

REPORT
on
Study Tour on Transportation Planning
prepared by Members of Group I & Group II



Submitted by
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1. Background – Study Tour

The National Capital Region Planning Board was constituted under the National Capital Region Planning Board Act, 1985 with the concurrence of the State legislatures of the participating States of Haryana, Uttar Pradesh and Rajasthan, (Delhi being a Union Territory at that time). It has the mandate for preparation of a Plan for the development of the National Capital Region and for coordinating and monitoring the implementation of such plan and for evolving the harmonized policies for the control of land uses and development of infrastructure in the National Capital Region comprises an area of 33,578 square kilometers and covers eight districts of Haryana, five districts of Uttar Pradesh, one district of Rajasthan and the entire National Capital Territory of Delhi. The National Capital Region also has five Counter-magnet Areas outside the Region, namely, Hissar (Haryana), Bareilly (Uttar Pradesh), Kota (Rajasthan), Patiala (Punjab) and Gwalior (Madhya Pradesh).

NCR Planning Board prepared a Regional Plan with the perspective 2021 for the National Capital Region which was notified on 17.9.2005 for implementation. The Plan aims at *promoting growth and balanced development of the National Capital Region*. In this endeavor the effort is to harness the spread of the developmental impulse and agglomeration economies generated by Delhi. The above objective is sought to be achieved through:

- (i) By providing suitable economic base for future growth and by identification and development of regional settlements capable of absorbing the economic development impulse of Delhi.
- (ii) To provide efficient and economic rail and road based transportation networks (including mass transport systems) well integrated with the land use patterns.
- (iii) To minimize the adverse environmental impact that may occur in the process of development of the National Capital Region.
- (iv) To develop selected urban settlements with urban infrastructural facilities such as transport, power, communication, drinking water, sewerage, drainage etc. comparable with Delhi.
- (v) To provide a rational land use pattern in order to protect and preserve good agricultural land and utilize unproductive land for urban uses.
- (vi) To promote sustainable development in the Region to improve quality of life.
- (vii) To improve the efficiency of existing methods and adopt innovative methods of resource mobilization, and facilitate, attract and guide private investment in desired direction.

The thrust areas of the Regional Plan – 2021 are:

- Lays down Land Uses at the Regional level in terms of a harmonious pattern emerging from a careful examination of natural features including susceptibility to natural disasters and socio-economic activities.
- Proposes Development of Metro and Regional Centres as powerful growth nodes to attract major activities.
- Provide regional transport linkages and Mass Commuter System.
- Construction of peripheral expressways and orbital rail corridor around Delhi.
- Development of core urban infrastructure (transport, power, water supply, sewerage, drainage etc.) in NCR towns.
- Facilitate development of the region's economy through Model Industrial Estates, Special Economic Zones etc. outside NCT-Delhi.

The population of the National Capital Region in the year 2001 is about 371 lakhs. Sub-

regions of NCT-Delhi, Haryana, Rajasthan and Uttar Pradesh accommodated 37.33%, 23.42%, 8.07% and 31.19% of NCR's population respectively as indicated in the following table:

Sub-region wise Distribution of Population in NCR

Sub-region/ Year	Population (Person)			Decadal Growth Rate (%)		Share of Population (%)		
	1981	1991	2001	1981-1991	1991-2001	1981	1991	2001
1	2	3	4	5	6	7	8	9
NCT-Delhi	62,20,406	94,20,644	1,38,50,507	51.45	47.02	31.28	34.43	37.33
Haryana	49,38,541	66,43,604	86,87,050	34.53	30.76	24.84	24.28	23.42
Rajasthan	17,55,575	22,96,580	29,92,592	30.82	30.31	8.83	8.39	8.06
Uttar Pradesh	69,68,646	0,01,704	1,15,70,117	29.17	28.53	35.05	32.90	31.19
NCR	1,98,83,168	2,73,62,532	3,71,00,266	37.62	35.59	100.00	100.00	100.00

Source: Regional Plan-2021

Following table reveals that during the past two decades, the urban share in NCR has registered a higher growth rate as compared to its rural counterpart. The urban share increased from 45.87% in 1981 to 50.23% in 1991 and 56.39% in 2001:

Urban-Rural Components of Population in NCR (1981-2001)

Urban-Rural Component/ Year	Population (Person)			Percent share (%)		
	1981	1991	2001	1981	1991	2001
1	2	3	4	5	6	7
Total NCR	1,98,83,168	2,73,62,532	3,71,00,266	100.00	100.00	100.00
Urban NCR	91,20,172	1,37,44,784	2,09,20,074	45.87	50.23	56.39
Rural NCR	1,07,62,996	1,36,17,748	1,61,80,192	54.13	49.77	43.61
Urban NCR excluding NCT-Delhi	33,51,972	52,73,159	80,14,294	24.53	29.39	34.47

Source: Regional Plan-2021 for NCR

The population of NCR is projected to be 641.38 lakhs by 2021. The share of NCT-Delhi is projected to be 234.87 lakhs, while that of Haryana Sub-region: 160.16 lakhs, Rajasthan Sub-region: 48.06 lakhs and UP Sub-region: 198.29 lakhs by 2021. The percentage share of NCT-Delhi is expected to decrease from 37.33% in 2001 to 37% in 2011 and thereafter to 36.62% in 2021. In the case of Haryana Sub-region, the percentage share is projected to consistently increase from 23.42% in 2001 to 24.18% in 2011 and 24.97% in 2021, whereas in case of U.P., it may decline marginally from 31.19% in 2001 to 30.92% in 2021. The population projection for NCR for the year 2011 and 2021 is given in the following table:

Population projections of NCR and Sub-regions (in lakhs)

Year	NCR Total	NCT-Delhi		Haryana		Rajasthan		Uttar Pradesh	
		Population	% to total	Population	% to total	Population	% to total	Population	% to total
1	2	3	4	5	6	7	8	9	10
2001	371.00	138.50	37.33	86.87	23.42	29.92	8.07	115.70	31.19
2011	486.19	179.90	37.00	117.55	24.18	37.91	7.80	150.83	31.02
2021	641.38	234.87	36.62	160.16	24.97	48.06	7.49	198.29	30.92

Source: Regional Plan-2021 for NCR

The level of urbanization increased to 56.39% in the National Capital Region by the year 2001 and is expected to increase further. Looking into this aspect of urbanization, the Regional Plan-2021 emphasized the need for efficient & economic rail and road based transportation networks (including mass transport systems) well integrated with the land use patterns. In order to further elaborate the policies & proposals of the Regional Plan-2021 and to increase the mobility through efficient transport system in NCR which is a hub for production, consumption & distribution of goods & services within and outside NCR, the NCR Planning Board commissioned a study on 'Integrated Transportation Plan for National Capital Region' and awarded it to a Consultant [M/s Consulting Engineering Services (India) Pvt. Ltd.] with the approval of the PSMG-I.

It will focus on future transport demand on various existing transport corridors taking into account the traffic & travel characteristics, movement of goods, regional land use, deficiencies, issues of existing transport network, development of short-term, medium-term and long-term transport development plan etc. and prepare an 'Integrated Multi-modal Transportation Plan for the National Capital Region' which can cater to the growing transport demand at an acceptable level of service and identification of projects in the study including economical feasibility study for the said project. It will be a Functional Plan on Transport with a perspective of 2032 for the National Capital Region which is to be prepared which is to be prepared under Section 16 of the NCR Planning Board Act, 1985. The objectives of the Study are:

- To assess the level of utilization, potential and deficiencies in the present transportation system. Determining strengthening requirement of existing corridors and requirement of new rail and road corridors in NCR, particularly between Delhi and CNCR towns, Regional Centres, Metro Centres and among themselves.
- To study the existing regional road & rail network characteristics for passengers & goods traffic and discourage the transit of passengers & good vehicles through the core area of congested urban settlements.
- To select/develop and use a Regional Level Transporting Planning Model appropriate to the conditions and planning needs of NCR and develop alternative transport strategies, select the appropriate one and recommended short, medium and long-term comprehensive transport strategy for NCR up to the year 2032.
- To propose Integrated Multi-Modal Transportation System for NCR with a phased programme of its implementation up to the year 2032.
- To identify various projects.
- Capacity building of NCR Planning Board.

One of the components of the Study is Capacity Building of NCR Planning Board & constituent States through conducting overseas training/study tour for exposure and enhancement of knowledge in understanding various aspects and nitty-gritty involved in conceptualizing, developing and managing both institutional as well as operational mechanism for such large infrastructure facilities. Under this component, the consultant has organized professional training/study tour in Transport Planning, Management and implementation in the city/regions of comparable size in developed world.

Two Groups were constituted for this purpose comprising officers from the Ministry of Urban Development, NCR Planning Board & its participating States to visit and learn about various multi-modal Transportation Systems available and operating in the Developed Countries to know the best practices. Following cities/regions in developed countries were selected for overseas training/study tour where multi-modal transport systems are in existence:

- a) United States of America (USA): Baltimore, Boston, Chicago, New York, New Jersey and Washington
- b) European Union (EU): Frankfurt [Germany], Madrid [Spain] and Paris [France]
- c) United Kingdom (UK): London

Group I headed by Director (DD), Ministry of Urban Development, visited cities/regions at New York, New Jersey and Boston in USA, London in United Kingdom, Paris in France and Frankfurt in Germany and Group II headed by the Member Secretary, NCR Planning Board visited cities/regions at Madrid in Spain and Washington, Baltimore and Chicago in USA.

2. Objective of the Tour

In transport sector, large numbers of people are involved at different levels for its formulation and project/programme implementation in the entire process from Planning to Development till its actual Operation & Management.

Process of capacity building is a tool to widen the vision of individuals, to expose & give an overview to accommodate the wider, diverse and varied interests amongst people working within an organization and in different organizations. It is important to identify relevant and appropriate training and properly imparting it to each group and enhance their capability to discharge their assigned roles & duties efficiently and effectively.

Understanding the requirement, the training program was evolved with a focus to enable learning about the institutional mechanism, organizational structure and operational management of the agencies in each city/region responsible for smooth functioning of different public transport modes such as Metro, Commuter Rail, Urban Bus Systems and Sub-urban systems. The thrust of the training was to learn about the experiences while developing public transportation system in developed countries since mass transportation facilities for National Capital Region especially, sub-urban system are feeble and is considered as one of the constraint in achieving the goals of NCR Planning Board and objectives of the Regional Plan-2021 for NCR as a whole. Accordingly, keeping the above facts in mind, the overseas training /study tour was proposed with following objectives:

- i. Study various public transport systems, their institutional arrangements and operational challenges including financial sustainability.
- ii. Broadening the vision of the officers and enabling them to plan an appropriate Mass Commuter system for NCR based on its need & characteristics and adopt the best practices.

Places visited by Group-I



Members of Group-I

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3. Transport System available in Developed Countries – City wise details

During the tour the aim was to study the various Public Transport Systems/Mass Commuter Systems that exist in with a focus to learn institutional mechanism and operational challenges including financial sustainability. Various transport modes that were seen city/region-wise during the tour are detailed out below. The information is presented at large in following pattern:

- I. Cities/regions visited by Groups I
 - II. Cities/regions visited by Groups II
- For each city/region
- i) Overview of the city/region
 - ii) Public Transport Systems and their functioning & operation including financing
 - iii) Other features

I. Cities/regions visited by Group I

Under the Study tour, Group I visited and studied the public transport systems in cities/regions at New York, New Jersey and Boston in USA, London in United Kingdom and Frankfurt in Germany.

a) New York, USA

Overview of the city/region

New York is a state in the Mid-Atlantic and Northeastern regions of United States. It is the the third most populous state of USA. The adjoining states are Vermont, Massachusetts, Connecticut, New Jersey, and Pennsylvania. It also has an international border with the Canadian provinces of Quebec and Ontario. New York is the third largest state in population after California and Texas, with an estimated population of 19,306,183. In spite of the open land in the state, 92% of population lives in urban area.



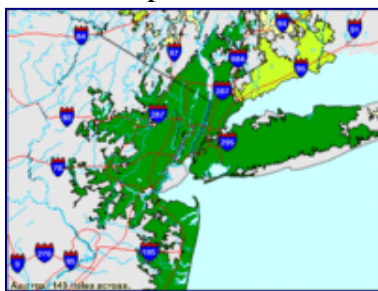
New York City, the largest city in United States, is known as a gateway for immigration to the United States. It is also famous as financial, cultural, transportation, and manufacturing center. It was named after the 17th century Duke of York, James Stuart, future James II and VII of England and Scotland. New York city consists of five boroughs (counties) the Bronx, New York (Manhattan), Queens, Kings (Brooklyn) and Richmond (Staten Island). New York City is home to more than two-fifths of the state's population. Four of New York City's five boroughs are on the three islands at the mouth of the Hudson River: Manhattan Island, Staten Island, and Brooklyn and Queens on Long Island. The Hudson River flows through the Hudson Valley into New York Bay. The Hudson river separates the city from New Jersey. The East River, actually a tidal strait, flows from Long Island Sound and separates the Bronx and Manhattan from Long Island. The Harlem river, another tidal strait between the East and Hudson Rivers, separates Manhattan from the Bronx.



New York is 13th largest city of the world with a population of 82,50,567 and an area of 1,214.4 sq. kms. The gross density is 67,96 persons per sq.kms and the net city density is 10,502 persons per sq. kms. This is comparable with gross density of our National Capital Territory of Delhi which has an estimated population of about 170 lakhs in 2008. The gross density of NCT-Delhi is 11,463 persons per sq. kms. The modern City of New York was formed with the consolidation of Brooklyn, the County of New York, the County of Richmond, and the western portion of the County of Queens. The opening of the New York City Subway in 1904 helped in binding the city together.

New York city & its Sub-way System

The metropolitan area is defined by the United States Census Bureau as the New York-



Northern New Jersey-Long Island, NY-NJ-PA Metropolitan Statistical Area (MSA), with an estimated population of 18,815,988 as of 2007. This wider region includes the largest city in the United States (New York), the five largest cities in New Jersey (Newark, Jersey City, Elizabeth, Paterson, and Trenton) and the two largest cities in Connecticut (Bridgeport and New Haven). The total land area of the extended metropolitan area is 30,671 sq. kms.

New York Metropolitan Area

Despite New York's reliance on rail based public transit, roads are a defining feature of the city. Manhattan's street grid plan greatly influenced the city's physical development. There are twelve avenues that run parallel to the Hudson River, and 220 numbered streets that run perpendicular to the river.

It has already been stated that city is divided into islands and hence several bridges and tunnels have been constructed to connect the different parts. New York has several world famous bridges and tunnels to connect the different parts of city situated on several islands. Brooklyn Bridge is one of the city's most recognized architectural structures. The Brooklyn Bridge's main span is 1,596 foot and 6 inches, and was the longest in the world when it was completed. The Williamsburg Bridge and Manhattan Bridge are other two in the trio of architecturally-notable East River crossings. The Queensboro Bridge, which links Manhattan and Queens, is an important piece of cantilever bridge design. The borough of Staten Island is connected to Brooklyn through the Verrazano-Narrows Bridge. The towers of the Verrazano, which rise 650 foot above the water, are 4,260 foot apart; these towers are far away enough from each other, due to the length of the main span, that there is a $1\frac{3}{8}$ inches (34 mm) displacement between the theoretical position of the side at the top of the tower, and the actual position, due to the Earth's curvature.



Brooklyn Bridge

New York has historically been a pioneer in tunnel construction. The Lincoln Tunnel, which carries 120,000 vehicles per day under the Hudson River between New Jersey and Manhattan, is the world's busiest vehicular tunnel. The Holland Tunnel, also under the Hudson River, was the first mechanically ventilated vehicular tunnel in the world. Two other

notable tunnels connect Manhattan to other places; one is the Queens Midtown Tunnel, and the other the Brooklyn-Battery Tunnel. The Brooklyn-Battery Tunnel is the longest underwater tunnel in North America. The city has extensive network of expressways includes four primary Interstate Highways: I-78, I-80, I-87 and I-95. I-278. The Long Island Expressway begins at the Queens Midtown Tunnel and runs through the heart of Queens east into the Long Island suburbs.

Queens Midtown Tunnel

There are limited-access parkways, which were designed from the outset to carry only cars. The FDR Drive and Harlem River Drive are two such routes through Manhattan. The Henry Hudson Parkway, the Bronx River Parkway and the Hutchinson River Parkway link the Bronx to nearby Westchester County and its parkways. The Grand Central Parkway and Belt Parkway provide similar functions for Long Island's parkway system.



Public Transport Systems and their functioning & operation including financing

Public transit is overwhelmingly the dominant form of travel in New York. About one in every three users is of mass transit in the United States and two-thirds of the nation's rail riders live in New York and its suburbs. This is in contrast to the rest of the country, where about 90% of commuters drive automobiles to their workplace. New York is the only city in the United States where more than half of households do not own a car. According to the US Census Bureau, New York City residents spend on an average of about one full week an year getting to work (an average of 38.4 minutes per day).

Rush hours in Manhattan

The transportation system of New York City is a cooperation of complex systems of infrastructure. The transportation system includes the largest subway system in the world. New York City is distinguished from other cities in the United States because of its significant use and dependency on public transportation.



Around 48% of New Yorkers own cars, yet fewer than 30% use them to commute to work. People find public transportation cheaper and more convenient, due to traffic congestion which also slows cars. To ease traffic, the Mayor in 2007 proposed congestion pricing for motor vehicles entering Manhattan's business district from 6:00 a.m. to 6:00 p.m. Traffic on highways at the edge of the area would not be charged. Transit buses, emergency vehicles, taxis and for-hire vehicles, and vehicles with handicapped license plates, are exempted. Congestion Charge is payable only once per day by any vehicle.

In New York, there are several agencies engaged in providing the transport service to the people. The New York Metropolitan Transportation Council (NYMTC) serves as the federally designated Metropolitan Planning Organization (MPO) for New York city, Long Island, Lower Hudson Valley counties of Putnam, Rockland and Westchester. The Council is responsible to facilitate a metropolitan transportation planning process for the area.

NYMTC is the regional council of governments whose job it is to plan for and make decisions on spending money regionally to build and maintain transit systems, highways, bridges, roads and other surface transportation. NYMTC's mission is developing a shared

regional transportation on the basis of a sophisticated capacity for data collection, reporting and analysis further the ability to draw together planning organizations, stakeholders and the public in project activities of all types.

To ensure that transportation funding is allocated effectively in order to improve mobility, support economic progress and protect the environment, Metropolitan Planning Organizations have been formed throughout the country. NYMTC is the designated Metropolitan Planning Organization for New York region. It is primarily funded by the U.S. Department of Transportation Federal Highway Administration and Federal Transit Administration and by New York State and local government.

NYMTC studies existing transportation networks, forecasts future needs and pools the planning activities of its member agencies to develop a shared strategic vision for transportation in the region. It produces several key products used to guide the development, maintenance and funding of transportation projects in the region which includes Regional Transportation Plan (The Plan), Unified Planning Work Program (UPWP) and Transportation Improvement Program (TIP).

Every five years NYMTC prepares a policy document of Transportation Plan wherein the funding pattern is also shown. NYMTC also manages planning studies in collaboration with member agencies in the region and hosts sessions in which members discuss issues and create solutions.

Metropolitan Transportation Authority is the major agency responsible for providing and running the transportation facility in New York. The agency owns most of the transportation system. MTA decides the fare and also selects the agency to run the services on a particular route. The service provider is a contractor and provides the services as per the specifications fix by MTA. The profit or loss is to be borne by MTA. The service provides gets the payment as per the contract.

Transportation System of New York City	
Region	New York City and the surrounding region in New York State, New Jersey, Connecticut and Pennsylvania
Transit type	Rapid transit, commuter rail, buses, private automobile, ferry, Taxicab, bicycle, pedestrian
Rider ship	More than ten million commuters daily
Owner	Metropolitan Transportation Authority, Port Authority of New York and New Jersey, local states for highways and the federal government for interstates, highways.
Operator	Metropolitan Transportation Authority, Long Island Railroad, Port Authority Trans-Hudson, Metro-North Commuter Railroad Company, New Jersey Transit, New York City Taxi and Limousine Commission, New York Waterway, New York Water Taxi.

The funding pattern for New York Metropolitan Transportation Council (NYMTC) is in the ratio of 80:20 from Federal Government of USA and rest of shareholders of the company (State Government, Local bodies). The Metropolitan Transport Authority who runs the public transport for New York recovers about 50% of operation and maintenance cost from fare collection. Other sources of fund are Federal funds maximum up to the limit of 50%, State funds, Local COLLECTIONS from taxes, lease rent etc. and borrowings in the form of

bonds against revenue.

Among the funding sources for transportation projects is federal support provided through the Transportation Equity Act of the 21st Century (TEA-21) for infrastructure renewal and network expansion. State and local resources also support transportation system projects in the NYMTC region. Local funds are provided by Metropolitan Transportation Authority, New York State Thruway Authority and Port Authority of New York/New Jersey as well as local counties and municipalities. Also, resources other than federal, state and local have been used to fund transportation projects in the past and can be expected to do so in the future. An example is the use of bridge and tunnel toll revenue to support the sale of bonds for financing transportation projects.

The federal government funds only those projects that are identified on the region's five-year Transportation Improvement Program (TIP) or in the 20 year Regional Transportation Plan (RTP). The TIP is consistent with the Plan and is fiscally constrained with reasonable estimates of project costs balanced against anticipated funding. The TIP is a multimodal program of bridge, bikeway, pedestrian, transit, highway, safety and demand management projects. NYMTC's adoption of the TIP assures Federal officials that NYMTC's members have agreed on priorities for the region. Additionally, NYMTC issues a Unified Planning Work Program (UPWP) which lists all of the studies on transportation and air quality planning activities that will be undertaken by the NYMTC staff, member agencies and regional transportation planning agencies in the coming year. Several proposals for expanding the New York City transit system are in various stages of discussion, planning, or initial funding which includes following:

- § In January 2007, the Port Authority approved Plans for \$78.5 million purchase of a lease of Stewart Airport in Newburgh, New York as a 4th major airport for the area.
- § PATH World Trade Center station, whose construction began in late 2005, will replace the temporary PATH terminal that replaced the one destroyed in the September 11, 2001 attacks. This new central terminal, will allow easy transfer between the PATH system, several subway lines. It is expected to serve 250,000 commuters daily.
- § Fulton Street Transit Center, a \$750 million project in Lower Manhattan will improve access and connections between 12 subway lines, PATH service and the World Trade Center site. Construction began in 2005 and will be finished in 2008.
- § Moynihan Station would expand Penn Station into the James Farley Post Office building across the street. The project is in the design phase.
- § Second Avenue Subway, a new north-south line, first proposed in 1929, would run from 125th Street in Harlem to Hanover Square in lower Manhattan. The project is scheduled to be finished by 2013.
- § East Side Access project will route some Long Island Rail Road (LIRR) Trains to Grand Central Terminal instead of Penn Station. Many LIRR commuters work on the east side of Manhattan, many within walking distance of Grand Central. This project will save travel time and reduce congestion at Penn Station and on subway lines connecting it with the east side. It will also greatly expand the hourly capacity of the LIRR system. Project completion is scheduled for 2013.
- § Trans-Hudson Express Tunnel would add a second pair of railroad tracks under the Hudson River, connecting an expanded Penn Station to NJ Transit lines. This project has been approved, and is slated to begin construction in 2009, with completion in 2016 at the earliest.

Rail

Sub-way

The most dominant mode of urban mass transport in New York City is rail, popularly known as “Sub-way”. Extensive use of sub-way is reflected by the fact that only 6% of shopping trips in Manhattan's Central Business District involve the use of a car. Several government agencies and private corporations manage the various components of the system. The largest and most important is the Metropolitan

New York City Sub-way



Transportation Authority (MTA), a public benefit corporation which runs all of the city's subways and buses and two of its three commuter rail networks. Ridership in the city increased 36% to 2.2 billion annual riders from 1995 to 2005. Average weekday subway ridership was 5.076 million in September 2006, while combined subway and bus ridership on an average weekday that month was 7.61 million.

The New York City Sub-way is the largest rapid transit system in the world when measured by track mileage (1,056 km of mainline track), and the fourth-largest when measured by annual ridership (1.4 billion passenger trips in 2005). It is the second-oldest subway system in the United States after the rapid transit system in Boston. Life in New York City is dependent on the sub-way systems and is in service almost for 24 hours. The city's 26 sub-way lines run through all boroughs except Staten Island, which is served by the Staten Island Railway.

Subway riders pay with the MetroCard, which is also valid on all other rapid transit systems and buses in the city. The MetroCard has completely replaced tokens, which were used in the past, to pay fares. Fares are loaded electronically on the card.

The Port Authority Trans-Hudson (PATH) is a subway system that links Manhattan, in New York State, to Jersey City, Hoboken, Harrison, and Newark, in New Jersey State. The primary transit link between Manhattan and New Jersey, PATH carries 240,000 passengers each weekday. The PATH system spans 22.2 km of route mileage (Excluding track overlap). Like the New York City Subway, PATH also operates 24 hours a day. It was opened in 1908 as the Hudson and Manhattan Railroad, a privately owned corporation. Since 1962, PATH has been operated by the Port Authority of New York and New Jersey. Kennedy and Newark airports are connected by rail systems. AirTrain JFK is an 13 km rapid transit system that connects Kennedy to New York's subway and commuter rail network in Queens. It also provides free transit between airport terminals. For trips beyond the airport the train costs \$5. Roughly 4 million people used the AirTrain to and from Kennedy in 2006, an increase of about 15% over 2005. AirTrain Newark is a 3 km monorail system connecting Newark's three terminals to commuter and intercity trains running on the Northeast Corridor rail line.

Grand Central Terminal – Rail Station

Commuter rail

Commuter Rail System refers to the train facility for the daily commuters beyond city boundaries. For New York the commuter rail system covers three States i.e. New York, New Jersey and Connecticut. New York City's commuter rail system has about 250 stations and 20 rail lines serving more than 150 million commuters annually in the tri-state region. Commuter rail service from the suburbs is operated by two agencies. The MTA operates the Long Island Rail Road



on Long Island and the Metro-North Railroad in the Hudson Valley and Connecticut. New Jersey Transit operates the rail network on the New Jersey side of the Hudson River. These rail systems converge at the two busiest train stations in the United States, Penn Station and Grand Central Terminal, both in Manhattan.

Inter-city Rail

Intercity train service from New York City is provided by Amtrak. 54 trains run each day on New York to Philadelphia route. For trips of less than 500 miles Amtrak is often cheaper and faster than air travel. Amtrak accounts for 47% of all non-automobile intercity trips between New York and Washington, D.C. and about 14% of all intercity trips between those cities. Amtrak's high-speed Acela trains run from New York to Boston and Washington, D.C. using tilting technology and fast electric locomotives. This route, known as the Northeast Corridor, accounts for about half of Amtrak's total national ridership.

