region or geography to fulfill their local transportation requirement.
- c. **Different Class of Services** - Requirement of transportation for Urban and Rural are different, Long distance and Short distance services need to have different type of vehicles and operating rules; due to very high diversity in financial condition of people

it is important to have variety of services starting from Ordinary to Super luxury which requires entirely different treatment and operating rules.

**Solution:** Hence it is important to have different Infrastructural development, Bus designs and operating rules catering to specific need of specific class of people.

- d. **Seamless Movement** - In a global economy it is very important that our country grows and becomes globally competent in attracting customers for India products. This will require industrialization to propel that growth and to facilitate this growth it is very important to have seamless movement of vehicles throughout the country. Transport being a State subject today it is challenging to have this seamless movement; as every state is looking after passenger transport as revenue generating source due to which interstate movement of vehicles is becoming cumbersome.

**Solution:** Hence to facilitate seamless Interstate Movement of vehicles, uniformity in taxation policy & operating rules is required.

- e. **Specific Operating Rules** - It is very important to have variety, clarity and uniformity in Operating rules for various class of services hence differentiation and classification of services on the basis of planning is required to ensure this Planning should be made mandatory similarly to achieve desired results making of schemes on the basis of variety and class of service requirement designing and declaration of Schemes must be made mandatory before issuing of permits.

## 4. Conclusion<sup>19</sup>

### CONCLUSIONS DERIVED FROM THE DELIBERATION ON THE URBAN TRANSPORT SCENE AS LISTED AS FOLLOWS:

- Urban transport scene in Indian cities, today, is headed in the wrong direction.
- The 'Business As Usual' Growth Scenario projected to 2030 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 (Rs 75000 to Rs 100,000 crores) are needed to build up urban transport infrastructure and services in cities to enable them to play their role in the desired economic growth of the country.

### RECOMMENDATIONS OF THE DOCUMENT FOR THE GOALS TO ACHIEVE THE VISION 2030 AS LISTED BELOW.

For augmentation of public transport following **goals** should be adopted:

- Organised city Bus service as per Urban bus specifications i.e VTS and PIS in all 1 lakh+ cities and state capitals;
- Add BRTS @ 20 km/1 Mn population in cities with pop. > 1 Mn;
- Cities with population >2 Mn to start planning rail transit projects, with 3 Mn to start construction. Estimated requirement 10 km per Mn;
- In existing mega cities, Metro rail to be expanded @ minimum 10 km per/year
- Suburban rail to be provided in urban agglomeration with population > 4 Mn

**Other Goals are:**

- Walk and cycle lanes to be provided in all 2 lakh+ cities and state capitals
- Creation of an effective institutional and Implementation framework as well as capacity building to manage projected investments
- Road network in all 2 lakh + cities to be completed with missing links and with good surface and effective drainage.
- Work of utility agencies to be regulated
- Safety, safety audit and security to be upgraded
- Technology to be used for integration, Enforcement and traffic management

<sup>19</sup> National Transport Development Policy Committee(NTDPC)-Working Group Report on Urban Transport

**ROLLING PROGRAM AND FINANCING STRATEGY NEEDS TO BE AS FOLLOWS:**

- The rolling program should be adopted as per annexure D
- Financing strategy should be based on consortium approach with the participation of Central and State Govt. / City Development Authorities, Property Developers, Private Sector, Debt from Multilateral / Bilateral institutions and Debt from domestic financial institutions contribute
- All forms of public transport should be treated as infrastructure and tax concessions extended to them
- Urban development funds should be set up at the city and National level
- Transit oriented development should be promoted
- Financing of buses, both capital and revenue should be placed on a firm footing

**INSTITUTIONAL FRAMEWORK FOR URBAN RAIL TRANSIT PROJECTS SHOULD BE:**

- A National Urban Rail Transit Authority under the Ministry of Urban Development, Government of India to help urban Rail transit projects
- An R&D Cell to be set up under the control of Ministry of Urban Development, Government of India
- Suburban Rail systems to be corporatized to become a part of the city transport system
- Technical control of Rail Transit projects should remain with the Ministry of Railways as per the current allocation of business rules.



## INSTITUTIONAL FRAMEWORK SHOULD BE CREATED AS FOLLOWS;

- A new department of Urban transport at the Centre under a full time secretary,
- A new department of urban transport in each state and union territory under a full time secretary including a 'Safety Board'
- Setting up MPC/DPC in cities as envisaged in the 74th constitutional amendment
- A dedicated unified metropolitan transport authority (UMTA) in million plus cities or for a group of small cities including traffic management and engineering cells
- Existing city agencies engaged in implementation and operation of UT related projects to continue with their present roles
- A Regulator

## CITIES SHOULD BE EMPOWERED TO TAKE CARE OF ITS URBAN TRANSPORT NEEDS AS FOLLOWS

- State should create a new State cadre of urban transport professionals to be posted to various cities and managed by the proposed urban transport department at the State headquarters.
- A comprehensive UT act to cover all aspects of urban transport should be enacted by the Central Government and States may draft rules under it as per its needs
- A policy on budgetary allocations, user charges and tapping other source of funds based on taxation of non-user beneficiaries, land development and vehicle taxation on the 'polluter pays principle' should be provided to the city.

City should have a three level **organizational set up** as follows;

- Metropolitan/District planning committee
- Dedicated authority for urban transport (UMTA)
- Other existing city agencies

## A CAPACITY BUILDING PROGRAM WITH THE FOLLOWING COMPONENTS SHOULD BE IMPLEMENTED;

- Training of city officials and other stakeholders to enable them to undertake small planning assignments and to supervise and monitor the work of the consultant,
- Institutional capacity building at the Central/State Govt. level
- A data base and knowledge management center
- Development of manuals, codes and standards for UT
- R & D to be organized and findings disseminated
- M techs and Ph.Ds should be generated by universities with appropriate curriculum. State Governments should create jobs to absorb these professionals

Steps initiated by the Ministry of Urban Development, Government of India for capacity building, setting up a knowledge management cum data base center, and organized R&D. are ongoing activities and should be institutionalized.