New York City's Penn Station is the busiest Amtrak station in the United States by annual boardings. In 2004 it saw 4.4 million passenger boardings, more than double the next busiest station, Union Station in Washington, D.C.

Bus

Commuter Buses

After trains the second preferred mode of mass commuter system is Bus. New York City's bus network is extensive, with approximately 5,800 buses carrying about 2.01 million passengers every day on more than 200 local routes and 30 express routes. Buses owned by MTA account for 80% of the city's surface mass transit. New York City has the largest clean air diesel-hybrid and compressed natural gas bus fleet in the United States.

Orion VII Hybrid Bus



Buses are labeled with a number and a prefix identifying the primary borough (B for Brooklyn, Bx for the Bronx, M for Manhattan, Q for Queens, and S for Staten Island). Express buses use the letter "x" rather than a borough label.

The Port Authority Bus Terminal, near Times Square, is the busiest bus station in the United States and the main gateway for interstate buses into New York City. The terminal serves both commuter routes, mainly operated by New Jersey Transit, and national routes operated by companies such as Greyhound and Peter Pan.

Cycle rickshaw in Manhattan

Other features

Pedestrians and Bicycles

Utility cycling is a growing mode of transport in New York City. An estimated 120,000 city residents travel to work by bicycle and make 400,000 trips each day equivalent to the number of the ten most popular bus routes in the city. The city has 420 miles of bike lanes (as of 2005) and has in recent years expanded protected bike lanes on major thoroughfares and on bridges across the East River. As part of Plan NYC 2030, bike lanes will be added at a rate of about 100 miles per year until 2010 and 1,800 miles should be completed by 2030. More than 500 people annually work as bicycle rickshaw drivers, who in



2005 handled one million passengers. However, the City Council recently voted to curtail and license pedicab drivers, and will only allow 325 pedicab licenses.

Walk and bicycle modes of travel account for 21% of all modes for trips in the city; nationally the rate for metro regions is about 8%. In 2000 New York had the largest number of walking commuters among large American cities in both total number and as a proportion of all commuters: 517,290, or 5.6%. By way of comparison, the next city with the largest proportion of walking commuters, Boston, had 119,294 commuter pedestrians, amounting to 4.1% of that city's commuters.

Semi-formal Public Transport

New York has several semi-formal public transportation, including "dollar vans" and "Chinese vans." Dollar vans serve major corridors in Brooklyn, Queens and the Bronx that lack adequate subway service. In 2006, the New York City Council initiated a regulation in this regard. It also required all dollar vans to be painted in a specific color to make them easier to recognize. The vans pick up and drop off anywhere along a route, and payment is made at the end of a trip.



Ticket window of a Chinatown bus company

Similar to dollar vans, Chinese vans serve predominantly Chinese and other East Asian communities in Brooklyn's Chinatown, Manhattan's Chinatown, Elmhurst and Flushing. There are also Chinatown bus lines operating routes from New York City's Chinatowns to other Chinatowns in the Northeast, with frequent service to major cities like Boston and Philadelphia. These bus companies use full-size coaches and offer fares much lower than other carriers like Greyhound.

Taxis

There are 13,087 taxis operating in New York City, excluding over 40,000 other for-hire vehicles. The distinctive yellow paint has made them New York icons. Taxicabs are operated by private companies and licensed by the New York City Taxi and Limousine Commission. "Medallion taxis", the yellow cabs, are the only vehicles in the city permitted to pick up passengers in response to a street hail. Fares begin at US\$2.50 (US\$3.00 after 8:00pm, and US\$3.50 during the peak weekday hours of 4:00pm to 8:00pm) and increase based on the distance traveled and time spent in slow traffic. The passenger also pays the toll tax payable by taxi during its journey. 241 million passengers rode in New York taxis in 1999. According to the 2000 U.S. Census, there are 42,000 cab drivers in New York.



New York Taxi

In 2005, New York introduced incentives to replace yellow cabs with electric hybrid vehicles. Further in May 2007, New York City Mayor proposed a five-year plan to switch New York City's taxicabs to more fuel-efficient hybrid vehicles as part of an agenda for New York City to reduce greenhouse gas emission.

Ferries

The New York city development covers habitation on several islands. The easiest way to connect them is through Ferry Service. Due to environmental considerations construction of Jetties are limited. However, there are several ferry services connecting the islands of New

York City among themselves and with the Jersey City which is situated across Hudson River. The busiest ferry in the United States is the Staten Island Ferry, which annually carries over 19 million passengers on its 8.4 km service between Staten Island and Lower Manhattan. Service is provided 24 hours a day, 365 days a year, and takes approximately 25 minutes each way. Each day approximately five boats transport almost 65,000 passengers in 104 trips. The Ferry service is free of charge since 1997. Vehicles have not been allowed on the Ferry since the September 11, 2001 terrorist attacks. Bicycles are allowed for free. The ferry ride provides excellent views of the Lower Manhattan skyline and the Statue of Liberty.

Major privately run ferry companies include NY Waterway, which operates several routes from New Jersey to Manhattan; SeaStreak, which provides service from Monmouth County, New Jersey to Manhattan; and New York Water Taxi, which connects Brooklyn and Queens to Manhattan.



Staten Island Ferry

Port Infrastructure

Airports

New York City is the top international air passenger gateway to the United States. 100 million travelers used the city's airports in 2005; New York is the busiest air gateway in the nation. The city is served by three major airports namely, John F. Kennedy International (also known as JFK), Newark Liberty International, and LaGuardia. JFK and Newark both connect to regional rail systems by a light rail service. JFK and Newark serve long-haul domestic and international flights. The two airports' outbound international travel accounted for about a quarter of all U.S. travelers who went overseas in 2004. LaGuardia caters to short-haul and domestic destinations.

JFK is the major entry point for international arrivals in the United States. About 100 airlines from more than 50 countries operate direct flights to JFK. The airport is located along Jamaica Bay near Howard Beach, Queens, about 12 miles east of downtown Manhattan. Newark was the first major airport serving New York City and is the fifth busiest international air gateway to the United States. The airport is located in Newark, New Jersey, about 12 miles west of downtown Manhattan. LaGuardia, the smallest of New York's primary airports, handles domestic flights. The airport is located in northern Queens about 6 miles from downtown Manhattan. Manhattan has three public heliports, used mostly by business travelers. A regularly-scheduled helicopter service operates flights to JFK Airport from the Downtown Manhattan Heliport, located at the eastern end of Wall Street.

Seaports

At New York Harbor, each year, more than 25 million tons of oceanborne general cargo moves through New York. In 2005 more than 5,300 ships delivered goods to the port that went to 35% of the U.S. population. The port is experiencing rapid growth. There are three cargo terminals and a passenger terminal on the New York City side of the harbor, including the Howland Hook Marine Terminal, Red Hook Container Terminal, Brooklyn Marine Terminal, and New York Cruise Terminal; three additional cargo terminals are on the New Jersey side.

The Port of New York is also a major hub for passenger ships. More than half a million people depart annually from Manhattan's cruise ship terminal on the Hudson River,

accounting for five percent of the worldwide cruise industry and employing 21,000 residents in the city. The Queen Mary 2, the world's second largest passenger ship and one of the few traditional ocean liners still in service, was designed specifically to fit under the Verrazano Bridge, the longest suspension bridge in the United States. The Queen Mary 2 makes regular ports of call on her transatlantic runs from Southampton, England. A new cruise ship terminal is under construction in Red Hook, Brooklyn.

Port Newark-Elizabeth Marine Terminal operated by the Port Authority of New York and New Jersey, is the largest port complex on the East Coast. \$114.54 billion of cargo passed through this Port in 2004. The top five trading partners at this port are China, Italy, Germany, Brazil and India.

b) New Jersey, USA

Overview of the city/region

New Jersey is a state in the Mid-Atlantic and Northeastern regions of the United States. It is bordered on the north by New York, on the east by the Atlantic Ocean, on the southwest by Delaware, and on the west by Pennsylvania. Parts of New Jersey lie within the sprawling metropolitan areas of New York and Philadelphia. The State's name was taken from the largest of the English Channel Islands, Jersey. As of 2008, New Jersey had more millionaire residents than any other state in USA. New Jersey consists of 21 counties(please refer the map). The New Jersey Commerce, Economic Growth, & Tourism Commission divides the state into six distinct regions. The regions are:

- Gateway Region, encompassing Hudson County, Essex County, Union County, Middlesex County, Bergen County, and Passaic County.
- Skylands Region, encompassing Sussex County, Morris County, Warren County, Hunterdon County, and Somerset County.
- Shore Region, encompassing Monmouth County and Ocean County.
- Delaware River Region, encompassing Mercer County, Burlington County, Camden County, Gloucester County, and Salem County.
- Greater Atlantic City Region, encompassing Atlantic County.
- Southern Shore Region, encompassing Cumberland County and Cape May County.



Map of The New Jersey State

New Jersey is connected to New York City via various bridges and tunnels. The George Washington Bridge carries one of the heaviest loads of traffic from New Jersey to the Washington Heights in Upper Manhattan. The Lincoln Tunnel connects to Midtown Manhattan and the Holland Tunnel connects to Lower Manhattan. These are the three major Hudson River crossings that see heavy vehicular traffic.

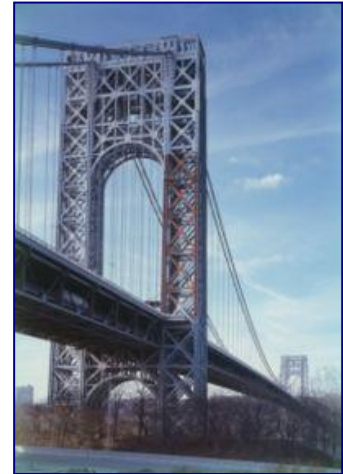
New Jersey is also connected to Staten Island by three bridges, namely the Outerbridge Crossing, Goethals Bridge, and Bayonne Bridge. The Goethals Bridge also provides a route

from New Jersey to Brooklyn, New York.

In New Jersey other expressways are the Atlantic City Expressway, the Palisades Interstate Parkway, Interstate 76, Interstate 78, Interstate 80, Interstate 195, Interstate 280, Interstate 287, and Interstate 295.

New Jersey has interstate agreement with all three neighboring states. The Port Authority of New York and New Jersey, the Delaware River Port Authority (with Pennsylvania), and the Delaware River and Bay Authority (with Delaware) operate several transportation routes into and out of New Jersey. Bridge tolls are collected in one direction only — it is free to cross into New Jersey, but motorists must pay when exiting the state. Exceptions to this are the Dingman's Ferry Bridge and the Delaware River-Turnpike Toll Bridge where tolls are charged both ways. The toll free bridges are Scudders Falls (on I-95) bridges near Trenton, as well as Trenton's Calhoun Street and Bridge Street bridges.

George Washington Bridge



Public Transport Systems and their functioning & operation including financing

New Jersey Transit Corporation popularly known as NJ Transit is the agency responsible to provide safe, reliable, convenient and cost effective transit services to the residents of New Jersey. This is the third largest public transportation system in United States behind New York's MTA and Chicago's RTA. The company was created with the enactment of Public Transportation Act in 1979 which empowers to "Acquire, Operate and Contract for transportations service in the public interest." The New Jersey Transit Corporation (NJ Transit) operates rail and bus service throughout the state. NJ Transit is a state-run corporation that began with the consolidation of several private bus companies in North Jersey.

NJ Transit is able to recover only 50% of operation and maintenance cost through its internal collections i.e. fare box collection and rent, lease etc. The other sources of funding are grant from Federal Government, State Budget, Subsidies and taxes etc.

NJ Transit

In the early 1980s, it acquired the commuter train operations of Conrail that connect towns in northern and central New Jersey to New York City. NJ Transit has eleven lines that run throughout different parts of the state. Most of the trains start at various points in the state and most end at either Pennsylvania Station, in New York City, or Hoboken Terminal in Hoboken. NJ Transit began service between Atlantic City and Lindenwold in 1989 and extended it to Philadelphia, Pennsylvania, in the 1990s.

NJ Transit also operates three light rail systems in the state. The Newark City Subway is the only subway system in the state. Its Main Line connects Newark Penn Station with Grove Street station in Bloomfield. The Broad Street Line of the subway, the first component of the Newark-Elizabeth Rail Link, opened in the summer of 2006. The PATH links North Jersey and New York City. The PATH operates four lines that connect various points in North Jersey and New York. The lines all start in either Hudson County or Essex County, New Jersey and end either at the World Trade Center station or at 33rd Street in Midtown

Manhattan.

AirTrain Newark is a monorail connecting the Amtrak/NJ Transit station on the Northeast Corridor to the airport's terminals and parking lots. Some private bus carriers still remain in New Jersey. Most of these carriers operate with state funding to offset losses and state owned buses are provided to these carriers . Other carriers include private charter and tour bus operators.

NJT trains at terminal



Inter-city Rail

The PATCO High Speedline links Camden County and Philadelphia. PATCO operates a single elevated and subway line that runs from Lindenwold to Center City Philadelphia. Amtrak also operates numerous long-distance passenger trains in New Jersey to and from neighboring states and around the country. In addition to the Newark Airport connection, other major Amtrak railway stations include Trenton Rail Station, Metropark, and the grand historic Newark Penn Station.

Private bus carriers

Several private bus lines provide transportation service in the state of New Jersey which are:

- § Academy--commuter bus service from Burlington, Middlesex, Monmouth, and Ocean counties to lower and midtown Manhattan
- § Bergen Avenue IBOA--local bus service in Jersey City
- § Broadway Bus--local bus service in Bayonne
- § Coach USA
 - Community Coach--commuter bus service from Essex and Morris counties
 - ONE Bus/Olympia Trails--local bus service in Essex and Union counties, commuter bus service from the Raritan Valley to Manhattan
 - Red & Tan in Hudson County--local bus service in Hudson County
 - Rockland Coaches--commuter and local bus service from Bergen County to Manhattan
 - Suburban Trails--commuter bus service from Middlesex County to Manhattan, local bus service in Middlesex County
- § DeCamp Bus Lines--commuter bus service from Essex County to Manhattan
- § Greyhound--interstate bus service from terminals in Newark, Atlantic City, and Mount Laurel
- § Lakeland Bus Lines--commuter and local bus service from Morris, Somerset, Union, and Sussex counties to Manhattan
- § Martz Trailways--service from Warren County to Manhattan
- § Montgomery & West Side IBOA--local bus service in Jersey City
- § Trans-Bridge Lines--service from the Skylands Region to and from Manhattan

Other features

Ferries

There are many ferry services that operate in New Jersey. On the Delaware Bay, the Delaware River and Bay Authority operates the Cape May-Lewes Ferry. It also operates ferries between Fort Mott in New Jersey and Fort Delaware and Fort DuPont in Delaware. On

the Hudson River, New York Waterway has numerous ferry terminals in Belford, Jersey City, Hoboken and Weehawken. The stops are at Port Liberte, Liberty Harbor, Colgate/Exchange Place in Jersey City, Belford, Port Imperial and Lincoln Harbor in Weehawken, Hoboken Terminal (Hoboken South) and 14th Street (Hoboken North) in Hoboken. These ferries stop at Wall Street, the World Financial Center in Manhattan. There are several other ferry services.

Airports

Newark Liberty International Airport situated in New Jersey is one of the busiest airports in the United States. It is operated by the Port Authority of New York and New Jersey, which also runs the other two major airports in the New York metropolitan area (John F. Kennedy International Airport and LaGuardia Airport). The adjacent Newark Airport railroad station provides access to the trains of Amtrak and New Jersey Transit.

c) Boston, Massachusetts, USA

Overview of the city/region

Boston, located in Suffolk County, is the capital and largest city of Massachusetts State in the United States of America. Boston is considered the economic and cultural center of the Region. The city, which had a population of 590,763 in 2006 spreads over an area of 232.1 sq. kms. and lies at the center of the Cambridge–Boston–Quincy metropolitan area—the 11th largest metropolitan area in US, with a population of 4.4 million and 11,684.7 sq. kms. Owing to its early founding, Boston is very compact. Boston is surrounded by the "Greater Boston" region, and bordered by the cities and towns of Winthrop, Revere, Chelsea, Everett, Somerville, Cambridge, Watertown, Newton, Brookline, Needham, Dedham, Canton, Milton, and Quincy.



After American independence, Boston became a major shipping port and manufacturing center. The city was the site of several firsts, including America's first public school, Boston Latin School (1635) and first college, Harvard College (1636), in neighboring Cambridge. Boston was also home to the first subway system in the United States.

Through land reclamation and municipal annexation, Boston has expanded beyond the peninsula. With many colleges and universities within the city and surrounding area, Boston is a center of higher education and a center for health care. The city's economy is also based on research, finance and technology mainly biotechnology. Boston has been experiencing gentrification and has one of the highest costs of living in the United States.

Downtown Boston's streets are not organized on a grid, but grew in a meandering organic pattern beginning early in the seventeenth century. They were created as needed. On the other hand, streets in the Back Bay, East Boston, the South End and South Boston follow a grid system.

Boston is the eastern terminus of I 90 also known as the Mass Pike. I 95, which surrounds the city and is locally referred to as Route 128. US Route 1 and I 93 run north to south through the city. The city is bisected by major highways, I 90 and I 93, the intersection of which has

recently undergone a major renovation. Boston also has an extensive network of secondary highways, parkways and local roads.

Public Transport Systems and their functioning & operation including financing

The Boston transportation system includes roadway, rail, air, and sea options for passenger and freight transit. The Massachusetts Port Authority (Massport) operates the Port of Boston, which includes a container shipping facility in South Boston, and Logan International Airport in East Boston. The Massachusetts Bay Transportation Authority (MBTA) operates bus, subway, short distance rail, and water ferry passenger services throughout the city and region. Amtrak operates passenger rail service from the downtown to Portland, Maine, Springfield, Massachusetts, Hartford, Connecticut and New York City. A major bus terminal at South Station is served by varied intercity bus companies.

In city mass transit services are provided primarily by the MBTA. The MBTA offers scheduled service by subway, surface bus, short-distance passenger rail, and ferry or water taxi. The MBTA offers a trip planner on its web site that provides information for public transit in Boston and surrounding areas. Riders enter their intended origin and destination, along with optional time, date, and other information, and the trip planner displays itineraries showing the stops, departure and arrival times, and times to get from the origin to the destination.

The Massachusetts Bay Transportation Authority (MBTA) is "a body politic and corporate, and a political subdivision" of the Commonwealth of Massachusetts formed in 1964 to finance and operate most bus, subway, commuter rail and ferry systems in the greater Boston, Massachusetts, area which replaced the Metropolitan Transit Authority (MTA).



Rail

Sub-way

Boston has the oldest subway system in North America, with the first underground street car traffic dating back to 1897. Locals call it simply "The T" due to its logo i.e., the letter 'T' in a circle which was adopted in the 1960s. In 2006, the system averaged 1.1 million passenger trips each weekday of which the sub-way averaged 598,200 [daily ridership of 549,000 trips excluding the Silver Line bus], which compares with the Washington Metrorail's 910,100, the Chicago L's 596,300 and Los Angeles's 126,900 making it the fourth busiest sub-way system in the United States. The Green Line and Ashmont–Mattapan High Speed Line of the T comprise the busiest light-rail system in the U.S, with a weekday ridership of 255,100. The MBTA also operates its own independent law enforcement agency, the Massachusetts Bay Transportation Authority Police.

Boston Sub-way System



The basic one way fare is \$1.70 or \$2.00 if paid cash. Monthly commuter passes and day and week visitor's passes are available. There are four subway lines in the metropolitan Boston area: the Red Line, Green Line, Orange Line, and Blue Line. The colors of each line have a meaning i.e., Blue Line runs along the ocean, Red Line to terminate at Harvard University,

Orange Line run along Washington Street, which was once called Orange Street and Green Line runs into the leafy suburbs of Brookline and Newton.

The Green Line actually comprises of four different lines. It starts as one line and at about halfway through the system it splits into four different branches as the B (Boston College), C (Cleveland Circle), D (Riverside) and E (Heath Street) trains. The split is only present on the out-bound end of the lines, thus on way back one may take any train in-bound. The Red Line splits as well with southbound trains going either to Braintree or Ashmont.

Though most of Boston's rapid transit network is powered via third rail, significant portions of the Blue Line, as well as all of the Green Line and the Mattapan High Speed Line are powered by overhead lines. The name "sub-way" is a misnomer, as with other systems, large segments run above ground when far from the city's downtown. Additionally, the Green Line and Mattapan High Speed Lines are technically light-rail services, using trolley cars rather than the typical multiple unit trains.

Like the New York City sub-way, Boston's sub-way system does keep to an exact fixed schedule (unlike the Tokyo sub-way) and it has no mechanism in place to inform customers of current train locations or estimated times until arrivals (unlike the Washington Metro).

Commuter rail

The MBTA's commuter rail system, also known as the Purple Line, brings people from as far away as Worcester and Providence, Rhode Island into Boston. Lines from the North Shore and northwestern suburbs begin and terminate at North Station; lines from the South Shore and the west start and end at South Station. There are approximately 125,000 one-way trips on the commuter rail each day.

The MBTA Commuter Rail system is a Regional rail network that shares its tracks with freight trains and in 2007 there were 13 lines. Each Commuter Rail line is divided into up to 9 fare zones (previously 10 on some lines), numbered 1A, and 1 through 8. Riders are charged based on the number of zones they travel through. Tickets can be purchased on the train or at designated ticket vendor locations near major stations. If a local vendor is available, riders must purchase a ticket before boarding to avoid a surcharge. Fares range from \$1.70 to \$7.75, with monthly passes available.

Inter-city rail

There are two major rail stations in Boston: North Station and South Station. There is a third station in Back Bay and a fourth, outside the city on Route 128. All of these are served by commuter rail and Amtrak. Amtrak's Northeast Corridor service terminates at South Station; Amtrak's Downeaster service to Maine terminates at North Station. There is no direct rail connection between North Station and South Station; most transfers from one side to the other can be done using the MBTA Orange Line. A major CSX rail freight facility is located in Allston.

Bus

Sub-urban Buses

The MBTA operates 162 bus routes within the Greater Boston area with a combined ridership of approximately 375,000 one-way trips per day. The Urban Ring Project (MBTA), which would provide more circumferential service, is in the planning



stages and has largely not yet been implemented due to lack of funding..

Bus Rapid Transit

In an effort to provide service inter-mediate in speed and capacity between subways and buses, the MBTA has begun projects using the Bus Rapid Transit, or BRT, system. The term *rapid* does not refer to the speed of the bus, but instead to the provision for separate bus lanes. The MBTA has one BRT line, the Silver Line, which lacks continuous bus lanes and operates in two discontinuous sections.

Other features

Ferries

The MBTA operates scheduled ferry service from downtown at Long Wharf, Rowes Wharf, and the Charlestown Navy Yard, to Logan Airport and the nearby towns of Hull and Hingham. The boats are operated under contract by Water Transportation Alternatives, which also offers scheduled ferry service to the Boston Harbor Islands and to the city of Salem. Another company operates scheduled fast-ferry service from the Boston World Trade Center to Provincetown, at the tip of Cape Cod.

Elevated sections

Despite the first section being built underground, many later parts were built as elevated railways. The only old-style elevated remaining is the Red Line at Charles-MGH, between the tunnel under Beacon Hill and the Longfellow Bridge. The part north of there will remain elevated and runs along a concrete arch bridge.

Boston Region Metropolitan Planning Organisation

The Boston Metropolitan Planning Organization is one of the 13 Massachusetts Regions established to carry out federally funded transportation plans and programs. The area constitutes 1,400 square miles and home to nearly three million people. It is made up of 101 cities and towns. The Boston Metropolitan Planning Organization is composed of seven agencies, seven municipalities, and a public advisory committee that collectively carry out the federally mandated "continuing, comprehensive and cooperative" (3C) transportation planning process for the region. The MPO members are:

1. The cities of Boston, Newton, Salem and Somerville
2. Executive Office of Transportation
3. Federal Highway Administration (ex officio)
4. Federal Transit Administration (ex officio)
5. Regional Transportation Advisory Council (RTAC)
6. Massachusetts Bay Transportation Authority
7. MBTA Advisory Board
8. Massachusetts Highway Department
9. Massachusetts Port Authority
10. Massachusetts Turnpike Authority
11. Metropolitan Area Planning Council
12. The towns of Bedford, Hopkinton, and Framingham

The metropolitan transportation planning process was first set out in the Federal-Aid Highway Act of 1962. In January 1973, a framework for regional transportation planning in the Boston area was institutionalized through a Memorandum of Understanding which established that the MPO agencies would work together on the federally required

transportation planning process; establish a Joint Regional Transportation Committee (now known as the Regional Transportation Advisory Council) to ensure citizen participation in regional transportation planning; work together to ensure compliance with federally mandated planning documents; establish a joint technical staff to support decision making; and the MPO's unified work program is carried out by the Central Transportation Planning Staff. CTPS was created as an integral part of the region's 3C process. It is composed of professional transportation planners and support staff that conduct comprehensive, multimodal transportation planning and analysis for the MPO. This arrangement promotes interagency cooperation, ensures consistency among planning efforts, and fills gaps in the capabilities of the individual MPO agencies. The MPO Members are briefly described below:

Voting Members:

1. The Executive Office of Transportation (EOT) is the Massachusetts agency that sets policy for and coordinates the transportation work of the various state departments, commissions, and authorities. Transportation Secretary Bernard Cohen is the Chairman of the Boston MPO.
2. The Massachusetts Bay Transportation Authority (MBTA) provides public transportation service by bus, rapid transit, light rail, trackless trolley, commuter rail, and ferry in its district, which comprises 175 cities and towns.
3. The MBTA Advisory Board, which consists of representatives of the 175 communities included in the MBTA district, reviews and approves the MBTA's annual budget and Program for Mass Transportation, reviews the yearly Capital Investment Plan, and assists in the development of service quality standards and in service planning. It also serves as a public forum for the discussion of transit issues.
4. The Massachusetts Highway Department (MassHighway) plans, designs, operates, and maintains state highways and bridges. It has direct responsibility for 2,909 miles of highway and 2,900 bridges.
5. The Massachusetts Port Authority (Massport) operates aviation and maritime facilities and promotes economic development. It owns and manages Logan Airport, Hanscom Field, the Tobin Bridge, Conley and Moran container terminals.
6. The Massachusetts Turnpike Authority operates the Massachusetts Turnpike, the Massachusetts Turnpike Extension, and the Boston Harbor crossings (the Callahan, Sumner, and Ted Williams tunnels).
7. The Metropolitan Area Planning Council (MAPC) is the regional comprehensive planning agency for the 101 cities and towns of the Boston metropolitan area. It is an autonomous public agency composed of municipal officials, state agency representatives, and independent gubernatorial appointees.
8. Municipal representation in the Boston MPO is determined by Metropolitan Area Planning Council elections held every year. The cities of Newton, Salem, and Somerville and the towns of Bedford, Hopkinton, and Framingham are elected municipal members of the MOP. The City of Boston has permanent status on the MPO.

Non-Voting Members:

1. The Federal Highway Administration and Federal Transit Administration serve the Boston MPO in an ex officio capacity and ensure that MPO plans and programs are carried out in a manner consistent with applicable federal planning and funding requirements.
2. Regional Transportation Advisory Council (RTAC) provides policy advice to the other members on regional transportation issues and specific MPO actions. It is composed of representatives from cities and towns, community groups, subregions, and various state and regional agencies.

The Massachusetts Bay Transportation Authority (MBTA) is able to recover less than 50% from its internal sources i.e., from fare box collection and from lease, rent etc. the rest has to come from State Govt. as subsidy. Further, the transportation projects to be implemented are funded by the Federal Government (upto 50%) and the balance has to be arranged by the State Govt. and MBTA from internal resources. In some cases, if the Federal Govt. does not give grant to the project, the complete funding has to be done by the MBTA and State Govt.

Port of Boston

South Boston is home to a significant freight container shipping facility near Castle Island. It also is home to the Black Falcon Cruise Terminal, which serves 200,000 cruise passengers annually.

Aviation

Boston has extensive domestic and international airline service at three airports: Logan International Airport in East Boston, T. F. Green Airport in Providence, Rhode Island and Manchester-Boston Regional Airport in Manchester, New Hampshire.

Walking and Bicycling

Boston is known as "America's Walking City". Boston is a compact city, suitable for walking or bicycling. The city has the highest percentage of on-foot commuters in the United States. In 2000, 13.36% of Boston commuters walked to work according to the US Census. This was the highest of any major US city. Most of the cities and towns have standing committees devoted to improvements to the bicycle and pedestrian environment.

Bicycle paths are marked on some roadways, and several separated paths are available to cyclists. The Minuteman Bikeway (which runs through several suburbs of Boston) and Charles River bike paths are very popular with recreational cyclists and tourists. Many MBTA riders use a bicycle to get to the station.

Park and Ride

The MBTA operates several large park and ride facilities on its subway and commuter rail lines, close to major highways, providing access to downtown. While most of these tend to fill up with commuters on weekday mornings, they provide a good place for visitors to leave their cars and see the city without parking hassles on evenings and weekends.

Short Comings

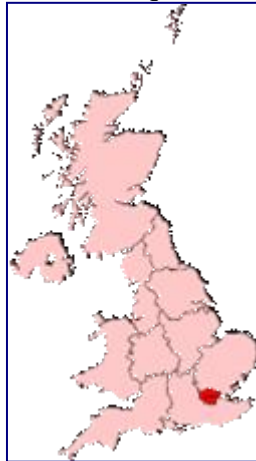
The residents cannot go from one outlying area to another without first riding downtown and changing lines. The Urban Ring Project (MBTA), which would provide more circumferential service, is in the planning stages and has largely not yet been implemented due to lack of funding.

The T stops running at 12:45 a.m. each night, despite the fact that bars and clubs in most areas of Boston are open until 2 a.m. This eliminates, for many, the potential to use The T to avoid driving drunk. Unfortunately, this can't be changed. Since the T (unlike the New York City subway) doesn't have double tracking, rail maintenance can only be done when the T isn't running. The maintenance is essential with a 109-year-old system. MBTA did experiment with Night Owl bus service for several years in the early 2000s, but this was abandoned due to high per rider cost (\$7.53) to keep the service open.

d) London, United Kingdom

Overview of the city/region

The City of London is a geographically small city within Greater London, England. It is the historic core of London around which, along with Westminster, the modern conurbation grew. The City's boundaries have remained almost the same since the Middle Ages, and hence it is now only a tiny part of the much larger London metropolis. It is often referred to as just the City or as the Square Mile, as it is exactly one square mile (2.6 sq. kms) in area.



The term London now refers to a much larger conurbation containing the City of London and the City of Westminster. The City of London is part of London's city centre, but apart from financial services, most of London's metropolitan functions are centred on the West End. The City is today a major business and financial centre. The City has a resident population less than 10,000, whilst the City employs 340,000 professional workers, mainly in the financial sector, who commute on a daily basis - making the area's transport system extremely busy during peak hours. The City is governed by the City of London Corporation, which has some unusual responsibilities for a local authority, such as being the police authority for the City. It also has numerous responsibilities and ownerships which lie beyond the City's boundaries.

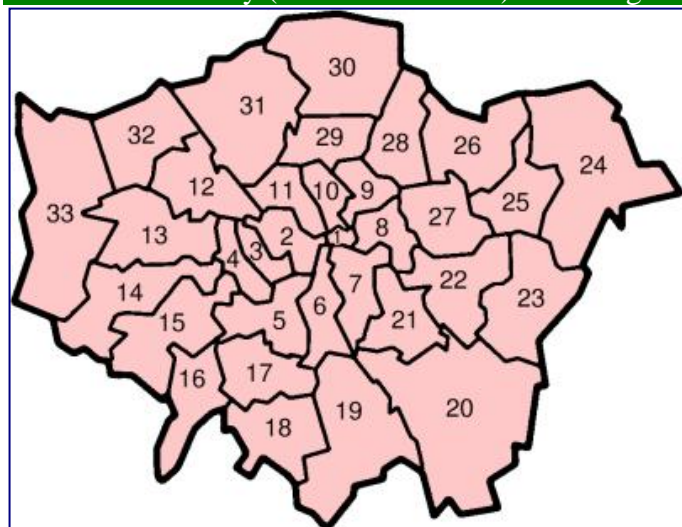
Location of London Region

Greater London is the area in South East England which includes the City of London, 32 London boroughs and 2 Liberties when considered as an administrative area; the name has been, and continues to be, applied to a greater or lesser area in contexts such as e.g. transport, urban development, etc. which cross administrative boundaries. It covers 1579 sq. kms and had a 2006 mid-year estimated population of 7,512,400. In terms of population, London is the 25th largest city and the 17th largest metropolitan region in the world.

London has a hierarchy of roads ranging from major radial and orbital trunk roads to minor streets. At the top level are motorways and grade-separated dual carriageways, supplemented by non-grade-separated urban dual carriageways, major single carriageway roads, local distributor roads and small local streets. Most of the streets of central London were laid out before cars were invented. The London's road network is congested. Attempts to tackle this aspect date back at least to the 1740s, when the New Road was built north of the city;

it is now just another congested central London thoroughfare. New wide roads such as Victoria Embankment, Shaftesbury Avenue, Kingsway, Western Avenue and Eastern Avenue, were constructed in the new suburban outskirts of London but little could be done in

London city (indicated as No.1) & its Region



the congested central area.

In the 1960s the Greater London Council prepared a drastic plan for a network of London Ringways which included the construction of the London Motorway Box which would have involved massive demolition and huge cost to bring motorways into the heart of the city. Resistance from Central Government over the costs and campaigns of objection from local residents caused the cancellation of most of the plans in 1973. By the end of the 20th century policy focused towards a preference for public transport improvements. Further, 190 km orbital motorway was constructed between 1973 and 1986 to provide a route for traffic to bypass the London urban area.

Due to the opposition to the Ringway plan and earlier proposals there are few grade-separated routes penetrating to the city centre. Only the western A40 and the eastern A12 and A13 are grade separated for entry into central London. Motorways are controlled and operated by the Highways Agency, and other major routes are controlled and operated by TfL as part of the Transport for London Route Network (TLRN). Many of London's major radial routes continue far beyond the city as part of the national motorway and trunk road network. From the north, clockwise the major radial routes are the A10 (north to Hertford), the M11 (north to Cambridge), the A12 (northeast to Chelmsford), the A127 (east to Southend), the A13 (also east to Southend), the A2/M2 (east to Chatham), the A20/M20 (southeast to Maidstone), the A23/M23 (south to Gatwick Airport and Brighton), the A3 (southwest to Guildford), A316/M3 (southwest to Basingstoke), the A4/M4 (west to Heathrow Airport and Reading), the A40/M40 (west to Oxford), the M1 (northwest to Luton) and the A1 (north to Stevenage).

M25 Motorway

There are also three ring roads linking these routes orbitally. The innermost, the Inner Ring Road, circumnavigates the congestion charging zone in the city centre. The generally grade-separated North Circular (the A406 from Gunnersbury to West Ham) and the non-separated South Circular (the A205) form a suburban ring of roughly 10km radius. Finally, the M25 encircles most of the urban area with roughly a 25km radius. The western section of the M25 past Heathrow Airport is one of Europe's busiest, carrying around 200,000 vehicles per day. None of these roads have tolls, except the Dartford Crossing, which links the two ends of the M25 to the east of London, is tolled. The major roads mentioned above are supplemented by a host of standard single-carriageway main roads, operated as part of the afore-mentioned TLRN. These roads generally link suburbs with each other, and deliver traffic from the ends of the major routes into the city centre. The TLRN is supplemented by local distributor roads operated by the local authorities, the London boroughs. These non-strategic roads carry local traffic.



Public Transport Systems and their functioning & operation including financing

London's transport system forms the hub of the city with road, rail and air networks in the United Kingdom. It has its own dense and extensive internal private and public transport networks, as well as it provides a focal point for the national road and railway networks. London also has a number of airports including the UK's busiest, Heathrow, and a sea port. London's internal transport is one of the London's four policy areas, administered by its executive agency Transport for London (TfL). TfL controls the majority of public transport in the area, including the Underground, local buses, trams and the Docklands Light Railway, but

it has virtually no control over National Rail services within Greater London, which are administered by the national Department for Transport (DfT). TfL also controls most major roads in the area, but not the minor roads.

The Transport for London (TfL) was created in 2000 as the integrated body responsible for the London's transport system. The main role of TfL, which is part of the Greater London Authority, is to put the Mayor of London's Transport Strategy into action and manage transport services across the Capital. TfL manages London's transport network and it is responsible for the operation of transport services with the help of several companies as listed below:

- § London Underground Limited: Responsible for operating the London Underground train network and owns (in whole or in part) over 250 London underground stations.
- § London Buses Limited: Responsible for operating certain bus routes in East London and Dial-a-Ride, which provides door-to-door transport for people with disabilities.
- § London Bus Services Limited: Responsible for the regulation of the London bus network, including planning bus routes and setting bus services levels. The company also monitors service quality. It is responsible for providing bus infrastructure and for certain support services regarding the bus network, and the management of Croydon Tramlink.
- § Victoria Coach Station Limited: Operates Victoria Coach Station, which is responsible for providing an arrival and departures facility for coaches in London.
- § London River Services Limited: Operates and manages eight piers on the River Thames, licences boat services using those piers and subsidises multi-stop commuter services provided by a private operator.
- § Docklands Light Railway Limited: Owns the land on which the Docklands Light Railway is built and is responsible for the operation of the railway.
- § Transport Trading Limited: The holding company for all the operating transport companies owned by TfL. It also carries out certain other trading activities, such as running the London Transport Museum. It also receives the revenues from the sales of Travelcards in connection with all forms of transport operated by TfL. By law, TfL cannot carry out certain activities except through a limited liability company which is a subsidiary of TfL or which TfL formed or joined with others in forming.
- § London Transport Insurance (Guernsey) Limited: An insurance company based in Guernsey which provides insurance services to TfL, its subsidiary companies and some of their contractors.
- § Dial-a-RIDE Limited: Incorporated in 1991 as a contingency measure to provide door-to-door transport service to disabled persons. It had become necessary at that time for certain services to be operated directly for disabled persons. However it has never been traded. It is owned by London Bus Services Limited.
- § UKTRAM Limited: An associate company of London Bus Services limited (LBSL). It is limited by guarantee and owned in equal shares by LBSL, the Confederation of Passenger Transport UK, PTEG Limited and the Light Rapid Transit Forum. The main purpose of UKTram Limited is to represent the UK tramway industry in dealing with government and statutory bodies in developing a co-ordinated and structured approach to regulation, procurement and standardisation within the industry.
- § Cross London Rail Links Limited: A joint venture company that was formed by Transport Trading Limited and the SRA Investment Company Limited (SICL), then a wholly owned subsidiary of the Strategic Rail Authority. All of the SRA's shares in SICL have been transferred to the Department for Transport.
- § Rail for London Limited: A wholly owned subsidiary of Transport Trading Ltd. It will carry out the infrastructure upgrade for the North London line and enter into a concession

agreement for the London Rail Concession.

Transport for London (TfL) has main source of revenue from fare box collection, property taxes, grant from Government etc.

Rail

Metro and light rail

TfL operates two railway systems. The larger one is the London Underground and the smaller one is the automated Docklands Light Railway. TfL also has the Tramlink system, centred on Croydon with lines to Wimbledon, New Addington and Beckenham. Like the road network, a flaw in London's under- and over-ground railways is that they radiate out to the suburbs from the centre. It means that travelling between parts of London which are not on the same commuter-route can be slow. This problem would be reduced by the introduction of Tramlink and other proposed railway projects.

London Underground

Colloquially known as the Tube, London Underground is the oldest metro system in the world, having begun operations in 1863. More than 3 million passengers travel on the Underground every day, amounting to over 1 billion passenger journeys per year. The Underground has 12 lines, most of which connect the suburbs to Central London and also provide a distribution role around the city centre. The Underground serves London north of the river Thames much more extensively than the south. This is due to unfavourable geology, historical competition from surface railways and the historical geography of London which was focused to the north of the Thames. South London is served primarily by surface railways.

Tube at Green Park Station



Docklands Light Railway

The Docklands Light Railway (DLR) is an automated light rail system serving the Docklands area of East London. It complements the Underground, shares its fares system and has a number of interchanges with it. It is focused to the Canary Wharf business district, although this was not its initial objective upon its opening in 1987. Due to success of Canary Wharf, the system has expanded several times and now it has five main branches connecting the Isle of Dogs and Royal Docks to the City of London, Stratford and Lewisham south of the river. It also serves London City Airport. Several extensions are in the works.

Automated DLR Train



Trams

The tram system in London was the oldest in the world dating back to early Victorian time and still remains the largest tram network at its peak. However, the highly extensive tram lines disappeared from the streets of London by the mid 20th century, but a new tram system was opened in 2000 to serve the large employment centre of Croydon on the southern edge of London. Named Tramlink, it connects Croydon and its surface railway stations to surrounding suburbs and to the town centre of Wimbledon to the

A Tramlink Tram



north-west. Several tram schemes are being planned.

Commuter rail

London is the centre of an extensive radial commuter railway network serving the surrounding metropolitan area. Each terminus is associated with commuter services from a particular segment of this area. The majority of commuters to central London (about 80% of 1.1 million) arrive by either the Underground (400,000 daily) or by surface railway into these termini (860,000 daily).

Although the majority of services serve the termini, there are exceptions. Constantly increasing pressure on the commuter rail systems and on the Underground to disperse passengers from the busy terminals by Crossrail scheme. Similar to the RER lines of Paris, Crossrail would link services into Paddington in the west with Docklands and services out of Liverpool Street in the east, by constructing twin 16-km tunnels underneath the city centre. New stations would be provided at key city centre locations, linking to the Underground.

South Eastern Trains



The growing overcrowding on commuter rail services led to new ticket restrictions on leisure travellers using cheaper tickets. Although morning peak restrictions for travellers have been common for many years, evening peak restrictions are also now coming into place. London is also linked to Paris and Brussels in Europe by High Speed rail via Tunnel. High-speed Eurostar trains connect the UK's high speed network to Europe's. The Eurostar's London terminus is at St. Pancras International.

Intercity rail and Heavy rail

Long-distance intercity services depart from termini, but each terminus provides trains to a particular part of the country. London is the focal point of the British railway network, with 14 termini stations providing a combination of commuter, intercity, airport and international services. The termini are Blackfriars, Cannon Street, Charing Cross, Euston, Fenchurch Street, King's Cross, Liverpool Street, London Bridge, Moorgate, Marylebone, Paddington, St. Pancras, Victoria and Waterloo. The areas of the city which are not served by the Underground or DLR are served by commuter heavy rail services into one of these termini. Intercity services also carry significant volumes of commuters between their stops nearest to London and the termini.

Eurostar Trains



Rail services to airports

Heathrow, Gatwick and Stansted airports are served by dedicated train services, and the latter two are also served by standard commuter services. The Heathrow Express service from Paddington, the Gatwick Express from Victoria and Stansted Express from Liverpool Street airport connectivity by train.

International rail services

London is well connected with main land of Europe by a tunnel constructed beneath the sea. International rail services are provided by Eurostar from St. Pancras to Paris and Brussels via the Channel Tunnel, with an intermediate stop in Stratford in East London.

Buses

Bus Network in and around London

London's bus network is extensive, with over 6,800 scheduled services every weekday carrying about six million passengers on over 700 different routes. It carries more number of passengers than the tube. In addition to this, a 100-route night bus service is also operated, making it a 24-hour service on some routes. TfL manages the bus system by tendering out routes to private companies. This means that TfL set the routes, frequencies, fares and even the type of vehicle used, and companies bid to run these services for a fixed price. There are incentives and penalties to encourage good performance against certain criteria.

Many services are operated with the red double decker buses. These are low-floor vehicles. Old traditional buses are now limited on two "heritage routes" after its phase out in 2006. There has been good investment in bus system since TfL's inception in 2000. It led to improvements in the number of routes their frequency, reliability and the standard of the vehicles used.

Signage – end of cogestion zone

Other features

Congestion charge

In February 2003, TfL introduced congestion charge, a radical scheme to charge motorists £5 per day for driving vehicles within a designated area of central London during peak hours. The idea behind the scheme is to reduced traffic congestion and hence improved reliability of bus and taxi services. but this is strongly opposed by the critics. The charge was increased to £8 per day since 4 July 2005 and in 2007 the zone was extended to include West London.



Taxis -Black cabs and hire cars

All London taxicabs are licensed by TfL's Public Carriage Office (PCO), who also set taxicab fares along with strict maximum vehicle emission standards. Black cabs can be hailed on the street or hired from a taxicab rank (by all the mainline train stations and around the major business, shopping and tourist centres). Taxicab fares are set by TfL and are calculated using a Taximeter in the vehicle and are calculated using a combination of distance travelled and time. Private Hire Vehicles (PHVs or minicabs) are cars which are not licensed to pick up passengers up on the street. They must always be booked in advance by phone or at the operators offices.



Hackney Carriage or Black Cab

Bicycle taxis and pedicabs

Pedicabs (or bicycle rickshaw) are a fairly recent addition. It is used almost solely by the tourist making short journeys in the Covent Garden area. It is a pleasant way to see the city highlights in the summer but it has a little potential as a commuter transportation system.

Airports

London's Heathrow Airport handles more international passenger traffic than any other in the world. London is the best served city by airports in the world with almost 150 million passengers using its six airports in 2005. In order of size, these airports are Heathrow, Gatwick, Stansted, Luton and London City and the smallest, Biggin Hill which does not have

scheduled flights. Heathrow and Gatwick serve long-haul, European and domestic flights; Stansted and Luton cater primarily for low-cost European and domestic services, whilst London City caters for business passengers to short-haul and domestic destinations. The closest airport to the city centre is London City, approximately 10 km east of the City of London financial district in the Docklands area. A branch of the Docklands Light Railway links the airport to the City in under 25 minutes.

Two other airports are at the edge of the city but within the Greater London boundary: Biggin Hill, around 23 km southeast of the centre, and London's principal airport, Heathrow, 20-25 km from central London. Heathrow handles nearly 70 million passengers per annum, making it Europe's busiest airport. On the western edge of the city in the London Borough of Hillingdon, it has two runways and four passenger terminals, with a fifth terminal opening in 2008. It is connected to central London by the dedicated Heathrow Express rail service, the Heathrow Connect local rail service and London Underground's Piccadilly line, and is connected to the M4 and M25 motorways. Gatwick is about 40 km south of central London in Sussex, outside London's boundary. With a single runway and two terminals, it handles approximately 30 million passengers per year from domestic, short-haul and long-haul flights, and is linked to London by the Gatwick Express, Thameslink and Southern rail services, and by the M23 motorway. Stansted is London's most distant airport, approximately 50 km north of the centre, in Essex. With a single runway and terminal, it handles approximately 20 million passengers annually, mostly from low-cost short-haul and domestic leisure flights. It is connected to London by the Stansted Express rail service and the M11 motorway. Luton Airport is about 45 km northwest of London, connected to it by the M1 and First Capital Connect trains from nearby Luton Airport Parkway station. It has a single terminal and fairly short runway, and like Stansted it caters mainly for low-cost short-haul leisure flights.

Water transport

The river Thames was one of London's main transport arteries. It is navigable to ocean-going vessels up to London Bridge, and to other motor boats upstream of Greater London. There are small-scale passenger services and a large number of leisure cruises operating on the river. Additionally some bulk cargoes are also sail on the river. London also has several canals, which links the Thames to the Grand Union Canal and thus spread to the waterway network across England. These canals are used by leisure cruisers.



Festival Pier on River Thames

Once London's port used to be the country's busiest port but containerisation led to its decline and abandonment of Docklands. Tilbury in Essex is a purpose-built port at, around ten kilometres outside the Greater London boundary. Tilbury is operated by the Port of London Authority, which is responsible for most port activities in the Thames estuary, and is the third-busiest of Britain's ports.

Cycling

Cycling is a much cheaper, and often quicker, way around town than travelling by public transport or car. Over one million Londoners own bicycles but as of 2008 only around 2% of all journeys in London are made by bike: this compares to other major European cities such as Berlin (5%), Munich (12%), Copenhagen (20%) and Amsterdam (28%). Nevertheless this is an 83% increase compared to that in 2000. There are currently 480,000 cycle journeys estimated as of today.

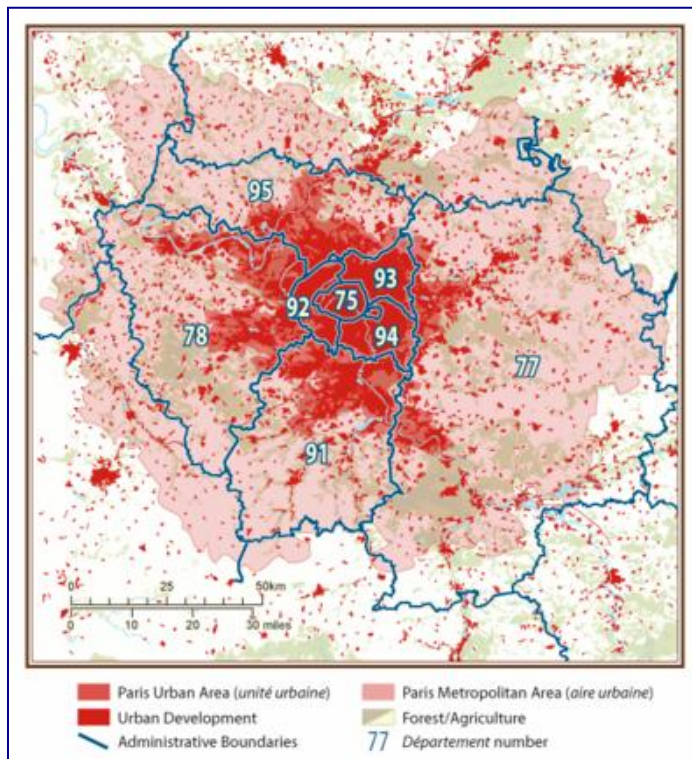
e) Paris, France

Overview of the city/region

Paris is the capital city of France. It is situated on the River Seine, in northern France, at the heart of the Île-de-France Region. The City of Paris has an estimated population of 2,167,994 within its administrative limits in January 2006. The Paris urban area extends well beyond the administrative city limits and has an estimated population of 9.93 million in 2005, while the metropolitan area has a population of nearly 12 million and is one of the most populated metropolitan areas in Europe. The city of Paris' administrative limits describe an area much smaller than its real urban growth. At present, the real extent of the dense urbanisation of which Paris is only a core, defined by the urban area statistical area, covers 2,723 sq. kms or an area about 26 times larger than the city itself. Surrounding the Paris *urban area* is the commuter belt area that completes metropolitan area covering 14,518 sq. kms or an area about 138 times that of Paris itself. Paris is one of the most densely populated city of more than 1 million population in the world. Its density, excluding the outlying woodland parks, was 24,448 inhabitants per square kilometre as per the 1999 census.



Paris Metropolitan Area



An important settlement for more than two millennia, Paris is today one of the world's leading business and cultural centres, and its influence in politics, education, entertainment, media, fashion, science and the arts all contribute to its status as one of the world's major global cities. The Paris Region is France's foremost centre of economic activity. With €500.8 billion (US\$628.9 billion), it produced more than a quarter of the gross domestic product (GDP) of France in 2006. Paris is the most popular tourist destination in the world, with over 30 million foreign visitors per year. There are numerous iconic landmarks among its many attractions, along with world famous institutions and popular parks.

Paris' unchanging borders, strict building codes and lack of developable land have together contributed in creating a phenomenon called *muséification* (or "museumification") as, at the same time as they strive to preserve Paris' historical past, existing laws make it difficult to create within city limits the larger buildings and utilities needed for a growing population. Paris' institutions and economic infrastructure are either already located in suburbs or planning to move to the suburbs. The financial business district, the main food wholesale market (Rungis), major renowned schools, world famous research laboratories, the largest sport stadium (*Stade de France*), and some ministries (namely the Ministry of

Transportation) are located outside of the city of Paris. The need for a larger Paris is largely acknowledged by the French government.

The Eiffel Tower was constructed for the 1889 Universal Exposition but the tower was never dismantled and it is now an enduring symbol of Paris. It is visible from most parts of the city. The Historical axis is a line of monuments, buildings and thoroughfares that run in a roughly straight line from the city centre westwards. There are several monuments along the axis.

The city's population was decreasing since 1954. The principal factors for the decrease of population were a significant decline in household size, and a dramatic outmigration of residents to the suburbs. Factors in the outmigration included de-industrialisation, high rent, the transformation of living space into offices and improved affluence among working families. The population losses are generally seen as negative for the city. The city administration is trying to reverse the trend with some success, as the population estimate of July 2004 shows a population increase for the first time since 1954 reaching a total of 2,144,700 inhabitants.

Public Transport Systems and their functioning & operation including financing

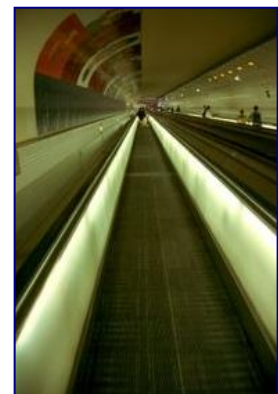
Paris public transport is operated by the RATP and includes the *métro* subway system, RER trains, buses, night buses, Montmartrobus, and the Montmartre funicular railway, all of which accept the same tickets and passes. One can purchase individual tickets or booklets of ten tickets, or Paris Visit passes designed for visitors and offering unlimited travel.

The Île-de-France public transport executive STIF (Syndicat des transports d'Île-de-France), is the authority that controls the Paris public transport network and coordinates the different transport companies operating in Île-de-France, mainly the RATP, the SNCF and Optile. STIF was created in 1959 and, since 2005, is a public establishment. STIF coordinates RATP, SNCF Ile-de-France and the 90 Optile-affiliated transport operators. STIF has a real autonomy and is not dependent on the French Government.

Metro System

The Paris *métro* system is a marvel of efficiency, providing safe and fast transportation for more than nine million passengers each day. It comprises over 200 kilometers of track and 370 stations.

Métro lines are numbered from 1 to 15, while the direction of trains is indicated by the name of the last station on the line. For example, eastbound Line 1 trains are identified *Château de Vincennes*, while westbound Line 1 trains are identified *La Défense*. A map of the *métro* system is available on website and also. Métro trains begin operation at about 05h30, continuing until about 00h30 (half past midnight).



Metro tunnel

RER Trains

Regional commuter trains named as RER, extend the reach of public transport into the Paris suburbs. It has five train lines to be identified by the letters A, B, C, D, and E. Like the *métro*, RER trains run from about 05h30 to about 00h30 (half past midnight).

Métro tickets may be used on RER trains while traveling within the *métro* system, that is, inside Paris. Outside the Paris area special RER fares and tickets apply, including while

traveling to or from the airports.

Paris Buses

Paris bus routes are numbered, and begin operation at 06h30. The last bus usually leaves the terminal between 20h30 and 21h30, but a few lines run until half past midnight. It is indicated by signs at the bus stops. There are also night buses, called *Noctabus*, which operate hourly between *Châtelet* and the main gates of Paris from 01h to 05h. The night routes are labeled with letters rather than numbers.

Maps of the bus routes can be found in bus shelters and inside the buses. Most shelters display the name of the stop. A special bus called *Montmartrobus*, bus line number 64, circulates in the Montmartre district. Its fare is the same as other buses.

The Montmartre funicular railway travels up and down the hill to *La Basilique du Sacre Coeur*, each direction requiring one ticket.

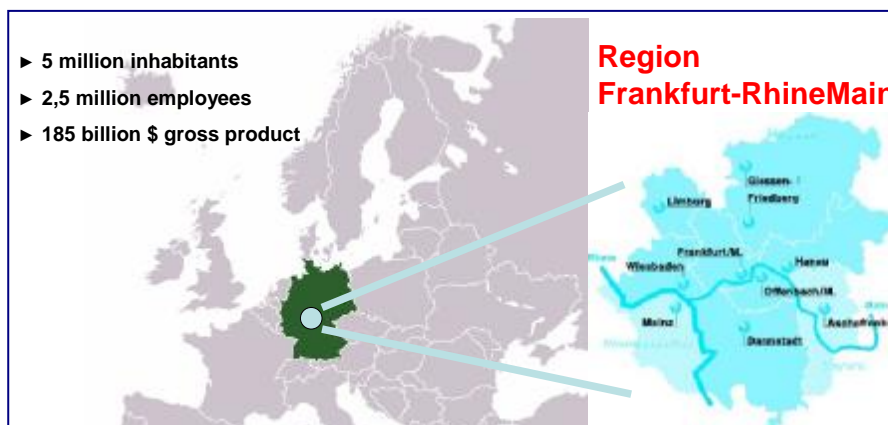
By purchasing a special pass called *Paris Visite*, one can avoid waiting in lines to buy individual tickets. A Paris Visite pass gives you an unlimited number of trips on all types of Parisian public transport, including métro trains, RER trains, buses, the Montmartre bus and funicular, and even *Île-de-France* SNCF trains. Passes are available for 2, 3, or 5 consecutive days, and 3 or 5 zones.

f) Frankfurt, Germany

Overview of the city/region

Frankfurt am Main is the largest city in the German state of Hesse and the fifth-largest city in Germany, with a 2007 population of 667,598. The urban area had an estimated population of 2.26 million in 2001. The city is at the center of the Germany's second largest metropolitan area Frankfurt Rhine Main Area which has a population of 5.3 million.

The three pillars of Frankfurt's economy are finance, transport, and trade fairs. Frankfurt has been Germany's financial center for centuries.



The city is located on both sides of the River Main in the south-west part of Germany. The southern part of the city contains the Frankfurt City Forest. The city centre of Frankfurt is located on the north side of the river.

Frankfurt City and RhineMain Region

Public Transport Systems and their functioning & operation including financing

The public transit system in Frankfurt consists of several carriers who all share the same fare system. Therefore, one ticket is valid for a journey which may include several modes of transit run by different operators. The fares are paid in advance of travel at a ticket vending machine or on board a bus. There are no turnstiles or other controlling barriers. Therefore passengers have responsibility for ticket. Plain-clothes ticket inspectors are employed and carry out checks to ensure passengers have paid fare. If found to be travelling without ticket, a passenger is required to pay an increased fare of €40. A trip within the central area of Frankfurt costs between €1.90 and €2.10, and a journey to the suburbs costs between €3 and €5 approximately. The commuter service is organised by several companies which are listed below.

- § The city's transit planning unit is *TraffiQ*, a Govt. agency.
- § The fare structure and distribution between the operators is organised by the *Rhein-Main-Verkehrsverbund*.
- § Rapid transit is run by Deutsche Bahn, the national German railroad operator.
- § Light rail and streetcars are run by the city owned Frankfurt Transit Company (*Verkehrsgesellschaft Frankfurt*).
- § Buses are run by *Verkehrsgesellschaft Frankfurt*, *In Der City Bus*, *MainMobil Frankfurt*, *Alpina* and *Regionalverkehr Kurhessen*.

There are currently proposals for a shake-up of the way bus services are run. Instead of being operated by Frankfurt Transit Company, the routes could be split into different franchises for which any bus operator may tender to run. The organisation offering the cheapest proposal would then be given a contract to run that route for several years.

The revenue collection from fare box and from the lease rent etc. accounts to about 50% of the annual expenditure. The balance money comes in the form of subsidy from local governments. The implementation of the transportation project is need based and not on financial viability. The public transport is considered as an essential requirement for the development of an area and hence connectivity by a public mode of transport is assured before development of an area.

Rail

Rapid Transit

Frankfurt is the central city of Rhein-Main Region, and therefore the transit service caters the large number of commuters who travel to and from the suburbs each day. The suburban rail service is provided by rapid transit trains (S-Bahn). All but one of the lines run together in a single underground section through the city centre, and then go to their separate ways at either end. In the suburban sections they are generally double-tracked and also share mainline tracks with other regional, long distance passenger and cargo trains. The trains can be up to 200 m (600 ft) long and have a maximum speed of approximately 140 km/h (90 mph). Electricity supply is provided by overhead wires at the common German railroad voltage (15,000 volts AC).



Frankfurt S-Bahn at Hauptbahnhof Station

The normal service interval on each of the lines is 15 or 30 min, but on the central sections a train runs approximately every 2 minutes during peak hour.

Frankfurt's rapid transit is very popular because it is fast. It has the added benefit of being very cost-effective for medium-distance lines with high usage. Expected time of arrival is displayed on the indicators placed at the platforms.

Trams

There are 9 Tram lines, with trams arriving usually every 10 min. Many sections served are served by 2 lines, combining to give a 5 minute frequency during rush-hour.

It is now appreciated that trams are more attractive to the travelling public than buses and cheaper to build than underground railways. Therefore neighbourhoods with medium transit usage are either currently served by tram routes or being planned to be served by tram in future.



Tram in the older part of the city centre

Underground

There are 7 Underground lines known as the U-Bahn. The U1-U3 run from the southern railway station to the north of the city on a common route. They then split and serve Nordweststadt (U1) the town of Bad Homburg Gonzenheim (U2) and the town of Oberursel (U3). The U4 runs from Seckbacher Landstrasse, through the city centre, the main train station, Exhibition Hall, and currently terminates in Bockenheim. This is the only route which runs entirely underground. The U5 is a combined tram and underground line heading from Preungesheim to the city centre. The U6 runs from Heerstrasse in the west, to Ostbahnhof (East Station) in the east. The U7 runs from Hausen in the west, to Bergen-Enkheim in the north-east.

There are several extension projects planned for the future, especially proposals to establish a fully-fledged underground system. As this would be rather expensive, it will probably not be built in the near future. The history shows that Frankfurt's underground network has always grown slower than it was planned.

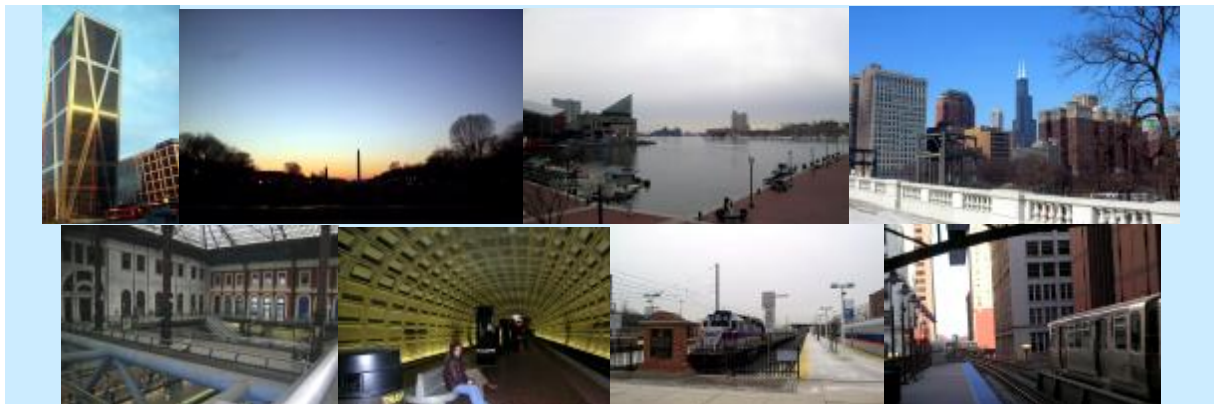


Underground train at *Hauptwache* Station

Bus

Buses play a minor role in Frankfurt transit since all major routes are served by rail based modes of transportation. There are, however, several cross-town bus routes, especially in the north. Buses are also used as feeder services for the underground lines and operate night services.

Places visited by Group-II



Members of Group-II

P.D. Sudhakar, IAS, Member Secretary, NCR Planning Board
Dr. K.S.R.V.S., Economic Advisor, Ministry of Urban Development, GoI
Rajeev Malhotra, Chief Regional Planner, NCR Planning Board
J.N. Barman, Joint Director (Technical), NCR Planning Board
Meenakshi Singh, Assistant Director (Technical), NCR Planning Board

Cities/regions visited by Group-II

Under the Study tour, Group II visited and studied the public transport systems in cities/regions at Madrid in Spain and Washington, Baltimore and Chicago in USA. During the tour, the Group visited various organizations for exchanging view & taking opinions in resolving and tackling different issues and problems in context to improve the mass transport system as well as sub-urban linkages in NCR. Besides this, the Group also undertook field trips different places for an overview of the functioning of the systems. Details are as follows:

- Madrid in Spain
 - Organizations:
 - § SOCOIN: PENOSA Company
 - § COSORTCIO Transportes_Madrid
 - § P4R Apertura Espanola
 - § Madrid_Global
 - Field Trips:
 - § Principe Pio Inter-modal exchange platform
 - § BRT & Metro ride
 - § M30 Station-tunnel monitoring
- Washington, Baltimore and Chicago in USA
 - Organizations:
 - § DoT, FTA [Washington]
 - § MTA [Baltimore, Maryland]
 - § CMAP & RTA [Washington]
 - Field Trips:
 - § Union Station [Washington]
 - § LRT and Metro Station, Metro ride [Baltimore]
 - § 'Loop' Rail ride [Chicago]

a) Madrid, Spain

Overview of the city/region

Madrid, the national capital, is the largest city of Spain. The city spread over an area of 606.14 sq. kms with a population of 31.29 lakhs in 2006. Madrid Region is one of the 17 Autonomous Regions in Spain comprising of 179 municipalities, with a total area of 8028.5 sq. kms and population 60.08 lakhs [2006].

The Region occupies 1.6% of the territory of Spain and up to 13% of the Spanish population. It is an urban society, densely populated and organised around a centre, which is the Madrid municipality.



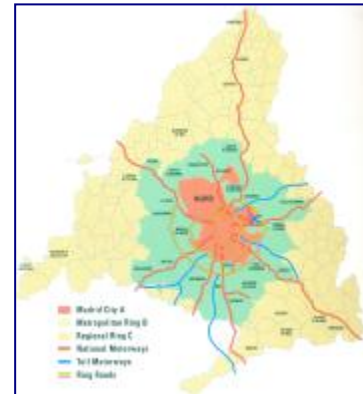
Madrid Region constituted as an Autonomous Region starting from the 1978 Spanish democratic Constitution got the full 'Autonomous' Statute in 1983. Under the Statute institutions that were created are: (i) Madrid Region Assembly



[legislative organ], (ii) Government Council [executive organ], (iii) Presidency of the Madrid Region that directs the Council's activity and (iv) Superior Court Justice [jurisdictional organ].

Like National Capital Region, these towns/municipalities are located in three functional rings, which are:

- i) Madrid city, the largest city and focal point of the region where about 52% of the population of region live.
- ii) The Metropolitan Ring, consisting of closely linked large and medium municipalities located in the Metropolitan areas around the city.
- iii) The Regional Ring consisting of a number of small and medium size municipalities.



City & its Region

In comparison, the area of 'Madrid Region' is almost 1/4th to the area of NCR and Madrid City is almost half the size of NCT-Delhi.

Similar to NCR/NCT-Delhi, the road network in Madrid Region/City is basically a radial system, with seven corridors located along seven national trunk roads. There are also two ring roads, the M-30 and the M-40, a third ring road, the M-50, with the northern part of the loop still to be completed, together with the M-45 cross town motorway, traffic is channelized and distributed within the area.

Road Network of the Region



Increase of population in the Metropolitan Ring has created greater demand for mobility between the Rings with a considerable links of quicker journey frequency. It was informed that of the 2.8 million jobs around 63.5% were located in Madrid city and 82% of the population of Madrid city works in the Madrid city itself. About 43% of the population living in the rest of the region works in Madrid city. This has necessitated multi-modal transportation system in Madrid.

The most recently completed construction projects include 4 radial toll motorways. These run more or less parallel to the existing radial roads: Radial 2, 61.9 km long, Radial 3, 33.1 km, and Radial 5, 31.3 km. The high-

capacity road network is 909 kilometres long, 75% of which is run by the Central Government and the remainder is the responsibility of the Regional Madrid Government.

The Group held discussions with Madrid Global created as an independent organisation under the umbrella of Mayors Cabinet Socoin: Penosa Company, Consorticio Transportes Madrid, P4R Apertura Espanola and visited Principe Pio Inter-modal exchange platform, BRT &

Metro ride and M30 tunnel monitoring station.

Public Transport Systems and their functioning & operation including financing

The Public Transport System for Madrid region is a complex inter-modal system consisting of various modes of transport city and suburban buses, metro, light rail, and suburban rail services. It's an extensive and efficient public transport system where the overall dependency on the public transport system within the Madrid city is 64% and in Region about 50%.

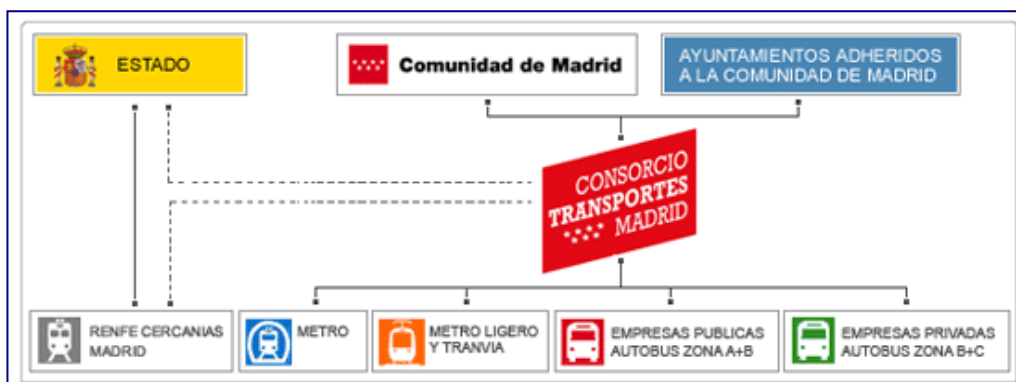


The responsibility of regular public transport is on Madrid Regional Transport Authority (Consortio Regional de Transportes de Madrid) also known as CRTM an autonomous agency of the Regional Government. Regional Transport Consortium was formed as Public Transport Authority to coordinate infrastructures and services for the different public transport modes in the region of Madrid. The strategy of the Transport Authority is based on the three fundamental features:

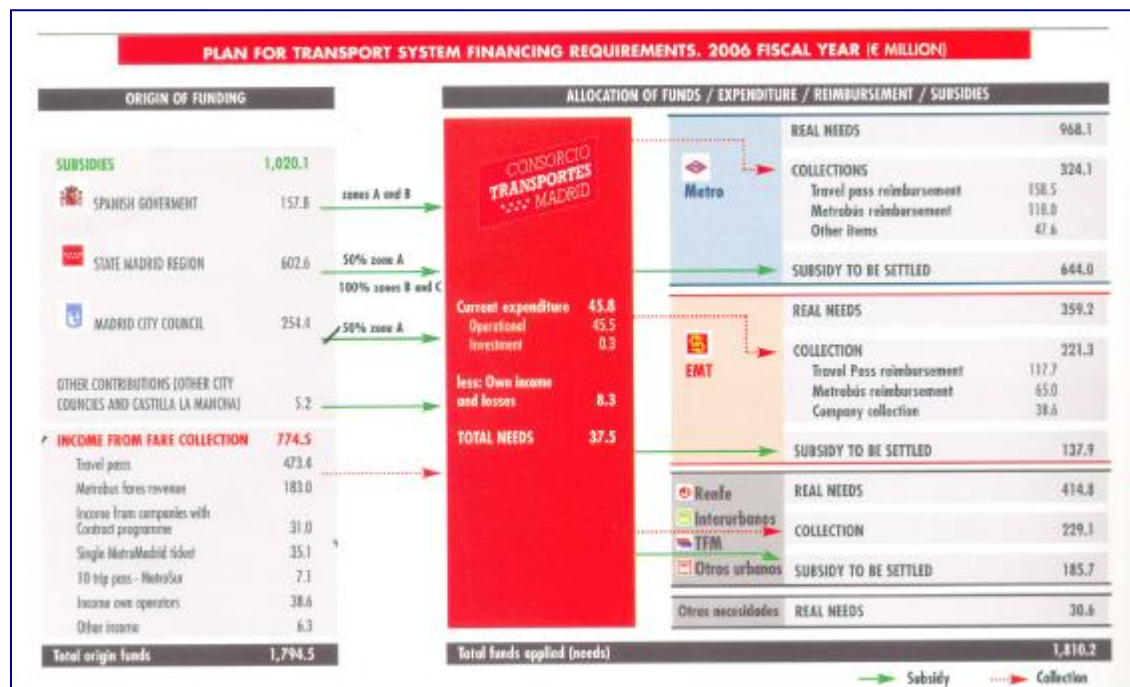
- § administrative integration, as unique authority for public transport, gathering former transport responsibilities of the region and of adhered municipalities;
- § fare integration, with the implementation of the travel pass (Abono de Transportes), which is presently used in more than 60 per cent of public transport journeys, and
- § modal integration, considering that different transport modes are complementary, being inter-modality a key issue.

The CRTM was founded by the Madrid Regional Government under Law 5/1985 of May 16th, after two years of creation of the Madrid region. The CRTM Board of Management consists of representatives from Public and private bodies, associated towns and municipalities, Spanish Government, private transport operators, trade unions and consumer associations. The functions of the CRTM are as under:

- i) Planning of public transport infrastructures
- ii) Planning and coordination of services and programmes for the operation of all transport modes.
- iii) Creation of an integrated fare system for the whole public transport network.
- iv) Creation of an overall image of the PT system, where CRTM holds the external relation with the users.



The flow of funds including subsidy for the functioning for year 2006 is shown below. It can be seen in order to have the coordination, CRTM plays a crucial role and all the funds are channelized through this Autonomous body to all the public and private players in running various transport modes under public transport system for the city & its region.



The public transport system in the region of Madrid consists of two large sub-systems are:

- § The urban area of the city of Madrid: around 200 EMT city bus routes, 13 underground lines and one light rail line, and thirty sub-urban train stations.
- § Metropolitan area of the region: one hundred city bus routes, over 300 sub-urban lines, four underground lines and three rail lines.

Both sub-systems are connected by a series of large inter-changes that surround the central area of the city of Madrid, channeling the radial mobility between the capital and its metropolitan rings. The system has various operating companies consisting of both public and privately owned:

- § Metro de Madrid, S.A., which operates the underground system, is a public company owned by the Madrid City Council (75%) and the Region of Madrid (25%).
- § EMT, which operates bus services in the city of Madrid, is wholly owned by Madrid City Council.
- § Private companies, 36 in total, operate the sub-urban bus services.
- § Cercanias-Rente, a public company dependent on the Spanish Ministry of Public Works, operates suburban rail services.
- § Light rail concessionaries: Metro Ligero Oeste S.A., Metros Ligeros de Madrid S.A. and Tranvia de Parla S.A.

In addition to the above, there are a number of significant companies namely the railway company TFM concessionaire of the line 9 underground extension; the Fuenlabrada municipal bus transport company and the Parla municipal bus transport company.

Urban Transport

Madrid Metro

The first section of Madrid Metro was opened to public on 17.10.1919. Since then it has under gone a process of continuous growth in line with the trend of economic development. In May 2007, the total network was 282.4 kms long with 282 station lines distributed over its 12 metro lines and its additional branch. In the year 2006, 660.3 million passengers travelled on the Metro network. It was pointed out that since 1991, the community of Madrid has carried out enormous expansion and Renovation Plan which focused on increasing capacity and accessibility and making general improvements to rolling stock and facilities in the old network.



Serving a large population, Madrid Metro is one of the most extensive and fast growing metro networks in the world followed by Seoul Metro/Beijing Subway and with the addition of a loop serving suburbs to Madrid's south-west "MetroSur", it is now the second largest metro system in Western Europe. In fact, it is among the top 10 longest metros in the world, though Madrid is approximately the twenty fifth most populous area in the world.

Traditionally, the Madrid metro was restricted to the city proper, but today nearly one third of its track length runs outside the border of the Madrid municipality. The metro is operated by its own company, under the Department of Public Works, City Planning, and Transportation of the autonomous community of Madrid.



Metro Network

MetroSur

In the southern metropolitan area of Madrid region, over a million people live in the five large municipalities of Alcorcon, Leganes, Fetafe, Fuenlabrada, Mostoles and other smaller neighbouring towns. These towns are inter-connected by MetroSur with 40.5 km and 28 stations, 6 of which connect to the commuter rail network and inter-change stations with line 10 of the Metro. The MetroSur was opened to public in 2003. These towns, in recent years has been transformed and given rise to emergence of an entire network of essential facilities and services, such as cultural and sports centres, schools and universities, health centres and hospitals, shopping and leisure centres etc. It was informed that of the total 40.5 kms of length, 26.6 km were constructed using tunneling method, 6.6 km using cut and covered method, 5.7 km between cut-off wolfs and 1.6 km using traditional methods.

The MetroSur concept is a unique example of decentralization of economic activities and reduction of centrality which can be considered for inter and Intra connectivity of CNCR towns of Uttar Pradesh and Haryana Sub-regions.

Light rail and Tram Line

In Madrid, New Light rail and Tram lines forms an important part of the 90 km of new railway lines and of which 36 km new lines are light railway lines. Metro Ligero (light rail) lines serve the various parts of the city/region which have been deemed not to be populated enough to justify the extraordinary spending of new Metro lines. Most of the ML track length is on surface, usually running on platforms separated from normal road traffic. However, ML1 line has some underground stretches and stations.



LRT System

City Bus Service

The first city bus route was inaugurated in 1924 the current bus network serving the city of Madrid is composed of 209 different routes, covering a distance of 3445 km. The bus service is managed by EMT a public company wholly owned by the city. The fleet consists of 2022 vehicles aged on average 5 years 98% with low floors. The buses are environmentally friendly powered by CNG. The EMT network has 92.8 km of bus line, which were frequently occupied by private cars, to protect them; the Madrid City Council has provided a specific design barrier.

The EMT fleet operates under Vehicle Scheduling and Control System (VSCS) that uses GPS to locate the position of the buses, which is transmitted in real time to a Central Control Centre and is displayed so that waiting time can be reduced. This has led to the implementation of a policy aimed at reinforcing service information for users in real time at Bus Stop Terminals, which display the arrival time of the next bus at the stop.

A new service was recently introduced to provide information via SMS on mobile telephone. This service was extended to all lines in 2006.

Sub-Urban Transport

Sub-urban rail network

Madrid is also served by an extensive commuter rail network called Cercanías.

The commuter rail network consists of 339.0 km of track, 97 stations and 9 lines and the present rolling stock is 809 units composed of modern carriages with fully air-condition.

Sub-urban Bus Service

The Buses operated by private companies are largely responsible for public transport road connections between the different municipalities in the region of Madrid and between Madrid and the metropolitan ring. About 36 private companies operate 326 bus routes covering 900 kms using a fleet of about 2000 buses aged owned aged 4.95 years. These companies have been granted 44 administrative concessions contracts by the CRTM through bidding process.

The Regional Transportation Consortium sells monthly and yearly passes worth unlimited trips within the zone covered on every transportation method adscribed to it.

The Madrid Metro network is split into the six 'functional' zones. Each one has a 'single' ticket (Billete Sencillo), valid for one trip within the zone, and a 10-trip ticket for a comparatively lower price. When crossing zone boundaries, one has to buy a new ticket for the zone being entered. There is also a "combined" ticket, which provides for a single trip between any two points of the network except the Airport stations, which have an additional supplement of 1€ All in all, it is possible to go from the airport to any other point of the network for 2.75 €



Fare Zones

Also, the Consorcio Regional de Transportes (Regional Transportation Consortium) has a division of its own, with geographic zones named A through C2. This body sells monthly and annual passes for unlimited trips within their zone of validity, and also a range of Tourist Passes for 1, 3, 5 or 7 days. All of them are accepted at the Metro stations within their zones, and passengers using a CRT pass do not have to pay the airport supplement.

Other features

Public Transport Financing

The region of Madrid has been using alternative systems for financing transport infrastructural investment, for example, the Underground Extension Plan 1995-1999 with an investment requirement of some €1,736 million for the underground construction works on a stretch of 37.8 kms (including rolling stock) was financed by ARPEGIO, a public limited company wholly owned by the Region of Madrid. Its principal asset of several million square meters of land acted as surety for the loans obtained to fund the works on the underground. The remaining third, for the extension of line 9 Arganda del Rey, was financed through a DBOT concessionary scheme with a 30-year term.

The next Underground Extension Plan for 1999-2003, which required a total investment of €2,788 million (rolling stock). The recently finalized Underground and Light Rail Extension Plan 2003-2007 (rolling stock) has been developed through publicly-owned Madrid Transport Infrastructure (MNTRA). Certain parts of the 2003-2007 Plan have been removed from the responsibility of MINTRA and will be financed through concessions for construction and operation over the next 30 years (as in the case with the 28 km of Light Rail €732 million excluding rolling stock, and the extension of Underground Line 8 to the new terminal at Madrid International Airport –Barajas, E46.5 million).

Notable within the 2003-2007 Plan is an innovative system whereby the financing of part of some of the infrastructure is to be funded privately by land developers, as in the case of the Underground Line 1 extension to Ensanche de Vallecas, where part of the investment (in tunnels) will be made by land developers, and another part will be financed by public companies, as in the case of the Tranvia de Parla, which has received a contribution of €42 million from benefits generated by capital gains from the Concorcio Urbanistico Parla Este.

The Regional Transport Consortium acts as a regulatory and coordinating body for public transport operations in the Madrid Region. By assuming the function of locating sources of finance it ensures a stable framework for the funding of transport services.

Private concessions of Metro lines to Rivas and Arganda

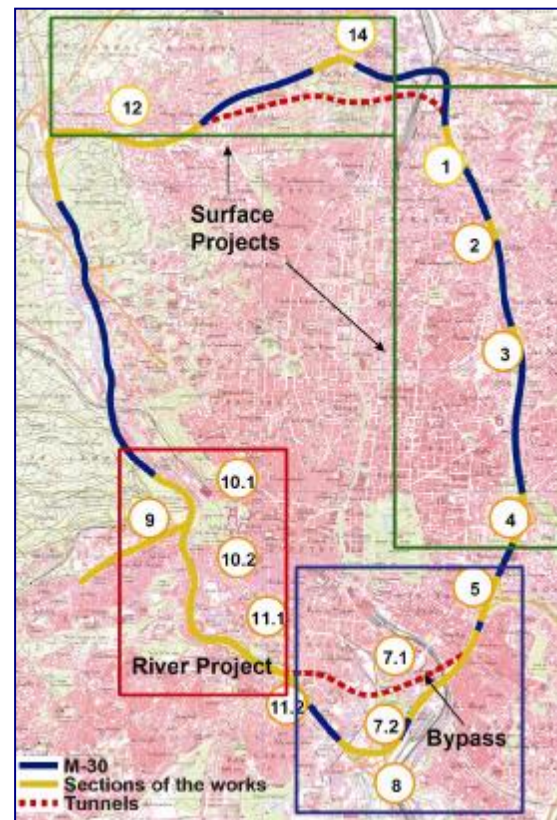
During discussions, it was pointed out that in 1996 Regional Government of Madrid decided to build the infrastructure and called for tenders from private companies to design, build and operate the lines for a period of 30 years and a contract was awarded and the following shareholders were adopted.

- 42.5% for the operating company, Metro de Madrid.
- 32.5% for the construction companies.
- 25.0% for the financing institution.

It was further informed that concession holders received incomes from direct proceeds from ticket sales and public subsidies earned on pre-passenger basis which is calculated by multiplying the average rate per passengers by the total daily number of passengers who use the service to a ceiling equal to the maximum number of journeys estimated by the concessionary for each year of the contract. The project was successfully completed in less than three years it became operational in 1999.

Madrid Calle 30

The financial structure of the Madrid Calle 30 or M-30 ring road project was discussed. The objective of the project was for remodeling of the roads and the area occupied by M-30 ring road includes road surface refurbishment, reroute measure sections through tunnel under the city areas and allow the surface areas to be redeveloped into green parks areas. The expected benefits were fall in accident rate by 45%, reduction of fuel consumption, saving of travel time and reduction of green house gas emissions. The project was to be implemented through PPP. Initially Madrid Calle 30 SA was a 100% public company later it was transformed into a public/private economy. The financial sources envisaged 80% debt and 20% owned resources. The share of Madrid Council envisaged was 80% and private partner 20%. The term is 30 years with a grace period of 5 and average loan life 24 years. The Madrid Calle 30 is responsible for operation and management of M-30 Ring Road.



M-30 Ring Road

Travel Pass



The Madrid region is divided into six fare zones with the outer zones successively incorporating the inner zones. To facilitate smooth and quick mobility, a travel pass is operational which is a multi-modal travel ticket for use on all public transport modes i.e., buses, metro, sub-urban railway within a specified zone for a period of a month or a year. Three types of monthly travel passes i.e., Standard Pass for users aged 21-64, Youth Pass for the under-21s (valid until June of the year in which the user turns 21) and Elderly Pass for the over-65s. These travel passes are highly popular that a total of 14.4 million travel passes were purchased in 2006 and the sale of travel pass has increased

11.3% of the total ticket sale from 1987 to 64.2% in 2006. Tourist pass has also been introduced in 2004 which offers unrestricted travel of 1, 2, 3, 5 or 7 days of tour area i.e., Madrid city and the region of Madrid.

Multi-modal Inter-change terminals

In 1986, first steps were taken to restructure to terminal to reduce the transfer's distances between the different modes of transport (city bus routes, suburban bus routes, metro lines and railway network). Renovation gave an opportunity to provide attractive facilities and of introducing the concept of Inter-modal Transport Interchange.

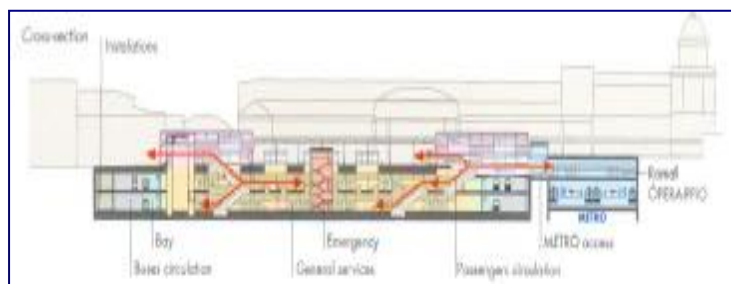


Principe Pio Inter-change Terminal

The Group visited Principe Pio one of the many inter-change terminals located in the Madrid city. It offers connection between all forms of public transport i.e., Metro, Sub-urban railways, city and sub-urban buses and was put into operation in 1995. A new underground inter-change was constructed under the station courtyard in order to house the sub-urban bus companies A-5 corridor. It has made significant improvement in the day-to-day lives of over 60,000 travellers for the everyday users of sub-urban buses and metro. The new inter-change terminal spread over an area of 25 hectares is built on two levels and each level has 14 bus platforms around a central waiting areas. On the first level there is connection with the metro and bus access and the access to the second level of inter change terminal is made through a tunnel that connects with the M-30, the internal orbital road of Madrid city for providing an easy and quick connection to the A-5 road, on the national highway.



Cross-section of Principe Pio ICT



Technology

The Regional Transport Consortium [CRTM] from time to time based on research, need, assessment and technical studies has developed and introduced new technology for strengthening and smooth functioning of the entire public transport networks in the Region.

Principe Pio Monitoring Station

Regional Transport Consortium has introduced Vehicle Scheduling Control System (VSCS) for the Madrid EMT and the Alcala de Henares bus networks which has increased service quality and improved operation control. The Smart Transport Ticketing (STT) project is being developed in some areas based on single or double interface micro processor.



The Regional Transport Consortium has implemented a programme designed to improve sub-urban bus facilities and information through improving the signaling and identification of bus stop providing services to users, improving comfort during

waiting periods etc. a new model of bus shelter has been installed since 1991. It is equipped with municipal transport map and an information panel containing bus time tabling and fares information.

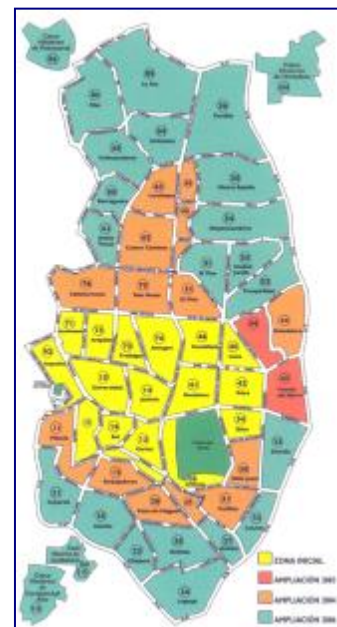
In all new inter-changes Public Transport Management Centre are incorporated to monitoring and coordinating all public transport modes.

The Madrid Regional Transport Consortium has also created a centre of excellence in these technological innovations in public transport. The Centre for Development and Compliance has technical and human resources at its disposal to allow testing of any new development before it is introduced to the network.

Policy on Private Vehicles

Madrid city has Servicio de Estacionamiento Regulado [SER] (Regulated Parking Service) Parking System in operation since 2002. Initially, it was for the city centre only which was later on extended and made operational to the entire city.

The Madrid city council policy on private vehicle has been to limit their movement in the centre of the city and promote the use of public transport. To implement these ideas, measures have been taken. Under it the first objective was to shift vehicles away from the city and secondly creation of resident priority zones by restricting traffic to the vehicles of local residents, public transport, emergency services and loading & unloading during specific hours. Further, the council has followed a policy of recovering green belt areas for pedestrians by restricting vehicle traffic through parks. By doing so, attempts are made to gradually recover the city, both the local residents as well as for the public in general to enable walk and enjoy in large areas of the city. The immediate outcome of this policy is reduction in the volume of traffic of 5% in the streets of the city centre.



Regulated parking zone [SER] Parking System

With SER system, around 1,65,958 parking spaces about 1.3 million residents are benefited. The rotation of vehicles accomplished under the system means that where previously one vehicle was parked, now three can be parked. The system operates from Monday to Friday (9.00 am-8.00 pm) and on Saturday (9.00 am – 3.00 pm).

NUMBER OF SER PARKING SPACES	
	Current total
Green spaces	144,259
Blue spaces	21,699
TOTAL spaces	165,958
Meters	4,369
Wardens	1,600
Surrounding population	1.3 million

REGULATED PARKING ZONE RATES (2007)						
User	Green spaces			Blue spaces		
	max. time	minimum rate	Hourly rate	max. time	minimum rate	Hourly rate
Residents	unlimited*	-	-	2 hrs	0.25 €/20 min	1 €/1 hr
Non-residents	1 hr	0.50 €/20 min	1.80 €/1 hr			

* max. 5 days in one space.
With a resident's permit, costing 24.60 euros/year in 2007

The Blue Zones are primarily for non-residents of the area, though they apply to all persons, even those who are residents of the area. The maximum time limit you can park in these zones is 2 hours. The

tariff ranges are (i) up to 20 minutes (minimum tariff): 0,25€ (ii) 30 minutes: 0,40€ (iii) 1 hour: 1,00€ (iv) 1 hour 30 min: 1,55€ and (v) 2 hours: 2,55€ The Green Zones are primarily

for residents of that specific zone, where a yearly pass can be purchased. The maximum time limit however for parking in concerned zone is 5 days in the same space. Visitors to the zone are only allowed to stay for a maximum period of 1 hour. For which tariff charges ranges: (i) up to 20 minutes (minimum tariff): 0,50€ (ii) 30 minutes: 0,90€ and 1 hour: 1,80€

Park and ride facility

Park and ride facilities constitute a key element in the model chain particularly among the residents of peripheral metropolitan area and suburbs which are mostly dependent on private transport. It acts as an interface between private vehicles and public transport. It was observed that a popularity of the private car as a mode of access to stations increases in direct proportion to distance from Madrid. A number of metro stations and other stations have the park and ride facilities. It was also pointed out that free park and ride facilities and small suburban regions in the Madrid are also being developed.

BUS- HOV System

Madrid has been implementing a high-occupancy vehicle (HOV) system of transport known as BUS-HOV System. This system promotes the use of public transport and encourages an increasing private vehicle occupation level. The BUS-HOV System has been implemented on the A-6 access road to Madrid. The lane consist of two sections in the first stage with a 12.3 km long has two reversible lanes for buses and high occupancy vehicles (towards the city in the morning and out of the city in the evening). The second stretch 3.8 km long is a single lane (also reversible) for the exclusive use of buses. These were introduced in 1995 and proved to be highly efficient. During the morning peak times 65% of the passengers – 38% in the vehicle terms entered Madrid via the BUS-HOV lane.



BUS-HOV Sections

b) Washington, USA

Overview of the city/region

Washington, the national capital of United States is coterminous with the District of Columbia which is abbreviated as D.C. and in general the city is called as Washington, D.C. The city covers an area of 177 sq. kms having a population of 5.82 lakhs in 2005 as per Census and estimates. Originally in 1790, the District of Columbia was carved out of two adjacent counties one each from Virginia [Alexandra county] and Maryland [county of Washington] where portion of each State organised as separate counties. Separately, a new city of Washington was also constructed around which were also a number of other communities and villages. In time, all of these communities were amalgamated to the city of Washington which thus came coterminous with District of Columbia and hence Washington County was abolished.





The Greater Washington metropolitan area, which initially planned in 'Diamond' shape measuring 16 km on each side consisting of an area of 259 sq. kms is now extended and is more than 500 sq. kms with a population of 58 lakhs in 2003. Similar to NCR, Greater Washington Metropolitan Area [WMA] contiguously spreads over three States and is an inter-state area with Washington its core city. The Washington Metropolitan Area, formally known as the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA, is a U.S. Metropolitan Statistical Area (MSA) as defined by the United States Office of Management and Budget (OMB) as of November 2004. It is also part of the larger Baltimore-Washington Metropolitan Area.

The WMA includes the District of Columbia/Washington, DC and parts of the States of Maryland, Virginia and West Virginia. The Washington Metropolitan Area includes the District of Columbia and parts of the states of Maryland, Virginia, and West Virginia. It is divided into two metropolitan divisions: (a) the Bethesda-Gaithersburg-Frederick, MD Metropolitan Division, consisting of Montgomery and Frederick counties and (b) the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division, comprising the majority of the metropolitan area. The Virginia portion of the area is also known as Northern Virginia. Due to a state constitutional change in 1871, all cities in Virginia are independent cities and they are not legally located in any county. The OMB considers these independent cities to be county-equivalents for the purpose of defining MSAs in Virginia. Each MSA is listed by its counties, then cities, each in alphabetical order, and not by size.

City & its Region



Road Network of the Region



Even in WMA, the road network is almost in radial pattern alike to NCR where major national roads radially merge to an orbital freeway road. In WMA, major inter-states runs through the area include I-495, I-66, I-95, I-395, I-295, and I-270. Inter-state 495, also known as the Capital Beltway, creates an artificial boundary for the inner suburbs of Washington. Almost completely circling Washington, D.C., it crosses a tiny portion of the District at its southern most point which is at the Woodrow Wilson Bridge. I-66 runs from the eastern edge of Georgetown, connects with the Beltway and continues through northern Virginia to I-81. I-295 comes up from the south starting at the eastern edge of the Woodrow Wilson Bridge on the Beltway and crosses the

Anacostia River into downtown, linking up with I-395 (also called the South-west-South-east Freeway), a major commuter route extending from New York Avenue to the Beltway and Inter-state 95 in Springfield, Virginia. The Anacostia Freeway (DC-295) splits from I-295 on the south side of the Anacostia and links with the Baltimore-Washington Parkway, which

eventually becomes Maryland State Highway 295, via a short section of Maryland State Highway 201.

City streets in the Washington, D.C. are organized primarily in a grid-like fashion with its origin or centre at the United States Capitol with diagonal streets running across this grid, as well as circles. The north-south roads are primarily named with numbers i.e., 1st Street, 2nd Street, etc., while the east-west roads are primarily named with letters i.e., A Street, B Street, etc. Among this network of streets, there are diagonal avenues or streets which are named after each of the 50 United States. Within this grid, all streets are a part of one of the four quadrants i.e., North-east (NE), North-west (NW), South-east (SE) & South-west (SW).

Public Transport Systems and their functioning & operation including financing

Washington has a number of different modes of transportation available for use. Commuters have a major influence on travel patterns, with only 28% of people employed in Washington, D.C. commuting from within the city, whereas 33.5% commute from the nearby Maryland suburbs, 22.7% from nearby Virginia suburbs, and the rest from Washington, D.C. outlying suburbs. Of those that work in Washington, D.C., 44.8% drive alone to work, 21.2% take Metro, 14.4% carpool, 8.8% use Metrobus, 4.5% walk to work, 2.7% travel by commuter rail, and 0.6% ride their bicycle to work. Approximately 35.4% of households in Washington, D.C. do not own a car and depends on public transportation.

The Washington area is served by the Washington Metropolitan Area Transit Authority, which operates the region's subway system, Metrorail (the nation's second-busiest after New York's subway), as well as Metrobus. The bus and rail systems serve both Washington and the immediate closest counties. A public-private partnership operates several DC Circulator bus routes downtown. It also has its own police agency, the Metro Transit Police. Many of the jurisdictions around the region run public buses that interconnect with the Metro-bus/Metro-rail system; the state of Maryland as well as private bus lines provide rush-hour commuter buses from more distant counties. Inter-city bus service is also available from the Greyhound Lines Terminal in Northeast D.C. and Chinatown.



Metro Network in the City

The Metro system is delivery intangible benefits to people throughout the region as well by giving millions of residents increased access to jobs, recreation, shopping and other activities that enrich their lives, the Metro adds to the quality of life for everyone and makes the region a more pleasant place in which to live and work.

Rail

Washington Metro

Washington Metro public transportation system is operated by the Washington Metropolitan Area Transit Authority. The Washington Metro connects with both commuter rail and inter-city rail systems at Union Station.



The System in total has 106.3 miles with 86 stations. Out of which, 50.5 miles is underground/sub-way having 47 stations, 46.31 miles on surface with 33 stations and 6 stations are there in 9.22 miles long aerial stretch. It has five lines – blue, green, orange, red and yellow. When two colors of trains serve the same track, the time between trains during rush hours is three minutes on the Green, Yellow, Blue and Orange lines. On the Red Line between Grosvenor-Strathmore and Silver Spring stations, the time is two and a half minutes. However, due to the high frequency of service, timetables for peak hours (weekdays 5 a.m.-9:30 a.m. and 3-7 p.m.) keep varying. All the stations and trains have facilities for access to people with disabilities also.

Currently, the Metro-rail is being extended to provide service to the Tysons Corner area of Virginia, with further extension to Dulles Airport. Phase I to Tysons Corner is expected to be completed in 2011. Phase II to Dulles is expected to be completed in 2015. No stations will be opened until the completion of each phase. This will add another color to the Metrorail system, silver. Drilling began in mid-2006. There are other rumors of a Georgetown Metrorail connector, an extension of the Green Line northward to BWI Airport, another line along I-395 or Columbia Pike in Virginia, and the Purple Line, which is a circular line to go along the Capital Beltway, particularly the portion between Bethesda and New Carrollton. While there has been much discussion about all of them, none is in any official planning stage. The Silver Line alone took more than ten years to start construction.



Navy Yard Metro Station

Metro has matured into the nation’s second largest rail system and fifth largest bus system. Metro has become woven into the region’s fabric of daily life, providing not only mobility but also economic vitality, environmental benefit and an enhanced quality of life to the millions of residents of the national capital region and in the process fulfilling its original vision. The Metro system and, in fact, the region it serves now finds itself at a crossroads in its development. Metro is the mode of choice to major special events including July 4 ceremonies, sports events, concerts, parades, festivals and historic celebrations such as presidential inaugurations. Indeed, Metro has become a national tourist attraction in its own right.

Commuter Rail Network in the Region - MARC



Commuter Rail

MARC provides service from Union Station to Baltimore and Perryville with intermediate stops on both the Camden and Penn Lines. MARC’s Brunswick line provides service between Martinsburg, West Virginia with intermediate stops, and Union Station. A new spur of the Brunswick line also goes to Frederick, Maryland. All three lines of Maryland’s MARC train system begin at Union Station in Washington where passengers can transfer to the DC Metro-rail’s Red Line; Metro-rail service is also provided to New Carrollton (Orange Line) and College Park-

University of Maryland and Greenbelt (Green Line) and Branch Avenue stations in Prince George’s County; and Silver Spring and Shady Grove stations in Montgomery County (Red Line). Virginia Railway Express [VRE] commuter trains provide service from Union Station to Fredericksburg and Manassas, Virginia.

VRE Network-Commuter Rail Lines



Amtrak [national rail system]

Amtrak provides service on the Northeast Corridor to Philadelphia, New York City and Boston, with the Acela Express, Metroliner, and Regional service. As well, the Vermonter provides service to Burlington, Vermont, via New York City. The Palmetto provides service to Florida, and the Crescent stops in Washington, D.C., enroute between New York City and New Orleans. The Capital Limited provides rail service between Washington, D.C. and Chicago. Connections to Amtrak are offered at Union Station in Washington, at New Carrollton Station in Prince George’s County, at Shady Grove in Montgomery County, and at King Street Station in Alexandria.

Amtrak also runs Auto Trains which has sleeping, dining, lounging and entertainment facilities on it. Auto Train does not offer checked baggage services, only overnight bag including medications is allowed and all other baggage are to be packed inside the vehicle. Passengers do not have access to their vehicles while on train. Passengers with automobiles (including vans) or motorcycles may travel on Auto Train.

Bus

Metro-bus

Metro-bus is a bus service operated by Metro, consisting of 176 bus lines serving 12,301 stops, including 3,133 bus shelters and nearly every Metro-rail station. In year 2006, Metro-bus provided 131 million trips about 39% of all Washington Metro trips. It serves areas of Washington, D.C. and the inner ring of suburban countries.

In addition to it, Maryland Department of Transportation and several other privately-operated companies provide bus service during weekday rush hours between D.C. and more distant countries such as Anne Arundel, Calvert, Charles, Frederick, Howard and St. Mary’s in Maryland; and Fredericksburg, Loudoun, Prince William, and Stafford in Virginia.

Student transportation

Several Metro-rail/metro-bus stations provide connection to Home Ride, a bus service which connects to Virginia Technology, Radford University, James Madison University and the University of Virginia to the northern Virginia area. It is best facility for the students on weekends to reach their destination.

Airport transportation

Metro-rail’s Yellow and Blue Lines serve Ronald Reagan Washington National Airport. Express bus service from L’Enfant Plaza, West Falls Church and Rosslyn is provided to Washington Dulles International Airport. Baltimore-Washington International Airport is

served by express bus from Greenbelt and by rail from Union Station by MARC and Amtrak, although MARC's service only runs Monday-Friday.

DC Circulator

DC Circulator is a downtown bus system which is provided by WMATA in public-private partnership. Under this system, there are three routes connecting points of interest in the city centre area.

Inter-city bus

The Union Station bus station is two blocks from Washington's Greyhound Lines station, which is also served by Peter Pan Bus Lines. A bus stop from the China town bus lines are near Gallery Place-China town and the Verizon Center. The Greenbelt Metro Station also has a bus line that commutes to the Baltimore-Washington International Thurgood Marshall Airport, which connects Metro to the Baltimore area's MTA buses and light rail system. MTA Commuter Bus also serves limited parts of Montgomery and Prince George's Counties in Maryland.

Other features

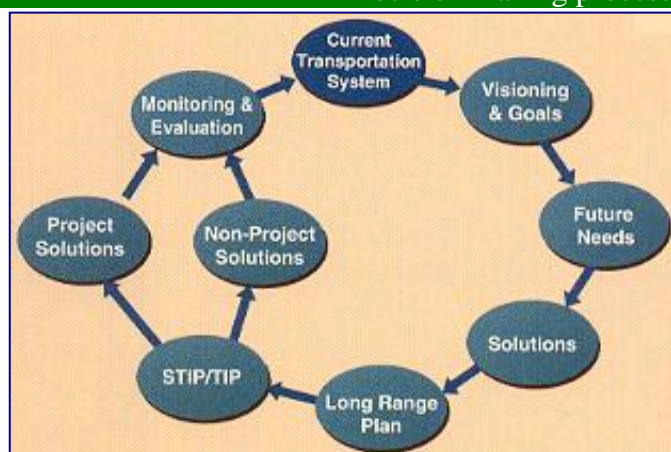
Transportation decisionmaking process in USA – in general

During the trip, the Group had discussions and shared views on public transport system with the officers of the Federal Agency of USA related to Transport Sector in specific to public/mass transport system i.e., Federal Transit Administration [FTA], US Department of Transportation. In general, the process of transportation from planning to its implementation was explained by the representatives. It was also mentioned that in order to have an efficient and effective transportation system, the organization has taken out a Guide book for the knowledge of the people and their response to improve the overall network. The information shared on decision making process regarding is transportation is detailed out below.

Transportation affects almost every aspects of a human life. Transportation planning is the process of identifying transportation problems and looking solutions to those problems. To have a transportation system that is safe, efficient and responsive to public needs and concerns about their communities and the natural environment the transportation decisionmaking process is plays an important role.

Decision making process

Prior to this, the region or State should have a Long-term Vision Plan. Vision Plan provides broad goals for what Region or State will look like and reflects what is important for the future. Development of Vision is based on several characteristics of a Region, State or Metropolitan areas and these characteristics changes over the next several years is also considered such as population growth; economic changes; current and future transportation needs [air, bicycle, bus, rail, roads, pedestrian and water]; safety; Maintenance, operation and management of transportation facilities; preserving the human and natural environment and Quality of life.



Some transportation plans focus strictly on transportation while others are more general where transportation is one part. State plan will also include regional, metropolitan and other local transportation plans. Transportation planning process is complicated as it needs to cover entire State and metropolitan systems.

In US, transportation decision-making is carried out by several governmental levels. Following are the agency involved and their responsibilities in the transportation decisionmaking process:

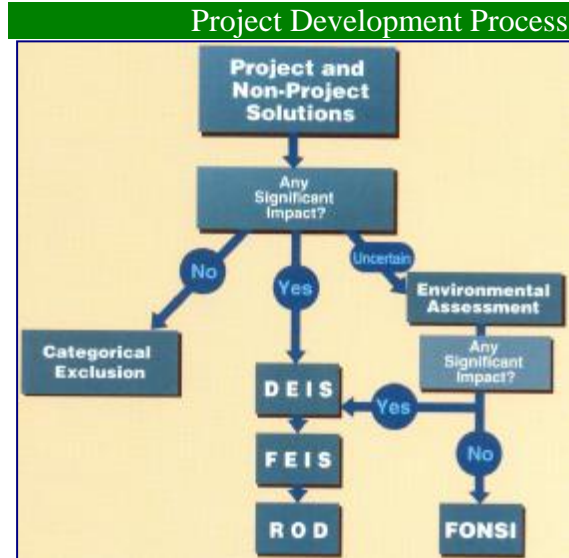
- Federal Government/US Department of Transportation [USDOT]: It is a federal government agency that funds, set policy for safety and provides other guidance for transportation by air, highways, rail, transit and water. It oversees the transportation planning and project activities of the MPOs and State DOTs as well as also supplies critical funding needed for transportation planning and projects. The two organisations namely, Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) are part of USDOT. At least every two years, the Federal Government approves a programme of projects submitted by State DOTs that includes projects proposed for Federal funds.
 - § FHWA administered the Federal-aid Highway Program, providing financial assistance to States to construct and improve highways, urban & rural roads and bridges. It also administers the federal Lands Highway Program that provides access to and within national forests, national parks, Indian reservations and other public lands. The FHWA headquarter is in Washington, DC and also has field offices across the country including one in each state.
 - § FTA is the principal source of Federal financing assistance to America's communities for the planning, development and improvement of public or mass transportation systems. It provides leadership, technical assistance and financial enhance mobility and accessibility to improve the Nation's communities and natural environment.
- State Departments of Transportation [DOTs]: These are the largest units of government that develop transportation plans and projects. They are responsible for setting the transportation goals for the State and also responsible for planning safe and efficient transportation between cities & towns.
- Metropolitan Planning Organisations [MPOs]: A MPO having 'council of governments' or 'regional planning commission' usually represents an area with a population of 50,000 or more. MPO's mission is to provide short and long-term solutions to transportation and transportation-related concerns. A Policy Board comprised of local elected official set MPO's policy, which may be influenced by non-profit organisations or community organisations or environmental organisations.
- Local governments: Involve in many transportation planning functions including scheduling improvements and maintenance for local streets and roads.
- Transit Agencies: These are both public and private organisations that provide public transportation that includes buses, subways, light rail, commuter rail, monorail, passenger ferryboats, trolleys, inclined railways and people movers.

Next step after transportation planning is project development. Project development is for individual projects ranging from small [new lane striping] to very large [new transit project or highway]. All the projects must go through the transportation planning process-appear in TIP or STIP, citizen involvement and approval by transportation officials. The project development process is critical as it links the planning process with actual project location, design and eventual construction.

Tri-jurisdictional Transit Authority

The Washington Metropolitan Area Transit Authority (WMATA) is a tri-jurisdictional government agency authorized by Congress, which operates transit service in the Washington, metropolitan area, including the Metro-rail and Metro-bus. WMATA is jointly funded by the District of Columbia, Virginia and Maryland. It was created in 1967 by inter-state compact through legislation passed by the District of Columbia, the State of Maryland, the Commonwealth of Virginia and the U.S. Congress “to plan, finance, construct and operate a comprehensive mass transportation system in the National Capital Region.”

WMATA broke ground for its train system in 1969. WMATA's bus system is a successor to four privately owned bus companies (DC Transit, the Washington, Virginia and Maryland Coach Company, the AB&W Transit Company, and the WMA Transit Company), which were sold to WMATA in 1973. WMATA is consisting of in total 12 board of directors where six are voting members, and six are alternates. Virginia, Maryland and the District each appoint two voting members and two alternate members. The position of board chairman rotates between the three jurisdictions. The board appoints a CEO and General Manager to supervise the day-to-day operation of the agency.



It has recently prepared the 10-Year Capital Improvement Program which addresses the region’s needs to adequately recapitalize the system and keep its assets in a state of good repair, to increase its rail and bus capacity to meet demand and serve new markets and to expand fixed-guideway service to portions of the region that are not adequately served by public transportation at present. It contains three separate programs—one to address each of these needs and the total projected cost for the entire 10-Year CIP is \$12.2 billion:

- § The Infrastructure Renewal Program (IRP) addresses the need to continue to maintain the physical plant in a state of good repair. This is done by replacing or upgrading all of the Metrorail and Metrobus physical assets according to normal replacement cycles as defined by industry standards. Without an adequate IRP budget to undertake these activities, the Metrorail and Metrobus systems would fall into a state of disrepair that would reduce service reliability and system safety and degrade the overall attractiveness of public transportation service. The IRP, with a projected 10-year cost of \$3.3 billion.
- § The System Access and Capacity Program (SAP) addresses the need to provide necessary bus and rail capacity and reduce crowding conditions while meeting future demand. The SAP’s projected 10-year cost is \$2.9 billion, which reflects only about 50 percent of the combined recommendations of the Core Capacity and Regional Bus studies.
- § The System Expansion Program (SEP) addresses the need to expand fixed-guideway transit systems to economically penetrate new markets and complement the existing Metrorail infrastructure. This program addresses the need for travel choices including light rail transit, trolley, and bus rapid transit, in addition to traditional heavy rail. An array of specific expansion projects totaling 114 miles is identified in the SEP. The initial phase of the expansion program, at a projected cost of \$6.0 billion.

The regional challenges has led to the development of this 10-Year Capital Improvement

Program [CIP] include the need to accommodate growing regional population and employment and the ridership demand the generate; the need to help address regional air quality issues; the need to continue and support the economic vitality of the \$240-billion-per-year regional economy; and the heightened need to ensure the security and safety of customers in the post-September 11 environment.

The CIP presents a new vision for improving mobility in the region. It is designed to support ridership growth of approximately 38% for Metrorail, 46% for Metrobus and 42% for the combined system. When the expansion program (SEP) is added, it supports a rail ridership growth of 87%. This is a vision that enhances traveler choices and system performance through improved management of assets and operation of the existing metro system. The new vision for Metro's future is of fully integrated regional system that brings high-quality, reliable service to parts of the metropolitan area where customers need access to transit.

The issue of funding is the crucial area where the region needs most to come together, especially during this challenging time of limited resources for all levels of government. The total cost of \$12.2 billion for the 10-year program represents several funding challenges. It is emphasized that the balanced program of improvements represents the minimum investment required in the region to meet basic recapitalization, market, and expansion demands. However, it is also recognized that such a program is beyond existing funding capabilities using traditional sources. Over the past three decades, WMATA has proven its role as a service provider to the federal government and as a national security asset. The system has fulfilled the mandate in its original charter to provide transit service "worthy of the nation's capital."

Currently, the federal government provides approximately \$150 million in capital funding under the federal surface transportation program. The District of Columbia, Maryland and Virginia make a combined capital contribution of more than \$90 million per year. This contribution exceeds the federal matching requirements by 40 percent. In addition to this capital contribution, the three major jurisdictions also combine to provide more than \$400 million per year in total operating assistance. This 10-Year CIP will allow WMATA to continue its crucial role in serving the residents of the national capital region for the foreseeable future. Metro-rail, Metro-bus and Metro Access para-transit services carry more than 1.1 million passenger trips per day, including 18% of all peak-period trips in the WMATA service area and 41% of all trips to the region's core.

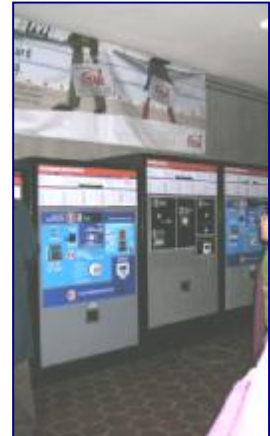
In an area that is struggling to meet federal emissions standards, Metro helps improve air quality by its very existence, removing 325,000 commuter trips per day from the region's roads and eliminating the need for some 1,400 lane-miles of highway construction. According to the American Public Transportation Association, Metro-rail and Metro-bus help keep approximately 1,400 tons of hydrocarbons, 9,000 tons of carbon monoxide, and 700 tons of nitrogen oxides out of the region's air. Metro riders save region about 5,800 barrels of oil, or 250,000 gallons of gasoline, per day by not operating their automobiles — an annual savings of 1.74 million barrels of oil.

The original investment of \$9 billion to build Metro-rail has produced a system that, if built today, would cost \$22 billion. Metro-rail supports economic development by providing tax revenues, development opportunities, and employment. Between 1994 and 2010 in Virginia alone, Metro-rail will generate an estimated \$2.1 billion in tax revenues and 91,000 permanent jobs and provide a 19 percent annual return on investment. Region-wide, Metro

has already generated more than \$15 billion in increased value at station sites, and the Urban Land Institute estimates the Metro-rail system will have contributed \$25 billion of commercial, office and retail growth by 2010. Metro supports a local economy with a gross regional product of \$240 billion, fourth highest in the United States.

Metro Fare Cards

Each passenger needs a farecard to enter and exit the Metro-Station. Children under age five may travel free with a paying customer. Fares are based on when and how far one ride. The regular fares are for 5-9.30am and 3-7pm on weekdays and 2-3am on Fridays and Saturday nights. For all other times including federal holidays* there are reduced fares. To buy these farecards in every station Farecards machines are installed, which are self operated. Senior citizens 65 & above and people with disabilities and customers with a Medicare card can ride for half the regular fare. On Metro-rail, use a senior/disable farecard or SmarTrip card.



SmartTrip Cards

SmarTrip is a permanent, rechargeable farecard used to pay for Metro-rail, Metro-bus and Metro parking which soon will be introduced on local bus systems also. A computer chip in the card keeps track of credit and debit amount. A SmarTrip card can hold up to \$300 so it can be used for long time before reloading. SmarTrip is the convenient plastic farecard that can be reloaded with value and used over and over to pay Metro-rail and Metro-bus fares and parking fees at Metro-operated lots. SmarTrip cards are sold from the small dispensing machines in the Metro-rail stations with parking and at the Metro Centre Sales and Service Centre.



Cards cost \$10 (\$5 for the card with \$5 in value already on it). SmarTrip machines accept major credit/debit cards and \$1, \$5 and \$10 bills only. Fare and parking values can be added to SmarTrip cards at Passes/Farecards machines. One can also buy a SmarTrip card online with a credit card of minimum amount of \$30 wherein \$25 is the value of the card.



Union Station – multi modal interchange station

Multi-modal Inter-change Station

The city also has a number of multi-modal inter-change stations to provide various modes of facilities at single point as well as in maintaining an efficient system operational. The Group visited the longest station of the city called Union Station. Union Station is the second busiest train station in the United States after New York’s Penn Station. It is the southern terminus of Amtrak’s Northeast Corridor service, and is served by MARC and Virginia Railway Express commuter trains.



Today Union Station is one of Washington’s busiest and best-known places, visited by 20 million people each year. The terminal is located at the southern end of the Northeast Corridor, an electrified rail line extending north through major cities including Baltimore,

Philadelphia, New York and Boston. The terminal is served by Amtrak, MARC and VRE commuter railroads, and the Washington Metro transit system of buses and subway trains.

Passenger services include Amtrak's high-speed Acela Express, Regional, the MARC and VRE commuter railways, linking Washington to Maryland and Virginia, respectively as well as the Washington Metro Red Line. From Union Station Amtrak also operates long-distance service to the southeast and midwest, including many intermediate stops to destinations like Chicago, Atlanta, New Orleans, and Miami.

It features an island platform with two exits, one mid-platform leading into the main part of the station and Massachusetts Avenue and the other at the northern end emptying onto 1st Street NE and to the main boarding concourse. The track area of the station is divided into upper and lower levels. On the Upper Level are tracks 7-20 which are used by MARC (weekdays) and Amtrak Acela Express as well as a few Amtrak Regional trains. The Lower Level consists of tracks 22-29 is used by all southbound service, including all VRE trains via a tunnel as well as some northbound Amtrak services during the week. The D.C. Metrorail Red Line station is located underground at the western side of the building and is the busiest station in the entire Metro system.

Service began in 1976 with the opening of the Red Line. It is the busiest station in the Metrorail system, averaging 33,000 passengers per weekday as of May 2006. Union Station is owned by the non-profit Union Station Redevelopment Corporation, but an 84-year lease of the property is held by New York-based Ashkenazy Acquisition Corporation and managed by Chicago-based Jones Lang LaSalle.

Paid Parking facilities

During the week through 3am Friday nights there is a daily parking fee at each station. A SmarTrip card with full parking fee is required to exit Metro lots and garages. Cash is not accepted. Daily parking fees vary by station and are posted at the parking entrance/exit and on web site.

Taxi/Cab operation on Zone System

Washington, DC cabs run on a zone system instead of using meters. By law, the basic rates must be posted in every cab. The base fare for one zone is \$5.50. There is a \$1.50 charge for each additional passenger in the party and a \$1 surcharge during morning (7am – 9.30am) and evening (4pm – 6.30pm) rush hours. There is a gas surcharge of \$1.50 per taxi ride. There is a radio dispatch service charge of \$2.

Car Pooling

In 2001, Metro initiated a relationship with Flexcar, a private company which operates car sharing networks in several North American cities a car pooling facilities. A competitor, Zipcar also began giving service in the region contemporaneously. With either of the service, cars are parked at major Metro-rail stations and other convenient locations in the metropolitan area and made available for rental on an hourly basis, with the goal of reducing car dependency and congestion, improving the environment, and increasing transit ridership.

Affordable Transit System

With bicycle-friendly streets, ample sidewalks and one of the safest, cleanest and most efficient public transportation systems in the country is in Washington, DC which is easy to navigate. Washington DC boasts one of the world's safest, cleanest and most affordable

public transit systems. Most hotels and attractions are located within few minutes walk of Metro-rail stop, while other attractions are serviced by Metro-bus. Base fare starts at \$1.25 (bus) and \$1.35 (rail); daily passes are available for \$3 (bus) and \$6.50 (rail). The new Circulator bus provides easy connections between George town, downtown, Union Station, the National Mall and the South-west Waterfront for just \$1 per ride.

b) Baltimore, USA

Overview of the city/region



Baltimore is an independent city and the largest city in the State of Maryland in the United States. Baltimore is in the north central part of the State of Maryland on the Patapsco River and about 60 km north-east of Washington DC. The city has a total area of 238.5 sq. kms and in 2007, the population of Baltimore City was 640,961.

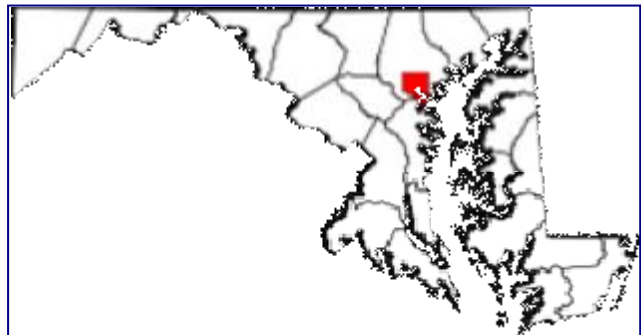


The city is a major U.S. seaport, situated closer to major Mid-western markets than any other major seaport on the East Coast. Once an industrial town with an economic base in manufacturing, Baltimore's economy has shifted primarily to a service sector-oriented.

Baltimore is an independent city — not part of any county. For most governmental purposes under Maryland law, Baltimore City is treated as a "county"-level entity.

The United States Census Bureau uses counties as the basic unit for presentation of statistical information in the United States, and treats Baltimore as a county equivalent for those purposes. Baltimore is officially divided into nine geographical regions: Northern, Northwestern, Northeastern, Western, Central, Eastern, Southern, Southwestern, and Southeastern, with each patrolled by a respective Baltimore Police Department district.

The Baltimore Metropolitan Area, which includes the city's surrounding suburbs, has approximately 2.6 million residents. Baltimore's metropolitan area is the 19th largest in the country. The Baltimore-Washington Metropolitan Area is a consolidated metropolitan area consisting of the overlapping the Region of the cities of Washington, D.C. and Baltimore, Maryland.



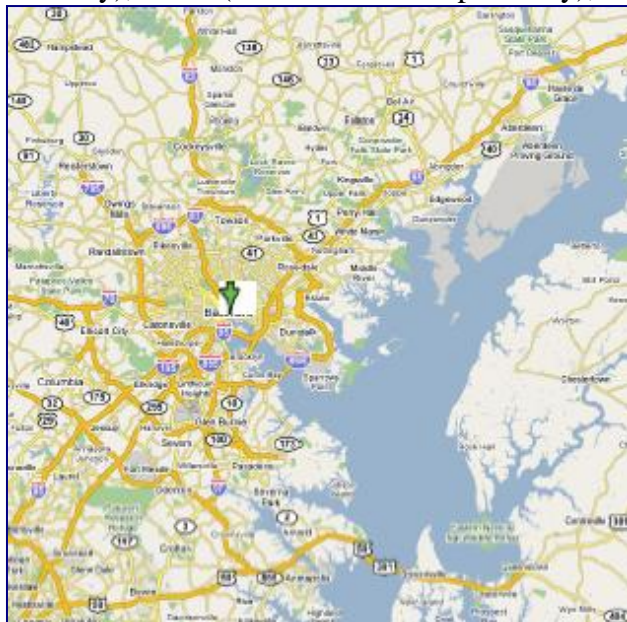
City & its Region

The Region includes Northern Virginia, Central Maryland, and two counties in the Eastern Panhandle of West Virginia. Officially, the area is designated by the U.S. Office of Management and Budget (OMB) as the Washington-Baltimore-Northern Virginia, DC-MD-VA-WV Combined Statistical Area (CSA). The CSA is composed primarily of two major

metropolitan areas, the Baltimore-Towson Metropolitan Statistical Area (MSA) and the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. The Baltimore-Washington Metropolitan Area is the 4th largest Combined Statistical Area in the United States, with an estimated population of 8,052,496. The most populated city in it is Baltimore and the most populated county is Fairfax County, at slightly more than 1 million.

The streets of Baltimore are organized in a grid pattern. The streets are lined with tens of thousands of brick and Formstone faced row houses. Top destination for Amtrak along the Northeast Corridor with Penn Station being one of the busiest in the country.

Like NCR/NCT-Delhi, Baltimore is served by 8 highways namely I-70, I-83 (the Jones Falls Expressway), I-95 (the John F. Kennedy Memorial Highway), I-395, I-695 (the Baltimore Beltway), I-795 (the Northwest Expressway), I-895 (the- Harbor Tunnel Thruway), and I-97.



Several of the city's inter-state highways e.g., I-95, I-83 and I-70 are not directly connected to each other.

Downtown Baltimore is connected to BWI airport by two major highways (I-95 and the Baltimore-Washington Parkway via Interstate 195) as well as the Baltimore Light Rail and Amtrak and MARC commuter rail service between Baltimore's Penn Station and BWI Rail Station. Martin State Airport is linked to downtown Baltimore by two major highways, namely I-95 and U.S. Route 40, and MARC commuter rail service between Baltimore's Penn Station and near to Martin State Airport.

Road Network of the Region

Public Transport Systems and their functioning & operation including financing

The Baltimore Metropolitan Area has a comprehensive public transport system in operation consisting of different modes of transport. The Maryland Transit Administration (MTA), better known as MTA Maryland is a State operated transit service. The Maryland Transit Administration [MTA] operates a comprehensive transit system throughout the Baltimore Metropolitan Area and a commuter bus service in other parts of the state.

The MTA was originally known as the Baltimore Metropolitan Transit Authority, then the Mass Transit Administration before it changed to its current name. The MTA took over the operations of the old Baltimore Transit Company on 1970. Mass transit in Baltimore and other cities shifted from a corporate operation to a tax-subsidized state-run service. MTA had Metro Sub-way opening in 1983 and the Light Rail in 1992.



MTA is the 11th largest property in USA serving over 2 million people in a 1800 sq.mile [00 sq. kms] area and operating and supporting accessible transit systems throughout the State of Maryland. MTA provides planning and financial assistance to transit properties serving all 23

Maryland counties and several cities. MTA offers a variety of transportation services ranging from Local Buses, Light Rail, Metro Sub-way, Commuter Buses, Commuter Trains and Mobility service. The MTA also has its own Police force. With nearly half of Baltimore residents lacking access to a car, the MTA is an important part of the regional transit.

The basic one way fare on MTA Local Buses, Light Rail and Metro Sub-way is \$1.60. A \$3.50 Day Pass allows unlimited daily travel on Local Buses, Light Rail and Metro Sub-way. There are reduced fares Passes of \$0.55 one way/\$1.20 Day Pass for seniors and individual with disabilities. MARC Train fares are based on distance. One way adult fare ranges from \$4.00 to \$14.00. In \$7.00 one can reach from Baltimore to Washington, DC. There are also special low rates for seniors ranging between \$2.00 to \$7.00. There is a special fare structure for disabled people and senior citizens with a special photo ID issued by the Maryland Transit Administration. The shuttle's fare system only applies to one-way trips. Daily, weekly, and monthly passes can be used as on other buses. People who qualify for paratransit services can use all MTA rail and bus services free of charge.



MTA operated Transit System

Baltimore is a top destination for Amtrak along the Northeast Corridor. Baltimore's Penn Station is one of the busiest in the country. In 2005, it ranked 8th in the United States with a total ridership of 910,523. Just outside the city, Baltimore/Washington International (BWI) Thurgood Marshall Airport Rail Station is another popular stop. Amtrak's Acela Express, Palmetto, Carolinian, Silver Star, Silver Meteor, Vermonter, Crescent, and Regional trains are the scheduled passenger train services that stop in the city. Additionally, MARC commuter rail service connects the city's two main inter-city rail stations, Camden Station and Penn Station, with Washington, D.C.'s Union Station as well as stops in between.

Bus

MTA Bus

MTA operates nearly 50 local Bus lines throughout the Baltimore area. MTA has 734 buses in its fleet including ten 'New Flyer' electric-diesel hybrid buses. With 51 core bus routes including the Mondawmin & Hampden Shuttles and 8,500 bus stops the service operates throughout the Baltimore Metropolitan Area i.e., Baltimore city, and Baltimore & Anne

Arundel counties. There are over 450 bus shelters and many Bus Lines connect with Light Rail, Metro Sub-way and MARC trains.

Local Buses are the backbone of the MTA due to their versatility. In an effort to modernize its bus fleet, approximately 235 new vehicles were purchased in 2004 and 2005. In 2006 the MTA began a purchase of hybrid diesel-electric buses. The first 10 of these energy-efficient and cleaner fuel vehicles are being tested in selected areas of the MTA service area. All buses in the current fleet are handicapped accessible.

Bus services operate throughout the Baltimore-Washington Metropolitan Area and other parts of the state. These include local bus lines (routes 1 through 98 and routes M-1 through M-17), which serve areas of Baltimore City, Baltimore County and Anne Arundel County.

Local bus lines consist of two types: regular bus lines, which are identified by a one or two digit number, and metro connection lines, which bear the letter "M" followed by a one or two digit number. The "M" lines, which are concentrated in the north-west part of the city and suburbs in the vicinity of the Metro Subway are designed to serve as feeder routes for the Metro system.

Commuter Bus Service

MTA Commuter Bus provides express weekday service connecting central, southern and western Maryland regions to Baltimore and Washington, DC. Commuter Bus service is provided from Harford, Washington, Frederick, Howard counties and Southern Maryland to the employment hubs in and around Washington and Baltimore. Commuter and express bus lines, which also operate within other parts of the state, include routes 120 through I-995.

There are more than 20 commuter bus routes in the Region which provide convenient connecting service from Baltimore to Washington, DC in the morning and return service in the afternoon/evening. The fare range from \$2.75 to \$6.50 for one way and Monthly Passes starts from \$93.50. Reduced fares of \$1.45-\$5.45 for one way are also available for seniors and individual with disabilities with MTA certified ID. A Commuter Transit Link Card (TLC) for an additional \$50 extends Monthly Pass Services to include unlimited travel WMATA Metro-rail and Metro-bus in the Washington, DC area.

Rail

Metro Sub-way system

Metro sub-way first began its service in Baltimore in November 1983. Within a span of 25 years the Metro subway completed rehabilitation and reconstruction of the escalators and elevators serving its fourteen stations. All Metro subway cars and stations are handicapped accessible.

This system operates elevated and underground from a corporate and shopping complex in Owings Mills in Baltimore County into the heart of Downtown Baltimore City's business, shopping and sightseeing districts to the world-renowned Johns Hopkins Medical Center Complex.

The line is 15.5 miles long having 14 stations in the total stretch with 7,375 parking spaces in 7 free station parking lots. The Metro Sub-way System operates at intervals of every 8 minutes during rush hour, 10 minutes during the day from 5 am to midnight and 15-20

minutes evenings, Saturdays and holidays from 6 am to midnight.

Light Rail System

Light Rail is a means of rapid transit in the Baltimore City area operating seven days at 10 to 30 minute intervals. It has stations at approximately every 1 mile. It may be mentioned that bicycles are permitted on Light rail and Metro Subway except for two hours.



Light rail at BWI station

MTA's 33 stops 29.5 miles Light Rail System serves the north-south corridor of the of Baltimore Metropolitan Area i.e., travels from a corporate, hotel, and shopping complex in Baltimore County's Hunt Valley, through the suburbs north of Baltimore and northern Baltimore City and into the heart of downtown Baltimore's shopping, sightseeing, dining, and entertainment districts, past the harbor and through southern Baltimore City and finally to BWI Marshall Airport and Cromwell Station/Glen Burnie in Anne Arundel County. There is also service to Amtrak's Baltimore Penn Station. There are two additional spurs to Amtrak's Penn Station in Baltimore and BWI Marshall Airport in Anne Arundel County. It offers 3,378 parking spaces in free parking lots.

Light Rail trains operate 10 minutes peak time & 15 minutes off peak hours between Timonium and Linthicum and 20/30 minutes between Hunt Valley & Timonium, Linthicum & BWI and Linthicum & Cromwell Station/Glen Burnie. Also every 11-19 minutes between University of Baltimore/Mt. Royal and Penn Station on the Shuttle Train. Hours of operation are 6 am to 11 pm from Monday to Friday and on Saturday from 7am to 11 pm while 11am to 7pm on Sundays & holidays.

Light Rail is critical to the operation of both stadiums in downtown Baltimore with approximately 12% of the fans using Light Rail. This equates to approximately 2000 fewer cars driving to Orioles games and almost 3000 fewer cars to Ravens games. Light Rail completed the double tracking of virtually the entire line in February 2006 creating a more efficient system. All Light Rail vehicles are handicapped accessible. All Light Rail stops have a ramped 'high block' permitting persons with disabilities to easily enter the rail car.



LRT System

MARC Train Service

The Commuter Rail (MARC Train) and Light Rail operate on separate tracks. MARC is primarily a commuter train operating weekdays only and at hourly intervals, with additional trains during peak rush hours. It has stations at approximately every 5 miles. MARC Train Service is operated under contract with the National Railroad Passenger Corporation (Amtrak) and CSX Transportation.

MARC Train Service operates Monday through Friday transporting commuters to and from work in both the commercial areas of Baltimore, Maryland and Washington, D.C. With weekly and monthly tickets, commuters can also ride the buses in Washington and Baltimore as well as the Metro Sub-way and Light Rail in Baltimore. This cross-ticketing encourages

the use of mass transit and has been well received by the riding public. Connectivity between the Light Rail and Commuter Rail (MARC Train System) in Baltimore is at two main terminus stations: Camden Yards on the Camden Line (Washington-Baltimore) and at Penn Station on the Penn Line (Washington-through Baltimore to Perryville).

MARC Train operates three lines, namely, Penn Line service from Perryville, MD (Cecil County) to Baltimore and Washington DC, Camden Lin service from Downtown Baltimore to Washington, DC and Brunswick Line service from Martinsburg, WV and Frederick, MD to Washington, DC. 200 miles long with 42 station MARC Train Service is the most convenient and affordable way to travel between Baltimore and Washington, DC. Every weekday 23 trains leave Amtrak's Penn Station (Baltimore) for Union Station (Washington, DC) and 9 trains leave MARC's Camden Station in Downtown (Baltimore) for Union Station (Washington, DC). The fare from Penn Station/Camden Station (Baltimore) to Union Station (Washington, DC) is only \$7.00 one way.

Other features

Hybrid Buses

MTA, Maryland to reduce the impact on environment from buses operated under it have introduction of hybrid-diesel-electric handicapped accessible buses recently in their local bus fleet for energy-efficiency and cleaner fuel vehicles as well as to reduce the pollution.



MTA Low Floor Hybrid Bus

Car sharing

Car sharing is an important feature in Baltimore which has been introduced in December 2001. Metro initiated a relationship with Flexcar, a private company which operates car sharing networks in several North American cities. With either service, cars are parked at major Metrorail stations and other convenient locations in the metropolitan area and made available for rental on an hourly basis, with the goal of reducing car dependency and congestion, improving the environment, and increasing transit rider ship.

Government owned Transit Authority

The Maryland Department of Transportation (MDOT) is a government agency in the U.S. state of Maryland. MDOT oversees organizations such as Maryland Transportation Authority, Maryland Transit Administration, Maryland Port Administration, State Highway Administration, Motor Vehicles Administration and Maryland Aviation Administration.

Maryland Transit Administration [MTA], Maryland a Government agency operates transit service in & around area of Washington DC-Baltimore Metropolitan area & Maryland including buses, LRT, Metro Subways. The Group had an opportunity to interact with various officers of the MTA, Maryland including the representatives of other transport agencies like MARC train etc as well as went on a Metro Sub-way ride.

In 1961, the Maryland General Assembly created the Metropolitan Transit Authority to regulate and coordinate the operations of the private transit companies operating in the greater Baltimore area. In 1964, Congress passed the Mass Transportation Act committing the federal government to aid State and local governments in rebuilding, rehabilitating and constructing new mass transit systems. In 2001, the State Legislature approved changing the

name to the Maryland Transit Administration emphasizing its statewide presence.

Financing is streamlined by using fewer federal funds and more local dollars. For the Metro sub-way 80% comes from the federal government. The Light Rail is financed using 70% state funding with the remaining 30% split between the local and federal governments. Today the MTA is the 11th largest transit property in America (based on unlinked passenger trips), serving over two million people in a 1,800 square mile area. The MTA has five divisions: bus, Metro Sub-way, Light Rail, MARC Train Service and Mobility. The MTA provides planning and financial assistance to transit properties serving all 23 Maryland counties and several cities.

In 1970 the MTA began acquiring the locally bus companies serving the greater Baltimore area. 1983 the new subway, now officially called the Metro began service from Charles Centre in Baltimore City northwest to Reisterstown Plaza. In May 1995 the final section of the 15.5 mile long Metro was completed to Johns Hopkins Hospital. In 1987 the governor proposed construction of a light rail system to run from Hunt Valley in the north, through Baltimore City to Glen Burnie in the south. In 2001, the Metro Sub-way began 7 day a week service, carrying almost 17,000 passengers on its first Sunday of service.

Fareboxes on Local Buses

All MTA Local Buses have been equipped with a new farebox from which magnetic Go Pass is issued. This magnetic Go Pass can also be used as a flash pass on Light Rail.

Fare collection methods

Prior to the summer of 2005, the MTA used an older fare collection system. Day passes purchased on buses were printed out by the bus fareboxes. It was possible to alter these passes so that they could be used on other days, and to sell them to other passengers, despite the fact that they were officially nontransferable. The MARC train service is preparing for the eventual integration with the regional SmarTrip smartcard-based fare system. The system will involve conductors using handheld units to validate SmarTrip cards as well as the MTA's Maryland Transit Pass.

The MTA has since installed new fareboxes on all of its buses that issue daily, weekly, and monthly passes with magnetic strips; new ticket vending machines at Light Rail and Metro Subway stations issue identical passes. The newer day passes can only be used on the appropriate day because the machine encodes the date and expiration time in the magnetic strip, which is read when swiped through the magnetic reader. Swiping the pass also sets a time limit on reuse so the pass cannot be immediately handed to a different passenger and used for free boarding.

Maryland Transit Pass

The MTA plans to begin selling smart cards under the name Maryland Transit Pass. These are similar to and compatible with Washington's smart card system, the SmarTrip card. When the Maryland Transit Pass system is fully implemented, it will be used not only on just Maryland Transit Administration transit services, but will also be able to be used in Washington D.C. on all WMATA

Easy Ticketing Facilities at LRT Station



buses, the Washington Metro and in Northern Virginia. Likewise, the WMATA SmarTrip card will be accepted by the fareboxes used by the MTA.

New Ticket Vending Machines (TVM) & Fare Gates at Metro Sub-way Stations

New 'Touch & Go' Ticket Centres and new faregates have been installed at many Metro Sub-way stations. From these vending machines once can conveniently purchase Single Trip, Day, Weekly and Monthly 'Go Passes'. Ticketing is non-barrier style, with passengers purchasing tickets from vending machines at each station platform before boarding the train.

Mobility Services

Mobility Services provides curb-to-curb service for individuals with disabilities unable to access regular-line MTA services. The MTA is constantly adding new vans, which are wheelchair accessible and sedans to its fleet. A popular new programme, Taxi Access has been added to the choice available to Mobility patrons. This allows individuals with disabilities to choose their own ride with a participating taxi or sedan company and book the ride directly on short notice if necessary.

MTA was among the first transit agencies to offer paratransit for persons with disabilities. This mobility service is a "non-fixed route" service and consists of fleet of specially converted Ford F-350's and Ford Crown Victorias. Some service is contracted out to MV Transportation and Veolia Transportation, but all vehicles are owned by MTA.

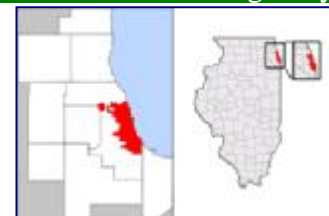
A sub-service of the Paratransit program is MTA's Taxi Access program, designed with technology made by a company called MJM Management. The Taxi Access program ensures that any sufficiently physically disabled person that consistently requires Paratransit service can also qualify for the Taxi Access program. The Taxi Access program allows the bearer of a Taxi Access card to take a taxicab door-to-door within the limits of anywhere MTA Paratransit vans go i.e., within 1/3 of a mile of an MTA public transit stop of any kind. Once the trip is complete, total out-of-pocket cost for the customer is \$3.00, and the MTA picks up the rest of the price of the fare, "paying" it to the driver in the form of a voucher that s/he later redeems at his/her cab company headquarters.

d) Chicago, USA

Overview of the city/region

Chicago, city in the State of Illinois is the largest in the Mid-west and third largest city in the United States. Chicago is a major transportation hub, as well as the business, financial, and cultural capital of the Mid-west. Chicago with a population of 28.16 lakhs spread over on area of 606.1 sq. kms bounded along the east by Lake Michigan on the west by Cicero Avenue, on the north by Howard St. and on the south by 138th Street. The city under the Chicago Park District consists of 552 parks with over 30 sq. kms of municipal parkland as well as beaches, museums, conservatories, historic lagoons and bird and wildlife gardens.

Location of Chicago city



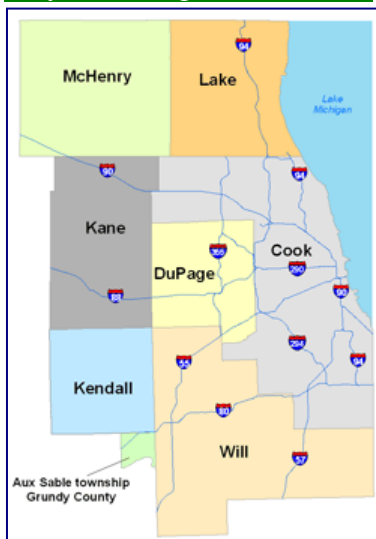
Chicago is partitioned into four main sections namely, Downtown (which contains the Loop), the North Side, the South Side, and the West Side. The Loop, is a portion of downtown

named for it's once having been located within a circuit of cable cars. The name reflects the elevated train Loop, which connects either directly or indirectly to every line in the CTA rapid transit system. Some of downtown's commercial, cultural, and financial institutions are located in the Loop.



Chicago has twenty-seven sister cities meaning like Chicago either being the second city of their country or are the main city of a country that has sent many immigrants to Chicago over the years. NCT-Delhi is also one of the sister cities of Chicago. The city began its step toward regional primacy as an important transportation hub between the eastern and western United States.

City & its Region - CMAP



The Chicago metropolitan area is the area that is closely linked to the city through social, economic, and cultural ties. The two most common definition Chicago Metropolitan Area is being (i) the area under the jurisdiction of the Chicago Metropolitan Agency for Planning the metropolitan planning organization and (ii) the area defined by the federal Office of Management and Budget (OMB) as the Chicago-Naperville-Joliet, IL-IN-WI Metropolitan Statistical Area (MSA).

The Chicago Metropolitan Agency for Planning (CMAP) responsible for transportation infrastructure, land use, and long term economic development planning for the areas under its jurisdiction covers seven counties in the State of Illinois Cook County, DuPage County, Kane County, Kendall County, Lake County, McHenry County and Will County.

The OMB also defines a slightly larger Region, the Combined Statistical Area (CSA), combining the metropolitan areas of Chicago, Michigan City (Indiana), and Kankakee (n Illinois). This area represents the extent of the labor market pool for the entire region. The combined statistical area, of which the Chicago metropolitan area is part, has a population of 9,725,317 in 2006.



The population of Chicago's metropolitan area, which covers several counties, contains about 95.06 lakhs people in Illinois, Wisconsin and Indiana making it the third largest metropolitan area in the USA. Chicago is classified as an alpha world city.

City & its Region - OMB

Chicago's streets primarily follow the grid system with major thoroughfares running on straight east-west and north-south routes established by the Chicago Board of Aldermen in 1908 and implemented on September 1909. All addresses are numbered outward from baselines at State Street, which runs North and South and Madison Street, which runs East and West. Street numbers begin at "1" at the base lines and ascend numerically to the city limits. Letters (N, S, E, or W) indicate directions. Each city block covers addresses in increments of approximately 100 and is about 1/8th of a mile. Every average block is assigned a new series of 100 numbers. Therefore, each 800 in numbers is one mile. The

blocks are normally counted out by “hundreds” and every four blocks i.e., half-mile is a major secondary street.

Nine inter-state highways run through Chicago and its suburbs. However, the various roadways are more typically known to Chicagoans not by their Interstate numbers but rather by various given names. The following roads are among the major highways leading into the city: Inter-state 90 (the Chicago Skyway) runs northwest from the state of Indiana towards Chicago. It joins Highway 94 at which point it becomes the Ryan Expressway and then the John F. Kennedy Expressway; Highway 55 (the Adlai E. Stevenson Expressway) leads into the city from the southwest; Inter-state 294 (the Tri-State Toll way) runs north-south about 25 kilometers (15 miles) west of Downtown and Highway 41 follows the lake shore and runs right through the city where it is known as Lake Shore Drive.

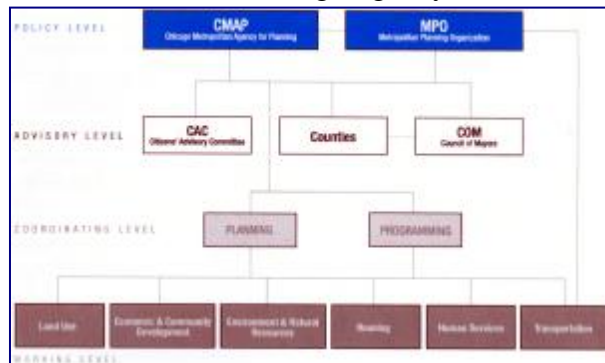
Public transportation is one of the easiest and most economical ways to get around in Chicago. In fact, downtown Chicago was nicknamed "the Loop" after the loop made by elevated trains encircling the area. The Chicago Transit Authority (CTA) operates a network of buses and elevated/subway trains throughout Chicago.



The Northeast Illinois where the focal city Chicago is located accommodates about 8 million people and projected to increase to 10 million by 2030. The Chicago Region having the third largest population in the United States following the Los Angeles and New York Regions. The Region has 272 municipalities of which it was informed that 82% of the Comprehensive Plans of the municipalities have been completed since 1980. The Northeastern Illinois Planning Commission (NIPC) has prepared a 2040 Regional Framework Plan to help guide local decision making. Similar to Regional Plan-2021 for NCR, the Regional Plan Framework 2040 provides the framework to guide regional development in accommodating growth while preserving valued assets, coordinate local land-use plans and regional-level decisions by facilitating greater inter-governmental cooperation and strengthen the link between land-use planning and investment in transportation and other infrastructure across the region.

The strategies for development align with a geography framework of Centres, Corridors and green areas to guide regional planning and growth through 2040. The Centres proposed are of different sizes from Metropolitan Centres to Hamlets. They are generally defined as compact, mixed use, livable, inclusive and economically vibrant places interconnected by multiple modes of transportation. The 2040 Plan defines a system of transportation corridors and supportive land uses meant to connect the region's centres and improve residents' quality of life by making it easier to get around our communities. From small parks and streams to large prairies and lakes, green areas are valuable, biodiversity resources that include agricultural land, open space, water resources and greenways. They can connect communities and provide for the health and well-being of citizens.

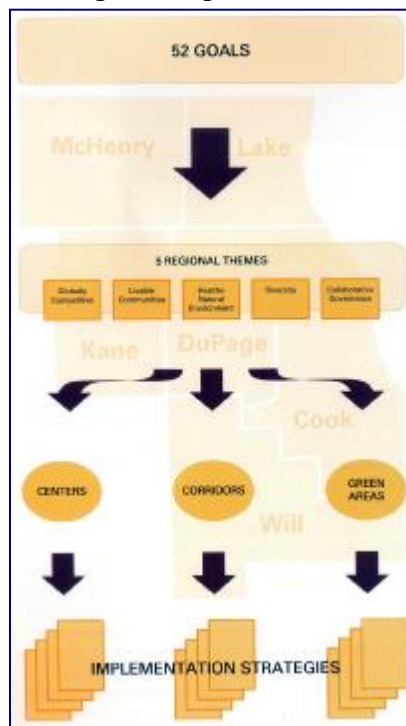
The Chicago Metropolitan Agency for Planning (CMAP) was formed in 2005 to approach planning in northeastern Illinois comprehensively and collaboratively. The agency and its partners are removing barriers to cooperation across geographical boundaries, and across subject's areas like land use, transportation, natural resources, and economic development. The North-eastern Illinois Planning Commission (NIPC) is the Planning Agency for six neighbouring Counties which form the greater



Chicago metropolitan area. The Regional Planning Act has merged the functions of CMAP and NIPC and created Regional Planning Board namely Board of CMAP to have a streamlined coordinated planning agency in order to Plan for the most effective public and private investments in the north eastern Illinois and to better integrate plans for land use and transportation.

Planning Process – Level of Interactions

State and federal laws require CMAP to produce by 2010 an integrated plan for land use and transportation. By going beyond these requirements to also address issues such as housing, economic development and human services by involving many partners throughout the process, CMAP prepared a Regional Comprehensive Plan that guides investments and development upto 2040 and beyond. The Regional Framework Plan 2040 provides a vision for meeting land use challenges in the most efficient coordinated and sustainable manner and envisaged this vision for growth with a framework of centres, corridors and green areas which is much similar to the Regional Plan vision for development of NCR.



The Regional Transportation Plan (RTP) which guides transportation planning and investment in the Region and the local initiative envisaged to fit within the Plan framework if federal funding is to be apportioned for them. It was stressed that all planning should strive for convergence and consistency in planning so the region has the capacity to embrace growth. Officers of the CMAP explained in detail to the Group about the entire planning process and also gave an overview of the intricacy involve and faced by the organisation while planning out for the Region. CMAP has to coordinate with more than 1400 local government which includes County, MPOs, Municipalities, general & special government and Special Districts such as green district, education district.

Priorities in Planning & Development of the Region

Public Transport Systems and their functioning & operation including financing

Chicago is a major transportation hub in the United States and is the third largest inter-modal port in the world after Hong Kong and Singapore. It is the only city in North America in which six Class I railroads converge. Chicago is one of the largest hubs of passenger rail

service in the nation.

Mass Transit in much of the Chicago metropolitan area is managed through the Regional Transportation Authority (RTA), which was constituted under Referendum in 1974. The RTA provides transportation services through the funding of three subordinate agencies: Chicago Transit Authority, Metra and Pace. The Chicago Transit Authority (CTA) handles public transportation in Chicago and a few adjacent suburbs. The Chicago Transit Authority (CTA) is an independent governmental agency created by state legislation. The CTA began operating on October 1947. In 1952, CTA became the sole operator of Chicago transit when it purchased the Chicago Motor Coach system.



Chicago is the region's economic Centre which holds 25% of the Region's manufacturing job and about 40% of the Region's business services employment. The CTA operates the nation's second largest public transportation system and covers the City of Chicago and 40 surrounding suburbs. On an average weekday 16 lakhs rides are taken on the CTA.

The Chicago Transit Authority or CTA, operates the second largest public transportation system in the United States (to New York's Metropolitan Transportation Authority) and covers the City of Chicago and 40 surrounding suburbs. The CTA operates 24 hours a day and, on an average weekday, 1.6 million rides are taken on the CTA. The transit system includes our 3800 buses and vans and 2300 train cars serving the Chicago and hundreds of suburbs spread across six countries.

Chicago offers a wide array of bicycle transportation facilities, such as miles of on-street bike lanes, 10,000 bike racks, and a state-of-the-art central bicycle commuter station in Millennium Park. The city has a 100-mile (160 km) on-street bicycle lane network that is maintained by the Chicago Department of Transportation Bike Program and the Chicagoland Bicycle Federation. Pedways Chicago has an underground system of pedestrian walkways that makes navigating the Windy City easier in inclement weather. At the far point under the Illinois Center at Michigan Avenue and the Michigan Avenue Bridge a network of walkways that lead to stores in the Loop area and the major train stations can be found. There is also an entrance elevator in loop buildings and subway stations.

Urban Transport



' System

Mass Transit [Chicago Transit Authority]

The Chicago Transit Authority (CTA) is an independent governmental agency created by state legislation. The CTA began operating after it acquired the properties of the Chicago Rapid Transit Company and the Chicago Surface Lines. CTA operates an extensive network of buses and a rapid transit system known locally as the "L" (for "elevated"), with several lines designated by colour and that also includes service to both Midway Airport and O'Hare Airport. The CTA's heavy rail transit lines consist of the Red, Blue, Green, Orange, Brown, Purple, Pink, and Yellow lines. Both the Red and Blue lines offer 24 hour service which makes Chicago one of the few cities in the world to offer 24 hour rail service.



CTA has approximately 2,000 buses that operate over 154 routes and 2,273 route miles. Buses provide about 1 million passenger trips a day and serve approximately 12,500 posted bus stops. CTA's 1,190 rapid transit cars operate over eight routes and 222 miles of track. CTA trains provide about 500,000 customer trips each day and serve 144 stations in Chicago, Evanston, Skokie, Wilmette, Rosemont, Forest Park, Oak Park and Cicero. Chicago is one of the few cities in the world that has rail service to two major airports. CTA's Blue Line 'L' can take customers to O'Hare International Airport. Orange Line trains, which operate clockwise on the Loop 'L' structure, travel to Midway Airport. Customers traveling from one airport to the other can change trains without paying an extra fare at the Clark/Lake station.

The full fare (bus and rail) is determined by the type of payment mode i.e., if Chicago Card and Chicago Card Plus where Full fare is \$1.75 & transfer for 25 cents and if Transit Card then Full Fare is \$1.75 & \$2.00 on buses & rail stations respectively with 25 cents for transfer. Transfers allow two additional rides within two hours after the first boarding. Chicago Card and Chicago Card Plus offer lower fares, quicker boarding, protected fares and a guaranteed bonus. Chicago Card and Chicago Card Plus customers get a \$2.00 bonus for each \$20 of value added. If paying in Cash the Full Fare is \$2 per ride on bus and rail but no transfers is issued. There are also Reduced Fare (bus and rail) which again is based on transaction mode i.e., cash or transit card.

CTA Bus Service



Commuter Rail [Metra]

Metra operates commuter rail service in Chicago and its suburbs. The Metra Electric Line is Chicago's oldest continuing commuter train (1856) and shares the railway with the South Shore Line operated by the Northwest Indiana Commuter Transit District ("NICTD"), which is a separate but analogous quasi-governmental entity from the RTA. The South Shore Line is an inter-urban railroad that operates between Chicago and South Bend (Indiana). Like the Metra Electric Line it also arrives and departs from Millennium Station.

The Northeastern Illinois Regional Commuter Railroad Corporation, under its trademark Metra, operates eleven commuter rail lines that serve more than 200 stations across the RTA's six-county service area. Unlike the 'L' lines, fare pricing is based on zones instead of a flat boarding fee. It operates 1,200 vehicles over 545.8 route miles, 1,189.4 miles of tracks and services over 100 communities in the 4,040 sq. miles of north-eastern Illinois Region. Metra, the commuter rail has 1200 miles and CTA has 290 miles tracks including 50 miles of elevated tracks and 24 miles of subway.

Rapid Transit System



In addition, although Metra is known for its speed and reliability it being mainly commuter rail service the frequent service is generally only provided during rush hours. Bicycles are permitted on all CTA and Metra trains during non-rush hours and on all buses 24 hours. The eleven lines connect into one of four different downtown stations which are (i) Union Pacific North, West, and Northwest arrive in the Richard B. Ogilvie Transportation Center; (ii) Milwaukee District North and West, North Central Service, Southwest Service, Burlington Northern, and Heritage Corridor converge

in Union Station; (iii) the Rock Island Line arrives in the LaSalle Street Station; and (iv) the Metra Electric arrives in Millennium Station.

Sub-urban Transport

Sub-urban Bus Transit [Pace]

Pace operates primarily sub-urban bus service that also offers some routes into Chicago. It Operates fixed-route, para-transit service and Dial-a-Ride service in six county of the Region excluding Kendall County and portion of Grundy County. 672 buses operate on 240 fixed routes and serve an area of 3,446 square miles in different counties.

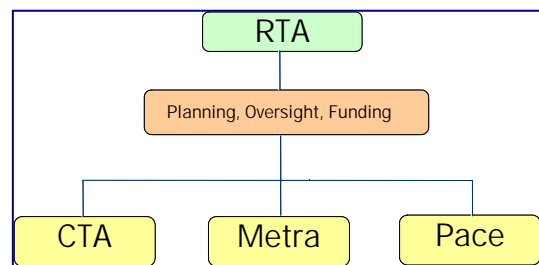


Sub-urban Bus Service by PACE

Other features

Autonomous agency - Regional Transportation Authority

Regional Transportation Authority was constituted under Act for planning, oversight and funding of transit service in Chicago Metropolitan Area through three subordinate agencies: CTA which provide Bus and Rail service in Chicago and adjoining suburban areas, Metra provides commuter rail service in the six counties of the Region and Pace provides bus service within suburbs, between suburbs and Chicago. The combined operations of RTA’S three Service Boards namely Chicago Transit Authority (CTA), Metra and Pace constitute the second largest system in USA. It covers nearly 3700 sq. miles with a population of more than 83 million. The RTA has 13 member Board, some of the members elected members and partly appointed members. The primary duties and responsibilities of RTA are following:



- § Review and approve balanced budgets and financial plans for each Service Board.
- § Receive/distribute state and federal operating funds.
- § Enforce fare box recovery ratio.
- § Review and approve consolidated capital plans.
- § Coordinate services in six-county area.
- § Mediate and arbitrate service disputes between SBs.

Unique Funding System ‘Generated (Farebox) Revenue Recovery Ratio’

RTA is required by statute to maintain a minimum 50% regional recovery ratio for entire system. The RTA Act requires the RTA Board to set a recovery ratio for each SB for the following FY. The combined revenue includes passenger revenue, reduced fare subsidy, other revenue such as advertising, charters, investment income and local government contributions and in-kind revenue such as CPD Transit Police service. Recovery ratio is the % of system operating costs covered by combined revenue. RTA has different sources of funding for operating and capital cost involved in development and operation of various which are as follows:

- a) Operating
 - § System generated revenue which includes fare and passes, advertising, concessions, charters, investments, and other revenue.
 - § RTA sales tax revenue which is currently 1% in Cook County and ¼ % in Collar

County.

§ Total State contribution that includes Public Transportation Funds (PTF), State financial assistance, reduced fare reimbursement, and State ADA funding.

§ Other revenue sources including sales tax interest, investment income, financial transportation receipts, and state and local technology grants.

§ New State funding 2007 budget includes “placeholder” for anticipated (but not guaranteed) new State funding.

b) Capital

§ Federal Transit Administration grants authorized through FY 2009 under Sections 5307, 5309 and 5340 of the Safe, Accountable, Flexible and Efficient Transportation Equity Act ‘A Legacy for Users (SAFETEA-LU)’.

§ State funding

§ Metra and RTA Transfer where some operations funds from the RTA system and from Metra have been reallocated to capital improvement projects.

§ CTA issues bonds to accelerate capital cost of the projects.

RTA Sales Tax is the primary source of revenue for the agency. The tax is authorized by Illinois statute that is imposed by the RTA in the six counties of the Region however it is collected by the State and is later on transferred to RTA. The RTA retains 15% of the total Sales Tax and distributes the remaining 85% to the Service Boards. The Public Transportation Fund (PTF) are based on a formula tied to Sales Tax results and are therefore projected to increased at the same growth rates as the Sales Tax. For every 4 dollars i.e., collected in the sales tax, the RTA receives an additional dollar in RTF. The estimated receipts as indicated in the 2008 budget will be about \$ 191.15 million. During the discussion, it was informed that a new legislation is in the pipeline which will have provisions for regional sales tax; real estate transfer tax in Chicago and additional State matching funds; Reforms the CTA pension and health care system; strengthens the financial management and planning authority of the agency; implements the recommendations of the Auditor General; and stems from an expectation that our system can be operated in a more effective, efficient and coordinated manner that will unable to generate an additional fund of \$500 million per year:

During discussions, it was informed that the RTA will begin offering free rides on fixed routes to senior aged 65 and over who live in the RTA Service Region. The free rides will be available on the all the facilities operated by CTA, Metra and Pace.

Park & Ride

For daily parking all the CTA Stations have Park & Ride lots. In this lots there is provision of long-term parking too. However, a limited number of Park & Ride spaces are available for reserved monthly parking for permit holders until 10 a.m. seven days per week. After 10 a.m. all unused reserved monthly parking spaces are available to the general public for parking. Effective from January 2006, the price and payment structure for reserved monthly parking permits is \$40 at the Park & Ride lot of your choice. The users with reserved monthly parking permits are required to pay the daily fee each time they park at the selected station. The daily fee is in addition to the \$40 monthly permit fee and there is also a \$4.95 for one time registration fee and a \$3.00 monthly administration fee.



Online Parking Space Information

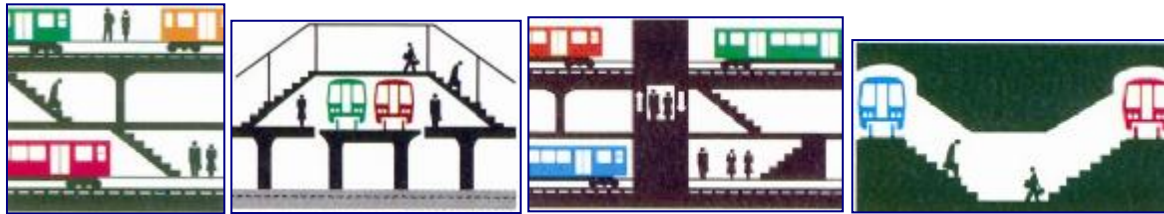
In Metra parking lots, there is also a provision on giving online information at entry points regarding availability of parking spaces.

Bike & Ride

Bicycles can be carried on CTA trains and also on bus bicycle racks. However, only two bicycles are allowed per train car or bus. About 80 stations have indoor or shelter bicycle parking. Bicycles are permitted on weekdays except from 7 am to 9 am & 4 pm to 6 pm and also on all weekends as well as holidays.

Free Downtown Connections

CTA also provides users for free connection between elevated and sub-way with no transfer extra or deduction through usage of Transit Card, Chicago Card, Chicago Card Plus or Passes.



Various free connections between varied Loop Elevated Lines including Sub-way

Chicago Cards

Chicago Card and Chicago Card Plus are two new fare cards that are accepted for full fare payment on all CTA rail & bus routes and Pace buses. Chicago Card uses a stored-value system and provides benefit such as lower fares where user have to only \$1.75 full fare and 25 cents transfer which other wise in cash is \$2.00 with non-availability of transfers as well as other benefits which includes fare bonus, quick boarding facility, fare protection.

Chicago card plus uses an online account-based system in which one can manage card to best suit your transit needs. The benefits of this cards includes option of multiple fare choices, online reloading, account management in addition to other benefits of Chicago cards as well.

Passes

Unlimited ride passes offer the best value for CTA riders. Full-fare passes are available in 1 day, 7 day and 30 day versions however these passes cannot be shared or recharged. The 30 day pass costs \$75 i.e., \$2.50 per day with unlimited rides for on CTA and most Pace routes, 7 day passes cost \$20 allowing unlimited rides on CTA buses and trains.

The CTA Reduced Fare 30 Day Pass is sold for \$35 to eligible reduced fare riders. The Full Fare Link-Up Pass is only available on Metra monthly ticket holders. U-Pass provides university students with unlimited CTA rides at all times. Visitor Passes offer most economical travel value with unlimited rides at \$5 for 1 Day Fun Pass and from \$9 to \$18 for 2 to 5 day Visitor Pass.

Real time information

System operating based on Transit Service Ratings - direct and frequent, direct with a transfer and circuitous, multiple transfers as well as providing real time information with improved signage & colour coding of the inter-agency through transit passenger information and options of online trip planner and coordination.

4. Institutional arrangement, Legal backing & Financing

Single Regional Transport Authority established for the Region is operating to assure the proper management of public transportation system in most of the towns/regions/countries visited during the Study Tour by both the Groups.

In Madrid-Spain, Madrid Regional Transport Consortium (CRTM) was founded by Madrid Regional Government under Law 5/1985 of 16th May just after two years of creation of Madrid Region. The Madrid Region was constituted in accordance with the Article 5 of the Spanish Constitution, which provides that the capital of the State shall be the City of Madrid, and in compliance with the provisions of Section 6 of the State of Autonomy of the Madrid Region, promulgated by Organic Act 3/1983, of 25 February, this title regulates the articulation of relations between State, regional and local institutions in the territorial area of the city of Madrid in those aspects connected with its status as capital.

Madrid Regional Transport Authority (CRTM) Madrid Regional Transport Authority (Consortio Regional de Transportes de Madrid) is an autonomous agency of the Regional Government, responsible for regular passenger public transport services to the inhabitants of the entire Madrid Region and its associated municipalities. The strategy of the Transport Authority is based on the three fundamental features – administrative integration, as unique authority for public transport, gathering former transport responsibilities of the region and of adhered municipalities; – fare integration, with the implementation of the travel pass (Abono de Transportes), which is presently used in more than 60 per cent of public transport journeys, and – modal integration, considering that different transport modes are complementary, being inter-modality a key issue.

The CRTM was created by law on 16 May 1985. Under the presidency of the Regional Minister for Public Works, Housing and Transportation, the CRTM Board of Directors includes representatives from the Regional Government, the City of Madrid and other municipalities, the National Government, transport operators associations, trade unions and consumers associations. The main functions of CRTM are:

- Planning of public transport infrastructures and coordination of all transport modes
- Establishment of an integrated fare system for the whole public transport network
- Creation of an overall image of the public transport system, where CRTM holds the external relationship with the users.

The total financial needs of the regional transport system in the 2001 budget were 1,017 million Euro, covered by the following way:

- 51.80 per cent (527 million Euro) obtained by fare incomes;
- 48.20 per cent (490 million Euro) subsidies from the different administrations as follows:
 - § Regional Government 48.44 per cent,
 - § National Government 30.68 per cent,
 - § Madrid City Government 20.20 per cent,
 - § other local Governments 0.67 per cent.

Evolution of Demand of Public Transport through a sustainable policy of investing to improve the quality and accessibility of public transport, the promotion of multimodal travel cards and multi-trip tickets and the construction of inter-modal transfer terminals, the Regional Transport Authority has increased the number of users of public transport by 49 per cent since the Authority creation in 1986 (see figure). Region of Madrid has the highest

public transport modal share for motorized trips compared with the main European metropolitan areas, according to data analysis made by European Metropolitan Transport Authorities (EMTA) from 1995 to 2000 in Madrid Region.

In US, the powers are given to the Federal Transit Administration under the US Department of Transportation at the National Level. US Congress established the legal authority to commence and continue FTA programs through authorizing legislation covering several years. On August 10, 2005, President Bush signed the Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU), reauthorizing surface transportation programs through fiscal year 2009. Each reauthorization amends the Federal Transit Laws codified in 49 USC Chapter 53. US Congress funds FTA's operations and programs through the annual appropriations process.

FTA develops issues and enforces regulations to govern the agency's financial assistance programs for public transportation. A major way FTA helps communities support public transportation is by issuing grants to eligible recipients for planning, vehicle purchases, facility construction, operations, and other purposes. FTA administers this financial assistance according to authorization, SAFETEA-LU, which was signed into law in August 2005.

SAFETEA-LU authorizes specific dollar amounts for each program. Each year Congress provides an annual appropriation which funds the programs specified in SAFETEA-LU. Upon receiving this appropriation, FTA apportions and allocates these funds according to formulas and earmarks. These FTA apportionments are published annually in the *Federal Register*.

FTA programs are typically identified by a name and/or a section number (of Title 49 of the United States Code) – for example, the "Elderly Persons and Persons with Disabilities" or "Section 5310" grant program. Each year Congress appropriates funds for each program and FTA awards grants to eligible recipients to meet the goals of that program.

Generally, FTA funds are available to designated recipients that must be public bodies (i.e. states, cities, towns, regional governments, transit authorities, etc.) with the legal authority to receive and dispense federal funds. The recipients of these grants are responsible for managing their projects in accordance with federal requirements. FTA conducts oversight reviews to ensure that these requirements are met. In addition to FTA's grant programs, there are other methods for funding public transportation.

The Department of Labor, Office of Labor-Management Standards, proposed revisions to existing procedures for processing grant applications under the Federal transit law to ensure timely certifications in a predictable manner, and remain consistent with the transit law's statutory objectives.

At the Regional Level, the public transit is governed by the Regional Transportation Authority Act for various Regions. In case of Chicago, it is governed by Regional Transportation Authority (70 ILCS 3615). The responsibility of operations, establishing service in fare level is allocated to Service Boards, each of which are controlled by boards appointed by elected officials whose constituents receive those services. The responsibility for the financial condition of the overall system is allocated to the Regional Transportation Authority (RTA) which is controlled by a Regional Board appointed by the same elected

officials. The RTA Act establishes that the purpose of the RTA is to “assure the proper management of public transportation and to receive and distribute State or federal operating assistance and to raise and distribute revenues for local operating assistance.” The 1983 amendments to the Act were intended to “reallocate responsibility for operating decisions” and have the RTA “provide financial review of the providers of public transportation in the metropolitan region and facilitate public transportation provided by the Service Boards”.

Taxing power: The RTA has three essential sources of power: (1) its power to tax and allocate operating dollars to the Service Boards (2) its power to issue bonds to fund capital projects of the Service Boards and to regulate the undertaking of capital projects by Service Boards regardless of the source of funding of the project, and (3) its power to approve Service Board budgets. The exercise of each of those powers requires a vote of nine directors, mandating consensus among regional interests. The RTA’s power to tax is limited to specific taxes. The RTA Act authorizes the RTA to impose, by a vote of nine of its directors, a series of taxes within the six country metropolitan region: a sales tax, a car rental tax, a motor fuel tax, an off-street parking tax, and a replacement vehicle tax, although there are limits on the combinations of these taxes that can be imposed at the same time.

Sales Tax: The regional sales tax is the principal source of RTA revenue. The Act also restricts the allocation of those revenues, creating entitlements in the Service Boards to percentages of the receipts from geographic areas within the region. 15% of the RTA tax proceeds and 100% of the state subsidy (a 25% match of the sales taxes collected) is allocated at the RTA’s discretion. The RTA is also limited in the amount of its revenues that can be spent on its administrative functions.

The Act authorizes the RTA to impose a retailers’ occupation tax (ROT), a service occupation tax (SOT) and a use tax (UT). The RTA has imposed these taxes at rates set by the Act since 1979. All of the RTA sales taxes are collected by the Illinois Department of Revenue under procedures that are largely identical to the corresponding State sales taxes. In calendar year 2005, the RTA is projected to receive approximately \$697 million in sales taxes.

The ROT is imposed on the gross receipts from the sale of tangible personal property at a rate of $\frac{3}{4}\%$ in Cook County (with a $\frac{1}{4}\%$ “replacement” from the State for a total of 1%) and $\frac{1}{4}\%$ in the collar countries. Except for the tax on food and drugs, the RTA tax base is identical to the State retailers’ occupation tax base. Consequently, when the State base is expanded or contracted by taxing or exempting receipts from specific transactions (e.g., the sale of computer software or rolling stock), the RTA tax base likewise expands or contracts. However, when the legislature exempted the sale of food and drugs from the State tax, the exemption was not extended to the RTA and other local government taxes. As a result the RTA tax on food and drugs is imposed at a rate of 1% throughout the six country area.

The SOT is imposed on the gross receipts from the sale of tangible personal property as an incident to the sale of a service. The tax rate is identical to the ROT. The tax base is identical the State service occupation tax base.

The UT is imposed on persons living in the six country area for the privilege of using a vehicle purchased outside the six country area that must be registered with the State. Unlike the State use tax, the RTA UT is limited to registered property, largely automobiles. The tax is imposed on the selling price of the property at the same rates as the ROT.

Car Rental Tax: The Act authorizes the RTA to impose an automobile renting occupation and use tax. This occupation tax, paralleling the State and local car rental taxes, may be imposed at a rate of 1% in Cook County and ¼% in the collar countries of the gross receipts from car rentals. The use tax may be imposed at the same rates on the privilege of using in the region a car rented outside, but titled in, Illinois. Any car leasing tax would be collected by the Illinois Department of Revenue.

This taxing power was added to the RTA Act in 1982, when the legislature imposed a state-wide car rental tax and authorized cities, countries and certain special districts that had the power to impose sales taxes to tax the car rental occupation. This taxing power has never been exercised by the RTA.

Motor Fuel Tax: The Act authorizes the RTA to impose a tax on retail sales and use of motor fuel at a rate of 5% of the gross receipts. The Act prohibits the RTA from imposing the motor fuel tax if it has imposed the broader sales taxes described above. This tax was imposed through 1979, then replaced by the sales tax.

Off-Street Parking Tax: The Act authorizes the RTA to impose a tax in unspecified amounts on the privilege of parking a motor vehicle in a public or private fee-charging lot in the six country area. Because the Act prohibits the imposition of this tax if the RTA has enacted sales taxes, it has never been imposed.

Replacement Vehicle Tax: The act authorizes the RTA to impose a \$50 tax on any passenger car purchased within the metropolitan area by an insurance company in settlement of a total loss claim of its insured. Any such tax would be collected by the State. This tax parallels a \$200 per vehicle tax imposed by the State u/s 5/3-2001 of the Illinois Vehicle Code that collected less than \$60,000 in State FY 03. The tax has never been imposed by the RTA.

Bonding power: The RTA has been given and has exercised substantial bonding power, with the majority of debt service expenses reimbursed by the State. The Act requires that any capital expenditure over \$250,000 by a Service Board be included in capital program adopted by the RTA.

Budget oversight: The oversight powers of the RTA over a Service Board's operations are not focused on service levels or equality, nor on fare structure or level, but on the overall financial condition of the system and each individual Service Board. Additionally, the Act charges the RTA with achieving the legislatively mandated balance between rider and taxpayers support for the transit system – at least 50% of the costs of operations must be funded with farebox revenues. The Act focuses the RTA on the financial solvency of the operating unit, the accuracy of its revenue and expense projections, and its achievement of its farebox recovery ratio.

Fare box revenues on average account for only 40 percent of system operating costs. Transit systems receive funds from the Federal, state, and local levels, and private sector sources, and it remains essentially a public service that is provided and managed locally. There has been an increase in the number of urbanized areas served by a single transit system. Regional transit authorities and transit organizations, decision making, and financing are becoming much more common. As transit plays a more important role in regional job access and congestion mitigation and in shaping development, this change in transit organization and governance is expected to accelerate.

Collectively, all levels of government provided \$21.0 billion for transit operations and capital improvements in 2000, with the Federal government contributing \$5.3 billion, and State and local governments contributing \$15.7 billion. Since 1991, the State and local share of total transit funding has remained around 75 percent.

Federal support for transit includes revenue from motor fuel taxes (from the Mass Transit Account of the Highway Trust Fund) and general fund appropriations. The amount of Federal motor fuel taxes dedicated for transit in the Mass Transit Account has totaled 2.86 cents per gallon since 1997. Sources of funds at the state and local levels include direct transit system taxing authority, property taxes, motor fuel taxes, tolls, sales taxes, income taxes, and a variety of other tax sources. In 2007, Federal funding for transit was nearly \$9 billion.

In U.K., the Transport and Works Act Orders Unit (TWAOU) processes and decides applications under the Transport and Works Act 1992 for powers to construct and operate railways, tramways and other guided transport schemes, and works which interfere with navigational rights.

The Transport for London (TfL) was created in 2000 as the integrated body responsible for the London's transport system. The main role of TfL, which is part of Greater London Authority, is to put up the Mayor of London's Transport Strategy into action and manage transport services across the Capital. It is responsible for operations of transport services with the help of several companies such as London Underground Limited, London Buses Limited, London Bus Services Limited, Victoria Coach Station Limited, London River Services Limited, Docklands Light Railway Limited, Transport Trading Limited, etc.

The main source of revenue is from fare box collection, property taxes, grants from Governments, etc.

The Île-de-France public transport executive STIF (Syndicat des transports d'Île-de-France), is the authority that controls the Paris public transport network and coordinates the different transport companies operating in Île-de-France, mainly the RATP, the SNCF and Optile. STIF was created in 1959 and, since 2005, is a public establishment. STIF coordinates RATP, SNCF Ile-de-France and the 90 Optile-affiliated transport operators. STIF has a real autonomy and is not dependent on the French Government.

In Frankfurt, Germany, the city's transit planning unit is *TraffiQ*, a Govt. agency and the commuter service is organised by several companies. The fare structure and distribution between the operators is organised by the *Rhein-Main-Verkehrsverbund*. Rapid transit is run by Deutsche Bahn, the national German railroad operator. Light rail and streetcars are run by the city owned Frankfurt Transit Company (*Verkehrsgesellschaft Frankfurt*). Buses are run by *Verkehrsgesellschaft Frankfurt*, *In Der City Bus*, *MainMobil Frankfurt*, *Alpina* and *Regionalverkehr Kurhessen*. It is proposed that instead of buses being operated by Frankfurt Transit Company, the routes could be split into different franchises for which any bus operator may tender to operate.

5. Transportation Systems

The Public Transport Systems in the Developed Countries visited are observed very efficient and people friendly. The most attractive feature is single ticketing for various systems. Public Transport Network is wide spread all over the city to serve all classes of society as well as have well connected with the sub-urban areas. The connection with sub-urban area is in such a way that its routes are either terminating in the heart of the city or cutting across the city so as to provide good accessibility and less interchange to the commuters of sub-urban areas. Following are the Public Transport Systems observed in the visited countries:

Urban Transport

Bus System

This is the back bone of the urban public transport due to its accessibility. It provides door to door services to the users. The buses are people friendly as they are low floor, air conditioned, without conductor and highly automated. Bus System is observed in all the cities.



Bus System in London



Bus System in Frankfurt

Bus Rapid Transit System BRTS

Bus Rapid Transit System (BRTS) is observed in most of the city network wherever right of way is available. Due to lack of road space, few routes are discontinuous but wherever road space is sufficient it is operating successfully, even discontinuous routes are also running successfully. BRTS is observed in London, Paris and Frankfurt.

Tram

Tram is a low speed rail based public transport system. It is observed in Paris and Frankfurt (T).



BRTS in Paris



Tram in Frankfurt (T)

Light Rail Transit (LRT)

Light Rail Transit System is the system in between Bus system and Metro System. Its carrying capacity is more than Bus system but less than Metro System. This is observed in Bostan, London (DLR). In London, it runs without driver.



LRT in London (DLR)



Metro in London

Metro

It is the highest order public transport system, which can carry maximum number of passengers in peak hour peak direction. In the metro cities, this system is almost essential for the sustenance of public transport system. In all the visited cities, its network is found very comprehensive and accessible to the users. This is observed in New York, New Jersey, Bostan, London (Underground/ Tube), Paris, and Frankfurt. In most of the cities it is underground, at few stretches only it at-grade also. Now elevated Metro system is in planning stage in London.



Metro in Paris



Metro in London: Underground/Tube

Sub-urban System

Bus System

Sub-urban bus system is observed in all the visited cities.

Rail System/Commuter Rail

In all the visited cities, it is observed that their rail based sub-urban system is effective and efficient. Its network coverage is also high. To avoid interchanges this system is either coming to heart of the city or crossing the city. In London it is known as National Rail, in Paris it is known as RER and in Frankfurt it is known as 'S'.



Sub-Urban System in Paris: RER



Sub-Urban System in Frankfurt

Water Transport System

Ferry

The European cities are located along the river and they have exploited the river very effectively. This system is predominantly used for Tourism purpose in London, Paris and Frankfurt.



Ferry in Paris



Ferry in Frankfurt

6. Observations & Recommendations

During the visit to various multi-modal transportation network operational in the countries/towns visited by both the Groups following was observed:

- (i) All the public transportation system in a Region are being operated through single agency under their respective Acts within their own legislative framework.
- (ii) It is not necessary that the transportation systems are operated under public sector. It is possible to run system under various operators on different lines or modes depending upon the bidding cost of any company. These companies operate under single regulator/public body under Local Government. Therefore the operation & maintenance of public transport system by private operators is through contracts.
- (iii) All these systems operate under farebox system where fare goes to the single agency i.e. Government/regulator. In U.S. atleast 50% of the operational cost is to be collected through farebox system and remaining 50% is shared between State Governemnt and local Government equally. All the capital cost including depreciation cost is bourne by the Central, State & Local Governments. In Spain/Madrid, the 70% of the operational cost is bourne by the Central/State/Local Governments and remaining 30% is collected from farebox system. The subsidies on operational cost varies from 30% to 70% in the countries visited by both the groups.
- (iv) The Regional Transit Authorities created in US have been empowered to impose Sale Tax, Car Rental Tax, Motor Fuel Tax, Off-Street Parking Tax, Replacement Vehicle Tax, etc. to mop up additional revenue for public transport.
- (v) Since different public transport systems are operational in the cities/regions, multi-modal inter-change stations have been provided which are handled by a single agency through coordination with private operators. These stations are provided with park & ride facility also.
- (vi) People prefer to have single mode travel or maximum one change. Accordingly, the systems are designed.
- (vii) In order to connect the Region, sub-urban rail systems are operational which bring the commuters right up to the heart of the city i.e. the terminate at the heart of the city or cut across the city. Bus Transit systems from the suburb also directly bring commuters to the multi-modal inter-change stations within the mother city. This reduces the number of change of modes.
- (viii) The systems used for public transport are Metro, Light Rail, Tram, Elevated Rail, Buses, High-capacity Buses, Ferry, Sub-urban Rail System, etc.
- (ix) In order to facilitate the commuters all the systems board/de-board passengers at multi-modal inter-change station.
- (x) Emphasis is given to reduce commuting time for travel of commuters. A table from US Census Bureau, Census 2000 provided in one of the booklets also indicates the same which is as follows:

Commute times by city and region				
<i>Travel time to work</i>	<i>Less than 30 minutes</i>	<i>30 to 59 minutes</i>	<i>60 to 90 minutes</i>	<i>90 minutes or more</i>
New York city	34.54%	41.00%	17.27%	7.19%
New York region	48.97%	32.64%	12.30%	6.09%
Los Angeles city	54.47%	34.96%	7.14%	3.43%
Los Angeles region	57.32%	31.53%	7.44%	3.71%
Chicago city	41.09%	42.95%	11.48%	4.48%
Chicago region	51.59%	35.23%	9.68%	3.50%
Philadelphia city	49.42%	37.91%	8.48%	4.19%
Philadelphia region	59.32%	31.20%	6.55%	2.93%
Dallas city	59.97%	33.21%	4.35%	2.47%
Dallas region	58.29%	33.91%	5.47%	2.33%

Source: U.S. Census Bureau, Census 2000

Based on the observations made during the Overseas Study Tour/Training by both the Groups, following recommendations are made for the National Capital Region:

- (i) There should be a Single Authority for the operation of Public Transportation System for the National Capital Region, namely, “Regional Transit Authority for NCR” with a proper legal support. This can act as a regulator and should be authorised to collect fare through fare collection box and impose taxes through local bodies and State Governments based on some sharing formula.
- (ii) All the capital and depreciation cost should be borne by the Central & State Government.
- (iii) Operators could be in private sector to be appointed through open bidding process on long term basis for identified routes. In case, the system is rail-based, feeder bus services, etc. would also be required.
- (iv) Subsidies for operation & maintenance is required to be given by the Central/State Governments and Local Bodies.
- (v) The Single Transportation/Transit Authority proposed to be created for NCR should be empowered to impose Sale Tax, Car Rental Tax, Motor Fuel Tax, Off-Street Parking Tax, Replacement Vehicle Tax, etc. to mop up additional revenue for public transport.

The collection power could remain with the local body or State Government but a formula could be evolved for providing the share to Transport/Transit Authority.

- (vi) Sub-urban Transit System or Sub-urban Commuter Rail or Sub-urban Commuter Buses (inter-state commuter buses in case of NCR) need to be promoted depending upon the traffic volume and should come upto the heart of the city or cut across the city. The terminals/inter-change station should be well integrated with the existing metro stations/bus stations to develop appropriate multi-modal inter-change stations. This will encourage the commuters to shift from private mode to public mode. Efforts should be made to reduce the number of change in mode of travel.
- (vii) Emphasis should be given to reduce commuting time for travel of commuters from the Region. It should not be more than 40 minutes for atleast 50% of commuters coming from the Region to their work places. This could only be possible that all the sub-urban system proposed to be developed should be linked with the work places.
- (viii) Most of the towns visited had their own Intra-city Urban Transportation System integrated with Regional Transportation System. In the National Capital Region, there are 108 towns. As per Regional Plan-2021 for NCR, the number of towns under various Class categories (as per Census 2001) for various sub-regions is given below:

Urban Settlements in NCR (2001)

Urban Settlement /Sub-region	Class-I	Class-II	Class-III	Class-IV	Class-V	Class-VI	Total
	100,000 +	50,000-99,999	20,000-49,999	10,000-19,999	5,000-9,999	Below 5,000	
1	2	3	4	5	6	7	8
Haryana	8	0	7	13	6	1	35
Rajasthan	1	0	4	3	1	0	9
Uttar Pradesh	7	9	16	22	8	1	63
NCT-Delhi	1	0	0	0	0	0	1
NCR	17	9	27	38	15	2	108

Source: Regional Plan-2021

Regional Plan-2021 has proposed that for the towns with projected population of 5 lakhs and above for the year 2021 Intra-city Urban Transportation System (Mobility Plan) should be developed. These towns are Faridabad-Ballabhgarh Complex, Gurgaon-Manesar Complex, Ghaziabad-Loni Complex, Noida, Sonapat-Kundli Complex, Greater Noida, Meerut, Panipat and Rohtak.

The towns of Faridabad and Meerut are covered in JNNURM Scheme. Remaining towns should also plan for their public transportation system and it should be well integrated with the Sub-urban Transit Systems to facilitate the commuters to reach their work places anywhere in NCR. Development of Public Transportation Systems in these towns could be included in the UIDSMT Scheme of the Ministry.

- (ix) The Single Transit Authority for the National Capital Region could address to both Regional Transit System and Intra-City Urban Transportation Systems for various towns. It would be important to operate/regulate the whole system in NCR by a single regulator. This would make the integration between the Regional Level Public Transportation System and Town Level Public Transportation System easier.

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- I. Presentation on ‘Study Tour: Transportation Planning’ made to Secretary [UD], GoI on 3rd March 2008
- II. Act on Capital Status and Special Regime of Madrid
- III. Regional Transportation Authority Act [70ICLS 3615] - Chicago

Presentation on ‘Study Tour: Transportation Planning’ made to Secretary [UD], GoI on 3rd March 2008

Act on Capital Status and Special Regime of Madrid

**Regional Transportation Authority Act [70ICLS
3615] - Chicago**